



Australian Government

MAR13 Maritime Training Package

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MAR13 Maritime Training Package

Modification History

The version details of this endorsed Training Package and its predecessor are in the table below. The latest information is at the top of the table.

Version	Release Date	Comments
1.0	8 June 2013	Primary release. MAR13 Maritime Training Package supersedes TDM07 Maritime Training Package.

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Preliminary Information

Important Note to Users

Training Packages are not static documents; they are amended periodically to reflect the latest industry practices and are version controlled. It is essential that the latest version is always used.

Check the version number before commencing training or assessment

This Training Package is Version 1 – check whether this is the latest version by going to the National Training Information Service (www.ntis.gov.au) and locating information about the Training Package. Alternatively, contact Transport & Logistics Industry Skills Council (www.tlisc.org.au) to confirm the latest version number.

Explanation of version number conventions

The primary release Training Package is Version 1. When changes are made to a Training Package, sometimes the version number is changed and sometimes it is not, depending on the extent of the change. When a Training Package is reviewed it is considered to be a new Training Package for the purposes of version control, and is Version 1.0. Do not confuse the version number with the Training Package's national code (which remains the same during its period of endorsement).

Explanation of the review date

The review date (shown on the title page and in the footer of each page) indicates when the Training Package is expected to be reviewed in the light of changes such as changing technologies and circumstances. The review date is not an expiry date. Endorsed Training Packages and their components remain current until they are reviewed or replaced.

Summary of AQF qualifications in MAR13 Maritime Training Package

Code	Title
MAR10113	Certificate I in Maritime Operations (General Purpose Hand)
MAR10213	Certificate I in Maritime Operations (Linesperson)
MAR20113	Certificate II in Maritime Operations (Coxswain)
MAR20213	Certificate II in Maritime Operations (Marine Engine Driver Grade 3)
MAR30113	Certificate III in Maritime Operations (Integrated Rating)
MAR30213	Certificate III in Maritime Operations (Marine Engine Driver Grade 2)
MAR30313	Certificate III in Maritime Operations (Marine Engine Driver Steam)
MAR30413	Certificate III in Maritime Operations (Master up to 24 metres)
MAR30513	Certificate III in Maritime Operations (Master Inland Waters)
MAR30613	Certificate III in Maritime Operations (Marine Surveying)
MAR30713	Certificate III in Maritime Operations (Marine Cookery)
MAR40113	Certificate IV in Maritime Operations (Chief Integrated Rating)
MAR40213	Certificate IV in Maritime Operations (Marine Engine Driver Grade 1)
MAR40313	Certificate IV in Maritime Operations (Master up to 35 metres)
MAR40413	Certificate IV in Maritime Operations (Marine Surveying)
MAR50113	Diploma of Maritime Operations (Marine Engineering Class 3)
MAR50213	Diploma of Maritime Operations (Engineer Watchkeeper)
MAR50313	Diploma of Maritime Operations (Watchkeeper Deck)
MAR50413	Diploma of Maritime Operations (Master up to 500 GT or Master 80 metres)
MAR50513	Diploma of Maritime Operations (Marine Surveying)
MAR60113	Advanced Diploma of Maritime Operations (Marine Engineering Class 2)
MAR60213	Advanced Diploma of Maritime Operations (Master Unlimited)

MAR60313	Advanced Diploma of Maritime Operations (Marine Engineering Class 1)
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AQF qualifications and Skill Sets by stream in MAR13 Maritime Training Package

The table below provides qualifications and Skill Sets in the MAR13 Maritime Training Package by stream.

Safety	MARSS00002 Safety Training Certification Skill Set MARSS00003 Shipboard Safety Skill Set
General Purpose Hand	MAR10113 Certificate I in Maritime Operations (General Purpose Hand)
Linesperson	MAR10213 Certificate I in Maritime Operations (Linesperson)
Coxswain	MAR20113 Certificate II in Maritime Operations (Coxswain) MARSS00001 Coxswain Grade 1 and Grade 2 Skill Set
Marine Cookery	MAR30713 Certificate III in Maritime Operations (Marine Cookery)
Marine Engine Driver	MAR20213 Certificate II in Maritime Operations (Marine Engine Driver Grade 3) MAR30213 Certificate III in Maritime Operations (Marine Engine Driver Grade 2) MAR30313 Certificate III in Maritime Operations (Marine Engine Driver Steam) MAR40213 Certificate IV in Maritime Operations (Marine Engine Driver Grade 1)
Marine Engineering	MAR50113 Diploma of Maritime Operations (Marine Engineering Class 3) MAR50213 Diploma of Maritime Operations (Engineer Watchkeeper) MAR60113 Advanced Diploma of Maritime Operations (Marine Engineering Class 2) MAR60313 Advanced Diploma of Maritime Operations (Marine Engineering Class 1)
Integrated Rating	MAR30113 Certificate III in Maritime Operations (Integrated Rating) MAR40113 Certificate IV in Maritime Operations (Chief Integrated Rating)

Marine Surveying	MAR30613 Certificate III in Maritime Operations (Marine Surveying) MAR40413 Certificate IV in Maritime Operations (Marine Surveying) MAR50513 Diploma of Maritime Operations (Marine Surveying)
Vessel Master	MAR30513 Certificate III in Maritime Operations (Master Inland Waters) MAR30413 Certificate III in Maritime Operations (Master up to 24 metres) MAR40313 Certificate IV in Maritime Operations (Master up to 35 metres) MAR50413 Diploma of Maritime Operations (Master up to 500 GT or Master 80 metres) MAR60213 Advanced Diploma of Maritime Operations (Master Unlimited)
Watchkeeper	MAR50313 Diploma of Maritime Operations (Watchkeeper Deck)

Units of competency by field in MAR13 Maritime Training Package

This is a complete list of units of competency in the MAR13 Maritime Training Package, listed under field.

Note that none of the units of competency in the MAR13 Maritime Training Package have pre-requisite requirements.

MARA Handling Cargo and Vessel Stability	
MARA3001A	Contribute to safe cargo operations on liquefied gas tankers
MARA3002A	Contribute to safe cargo operations on oil and chemical tankers
MARA4001A	Manage loading, discharging and stowage of cargo
MARA4002A	Manage vessel stability
MARA5001A	Maintain vessel stability
MARA5002A	Monitor loading, unloading and stowage of cargo
MARA6001A	Manage stability of a vessel 500 gross tonnage or more
MARB Equipment Checking and Maintenance	
MARB1001A	Assist with routine maintenance of a vessel

MARB2001A	Perform basic servicing and maintenance of main propulsion unit and auxiliary systems
MARB2002A	Service marine internal combustion engines, and propulsion and auxiliary systems
MARB3001A	Maintain firefighting appliances
MARB3002A	Perform routine engine maintenance on a vessel
MARB3003A	Perform routine maintenance and repairs on a vessel
MARB3004A	Perform routine maintenance on a vessel up to 24 metres
MARB3005A	Slip or dock a vessel and maintain hull on a vessel up to 80 metres
MARB3006A	Maintain marine internal combustion engines, propulsion plant and auxiliary systems
MARB3007A	Undertake basic maintenance of electrical systems
MARB4001A	Carry out basic welding, brazing, cutting and machining operations on a coastal vessel
MARB4002A	Implement vessel planned maintenance system
MARB4003A	Manage refuelling
MARB4004A	Manage stores for planned maintenance system
MARB4005A	Plan and supervise routine maintenance on a vessel up to 80 metres
MARB4006A	Undertake maintenance of 240 to 440 voltage alternating current electrical systems
MARB4007A	Undertake maintenance of machinery, machinery systems and structural components
MARB5001A	Maintain and repair marine electrical and electronic equipment
MARB5002A	Maintain and repair shipboard machinery and equipment
MARB6001A	Manage repairs and maintenance of a vessel 500 gross tonnage or more
MARC Equipment Operations	
MARC1001A	Carry out shore-based mooring and untying operations
MARC2001A	Complete engine room tasks

MARC2002A	Maintain hull out of water
MARC2003A	Operate and maintain extra low and low voltage electrical systems and equipment
MARC2004A	Operate deck machinery
MARC2005A	Operate inboard and outboard motors
MARC2006A	Operate main propulsion unit and auxiliary systems
MARC2007A	Operate marine internal combustion engines, and propulsion and auxiliary systems
MARC3001A	Manage fuel systems
MARC3002A	Operate and maintain a boiler
MARC3003A	Operate and maintain a steam engine up to 750 kW and steam auxiliary equipment
MARC3004A	Operate and maintain engines for auxiliary systems other than steam auxiliary systems
MARC3005A	Operate and monitor marine internal combustion engines, propulsion plant and auxiliary systems
MARC3006A	Operate deck machinery, cargo handling gear and equipment on a vessel
MARC3007A	Operate electrical systems
MARC3008A	Operate engine equipment and associated propulsion plant
MARC4001A	Manage a propulsion unit using appropriate engine systems and support services
MARC4002A	Monitor and manage vessel operations
MARC4003A	Operate auxiliary machinery systems up to 1500 kW
MARC4004A	Operate deck machinery and steering gear on a vessel up to 80 metres
MARC4005A	Operate marine internal combustion engines and associated systems up to 1500 kW
MARC4006A	Operate propulsion transmission systems up to 1500 kW
MARC4007A	Operate 240 to 440 voltage alternating current electrical systems

MARC5001A	Employ tools, equipment and materials in a shipboard context
MARD Administration and Human Resources	
MARD5001A	Manage business and administration on vessels limited by tonnage or near coastal operations
MARD5002A	Manage operations and maintenance on vessels limited by tonnage or near coastal operations
MARD6001A	Manage legal requirements of a vessel
MARE Communication	
MARE1001A	Communicate during shore-based mooring and untying operations
MARE5001A	Communicate effectively when performing engineering duties
MARF Operational Quality and Safety	
MARF1001A	Apply basic survival skills in the event of vessel abandonment
MARF1002A	Follow procedures to minimise and fight fires on board a vessel
MARF1003A	Follow vessel security procedures
MARF1004A	Follow work health and safety, and emergency procedures during shore-based mooring operations
MARF1005A	Meet work health and safety requirements
MARF1006A	Survive at sea using survival craft
MARF3001A	Assist in an emergency response
MARF3002A	Observe personal safety and social responsibility
MARF3003A	Operate emergency equipment and apply emergency procedures
MARF3004A	Operate survival craft and other lifesaving appliances
MARF3005A	Prevent and fight fires on board a vessel
MARF3006A	Survive at sea in the event of vessel abandonment
MARF3007A	Work safely in confined spaces on a vessel
MARF4001A	Manage firefighting and fire prevention activities on board a vessel

MARF5001A	Control safe access to and on vessel
MARF5002A	Provide medical first aid on board a vessel
MARF5003A	Respond to emergencies
MARF6001A	Coordinate search and rescue operations
MARF6002A	Manage provision of medical care on board a vessel
MARF6003A	Manage safety and security of vessel crew and passengers
MARG Teamwork	
MARG1001A	Work effectively as part of a crew on a vessel up to 80 metres
MARG4001A	Manage a small crew
MARG4002A	Manage an engine room and small engineering team
MARG4003A	Supervise a crew
MARG5001A	Provide leadership to crew
MARG6001A	Manage a vessel and its crew
MARH Navigation	
MARH2001A	Plan and navigate a passage for a vessel up to 12 metres
MARH3001A	Apply weather information when navigating inland waters as Master
MARH3002A	Manage and maintain a navigational watch on board vessels up to 80 metres
MARH3003A	Plan and navigate a passage for a vessel up to 80 metres
MARH3004A	Use wheelhouse equipment for safe navigation
MARH4001A	Forecast weather and oceanographic conditions
MARH5001A	Apply command navigation procedures on vessels limited by tonnage or near coastal operations
MARH5002A	Plan and conduct a passage
MARH5003A	Use an electronic chart display and information system to navigate safely

MARH5004A	Use bridge equipment to determine vessel position
MARH6001A	Forecast weather and oceanographic conditions to plan a safe passage
MARH6002A	Manage the navigation of a vessel 500 gross tonnage or more
MARI Regulations and Port Operations	
MARI2001A	Comply with regulations to ensure safe operation of a vessel up to 12 metres
MARI3001A	Observe regulations to ensure safe operation of a vessel up to 80 metres
MARJ Environment	
MARJ2001A	Follow environmental work practices
MARJ3001A	Monitor environmental management on a vessel
MARJ5001A	Ensure compliance with environmental management legislation
MARJ5002A	Inspect and report defects and damage to vessel
MARJ6001A	Manage compliance with environmental management legislation
MARK Manoeuvring Vessels	
MARK2001A	Handle a vessel up to 12 metres
MARK3001A	Manoeuvre a vessel up to 24 metres within near coastal waters
MARK3002A	Steer a vessel under direction of the Master
MARK4001A	Manoeuvre a vessel up to 80 metres
MARK5001A	Perform basic vessel manoeuvres
MARK6001A	Manoeuvre a vessel 500 gross tonnage or more
MARL Marine Engineering	
MARL4001A	Carry out engineering calculations
MARL5001A	Apply basic principles of marine electrotechnology
MARL5002A	Apply basic principles of marine engineering thermodynamics
MARL5003A	Apply basic principles of marine mechanics

MARL5004A	Apply basic principles of naval architecture
MARL5005A	Demonstrate basic knowledge of marine auxiliary boilers
MARL5006A	Demonstrate basic knowledge of marine auxiliary machinery and systems
MARL5007A	Demonstrate basic knowledge of marine control systems and automation
MARL5008A	Demonstrate basic knowledge of marine diesel engines and systems
MARL5009A	Demonstrate basic knowledge of marine electrical systems
MARL5010A	Demonstrate basic knowledge of marine steam turbines and main boilers
MARL5011A	Demonstrate basic knowledge of ships and ship routines
MARL5012A	Perform basic marine engineering calculations
MARL6001A	Apply intermediate principles of marine electrotechnology
MARL6002A	Apply intermediate principles of marine engineering thermodynamics
MARL6003A	Apply intermediate principles of marine mechanics
MARL6004A	Apply intermediate principles of naval architecture
MARL6005A	Apply advanced principles of marine electrotechnology
MARL6006A	Apply advanced principles of marine engineering thermodynamics
MARL6007A	Apply advanced principles of marine mechanics
MARL6008A	Apply advanced principles of naval architecture
MARL6009A	Demonstrate basic knowledge of ship construction
MARL6010A	Demonstrate basic knowledge of ship operation and maintenance
MARL6011A	Demonstrate intermediate knowledge of marine auxiliary boilers
MARL6012A	Demonstrate intermediate knowledge of marine auxiliary machinery and systems
MARL6013A	Demonstrate intermediate knowledge of marine control systems and automation

MARL6014A	Demonstrate intermediate knowledge of marine diesel engines and systems
MARL6015A	Demonstrate intermediate knowledge of marine electrical systems
MARL6016A	Demonstrate intermediate knowledge of marine steam turbines and main boilers
MARL6017A	Demonstrate advanced knowledge of marine auxiliary boilers
MARL6018A	Demonstrate advanced knowledge of marine auxiliary machinery and systems
MARL6019A	Demonstrate advanced knowledge of marine control systems and automation
MARL6020A	Demonstrate advanced knowledge of marine diesel engines and systems
MARL6021A	Demonstrate advanced knowledge of marine electrical systems
MARL6022A	Demonstrate advanced knowledge of marine steam turbines and main boilers
MARL6023A	Demonstrate advanced knowledge of ship operation and maintenance
MARM Marine Surveying	
MARM3001A	Apply knowledge of safety management system legal framework in the workplace
MARM3002A	Apply vessel construction theory to marine survey tasks
MARM3003A	Identify factors that affect a commercial vessel's fitness for purpose
MARM3004A	Work in the marine surveying sector
MARM4001A	Assess compliance with marine environment protection requirements
MARM4002A	Assist in the survey of commercial vessels
MARM4003A	Assist in the survey of vessel mechanical features
MARM4004A	Evaluate vessel stability
MARM4005A	Implement a systematic approach to the audit of safety management systems
MARM4006A	Survey lifesaving appliances, fire and other safety systems

MARM5001A	Calculate, assess and report on vessel trim and stability
MARM5002A	Conduct a range of surveys on domestic commercial vessels
MARM5003A	Conduct an audit of safety management systems
MARM5004A	Develop marine survey reports
MARM5005A	Participate in investigating marine incidents
MARM5006A	Survey hull and superstructure of a commercial vessel
MARM5007A	Survey vessel operational systems
MARM5008A	Undertake a periodic statutory survey
MARM5009A	Establish a marine surveyor practice
MARN Seamanship	
MARN1001A	Apply general purpose hand skills aboard a vessel
MARN2001A	Apply seamanship skills aboard a vessel up to 12 metres
MARN3001A	Perform seamanship operations on board a vessel up to 24 metres
MARN3002A	Use seamanship skills on board a vessel
MARN4001A	Manage seaworthiness of a vessel up to 80 metres
MARN5001A	Maintain seaworthiness of a vessel
MARN6001A	Manage cargo operations
MARO Watchkeeping	
MARO1001A	Perform basic lookout duties
MARO3001A	Contribute to monitoring and controlling a safe engine watch
MARO3002A	Contribute to monitoring and controlling a safe navigational watch
MARO5001A	Maintain a safe navigational watch
MARO5002A	Transmit and receive information by the Global Maritime Distress and Safety System
MARO5003A	Transmit and receive information by visual signalling

Imported units of competency in MAR13 Maritime Training Package

Unit code	Unit title
BSBADM307B	Organise schedules
BSBFLM303C	Contribute to effective workplace relationships
BSBMGT403A	Implement continuous improvement
BSBWOR203B	Work effectively with others
BSBWOR301B	Organise personal work priorities and development
CHCCOM403A	Use targeted communication skills to build relationships
HLTFA311A	Apply first aid
HLTFA403C	Manage first aid in the workplace
PSPGOV314A	Contribute to conflict management
PSPREG201A	Carry out inspections and monitoring under guidance
PSPGOV417A	Identify and treat risks
PSPGOV421A	Exercise delegations
PSPREG401C	Exercise regulatory powers
PUALAW003B	Give evidence in a judicial or quasi-judicial setting
SITHCCC001B	Organise and prepare food
SITHCCC002A	Present food
SITHCCC003B	Receive and store kitchen supplies
SITHCCC004B	Clean and maintain kitchen premises
SITHCCC005A	Use basic methods of cookery
SITHCCC027A	Prepare, cook and serve food for food service
SITXCOM001A	Work with colleagues and customers

SITXINV002A	Control and order stock
SITXOHS001B	Follow health, safety and security procedures
SITXOHS002A	Follow workplace hygiene procedures
TLID1001A	Shift materials safely using manual handling methods

Summary mapping MAR13 Maritime Training Package qualifications and Skill Sets

NA = Not applicable

E = equivalent (outcomes of old and new qualifications are equivalent)

NE = not equivalent (outcomes of old and new qualifications are not equivalent)

TDM07 Maritime Training Package Version 1.2	MAR13 Maritime Training Package Version 1.0	Comments	E/NE
NA	MARSS00002 Safety Training Certification Skill Set	New Skill Set	NA
NA	MARSS00003 Shipboard Safety Skill Set	New Skill Set	NA
NA	MARSS00001 Coxswain Grade 1 and Grade 2 Skill Set *NOTE: Entry requirement for this Skill Set is the MAR20113 Certificate II in Maritime Operations (Coxswain)	New Skill Set	NA
TDM10107 Certificate I in Transport Distribution (Maritime Operations)	NA	Qualification removed	
NA	MAR10113 Certificate I in Maritime Operations (General Purpose Hand)	New qualification	NA
TDM10207 Certificate I in Transport Distribution	MAR10213 Certificate I in Maritime Operations	Units revised to reflect current work	E

(Maritime Operations - Shore-Based Linesperson)	(Linesperson)	requirements; one new unit added for vessel security procedures	
TDM20107 Certificate II in Transport Distribution (Maritime Operations)	NA	Qualification removed	
TDM20307 Certificate II in Transport Distribution (Coastal Maritime Operations - Coxswain)	MAR20113 Certificate II in Maritime Operations (Coxswain)	Units revised to reflect current work requirements; total number of units required decreased	E
TDM20207 Certificate II in Transport Distribution (Marine Engine Driving - Grade 3)	MAR20213 Certificate II in Maritime Operations (Marine Engine Driver Grade 3)	Units revised to reflect current work requirements; total number of units required decreased	E
TDM30107 Certificate III in Transport Distribution (Maritime Operations)	NA	Qualification removed	
TDM30307 Certificate III in Transport Distribution (Maritime Operations - Integrated Rating)	MAR30113 Certificate III in Maritime Operations (Integrated Rating)	Units revised to reflect current work requirements	E
TDM30207 Certificate III in Transport Distribution (Marine Engine Driving - Grade 2)	MAR30213 Certificate III in Maritime Operations (Marine Engine Driver Grade 2)	Units revised to reflect current work requirements	E
NA	MAR30313 Certificate III in Maritime Operations (Marine Engine Driver Steam)	New qualification	NA
TDM30407 Certificate III in Transport Distribution (Coastal Maritime Operations - Master Class 5)	MAR30413 Certificate III in Maritime Operations (Master up to 24 metres)	Units revised to reflect current work requirements	E
NA	MAR30513 Certificate III in Maritime Operations (Master Inland Waters)	New qualification	NA
NA	MAR30613 Certificate III in Maritime Operations (Marine Surveying)	New qualification	NA

NA	MAR30713 Certificate III in Maritime Operations (Marine Cookery)	New qualification	NA
TDM40107 Certificate IV in Transport Distribution (Maritime Operations)	NA	Qualification removed	
NA	MAR40113 Certificate IV in Maritime Operations (Chief Integrated Rating)	New qualification	NA
TDM40207 Certificate IV in Transport Distribution (Marine Engine Driving - Grade 1)	MAR40213 Certificate IV in Maritime Operations (Marine Engine Driver Grade 1)	Units revised to reflect current work requirements	E
TDM40307 Certificate IV in Transport Distribution (Coastal Maritime Operations - Master Class 4)	MAR40313 Certificate IV in Maritime Operations (Master up to 35 metres)	Units revised to reflect current work requirements	E
NA	MAR40413 Certificate IV in Maritime Operations (Marine Surveying)	New qualification	NA
TDM50107 Diploma of Transport Distribution (Maritime Operations)	NA	Qualification removed	
TDM50407 Diploma of Transport Distribution (Coastal Marine Engineering - Engineer Class 3)	MAR50113 Diploma of Maritime Operations (Marine Engineering Class 3)	Units revised to reflect current work requirements	E
TDM50207 Diploma of Transport Distribution (Marine Engineering - Engineer Watchkeeper)	MAR50213 Diploma of Maritime Operations (Engineer Watchkeeper)	Units revised to reflect current work requirements	E
TDM50307 Diploma of Transport Distribution (Maritime Operations - Deck Watchkeeper)	MAR50313 Diploma of Maritime Operations (Watchkeeper Deck)	Units revised to reflect current work requirements	E
NA	MAR50413 Diploma of Maritime Operations (Master	New qualification	NA

	up to 500 GT or Master 80 metres)		
NA	MAR50513 Diploma of Maritime Operations (Marine Surveying)	New qualification	NA
TDM50507 Diploma of Transport Distribution (Coastal Maritime Operations - Master Class 3)	NA	Qualification removed	
TDM60107 Advanced Diploma of Transport Distribution (Maritime Operations)	NA	Qualification removed	
TDM60307 Advanced Diploma of Transport Distribution (Marine Engineering - Class 2)	MAR60113 Advanced Diploma of Maritime Operations (Marine Engineering Class 2)	Units revised to reflect current work requirements	E
TDM60407 Advanced Diploma of Transport Distribution (Maritime Operations - Master Unlimited)	MAR60213 Advanced Diploma of Maritime Operations (Master Unlimited)	Units revised to reflect current work requirements	E
TDM60207 Advanced Diploma of Transport Distribution (Marine Engineering - Class 1)	MAR60313 Advanced Diploma of Maritime Operations (Marine Engineering Class 1)	Units revised to reflect current work requirements	E

Summary mapping MAR13 Maritime Training Package units of competency: MAR13 to TDM07

E = equivalent (outcomes of old and new units are equivalent)

MAR13 Maritime Training Package Version 1.0		TDM07 Maritime Training Package Version 1.0	
MARA Handling Cargo and Vessel Stability			
MARA3001A	Contribute to safe cargo operations on liquefied gas	Merger of units + work requirements updated	

	tankers		
MARA3002A	Contribute to safe cargo operations on oil and chemical tankers	Merger of units + work requirements updated	
MARA4001A	Manage loading, discharging and stowage of cargo	TDMMA907B Prepare a cargo plan for cargo loading and unloading operations within limits of responsibility of a Master 4	E
MARA4002A	Manage vessel stability	TDMMA1207B Manage stress and dynamic factors affecting a small vessel's stability	E
MARA5001A	Maintain vessel stability	TDMMA1707A Determine the stability and trim of the vessel	E
MARA5002A	Monitor loading, unloading and stowage of cargo	Merger of units + work requirements updated	
MARA6001A	Manage stability of a vessel 500 gross tonnage or more	TDMMA1007B Control trim, stability and stress	E
MARB Equipment Checking and Maintenance			
MARB1001A	Assist with routine maintenance of a vessel	Merger of units + work requirements updated	
MARB2001A	Perform basic servicing and maintenance of main propulsion unit and auxiliary systems	New unit	
MARB2002A	Service marine internal combustion engines, and propulsion and auxiliary systems	Merger of units + work requirements updated	
MARB3001A	Maintain firefighting appliances	New unit	
MARB3002A	Perform routine engine maintenance on a vessel	Merger of units + work requirements updated	
MARB3003A	Perform routine maintenance and repairs on a vessel	New unit	
MARB3004A	Perform routine maintenance on a vessel up to 24 metres	Merger of units + work requirements updated	
MARB3005A	Slip or dock a vessel and	TDMMB707B Slip vessel and	E

	maintain hull on a vessel up to 80 metres	maintain hull	
MARB3006A	Maintain marine internal combustion engines, propulsion plant and auxiliary systems	TDMMB2907B Recognise and correct deteriorated fittings and machinery	E
MARB3007A	Undertake basic maintenance of electrical systems	New unit	
MARB4001A	Carry out basic welding, brazing, cutting and machining operations on a coastal vessel	TDMMR6207A Carry out basic welding, brazing, cutting and machining operations on a coastal vessel	E
MARB4002A	Implement vessel planned maintenance system	New unit	
MARB4003A	Manage refuelling	TDMMR5407B Carry out refueling and fuel transfer operations	E
MARB4004A	Manage stores for planned maintenance system	New unit	
MARB4005A	Plan and supervise routine maintenance on a vessel up to 80 metres	Merger of units + work requirements updated	
MARB4006A	Undertake maintenance of 240 to 440 voltage alternating current electrical systems	Merger of units + work requirements updated	
MARB4007A	Undertake maintenance of machinery, machinery systems and structural components	Merger of units + work requirements updated	
MARB5001A	Maintain and repair marine electrical and electronic equipment	New unit	
MARB5002A	Maintain and repair shipboard machinery and equipment	Merger of units + work requirements updated	
MARB6001A	Manage repairs and maintenance of a vessel 500 gross tonnage or more	TDMMB4307A Monitor and manage the seaworthiness of the vessel	E
MARC Equipment Operations			

MARC1001A	Carry out shore-based mooring and untying operations	TDMMR5607A Carry out shore-based mooring and untying operations	E
MARC2001A	Complete engine room tasks	Merger of units + work requirements updated	
MARC2002A	Maintain hull out of water	TDMMB1907B Carry out basic hull servicing	E
MARC2003A	Operate and maintain extra low and low voltage electrical systems and equipment	Merger of units + work requirements updated	
MARC2004A	Operate deck machinery	New unit	
MARC2005A	Operate inboard and outboard motors	TDMMR3007B Operate and carry out basic service checks on small vessel marine propulsion systems	E
MARC2006A	Operate main propulsion unit and auxiliary systems	New unit	
MARC2007A	Operate marine internal combustion engines, and propulsion and auxiliary systems	New unit	
MARC3001A	Manage fuel systems	New unit	
MARC3002A	Operate and maintain a boiler	New unit	
MARC3003A	Operate and maintain a steam engine up to 750 kW and steam auxiliary equipment	Merger of units + work requirements updated	
MARC3004A	Operate and maintain engines for auxiliary systems other than steam auxiliary systems	Merger of units + work requirements updated	
MARC3005A	Operate and monitor marine internal combustion engines, propulsion plant and auxiliary systems	TDMMR2707B Operate and maintain marine internal combustion engines within the limits of responsibility of a Marine Engine Driver Grade 2	E
MARC3006A	Operate deck machinery, cargo handling gear and equipment on a vessel	TDMMR3407B Operate deck machinery	

MARC3007A	Operate electrical systems	TDMMR2907B Operate and maintain marine low and medium voltage electrical systems	
MARC3008A	Operate engine equipment and associated propulsion plant	Merger of units + work requirements updated	
MARC4001A	Manage a propulsion unit using appropriate engine systems and support services	TDMMC607B Manage a propulsion unit using the appropriate engine systems and support services	E
MARC4002A	Monitor and manage vessel operations	New unit	
MARC4003A	Operate auxiliary machinery systems up to 1500 kW	Merger of units + work requirements updated	
MARC4004A	Operate deck machinery and steering gear on a vessel up to 80 metres	New unit	
MARC4005A	Operate marine internal combustion engines and associated systems up to 1500 kW	Merger of units + work requirements updated	
MARC4006A	Operate propulsion transmission systems up to 1500 kW	New unit	
MARC4007A	Operate 240 to 440 voltage alternating current electrical systems	Merger of units + work requirements updated	
MARC5001A	Employ tools, equipment and materials in a shipboard context	TDMMB3707B Fabricate simple shipboard components	E
MARD Administration and Human Resources			
MARD5001A	Manage business and administration on vessels limited by tonnage or near coastal operations	TDMML507A Manage business and administration on vessels limited by tonnage or near coastal operations	E
MARD5002A	Manage operations and maintenance on vessels limited by tonnage or near coastal operations	TDMMB4807A Manage the operations and maintenance on vessels limited by tonnage or near coastal operations	E

MARD6001A	Manage legal requirements of a vessel	TDMMF307B Manage business and legal requirements on a vessel	E
MARE Communication			
MARE1001A	Communicate during shore-based mooring and untying operations	TDMME907A Communicate during shore-based mooring and untying operations	E
MARE5001A	Communicate effectively when performing engineering duties	TDMME707B Use English in written and oral form to perform engineering duties	E
MARF Operational Quality and Safety			
MARF1001A	Apply basic survival skills in the event of vessel abandonment	Merger of units + work requirements updated	
MARF1002A	Follow procedures to minimise and fight fires on board a vessel	Merger of units + work requirements updated	
MARF1003A	Follow vessel security procedures	TDMMO107A Follow maritime security procedures	E
MARF1004A	Follow work health and safety, and emergency procedures during shore-based mooring operations	TDMMF6007A Follow OHS and emergency procedures during shore-based mooring operations	E
MARF1005A	Meet work health and safety requirements	TDMMF5407A Observe safety and emergency procedures on a coastal vessel	E
MARF1006A	Survive at sea using survival craft	Merger of units + work requirements updated	
MARF3001A	Assist in an emergency response	New unit	
MARF3002A	Observe personal safety and social responsibility	TDMMF5607A Observe personal safety and social responsibilities	E
MARF3003A	Operate emergency equipment and apply emergency procedures	TDMMF2307B Operate emergency equipment and apply emergency procedures	E
MARF3004A	Operate survival craft and other lifesaving appliances	TDMMF1907B Operate survival craft and other lifesaving appliances	E

MARF3005A	Prevent and fight fires on board a vessel	TDMMF6207A Prevent, control and fight fires on board an ocean-going vessel	E
MARF3006A	Survive at sea in the event of vessel abandonment	New unit	
MARF3007A	Work safely in confined spaces on a vessel	TDMMF5907A Work safely in enclosed spaces on a vessel	E
MARF4001A	Manage firefighting and fire prevention activities on board a vessel	TDMMF6107A Manage marine fire fighting and prevention activities on board a vessel	E
MARF5001A	Control safe access to and on vessel	TDMMF2107B Control safe access to and on vessel	E
MARF5002A	Provide medical first aid on board a vessel	New unit	
MARF5003A	Respond to emergencies	New unit	
MARF6001A	Coordinate search and rescue operations	TDMMF107B Assist in search and rescue operations	E
MARF6002A	Manage provision of medical care on board a vessel	Merger of units + work requirements updated	
MARF6003A	Manage safety and security of vessel crew and passengers	Merger of units + work requirements updated	
MARG Teamwork			
MARG1001A	Work effectively as part of a crew on a vessel up to 80 metres	New unit	
MARG4001A	Manage a small crew	TDMME1107A Contribute to effective communications and teamwork on a coastal vessel	E
MARG4002A	Manage an engine room and small engineering team	New unit	
MARG4003A	Supervise a crew	New unit	
MARG5001A	Provide leadership to crew	TDMML307B Establish and maintain a harmonious workplace environment	E

MARG6001A	Manage a vessel and its crew	TDMML407A Manage administration of the vessel and its personnel	E
MARH Navigation			
MARH2001A	Plan and navigate a passage for a vessel up to 12 metres	TDMMH1207B Plan and navigate a short voyage within inshore limits	E
MARH3001A	Apply weather information when navigating inland waters as Master	New unit	
MARH3002A	Manage and maintain a navigational watch on board vessels up to 80 metres	Merger of units + work requirements updated	
MARH3003A	Plan and navigate a passage for a vessel up to 80 metres	Merger of units + work requirements updated	
MARH3004A	Use wheelhouse equipment for safe navigation	Merger of units + work requirements updated	
MARH4001A	Forecast weather and oceanographic conditions	TDMMH707B Apply weather information when navigating a small vessel within limits of responsibility of a Master 4	E
MARH5001A	Apply command navigation procedures on vessels limited by tonnage or near coastal operations	TDMMH1707A Apply command navigation procedures on vessels limited by tonnage or near coastal operations	E
MARH5002A	Plan and conduct a passage	Merger of units + work requirements updated	
MARH5003A	Use an electronic chart display and information system to navigate safely	Merger of units + work requirements updated	
MARH5004A	Use bridge equipment to determine vessel position	Merger of units + work requirements updated	
MARH6001A	Forecast weather and oceanographic conditions to plan a safe passage	TDMMH907B Forecast weather and oceanographic conditions	E

MARH6002A	Manage the navigation of a vessel 500 gross tonnage or more	Merger of units + work requirements updated	
MARI Regulations and Port Operations			
MARI2001A	Comply with regulations to ensure safe operation of a vessel up to 12 metres	Merger of units + work requirements updated	
MARI3001A	Observe regulations to ensure safe operation of a vessel up to 80 metres	Merger of units + work requirements updated	
MARJ Environment			
MARJ2001A	Follow environmental work practices	Merger of units + work requirements updated	
MARJ3001A	Monitor environmental management on a vessel	Merger of units + work requirements updated	
MARJ5001A	Ensure compliance with environmental management legislation	Merger of units + work requirements updated	
MARJ5002A	Inspect and report defects and damage to vessel	New unit	
MARJ6001A	Manage compliance with environmental management legislation	TDMMU107B Monitor compliance with legislative requirements and measures to ensure protection of the environment	E
MARK Manoeuvring Vessels			
MARK2001A	Handle a vessel up to 12 metres	Merger of units + work requirements updated	
MARK3001A	Manoeuvre a vessel up to 24 metres within near coastal waters	TDMMC807B Manoeuvre a vessel within the limits of responsibility of a Master 5	E
MARK3002A	Steer a vessel under direction of the Master	TDMMC1007C Steer a domestic vessel under the direction of the master or officer in charge of the watch	E

MARK4001A	Manoeuvre a vessel up to 80 metres	TDMMC507B Manoeuvre a vessel within limits of responsibility of a Master 4	E
MARK5001A	Perform basic vessel manoeuvres	Merger of units + work requirements updated	
MARK6001A	Manoeuvre a vessel 500 gross tonnage or more	Merger of units + work requirements updated	
MARL Marine Engineering			
MARL4001A	Carry out engineering calculations	Merger of units + work requirements updated	
MARL5001A	Apply basic principles of marine electrotechnology	New unit	
MARL5002A	Apply basic principles of marine engineering thermodynamics	New unit	
MARL5003A	Apply basic principles of marine mechanics	New unit	
MARL5004A	Apply basic principles of naval architecture	New unit	
MARL5005A	Demonstrate basic knowledge of marine auxiliary boilers	New unit	
MARL5006A	Demonstrate basic knowledge of marine auxiliary machinery and systems	Merger of units + work requirements updated	
MARL5007A	Demonstrate basic knowledge of marine control systems and automation	New unit	
MARL5008A	Demonstrate basic knowledge of marine diesel engines and systems	Merger of units + work requirements updated	
MARL5009A	Demonstrate basic knowledge of marine electrical systems	New unit	
MARL5010A	Demonstrate basic knowledge of marine steam turbines and main boilers	Merger of units + work requirements updated	

MARL5011A	Demonstrate basic knowledge of ships and ship routines	Merger of units + work requirements updated	
MARL5012A	Perform basic marine engineering calculations	New unit	
MARL6001A	Apply intermediate principles of marine electrotechnology	Merger of units + work requirements updated	
MARL6002A	Apply intermediate principles of marine engineering thermodynamics	New unit	
MARL6003A	Apply intermediate principles of marine mechanics	New unit	
MARL6004A	Apply intermediate principles of naval architecture	Merger of units + work requirements updated	
MARL6005A	Apply advanced principles of marine electrotechnology	Merger of units + work requirements updated	
MARL6006A	Apply advanced principles of marine engineering thermodynamics	New unit	
MARL6007A	Apply advanced principles of marine mechanics	New unit	
MARL6008A	Apply advanced principles of naval architecture	New unit	
MARL6009A	Demonstrate basic knowledge of ship construction	New unit	
MARL6010A	Demonstrate basic knowledge of ship operation and maintenance	Merger of units + work requirements updated	
MARL6011A	Demonstrate intermediate knowledge of marine auxiliary boilers	New unit	
MARL6012A	Demonstrate intermediate knowledge of marine auxiliary machinery and systems	Merger of units + work requirements updated	
MARL6013A	Demonstrate intermediate knowledge of marine control systems and automation	TDMMB4207A Test, detect faults and maintain and restore electronic control equipment to operating	E

		condition on vessels over 750 kW propulsion power	
MARL6014A	Demonstrate intermediate knowledge of marine diesel engines and systems	Merger of units + work requirements updated	
MARL6015A	Demonstrate intermediate knowledge of marine electrical systems	Merger of units + work requirements updated	
MARL6016A	Demonstrate intermediate knowledge of marine steam turbines and main boilers	TDMMR5807A Manage the operation, monitoring and evaluation of the performance of steam propulsion plant on vessels over 750 kW propulsion power	E
MARL6017A	Demonstrate advanced knowledge of marine auxiliary boilers	New unit	
MARL6018A	Demonstrate advanced knowledge of marine auxiliary machinery and systems	Merger of units + work requirements updated	
MARL6019A	Demonstrate advanced knowledge of marine control systems and automation	Merger of units + work requirements updated	
MARL6020A	Demonstrate advanced knowledge of marine diesel engines and systems	Merger of units + work requirements updated	
MARL6021A	Demonstrate advanced knowledge of marine electrical systems	Merger of units + work requirements updated	
MARL6022A	Demonstrate advanced knowledge of marine steam turbines and main boilers	TDMMR5707A Manage the operation, monitoring and evaluation of the performance of steam propulsion plant on vessels of unlimited propulsion power	E
MARL6023A	Demonstrate advanced knowledge of ship operation and maintenance	Merger of units + work requirements updated	
MARM Marine Surveying			

MARM3001A	Apply knowledge of safety management system legal framework in the workplace	New unit	
MARM3002A	Apply vessel construction theory to marine survey tasks	New unit	
MARM3003A	Identify factors that affect a commercial vessel's fitness for purpose	New unit	
MARM3004A	Work in the marine surveying sector	New unit	
MARM4001A	Assess compliance with marine environment protection requirements	New unit	
MARM4002A	Assist in the survey of commercial vessels	New unit	
MARM4003A	Assist in the survey of vessel mechanical features	New unit	
MARM4004A	Evaluate vessel stability	New unit	
MARM4005A	Implement a systematic approach to the audit of safety management systems	New unit	
MARM4006A	Survey lifesaving appliances, fire and other safety systems	New unit	
MARM5001A	Calculate, assess and report on vessel trim and stability	New unit	
MARM5002A	Conduct a range of surveys on domestic commercial vessels	New unit	
MARM5003A	Conduct an audit of safety management systems	New unit	
MARM5004A	Develop marine survey reports	New unit	
MARM5005A	Participate in investigating marine incidents	New unit	
MARM5006A	Survey hull and superstructure of a commercial vessel	New unit	

MARM5007A	Survey vessel operational systems	New unit	
MARM5008A	Undertake a periodic statutory survey	New unit	
MARM5009A	Establish a marine surveyor practice	New unit	
MARN Seamanship			
MARN1001A	Apply general purpose hand skills aboard a vessel	Merger of units + work requirements updated	
MARN2001A	Apply seamanship skills aboard a vessel up to 12 metres	Merger of units + work requirements updated	
MARN3001A	Perform seamanship operations on board a vessel up to 24 metres	Merger of units + work requirements updated	
MARN3002A	Use seamanship skills on board a vessel	Merger of units + work requirements updated	
MARN4001A	Manage seaworthiness of a vessel up to 80 metres	TDMMB607B Monitor condition and seaworthiness of a coastal vessel up to 80 metres	E
MARN5001A	Maintain seaworthiness of a vessel	TDMMB4607A Apply information on vessel structure to maintenance and seaworthiness	E
MARN6001A	Manage cargo operations	Merger of units + work requirements updated	
MARO Watchkeeping			
MARO1001A	Perform basic lookout duties	New unit	
MARO3001A	Contribute to monitoring and controlling a safe engine watch	Merger of units + work requirements updated	
MARO3002A	Contribute to monitoring and controlling a safe navigational watch	Merger of units + work requirements updated	
MARO5001A	Maintain a safe navigational watch	TDMMF3007B Maintain a safe navigational watch	E
MARO5002A	Transmit and receive	TDMME807C Transmit and	E

	information by the Global Maritime Distress and Safety System	receive information by GMDSS subsystems and equipment	
MARO5003A	Transmit and receive information by visual signalling	TDMME307B Transmit and receive information by visual signalling	E

Summary mapping MAR13 Maritime Training Package units of competency: TDM07 to MAR13

NA = Not applicable

E = equivalent (outcomes of old and new units of competency are equivalent)

NE = not equivalent (outcomes of old and new units of competency are not equivalent)

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
A Handling Cargo and Vessel Stability				
TDMMA107B	Plan and ensure safe loading, stowage, security and unloading of cargo	Unit deleted	Relevant aspects of unit incorporated into MARN6001A Manage cargo operations	N
TDMMA207B	Plan and ensure safe care of cargo during the voyage	Unit deleted	Relevant aspects of unit incorporated into MARN6001A Manage cargo operations	N
TDMMA307B	Plan and monitor the carriage of dangerous cargoes	Unit deleted	Relevant aspects of unit incorporated into MARN6001A Manage cargo operations	N
TDMMA407B	Manage procedures for the handling, loading and discharging of liquefied gas cargoes	Unit deleted	Relevant aspects of unit incorporated into MARA3001A Contribute to safe cargo operations on liquefied gas tankers	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
TDMMA507B	Manage procedures for the handling, loading and discharging of chemical cargoes	Unit deleted	Relevant aspects of unit incorporated into MARA3001A Contribute to safe cargo operations on liquefied gas tankers	N
TDMMA607B	Manage procedures for the handling, loading and discharging of oil cargoes	Unit deleted	Relevant aspects of unit incorporated into MARA3001A Contribute to safe cargo operations on liquefied gas tankers	N
TDMMA707B	Monitor the loading, stowage, security and unloading of cargo	Unit deleted	Relevant aspects of unit incorporated into MARA5002A Monitor loading, unloading and stowage of cargo AND MARN6001A Manage cargo operations	N
TDMMA807B	Monitor the care of cargo during a voyage	Unit deleted	Relevant aspects of unit incorporated into MARA5002A Monitor loading, unloading and stowage of cargo AND MARN6001A Manage cargo operations	N
TDMMA907B	Prepare a cargo plan for cargo loading and unloading operations within limits of responsibility of a Master 4	Unit deleted	Relevant aspects of unit incorporated into MARA4001A Manage loading, discharging and stowage of cargo	E
TDMMA1007B	Control trim, stability and stress	Unit deleted	Relevant aspects of unit incorporated into MARA6001A Manage stability of a vessel 500 gross tonnage or more	E

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
TDMMA1107B	Maintain the stability of a vessel using basic stability information	Unit deleted	Relevant aspects of unit incorporated into MARN3001A Perform seamanship operations on board a vessel up to 24 metres	N
TDMMA1207B	Manage stress and dynamic factors affecting a small vessel's stability	Unit deleted	Relevant aspects of unit incorporated into MARA4002A Manage vessel stability	E
TDMMA1607B	Manage loading and embarkation procedures on roll-on roll-off vessels	Unit deleted	Unit not appropriate at this point; area of work may require further investigation	NA
TDMMA1707A	Determine the stability and trim of the vessel	Unit deleted	Relevant aspects of unit incorporated into MARA5001A Maintain vessel stability	E
B Equipment Checking and Maintenance				
TDMMB107C	Perform routine remedial, preventative and survey deck maintenance on a vessel	Unit deleted	Relevant aspects of unit incorporated into MARB3003A Perform routine maintenance and repairs on a vessel	E
TDMMB407B	Maintain seaworthiness of vessel	Unit deleted	Relevant aspects of unit incorporated into MARL6004A Apply intermediate principles of naval architecture AND MARL6010A Demonstrate basic knowledge of ship operation and maintenance	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
TDMMB507B	Manage the maintenance of the vessel	Unit deleted	Work covered by a range of other units	N
TDMMB607B	Monitor condition and seaworthiness of a coastal vessel up to 80 metres	Unit deleted	Relevant aspects of unit incorporated into MARN4001A Manage seaworthiness of a vessel up to 80 metres	E
TDMMB707B	Slip vessel and maintain hull	Unit deleted	Relevant aspects of unit incorporated into MARB3005A Slip or dock a vessel and maintain hull on a vessel up to 80 metres	E
TDMMB807B	Detect and identify the cause of machinery malfunctions and repair faults on vessels of unlimited propulsion power	Unit deleted	Relevant aspects of unit incorporated into MARL6020A Demonstrate advanced knowledge of marine diesel engines and systems	N
TDMMB907B	Manage safe maintenance and repair procedures on vessels of unlimited propulsion power	Unit deleted	MARL6023A Demonstrate advanced knowledge of ship operation and maintenance	N
TDMMB1207B	Fault-find, dismantle, maintain and repair shipboard plant and equipment	Unit deleted	Relevant aspects of unit incorporated into MARL5008A Demonstrate basic knowledge of marine diesel engines and systems	N
TDMMB1307B	Carry out shipboard fabrication and repair operations	Unit deleted	Relevant aspects of unit incorporated into MARL5008A	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
			Demonstrate basic knowledge of marine diesel engines and systems	
TDMMB1507B	Detect and identify the cause of machinery malfunctions and repair faults on vessels over 750 kW propulsion power	Unit deleted	Relevant aspects of unit incorporated into MARL6020A Demonstrate advanced knowledge of marine diesel engines and systems	N
TDMMB1607B	Organise safe maintenance and repair procedures on vessels of over 750 kW of propulsion power	Unit deleted	Relevant aspects of unit incorporated into MARL6020A Demonstrate advanced knowledge of marine diesel engines and systems	N
TDMMB1907B	Carry out basic hull servicing	Unit deleted	Relevant aspects of unit incorporated into MARC2002A Maintain hull out of water	E
TDMMB2007B	Assist engineer in the routine maintenance of main propulsion and ancillary machinery and systems	Unit deleted	Relevant aspects of unit incorporated into MARB3002A Perform routine engine maintenance on a vessel AND MARC3008A Operate engine equipment and associated propulsion plant	N
TDMMB2907B	Recognise and correct deteriorated fittings and machinery	Unit deleted	Relevant aspects of unit incorporated into MARB3006A Maintain marine internal combustion engines, propulsion plant and	E

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
			auxiliary systems	
TDMMB3107B	Organise maintenance and repairs on a small vessel	Unit deleted	Relevant aspects of unit incorporated into MARB4007A Undertake maintenance of machinery, machinery systems and structural components	N
TDMMB3507B	Employ damage control techniques for hull damage	Unit deleted	Relevant aspects of unit incorporated into MARB4007A Undertake maintenance of machinery, machinery systems and structural components	N
TDMMB3607B	Prepare a small vessel's machinery for sea within the limits of responsibility of a Marine Engine Driver Grade 3	Unit deleted	Relevant aspects of unit incorporated into MARC2001A Complete engine room tasks	N
TDMMB3707B	Fabricate simple shipboard components	Unit deleted	Relevant aspects of unit incorporated into MARC5001A Employ tools, equipment and materials in a shipboard context	E
TDMMB3807B	Dismantle, inspect, repair and reassemble vessel machinery	Unit deleted	Relevant aspects of unit incorporated into MARB5002A Maintain and repair shipboard machinery and equipment	N
TDMMB3907A	Manage the testing, detection of faults, maintenance and restoration of electrical	Unit deleted	Relevant aspects of unit incorporated into MARL6005A Apply advanced principles of	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
	machinery and equipment to operating condition on vessels of unlimited propulsion power		marine electrotechnology AND MARL6021A Demonstrate advanced knowledge of marine electrical systems	
TDMMB4007A	Manage the testing, detection of faults, maintenance and restoration of electronic control equipment to operating condition on vessels of unlimited propulsion power	Unit deleted	Relevant aspects of unit incorporated into MARL6019A Demonstrate advanced knowledge of marine control systems and automation	N
TDMMB4107A	Test, detect faults and maintain and restore electrical machinery and equipment to operating condition on vessels over 750 kW propulsion power	Unit deleted	Relevant aspects of unit incorporated into MARL6015A Demonstrate intermediate knowledge of marine electrical systems	N
TDMMB4207A	Test, detect faults and maintain and restore electronic control equipment to operating condition on vessels over 750 kW propulsion power	Unit deleted	Relevant aspects of unit incorporated into MARL6013A Demonstrate intermediate knowledge of marine control systems and automation	E
TDMMB4307A	Monitor and manage the seaworthiness of the vessel	Unit deleted	Relevant aspects of unit incorporated into MARB6001A Manage repairs and maintenance of a vessel 500 gross tonnage or more	E
TDMMB4507A	Monitor condition and seaworthiness of a small vessel up to 24	Unit deleted	Relevant aspects of unit incorporated into MARN2001A Apply seamanship skills aboard	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
	metres		a vessel up to 12 metres AND MARN3001A Perform seamanship operations on board a vessel up to 24 metres	
TDMMB4607A	Apply information on vessel structure to maintenance and seaworthiness	Unit deleted	Relevant aspects of unit incorporated into MARN5001A Maintain seaworthiness of a vessel	E
TDMMB4707A	Perform routine remedial, preventative and survey deck maintenance on a vessel of less than 80 metres	Unit deleted	Relevant aspects of unit incorporated into MARB3004A Perform routine maintenance on a vessel up to 24 metres AND MARB4005A Plan and supervise routine maintenance on a vessel up to 80 metres	N
TDMMB4807A	Manage the operations and maintenance on vessels limited by tonnage or near coastal operations	MARD5002A Manage operations and maintenance on vessels limited by tonnage or near coastal operations	Content revised to reflect current work requirements Unit code revised	E
C Manoeuvre Vessel				
TDMMC107B	Manoeuvre and handle a vessel of 500 gross tonnage or more under all conditions	Unit deleted	Relevant aspects of unit incorporated into MARK6001A Manoeuvre a vessel 500 gross tonnage or more	N
TDMMC207B	Operate remote controls of propulsion plant and engineering systems	Unit deleted	Relevant aspects of unit incorporated into MARK6001A Manoeuvre a vessel 500 gross tonnage or more	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
TDMMC307B	Manoeuvre and handle the vessel in normal conditions	Unit deleted	Relevant aspects of unit incorporated into MARK5001A Perform basic vessel manoeuvres AND MARK6001A Manoeuvre a vessel 500 gross tonnage or more	N
TDMMC407B	Manoeuvre the vessel and operate small power plants within limits of responsibility of a Master 3	Unit deleted	Relevant aspects of unit incorporated into MARK5001A Perform basic vessel manoeuvres	N
TDMMC507B	Manoeuvre a vessel within limits of responsibility of a Master 4	Unit deleted	Relevant aspects of unit incorporated into MARK4001A Manoeuvre a vessel up to 80 metres	E
TDMMC607B	Manage a propulsion unit using the appropriate engine systems and support services	Unit deleted	Relevant aspects of unit incorporated into MARC4001A Manage a propulsion unit using appropriate engine systems and support services	E
TDMMC707C	Apply seamanship skills and techniques when operating a small vessel within limits of responsibility of a Coxswain	Unit deleted	Relevant aspects of unit incorporated into MARK2001A Handle a vessel up to 12 metres AND MARN2001A Apply seamanship skills aboard a vessel up to 12 metres	N
TDMMC807B	Manoeuvre a vessel within the limits of responsibility of a Master 5	Unit deleted	Relevant aspects of unit incorporated into MARK3001A Manoeuvre a vessel up to 24 metres within near	E

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
			coastal waters	
TDMMC907C	Manoeuvre a domestic vessel within the limits of responsibility of a Coxswain	Unit deleted	Relevant aspects of unit incorporated into MARK2001A Handle a vessel up to 12 metres	N
TDMMC1007C	Steer a domestic vessel under the direction of the master or officer in charge of the watch	Unit deleted	Relevant aspects of unit incorporated into MARK3002A Steer a vessel under direction of the Master	E
D Load Handling				
TDTD197B	Shift materials safely using manual handling methods	Unit updated	Superseded by TLID1001A Shift materials safely using manual handling methods	E
E Communication				
TDMME207B	Communicate using standard marine vocabulary	Unit deleted	Relevant aspects of unit incorporated into MARO5003A Transmit and receive information by visual signalling	N
TDMME307B	Transmit and receive information by visual signalling	MARO5003A Transmit and receive information by visual signalling	Content revised to reflect current work requirements Unit code revised	E
TDMME507B	Transmit and receive information by marine radio or telephone	Unit deleted	Relevant aspects of unit incorporated into MARO5002A Transmit and receive information by the Global Maritime Distress and Safety System	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
TDMME707B	Use English in written and oral form to perform engineering duties	Unit deleted	Relevant aspects of unit incorporated into MARE5001A Communicate effectively when performing engineering duties	E
TDMME807C	Transmit and receive information by GMDSS subsystems and equipment	MARO5002A Transmit and receive information by the Global Maritime Distress and Safety System	Content revised to reflect current work requirements Unit code revised	E
TDMME907A	Communicate during shore-based mooring and untying operations	MARE1001A Communicate during shore-based mooring and untying operations	Content revised to reflect current work requirements Unit code revised	E
TDMME1007A	Transmit and receive information by marine VHF radio or telephone	Unit deleted	Appropriate additional requirements stated in the preamble to relevant qualifications	N
TDMME1107A	Contribute to effective communications and teamwork on a coastal vessel	Unit deleted	Relevant aspects of unit incorporated into MARG4001A Manage a small crew	E
F Operational Quality and Safety				
TDMMF107B	Assist in search and rescue operations	Unit deleted	Relevant aspects of unit incorporated into MARF6001A Coordinate search and rescue operations	E

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
TDMMF307B	Manage business and legal requirements on a vessel	Unit deleted	Relevant aspects of unit incorporated into MARD6001A Manage legal requirements of a vessel	E
TDMMF407B	Maintain the operational condition of lifesaving, firefighting and other safety systems	Unit deleted	Relevant aspects of unit incorporated into MARB4007A Undertake maintenance of machinery, machinery systems and structural components AND MARF6003A Manage safety and security of vessel crew and passengers	N
TDMMF507C	Develop emergency and damage control plans and handle emergency situations on board a vessel	Unit deleted	Relevant aspects of unit incorporated into MARF6003A Manage safety and security of vessel crew and passengers	N
TDMMF607B	Organise and manage the provision of medical care on board a vessel	Unit deleted	Relevant aspects of unit incorporated into MARF6002A Manage provision of medical care on board a vessel	N
TDMMF1007B	Provide elementary first aid	Unit deleted	Unit replaced with HLTF311A Apply first aid	E
TDMMF1107B	Survive at sea in the event of vessel abandonment	Unit deleted	Relevant aspects of unit incorporated into MARF1001A Apply basic survival skills in the event of vessel abandonment AND MARF1006A Survive at	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
			sea using survival craft	
TDMMF1407B	Plan and implement special safety, maintenance and emergency procedures for liquefied gas tankers	Unit deleted	Unit to be developed under continuous improvement process	NA
TDMMF1507B	Plan and implement special safety, maintenance and emergency procedures for chemical tankers	Unit deleted	Unit to be developed under continuous improvement process	NA
TDMMF1607B	Plan and implement special safety, maintenance and emergency procedures for oil tankers	Unit deleted	Unit to be developed under continuous improvement process	NA
TDMMF1807B	Apply medical first aid on board a vessel	Unit deleted	Relevant aspects of unit incorporated into MARF6002A Manage provision of medical care on board a vessel	N
TDMMF1907B	Operate survival craft and other lifesaving appliances	MARF3004A Operate survival craft and other lifesaving appliances	Content revised to reflect current work requirements Unit code revised	E
TDMMF2107B	Control safe access to and on vessel	MARF5001A Control safe access to and on vessel	Content revised to reflect current work requirements Unit code revised	E
TDMMF2207B	Maintain safety of engine equipment, systems and services on vessels of unlimited	Unit deleted	Relevant aspects of unit incorporated into MARL6023A Demonstrate advanced	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
	propulsion power		knowledge of ship operation and maintenance	
TDMMF2307B	Operate emergency equipment and apply emergency procedures	MARF3003A Operate emergency equipment and apply emergency procedures	Content revised to reflect current work requirements Unit code revised	E
TDMMF2407B	Maintain safety of engine equipment, systems and services on vessels over 750 kW propulsion power	Unit deleted	Relevant aspects of unit incorporated into MARL6010A Demonstrate basic knowledge of ship operation and maintenance	N
TDMMF2507B	Ensure safe working practices	Unit deleted	Relevant aspects of unit incorporated into MARL6023A Demonstrate advanced knowledge of ship operation and maintenance	N
TDMMF2607B	Establish watchkeeping arrangements and procedures	Unit deleted	Relevant aspects of unit incorporated into MARH6002A Manage the navigation of a vessel 500 gross tonnage or more	N
TDMMF2707B	Prevent, control and fight fires on board a small vessel	Unit deleted	Relevant aspects of unit incorporated into MARB4007A Undertake maintenance of machinery, machinery systems and structural components AND MARF1002A Follow	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
			procedures to minimise and fight fires on board a vessel	
TDMMF2907B	Maintain a safe navigational watch on a coastal voyage	Unit deleted	Relevant aspects of unit incorporated into MARO5001A Maintain a safe navigational watch	N
TDMMF3007B	Maintain a safe navigational watch	MARO5001A Maintain a safe navigational watch	Content revised to reflect current work requirements Unit code revised	E
TDMMF3107B	Maintain a safe engineering watch	Unit deleted	Relevant aspects of unit incorporated into MARL5011A Demonstrate basic knowledge of ships and ship routines	N
TDMMF3207C	Apply domestic regulations and industry practices when operating a small coastal vessel	Unit deleted	Relevant aspects of unit incorporated into MARI2001A Comply with regulations to ensure safe operation of a vessel up to 12 metres AND MARI3001A Observe regulations to ensure safe operation of a vessel up to 80 metres	N
TDMMF3307B	Execute watchkeeping arrangements and procedures on a small vessel	Unit deleted	Relevant aspects of unit incorporated into MARO5001A Maintain a safe navigational watch	N
TDMMF3507B	Contribute to maintaining a safe watch	Unit deleted	Relevant aspects of unit incorporated into MARO3001A	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
			Contribute to monitoring and controlling a safe engine watch AND MARO3002A Contribute to monitoring and controlling a safe navigational watch	
TDMMF3807B	Establish engine room watchkeeping procedures on vessels of less than 3,000 kW propulsion power	Unit deleted	Relevant aspects of unit incorporated into MARL5011A Demonstrate basic knowledge of ships and ship routines	N
TDMMF3907B	Maintain running log within the limits of responsibility of a Marine Engine Driver Grade 3	Unit deleted	Relevant aspects of unit incorporated into MARC2001A Complete engine room tasks	N
TDMMF4007B	Carry out basic operational engineering calculations	Unit deleted	Relevant aspects of unit incorporated into MARC2001A Complete engine room tasks	N
TDMMF4107B	Carry out engineering calculations related to maintenance and operations	Unit deleted	Relevant aspects of unit incorporated into MARC4005A Operate marine internal combustion engines and associated systems up to 1500 kW AND MARL4001A Carry out engineering calculations	N
TDMMF4307B	Carry out fast rescue craft (FRC) operations	Unit deleted	Unit to be developed under continuous improvement process	NA
TDMMF4407B	Apply safety regulations on roll-on roll-off passenger	Unit deleted	Unit to be developed under continuous	NA

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
	vessels		improvement process	
TDMMF4707B	Contribute to maintaining a safe watch on a domestic vessel	Unit deleted	Relevant aspects of unit incorporated into MARH3002A Manage and maintain a navigational watch on board vessels up to 80 metres AND MARH3004A Use wheelhouse equipment for safe navigation	N
TDMMF5407A	Observe safety and emergency procedures on a coastal vessel	Unit deleted	Relevant aspects of unit incorporated into MARF1005A Meet work health and safety requirements	E
TDMMF5507A	Fight and extinguish fires on board a coastal vessel	Unit deleted	Relevant aspects of unit incorporated into MARF1002A Follow procedures to minimise and fight fires on board a vessel	N
TDMMF5607A	Observe personal safety and social responsibilities	MARF3002A Observe personal safety and social responsibility	Content revised to reflect current work requirements Unit code and revised	E
TDMMF5707A	Assist in safe operations and emergency procedures on a coastal vessel	Unit deleted	Relevant aspects of unit incorporated into MARN1001A Apply general purpose hand skills aboard a vessel	N
TDMMF5807A	Adapt to basic industry and regulatory requirements for tanker operations	Unit deleted	Relevant aspects of unit incorporated into MARA3001A Contribute to safe cargo operations on liquefied	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
			gas tankers AND MARA3002A Contribute to safe cargo operations on oil and chemical tankers	
TDMMF5907A	Work safely in enclosed spaces on a vessel	Unit deleted	Relevant aspects of unit incorporated into MARF3007A Work safely in confined spaces on a vessel	E
TDMMF6007A	Follow OHS and emergency procedures during shore-based mooring operations	Unit deleted	Relevant aspects of unit incorporated into MARF1004A Follow work health and safety, and emergency procedures during shore-based mooring operations	E
TDMMF6107A	Manage marine fire fighting and prevention activities on board a vessel	Unit deleted	Relevant aspects of unit incorporated into MARF4001A Manage firefighting and fire prevention activities on board a vessel	E
TDMMF6207A	Prevent, control and fight fires on board an ocean-going vessel	Unit deleted	Relevant aspects of unit incorporated into MARF3005A Prevent and fight fires on board a vessel	E
G Teamwork				
TDTG197B	Work effectively with others	Unit deleted	Unit replaced with BSBWOR203B Work effectively with others	E
H Navigation				

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
TDMMH107B	Plan a voyage and conduct navigation	Unit deleted	Relevant aspects of unit incorporated into MARH6002A Manage the navigation of a vessel 500 gross tonnage or more	N
TDMMH207B	Determine position of the vessel and the accuracy of the resultant position	Unit deleted	Relevant aspects of unit incorporated into MARH6002A Manage the navigation of a vessel 500 gross tonnage or more	N
TDMMH307B	Manage safe navigation through the use of radar and other navigational aids	Unit deleted	Relevant aspects of unit incorporated into MARH5004A Use bridge equipment to determine vessel position	N
TDMMH507B	Use radar and other bridge equipment to maintain safe navigation	Unit deleted	Relevant aspects of unit incorporated into MARH5004A Use bridge equipment to determine vessel position AND MARH5003A Use an electronic chart display and information system to navigate safely	N
TDMMH607B	Plan and conduct a coastal passage and determine position within limits of responsibility of a Master 4	Unit deleted	Relevant aspects of unit incorporated into MARH3003A Plan and navigate a passage for a vessel up to 80 metres	N
TDMMH707B	Apply weather information when navigating a small	Unit deleted	Relevant aspects of unit incorporated into MARH4001A Forecast	E

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
	vessel within limits of responsibility of a Master 4		weather and oceanographic conditions	
TDMMH807B	Plan and navigate an offshore passage within limits of responsibility of a Master 5	Unit deleted	Relevant aspects of unit incorporated into MARH3003A Plan and navigate a passage for a vessel up to 80 metres AND MARH3004A Use wheelhouse equipment for safe navigation	N
TDMMH907B	Forecast weather and oceanographic conditions	Unit deleted	Relevant aspects of unit incorporated into MARH6001A Forecast weather and oceanographic conditions to plan a safe passage	E
TDMMH1007B	Navigate a high speed vessel	Unit deleted	Unit to be developed under continuous improvement process	NA
TDMMH1107B	Use radar and other electronic navigational aids to maintain safe navigation within limits of responsibility of a Master 5	Unit deleted	Relevant aspects of unit incorporated into MARH3003A Plan and navigate a passage for a vessel up to 80 metres AND MARH3004A Use wheelhouse equipment for safe navigation	N
TDMMH1207B	Plan and navigate a short voyage within inshore limits	Unit deleted	Relevant aspects of unit incorporated into MARH2001A Plan and navigate a passage for a vessel up to 12 metres	E
TDMMH1307B	Apply weather information when navigating a small	Unit deleted	Relevant aspects of unit incorporated into MARH3003A Plan and	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
	vessel within limits of responsibility of a Master 5		navigate a passage for a vessel up to 80 metres AND MARH3004A Use wheelhouse equipment for safe navigation	
TDMMH1407A	Apply weather information when navigating a vessel within limits of responsibility of a Master 3	Unit deleted	Relevant aspects of unit incorporated into MARH5002A Plan and conduct a passage	N
TDMMH1507A	Measure and observe weather conditions and interpret and apply to watchkeeping	Unit deleted	Relevant aspects of unit incorporated into MARH5002A Plan and conduct a passage	N
TDMMH1607A	Determine position of the vessel	Unit deleted	Relevant aspects of unit incorporated into MARH5002A Plan and conduct a passage	N
TDMMH1707A	Apply command navigation procedures on vessels limited by tonnage or near coastal operations	MARH5001A Apply command navigation procedures on vessels limited by tonnage or near coastal operations	Content revised to reflect current work requirements Unit code revised	E
TDMMH1807A	Apply command navigation procedures on vessels (unlimited)	Unit deleted	Relevant aspects of unit incorporated into MARH6002A Manage the navigation of a vessel 500 gross tonnage or more	N
TDMMH1907A	Plan a passage	Unit deleted	Relevant aspects of unit incorporated into MARH5002A Plan and conduct a passage	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
TDMMH2007A	Use radar and other wheelhouse equipment to maintain safe navigation within the limits of responsibility of a Master 4	Unit deleted	Relevant aspects of unit incorporated into MARH3004A Use wheelhouse equipment for safe navigation	N
L Human Resources				
TDMML307B	Establish and maintain a harmonious workplace environment	Unit deleted	Relevant aspects of unit incorporated into MARG5001A Provide leadership to crew	E
TDMML407A	Manage administration of the vessel and its personnel	Unit deleted	Relevant aspects of unit incorporated into MARG6001A Manage a vessel and its crew	E
TDMML507A	Manage business and administration on vessels limited by tonnage or near coastal operations	MARD5001A Manage business and administration on vessels limited by tonnage or near coastal operations	Content revised to reflect current work requirements Unit code revised	E
O Security				
TDMMO107A	Follow maritime security procedures	Unit deleted	Relevant aspects of unit incorporated into MARF1003A Follow vessel security procedures	E
TDMMO207A	Carry out ship security officer functions	Unit deleted	Unit to be developed under continuous improvement process	NA
R Carry Out Operations on Equipment and Systems				
TDMMR107B	Operate and maintain steering gear	Unit deleted	Relevant aspects of unit incorporated into	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
	arrangements		MARB3004A Perform routine maintenance on a vessel up to 24 metres	
TDMMR207B	Use and maintain deck equipment and machinery	Unit deleted	Relevant aspects of unit incorporated into MAR2004A Operate deck machinery	N
TDMMR307B	Operate fuel, fresh and sea water, bilge and fire pumping systems installed in a vessel	Unit deleted	Relevant aspects of unit incorporated into MARB3004A Perform routine maintenance on a vessel up to 24 metres	N
TDMMR407B	Operate electrical machinery and electronic control equipment on vessels of unlimited propulsion power	Unit deleted	Relevant aspects of unit incorporated into MARL6021A Demonstrate advanced knowledge of marine electrical systems	N
TDMMR507B	Manage fuel, bilge and ballast operations procedures on vessels of unlimited propulsion power	Unit deleted	Relevant aspects of unit incorporated into MARL6018A Demonstrate advanced knowledge of marine auxiliary machinery and systems AND MARL6023A Demonstrate advanced knowledge of ship operation and maintenance	N
TDMMR607B	Manage the operation, monitoring and evaluation of the performance of engines on vessels of unlimited propulsion power	Unit deleted	Relevant aspects of unit incorporated into MARL6020A Demonstrate advanced knowledge of marine diesel engines and systems	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
TDMMR707B	Plan and schedule operations on vessels of unlimited propulsion power	Unit deleted	Relevant aspects of unit incorporated into MARL6020A Demonstrate advanced knowledge of marine diesel engines and systems	N
TDMMR807B	Manage the start up and shut down of main propulsion and auxiliary machinery and associated systems on vessels of unlimited propulsion power	Unit deleted	Relevant aspects of unit incorporated into MARL6020A Demonstrate advanced knowledge of marine diesel engines and systems	N
TDMMR907B	Operate alternators, generators and control systems to supply shipboard electrical power	Unit deleted	Relevant aspects of unit incorporated into MARL6019A Demonstrate advanced knowledge of marine control systems and automation AND MARL6021A Demonstrate advanced knowledge of marine electrical systems	N
TDMMR1007B	Operate pumping systems and associated control systems	Unit deleted	Relevant aspects of unit incorporated into MARL5006A Demonstrate basic knowledge of marine auxiliary machinery and systems	N
TDMMR1107B	Operate main and auxiliary machinery and associated control systems	Unit deleted	Relevant aspects of unit incorporated into MARL5006A Demonstrate basic knowledge of marine auxiliary machinery and	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
			systems AND MARL5008A Demonstrate basic knowledge of marine diesel engines and systems	
TDMMR1307B	Operate electrical machinery and electronic control equipment on vessels over 750 kW propulsion power	Unit deleted	Relevant aspects of unit incorporated into MARL6001A Apply intermediate principles of marine electrotechnology AND MARL6015A Demonstrate intermediate knowledge of marine electrical systems	N
TDMMR1407B	Manage fuel, bilge and ballast operations procedures on vessels over 750 kW propulsion power	Unit deleted	Relevant aspects of unit incorporated into MARL6010A Demonstrate basic knowledge of ship operation and maintenance AND MARL6012A Demonstrate intermediate knowledge of marine auxiliary machinery and systems	N
TDMMR1507B	Operate, monitor and evaluate engine performance on vessels over 750 kW propulsion power	Unit deleted	Relevant aspects of unit incorporated into MARL6014A Demonstrate intermediate knowledge of marine diesel engines and systems	N
TDMMR1607B	Plan and schedule operations on vessels over 750 kW	Unit deleted	Relevant aspects of unit incorporated into MARL6010A	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
	propulsion power		Demonstrate basic knowledge of ship operation and maintenance	
TDMMR1707B	Start up and shut down main propulsion and auxiliary machinery and associated systems on vessels over 750 kW propulsion power	Unit deleted	Relevant aspects of unit incorporated into MARL6012A Demonstrate intermediate knowledge of marine auxiliary machinery and systems AND MARL6014A Demonstrate intermediate knowledge of marine diesel engines and systems	N
TDMMR1807B	Operate deck machinery installed on a small vessel of less than 750 KW propulsion power	Unit deleted	Relevant aspects of unit incorporated into MARB3004A Perform routine maintenance on a vessel up to 24 metres	N
TDMMR1907B	Safely handle and stow explosive and flammable materials	Unit deleted	Relevant aspects of unit incorporated into MARB4007A Undertake maintenance of machinery, machinery systems and structural components	N
TDMMR2107B	Operate and maintain engines, machinery and auxiliary power sources on vessels of less than 3,000 kW propulsion power	Unit deleted	Relevant aspects of unit incorporated into MARB5002A Maintain and repair shipboard machinery and equipment AND MARL5008A Demonstrate basic knowledge of marine diesel engines and	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
			systems	
TDMMR2207B	Operate and maintain boiler systems	Unit deleted	Relevant aspects of unit incorporated into MARL5010A Demonstrate basic knowledge of marine steam turbines and main boilers	N
TDMMR2307B	Operate and maintain batteries, starter motors and power distribution systems	Unit deleted	Relevant aspects of unit incorporated into MARC2003A Operate and maintain extra low and low voltage electrical systems and equipment	N
TDMMR2407B	Operate and maintain internal combustion engines and propulsion transmission systems	Unit deleted	Relevant aspects of unit incorporated into MARB4007A Undertake maintenance of machinery, machinery systems and structural components AND MARC4005A Operate marine internal combustion engines and associated systems up to 1500 kW	N
TDMMR2507B	Operate and maintain auxiliary machinery systems, including steering gear and refrigeration systems	Unit deleted	Relevant aspects of unit incorporated into MARC4003A Operate auxiliary machinery systems up to 1500 kW AND MARC4005A Operate marine internal combustion engines and associated systems up to 1500 kW	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
TDMMR2607B	Operate, test and maintain marine electrical and control equipment	Unit deleted	Relevant aspects of unit incorporated into MARB4006A Undertake maintenance of 240 to 440 voltage alternating current electrical systems AND MARC4007A Operate 240 to 440 voltage alternating current electrical systems	N
TDMMR2707B	Operate and maintain marine internal combustion engines within the limits of responsibility of a Marine Engine Driver Grade 2	Unit deleted	Relevant aspects of unit incorporated into MARC3005A Operate and monitor marine internal combustion engines, propulsion plant and auxiliary systems	E
TDMMR2807B	Operate and maintain auxiliary systems on vessels within limits of responsibility of a Marine Engine Driver Grade 2	Unit deleted	Relevant aspects of unit incorporated into MARC3003A Operate and maintain a steam engine up to 750 kW and steam auxiliary equipment AND MARC3004A Operate and maintain engines for auxiliary systems other than steam auxiliary systems	N
TDMMR2907B	Operate and maintain marine low and medium voltage electrical systems	Unit deleted	Relevant aspects of unit incorporated into MARC3007A Operate electrical systems	E
TDMMR3007B	Operate and carry out basic service checks on small vessel marine	Unit deleted	Relevant aspects of unit incorporated into MARC2005A Operate	E

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
	propulsion systems		inboard and outboard motors	
TDMMR3107B	Operate and carry out basic servicing on auxiliary systems	Unit deleted	Relevant aspects of unit incorporated into MARB2002A Service marine internal combustion engines, and propulsion and auxiliary systems	N
TDMMR3207B	Operate and carry out basic routine servicing of marine extra low and low voltage electrical systems	Unit deleted	Relevant aspects of unit incorporated into MARC2003A Operate and maintain extra low and low voltage electrical systems	N
TDMMR3307B	Perform rigging and lifting operations on board a vessel	Unit deleted	Relevant aspects of unit incorporated into MARN3002A Use seamanship skills on board a vessel	N
TDMMR3407B	Operate deck machinery	Unit deleted	Relevant aspects of unit incorporated into MARC3006A Operate deck machinery, cargo handling gear and equipment on a vessel	E
TDMMR4307B	Assist in mooring and anchor handling activities	Unit deleted	Relevant aspects of unit incorporated into MARN3002A Use seamanship skills on board a vessel	N
TDMMR4407B	Assist in completion of deck operations and maintenance documentation	Unit deleted	Relevant aspects of unit incorporated into MARN3002A Use seamanship skills on board a vessel	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
TDMMR4507B	Provide support in completing cargo and bunkering operations	Unit deleted	Relevant aspects of unit incorporated into MARC3008A Operate engine equipment and associated propulsion plant AND MARN3002A Use seamanship skills on board a vessel	N
TDMMR4607B	Assist in basic welding, brazing, cutting and machinery operations on a vessel	Unit deleted	Relevant aspects of unit incorporated into MARB3002A Perform routine engine maintenance on a vessel	N
TDMMR4707B	Use and care for hand and power tools on a vessel	Unit deleted	Relevant aspects of unit incorporated into MARB3002A Perform routine engine maintenance on a vessel	N
TDMMR5007B	Carry out basic food handling, preparation, stock control and storage on an off-shore support vessel or rig	Unit deleted	Unit to be developed under continuous improvement process	NA
TDMMR5107B	Carry out windlass operations on a rig	Unit deleted	Unit to be developed under continuous improvement process	NA
TDMMR5207B	Carry out dogging and cargo handling operations at a rig	Unit deleted	Unit to be developed under continuous improvement process	NA
TDMMR5307B	Carry out anchor handling, towage and supply duties at a rig	Unit deleted	Unit to be developed under continuous improvement process	NA
TDMMR5407B	Carry out refueling and fuel transfer operations	Unit deleted	Relevant aspects of unit incorporated into	E

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
			MARB4003A Manage refuelling	
TDMMR5507B	Perform seamanship, rigging and lifting operations on board a small domestic vessel	Unit deleted	Relevant aspects of unit incorporated into MARN3001A Perform seamanship operations on board a vessel up to 24 metres	N
TDMMR5607A	Carry out shore-based mooring and untying operations	MARC1001A Carry out shore-based mooring and untying operations	Content revised to reflect current work requirements Unit code revised	E
TDMMR5707A	Manage the operation, monitoring and evaluation of the performance of steam propulsion plant on vessels of unlimited propulsion power	Unit deleted	Relevant aspects of unit incorporated into MARL6022A Demonstrate advanced knowledge of marine steam turbines and main boilers	E
TDMMR5807A	Manage the operation, monitoring and evaluation of the performance of steam propulsion plant on vessels over 750 kW propulsion power	Unit deleted	Relevant aspects of unit incorporated into MARL6016A Demonstrate intermediate knowledge of marine steam turbines and main boilers	E
TDMMR5907A	Operate steam propulsion plant and associated systems on steam vessels	Unit deleted	Relevant aspects of unit incorporated into MARL5010A Demonstrate basic knowledge of marine steam turbines and main boilers	N
TDMMR6007A	Assist in routine deck operations within limits	Unit deleted	Relevant aspects of unit incorporated into	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
	of responsibility of a General Purpose Hand		MARN1001A Apply general purpose hand skills aboard a vessel AND MARB1001A Assist with routine maintenance of a vessel	
TDMMR6107A	Use and care for hand and power tools on a small vessel	Unit deleted	Relevant aspects of unit incorporated into MARB2002A Service marine internal combustion engines, and propulsion and auxiliary systems	N
TDMMR6207A	Carry out basic welding, brazing, cutting and machining operations on a coastal vessel	MARB4001A Carry out basic welding, brazing, cutting and machining operations on a coastal vessel	Content revised to reflect current work requirements Unit code revised	E
U Environment				
TDMMU107B	Monitor compliance with legislative requirements and measures to ensure protection of the environment	Unit deleted	Relevant aspects of unit incorporated into MARJ6001A Manage compliance with environmental management legislation	E
TDMMU407B	Ensure compliance with pollution prevention measures	Unit deleted	Relevant aspects of unit incorporated into MARJ2001A Follow environmental work practices AND MARJ5001A Ensure compliance with environmental management legislation	N

TDM07 Maritime Training Package Version 1.0		MAR13 Maritime Training Package Version 1.0	Comments	E/N
TDMMU507B	Ensure compliance with environmental considerations in a small domestic vessel	Unit deleted	Relevant aspects of unit incorporated into MARJ2001A Follow environmental work practices AND MARJ3001A Monitor environmental management on a vessel	N

Overview of Training Packages

What is a Training Package?

A Training Package is an integrated set of nationally endorsed competency standards, assessment guidelines and Australian Qualifications Framework (AQF) qualifications for a specific industry, industry sector or enterprise.

Each Training Package:

- provides a consistent and reliable set of components for training, recognising and assessing people's skills, and may also have optional support materials;
- enables nationally recognised qualifications to be awarded through direct assessment of workplace competencies;
- encourages the development and delivery of flexible training which suits individual and industry requirements; and
- encourages learning and assessment in a work-related environment which leads to verifiable workplace outcomes.

How do Training Packages fit within the National Skills Framework?

The National Skills Framework applies nationally, is endorsed by the Ministerial Council for Vocational and Technical Education, and comprises the Australian Quality Training Framework 2010 (AQTF 2010), and Training Packages endorsed by the National Skills Standards Council (NSSC).

How are Training Packages developed?

Training Packages are developed by Industry Skills Councils or enterprises to meet the identified training needs of specific industries or industry sectors. To gain national endorsement of Training Packages, developers must provide evidence of extensive research, consultation and support within the industry area or enterprise.

How do Training Packages encourage flexibility?

Training Packages describe the skills and knowledge needed to perform effectively in the workplace without prescribing how people should be trained.

Training Packages acknowledge that people can achieve vocational competency in many ways by emphasising what the learner can do, not how or where they learned to do it. For example, some experienced workers might be able to demonstrate competency against the units of competency, and even gain a qualification, without completing a formal training program.

With Training Packages, assessment and training may be conducted at the workplace, off-the-job, at a training organisation, during regular work, or through work experience, work placement, work simulation or any combination of these.

Who can deliver and assess using Training Packages?

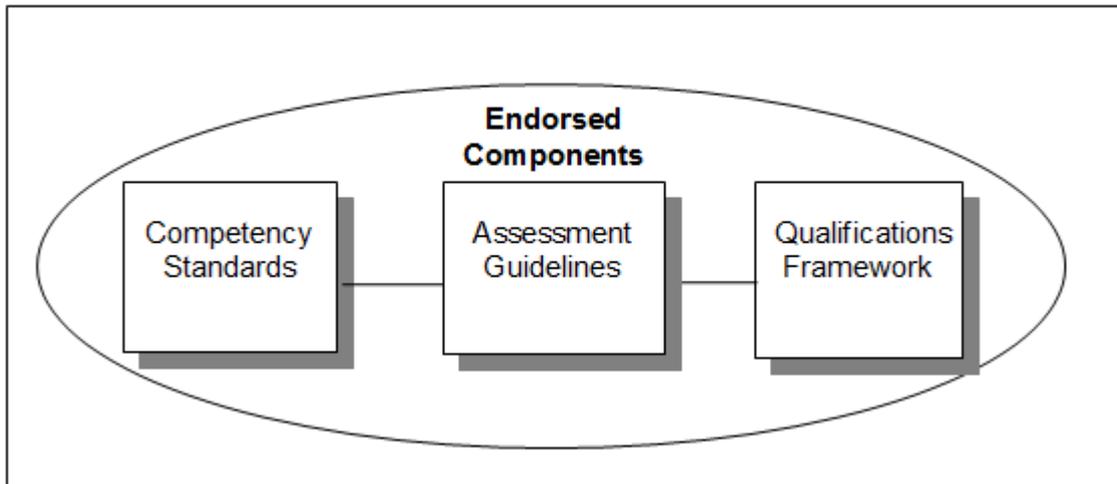
Training and assessment using Training Packages must be conducted by a Registered Training Organisation (RTO) that has the qualifications or specific units of competency on its scope of registration, or that works in partnership with another RTO, as specified in the AQTF 2010.

Training Package Components

Training Packages are made up of mandatory components endorsed by the NQC, and optional support materials.

Training Package Endorsed Components

The nationally endorsed components include the Competency Standards, Assessment Guidelines and Qualifications Framework. These form the basis of training and assessment in the Training Package and, as such, they must be used.



Competency Standards

Each unit of competency identifies a discrete workplace requirement and includes the knowledge and skills that underpin competency as well as language, literacy and numeracy; and occupational health and safety requirements. The units of competency must be adhered to in training and assessment to ensure consistency of outcomes.

Assessment Guidelines

The Assessment Guidelines provide an industry framework to ensure all assessments meet industry needs and nationally agreed standards as expressed in the Training Package and the AQTF 2010. The Assessment Guidelines must be followed to ensure the integrity of assessment leading to nationally recognised qualifications.

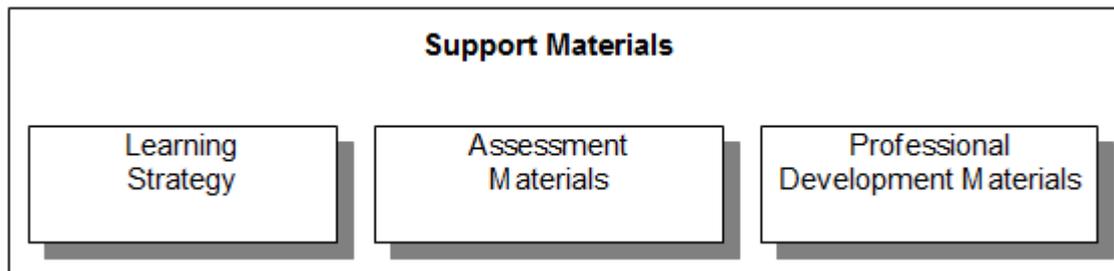
Qualifications Framework

Each Training Package provides details of those units of competency that must be achieved to award AQF qualifications. The rules around which units of competency can be combined to make up a valid AQF qualification in the Training Package are referred to as the 'packaging rules'. The packaging rules must be followed to ensure the integrity of nationally recognised qualifications issued.

Training Package Support Materials

The endorsed components of Training Packages are complemented and supported by optional support materials that provide for choice in the design of training and assessment to meet the needs of industry and learners.

Training Package support materials can relate to single or multiple units of competency, an industry sector, a qualification or the whole Training Package. They tend to fall into one or more of the categories illustrated below.



Training Package support materials are produced by a range of stakeholders such as RTOs, individual trainers and assessors, private and commercial developers and Government agencies.

Training Package, Qualification and Unit of Competency Codes

There are agreed conventions for the national codes used for Training Packages and their components. Always use the correct codes, exactly as they appear in the Training Package, and with the code always before the title.

Training Package Codes

Each Training Package has a unique five-character national code assigned when the Training Package is endorsed, for example XYZ08. The first three characters are letters identifying the Training Package industry coverage and the last two characters are numbers identifying the year of endorsement.

Qualification Codes

Within each Training Package, each qualification has a unique eight-character code, for example XYD10108. Qualification codes are developed as follows:

- the first three letters identify the Training Package;
- the first number identifies the qualification level (noting that, in the qualification titles themselves, arabic numbers are not used);
- the next two numbers identify the position in the sequence of the qualification at that level; and
- the last two numbers identify the year in which the qualification was endorsed. (Where qualifications are added after the initial Training Package endorsement, the last two numbers may differ from other Training Package qualifications as they identify the year in which those particular qualifications were endorsed.)

Unit of Competency Codes

Within each Training Package, each unit of competency has a unique code. Unit of competency codes are assigned when the Training Package is endorsed, or when new units of competency are added to an existing endorsed Training Package. Unit codes are developed as follows:

- a typical code is made up of 12 characters, normally a mixture of uppercase letters and numbers, as in MARF3002A
- the first three characters signify the Training Package – (MAR Maritime Training Package) – in the above example and up to eight characters, relating to an industry sector, function or skill area, follow;
- the last character is always a letter and identifies the unit of competency version. An ‘A’ at the end of the code indicates that this is the original unit of competency. ‘B’, or another incremented version identifier means that minor changes have been made. Typically this would mean that wording has changed in the range statement or evidence guide, providing clearer intent; and
- where changes are made that alter the outcome, a new code is assigned and the title is changed.

Training Package, Qualification and Unit of Competency Titles

There are agreed conventions for titling Training Packages and their components. Always use the correct titles, exactly as they appear in the Training Package, and with the code always placed before the title.

Training Package Titles

The title of each endorsed Training Package is unique and relates the Training Packages broad industry coverage.

Qualification Titles

The title of each endorsed Training Package qualification is unique. Qualification titles use the following sequence:

- first, the qualification is identified as either Certificate I, Certificate II, Certificate III, Certificate IV, Diploma or Advanced Diploma;
- this is followed by the words ‘in’ for Certificates I to IV, and ‘of’ for Diploma and Advanced Diploma;
- then, the industry descriptor, for example Telecommunications; and
- then, if applicable, the occupational or functional stream in brackets, for example (Computer Systems).

For example:

MAR30113 Certificate III in Maritime Operations (Integrated Rating)

Unit of Competency Titles

Each unit of competency title is unique. Unit of competency titles describe the competency outcome concisely, and are written in sentence case.

For example:

MARF3002A Observe personal safety and social responsibility

Introduction to the MAR13 Maritime Training Package

The Australian Government’s shipping reforms will introduce new structural and regulatory changes and are aimed at revitalising Australia’s maritime industry.

Following the signing of the Intergovernmental Agreement on Commercial Vessel Safety Reform by the commonwealth, states and territories in August 2011, the Australian Maritime Safety Authority (AMSA) will become the National Regulator for commercial vessel safety regulation in 2013 delivering a national system for the first time.

With the commencement of the national system, AMSA will also assume the maintenance and development of the National Standards for Commercial Vessels (NSCV), which is currently undertaken by the National Maritime Safety Committee (NMSC).

The MAR13 Maritime Training Package qualifications, Skill Sets and units of competency:

- ensure close alignment with the regulatory requirements of national, state and territory marine authorities
- accommodate the multiple job roles, enterprise requirements and changing technological nature of the maritime industry.

In the MAR13 Maritime Training Package, qualifications and Skill Sets are directly aligned with the educational requirements specified by marine authorities for regulated occupations within:

- coastal operations as described and defined in Part D of the National Standard for Commercial Vessels (NSCV)
- ocean-going operations falling within the regulatory jurisdiction of the Australian Maritime Safety Authority (AMSA) as defined in Marine Orders under the Australian Navigation Act 2012.

Critical issues that combine to create challenges for the sector are most notably the capacity to maintain safety, efficiency, international competitiveness and appropriate environmental standards.

The MAR13 Maritime Training Package also provides qualifications beyond basic mandatory safety requirements to fulfil the diverse competency requirements of occupations in ancillary and support areas associated with maritime operations.

Developments in the MAR13 Maritime Training Package reflect the skills in demand in the maritime industry, such as:

- General Purpose Hand
- Integrated Rating
- Deck Officer
- Marine Engineer
- Ship's Master.

While the nature of the work in the maritime industry is not conducive to flexible working arrangements such as part-time work, the industry is exploring other opportunities to grow the workforce, for example by:

- developing clear pathways within the industry (such as onshore roles) and from other related industries (such as fishing)
- encouraging greater participation by under-represented groups, such as women and Indigenous workers.

Figure 1 Examples of areas of maritime operations covered by the Maritime Training Package



Coverage of the MAR13 Maritime Training Package

The coverage of the MAR13 Maritime Training Package includes:

Regulated commercial maritime occupations on commercial vessels engaged in coastal operations as described in Part D of the National Standard for Commercial

Vessels (NSCV). This includes:

- General Purpose Hand
- Coxswain Grades 1, 2 and 3
- Marine Engine Driver Grade 3
- Marine Engine Driver Grade 2
-
- Marine Engine Driver Grade 1
- Master < 24 m
- Master Class < 35 m and Mate < 80 m Near Coastal
- Engineer Class 3
- Master Class less than 80 metres
- Marine Engine Driver (Steam)

Regulated commercial maritime occupations on commercial vessels engaged in ocean-going operations falling within the jurisdiction of the Australian Maritime Safety Authority (AMSA) and described in the Marine Orders Part 3: Seagoing Qualifications under the Australian Navigation Act 2012. This includes:

- Integrated Rating
- Chief Integrated Rating
- Watchkeeper (Deck)
- Master (< 500 GT)
- Engineer Watchkeeper
- Master (Unlimited)
- Marine Cook
- Master (< 3,000 GT)
- Chief Mate (Unlimited)
- Chief Mate (< 3,000 GT)
- Engineer Class 1
- Engineer Class 2
- Engineer Class 3 STCW

Persons employed on the various types of vessels in unregulated occupations who may not be specifically operating and maintaining the vessel and therefore are not included in the regulated occupations above but who may need to fulfil the basic competency requirements specified by marine authorities for maritime safety, survival, environmental protection, emergency procedures, etc.

How the TDM07 Maritime Training Package was reviewed

To review the TDM07 Maritime Training Package, sector specific steering committees were established with representation from various aspects of the maritime industry and associated job roles.

Broadly the sectors were:

- Engineering Standards of Training, Certification & Watchkeeping for Seafarers
- Deck Standards of Training, Certification & Watchkeeping for Seafarers
- Deck Near Coastal
- Engineering Near Coastal
- Ratings
- Marine Surveyors.

Steering committees comprised representatives from appropriate industry operators and their peak bodies, Regulators at both State and Federal levels, major RTOs, and Union representatives where applicable.

Steering Committee members were required to establish the job roles applicable to their sectors and identify the competencies that would be required. The job roles were then aligned to regulatory requirements and a structure for each qualification proposed. Once a structure had been agreed to, units of competency were developed and discussed with steering committee members. Discussions were conducted via face-to-face meetings and email exchanges.

Drafts of agreed material were then placed on the TLISC website for comment.

The broad processes for the review of the TDM07 Maritime Training Package included:

Desktop research drawing from a range of information sources, including:

- TDM07 Maritime Training Package Version 1.0
- maritime regulations, certification requirements and codes of practice
- trends and developments in the organisation of the Maritime Industry
- international trends and developments in maritime training
- Guidelines for Training Package Development
- related developments in higher education and schools
- related Training Packages (e.g. tourism, hospitality, business services, engineering, health, public sector)
- existing approved courses for maritime occupations.

Industry and VET consultation processes, including:

- consultative forums of key stakeholders at key stages of the project
- individual consultative meetings as required
- maintenance of an issues register
- meetings with the equity adviser appointed to the review
- meetings with representatives of the various marine regulatory authorities
- development of schedules of agreed changes

- reference groups of industry advisers
- posting of draft new and revised units of competency on the Transport & Logistics Industry Skills Council website for review and comment by stakeholders.

Validation and editing of final products:

- Editing to ensure the material conformed to the Training Package Development Handbook requirements
- Checks to ensure that the new MAR13 Training Packages meets the requirements in the Guidelines for Training Package Development
- Proofreading of the units of competency and the four volumes that comprise the new MAR13 Maritime Training Package.

Relationship between the Qualifications in the MAR13 Maritime Training Package and Marine Regulatory Requirements at the National and State/Territory Levels

Regulatory requirements for occupations in the Australian Maritime Industry for the purposes of the MAR13 Maritime Training Package can be divided into two categories: Coastal operations and ocean-going operations.

Coastal operations refers to all domestic marine operations falling under the jurisdiction of the relevant State and Territory marine authorities and covers the occupations defined within the National Standard for Commercial Vessels (NSCV) Part D ‘Crew Competencies’ administered by AMSA. This includes the following specific marine occupations:

Ocean-going operations refers to all international maritime operations and related occupations covered by and defined within Marine Orders – Part 3, Section 6 under the Navigation Act 2012. This includes the following specific marine occupations:

Information on the occupations and related certification requirements within the Coastal and Ocean-going sectors of the Maritime Industry in Australia can be obtained by contacting the relevant State and Territory Marine Authority and the AMSA. Website and contact details for the various marine authorities are provided in the table below.

Organisation	Website	Telephone
Australian Maritime Safety Authority (AMSA)	http://www.amsa.gov.au	(02) 6279 5000
National Marine Safety Committee (NMSC)	http://www.nmsc.gov.au	(02) 9247 2124
NSW Maritime	http://www.maritime.nsw.gov.au	(02) 9563 8511
Marine Safety Victoria (MSV)	http://www.marinesafety.vic.gov.au	(03) 9655 3399

Maritime Safety Queensland (MSQ)	http://www.msq.qld.gov.au	(07) 3120 7462
Marine and Safety Tasmania (MAST)	http://www.mast.tas.gov.au	(03) 6233 8801
WA Department for Planning and Infrastructure (Marine Safety Section)	http://www.dpi.wa.gov.au/imarine	(08) 9264 7777
NT Department of Planning and Infrastructure (Marine Safety Section)	http://www.ipe.nt.gov.au/whatwedo/marinesafety/index.html	(08) 8999 5285
Transport SA (Marine Safety Section)	http://www.marine.transport.sa.gov.au/index.asp	(08) 8343 2222

Two key reference documents that provide information on certification requirements for various maritime occupations are:

- National Standard for Commercial Vessels (NSCV) Part D ‘Crew Competencies’ (downloadable from the NMSC website)
- Marine Orders Part 3 ‘Seagoing Qualifications’ under the Navigation Act 2012 (downloadable from the AMSA website).
-

Qualifications Framework

The Australian Qualifications Framework

What is the Australian Qualifications Framework?

A brief overview of the Australian Qualifications Framework (AQF) follows. For a full explanation of the AQF, see the AQF Implementation Handbook.

http://www.aqf.edu.au/Portals/0/Documents/Handbook/AQF_Handbook_07.pdf

The AQF provides a comprehensive, nationally consistent framework for all qualifications in post-compulsory education and training in Australia. In the vocational education and training (VET) sector it assists national consistency for all trainees, learners, employers and providers by enabling national recognition of qualifications and Statements of Attainment.

Training Package qualifications in the VET sector must comply with the titles and guidelines of the AQF. Endorsed Training Packages provide a unique title for each AQF qualification which must always be reproduced accurately.

Qualifications

Training Packages can incorporate the following eight AQF qualifications.

- Certificate I in ...
- Certificate II in ...

- Certificate III in ...
- Certificate IV in ...
- Diploma of ...
- Advanced Diploma of ...
- Vocational Graduate Certificate of ...
- Vocational Graduate Diploma of ...

On completion of the requirements defined in the Training Package, a Registered Training Organisation (RTO) may issue a nationally recognised AQF qualification. Issuance of AQF qualifications must comply with the advice provided in the AQF Implementation Handbook and the AQTF 2010 Essential Standards for Initial and Continuing Registration.

Statement of Attainment

A Statement of Attainment is issued by a Registered Training Organisation when an individual has completed one or more units of competency from nationally recognised qualification(s)/courses(s). Issuance of Statements of Attainment must comply with the advice provided in the current AQF Implementation Handbook and the AQTF 2010 Essential Standards for Initial and Continuing Registration.

Under the AQTF 2010, RTOs must recognise the achievement of competencies as recorded on a qualification or Statement of Attainment issued by other RTOs. Given this, recognised competencies can progressively build towards a full AQF qualification.

AQF Guidelines and Learning Outcomes

The AQF Implementation Handbook provides a comprehensive guideline for each AQF qualification. A summary of the learning outcome characteristics and their distinguishing features for each VET related AQF qualification is provided below.

Certificate I

Characteristics of Learning Outcomes

Breadth, depth and complexity of knowledge and skills would prepare a person to perform a defined range of activities most of which may be routine and predictable.

Applications may include a variety of employment related skills including preparatory access and participation skills, broad-based induction skills and/or specific workplace skills. They may also include participation in a team or work group.

Distinguishing Features of Learning Outcomes

- Do the competencies enable an individual with this qualification to:
- demonstrate knowledge by recall in a narrow range of areas;
- demonstrate basic practical skills, such as the use of relevant tools;
- perform a sequence of routine tasks given clear direction; and
- receive and pass on messages/information.

Certificate II*Characteristics of Learning Outcomes*

Breadth, depth and complexity of knowledge and skills would prepare a person to perform in a range of varied activities or knowledge application where there is a clearly defined range of contexts in which the choice of actions required is usually clear and there is limited complexity in the range of operations to be applied.

Performance of a prescribed range of functions involving known routines and procedures and some accountability for the quality of outcomes.

Applications may include some complex or non-routine activities involving individual responsibility or autonomy and/or collaboration with others as part of a group or team.

Distinguishing Features of Learning Outcomes

Do the competencies enable an individual with this qualification to:

- demonstrate basic operational knowledge in a moderate range of areas;
- apply a defined range of skills;
- apply known solutions to a limited range of predictable problems;
- perform a range of tasks where choice between a limited range of options is required;
- assess and record information from varied sources; and
- take limited responsibility for own outputs in work and learning.

Certificate III*Characteristics of Learning Outcomes*

Breadth, depth and complexity of knowledge and competencies would cover selecting, adapting and transferring skills and knowledge to new environments and providing technical advice and some leadership in resolution of specified problems. This would be applied across a range of roles in a variety of contexts with some complexity in the extent and choice of options available.

Performance of a defined range of skilled operations, usually within a range of broader related activities involving known routines, methods and procedures, where some discretion and judgement is required in the selection of equipment, services or contingency measures and within known time constraints.

Applications may involve some responsibility for others. Participation in teams including group or team coordination may be involved.

Distinguishing Features of Learning Outcomes

Do the competencies enable an individual with this qualification to:

- demonstrate some relevant theoretical knowledge;
- apply a range of well-developed skills;
- apply known solutions to a variety of predictable problems;

- perform processes that require a range of well-developed skills where some discretion and judgement is required;
- interpret available information, using discretion and judgement;
- take responsibility for own outputs in work and learning; and
- take limited responsibility for the output of others.

Certificate IV

Characteristics of Learning Outcomes

Breadth, depth and complexity of knowledge and competencies would cover a broad range of varied activities or application in a wider variety of contexts most of which are complex and non-routine. Leadership and guidance are involved when organising activities of self and others as well as contributing to technical solutions of a non-routine or contingency nature.

Performance of a broad range of skilled applications, including the requirement to evaluate and analyse current practices, develop new criteria and procedures for performing current practices and provision of some leadership and guidance to others in the application and planning of the skills.

Applications involve responsibility for, and limited organisation of, others.

Distinguishing Features of Learning Outcomes

Do the competencies enable an individual with this qualification to:

- demonstrate understanding of a broad knowledge base incorporating some theoretical concepts;
- apply solutions to a defined range of unpredictable problems;
- identify and apply skill and knowledge areas to a wide variety of contexts, with depth in some areas;
- identify, analyse and evaluate information from a variety of sources;
- take responsibility for own outputs in relation to specified quality standards; and
- take limited responsibility for the quantity and quality of the output of others.

Diploma

Characteristics of Learning Outcomes

Breadth, depth and complexity covering planning and initiation of alternative approaches to skills or knowledge applications across a broad range of technical and/or management requirements, evaluation and coordination.

The self-directed application of knowledge and skills, with substantial depth in some areas where judgement is required in planning and selecting appropriate equipment, services and

techniques for self and others.

Applications involve participation in development of strategic initiatives as well as personal responsibility and autonomy in performing complex technical operations or organising others. It may include participation in teams, including teams concerned with planning and evaluation functions. Group or team coordination may be involved.

The degree of emphasis on breadth as against depth of knowledge and skills may vary between qualifications granted at this level.

Distinguishing Features of Learning Outcomes

Do the competencies or learning outcomes enable an individual with this qualification to:

- demonstrate understanding of a broad knowledge base incorporating theoretical concepts, with substantial depth in some areas;
- analyse and plan approaches to technical problems or management requirements;
- transfer and apply theoretical concepts and/or technical or creative skills to a range of situations;
- evaluate information, using it to forecast for planning or research purposes;
- take responsibility for own outputs in relation to broad quantity and quality parameters; and
- take some responsibility for the achievement of group outcomes.

Advanced Diploma

Characteristics of Learning Outcomes

Breadth, depth and complexity involving analysis, design, planning, execution and evaluation across a range of technical and/or management functions including development of new criteria or applications or knowledge or procedures.

The application of a significant range of fundamental principles and complex techniques across a wide and often unpredictable variety of contexts in relation to either varied or highly specific functions. Contribution to the development of a broad plan, budget or strategy is involved and accountability and responsibility for self and others in achieving the outcomes is involved.

Applications involve significant judgement in planning, design, technical or leadership/guidance functions related to products, services, operations or procedures.

The degree of emphasis on breadth as against depth of knowledge and skills may vary between qualifications granted at this level.

Distinguishing Features of Learning Outcomes

Do the competencies or learning outcomes enable an individual with this qualification to:

- demonstrate understanding of specialised knowledge with depth in some areas;
- analyse, diagnose, design and execute judgements across a broad range of technical or management functions;

- generate ideas through the analysis of information and concepts at an abstract level;
- demonstrate a command of wide-ranging, highly specialised technical, creative or conceptual skills;
- demonstrate accountability for personal outputs within broad parameters; and
- demonstrate accountability for personal and group outcomes within broad parameters.

Vocational Graduate Certificate

Characteristics of competencies or learning outcomes

- The self-directed development and achievement of broad and specialised areas of knowledge and skills, building on prior knowledge and skills.
- Substantial breadth and complexity involving the initiation, analysis, design, planning, execution and evaluation of technical and management functions in highly varied and highly specialised contexts.
- Applications involve making significant, high-level, independent judgements in major broad or planning, design, operational, technical and management functions in highly varied and specialised contexts. They may include responsibility and broad-ranging accountability for the structure, management and output of the work or functions of others.
- The degree of emphasis on breadth, as opposed to depth, of knowledge and skills may vary between qualifications granted at this level.

Distinguishing features of learning outcomes

- Demonstrate the self-directed development and achievement of broad and specialised areas of knowledge and skills, building on prior knowledge and skills.
- Initiate, analyse, design, plan, execute and evaluate major broad or technical and management functions in highly varied and highly specialised contexts.
- Generate and evaluate ideas through the analysis of information and concepts at an abstract level.
- Demonstrate a command of wide-ranging, highly specialised technical, creative or conceptual skills in complex contexts.
- Demonstrate responsibility and broad-ranging accountability for the structure, management and output of the work or functions of others.

Vocational Graduate Diploma

Characteristics of competencies or learning outcomes

- The self-directed development and achievement of broad and specialised areas of knowledge and skills, building on prior knowledge and skills.

- Substantial breadth, depth and complexity involving the initiation, analysis, design, planning, execution and evaluation of major functions, both broad and highly specialised, in highly varied and highly specialised contexts.
- Further specialisation within a systematic and coherent body of knowledge.
- Applications involve making high-level, fully independent, complex judgements in broad planning, design, operational, technical and management functions in highly varied and highly specialised contexts. They may include full responsibility and accountability for all aspects of work and functions of others, including planning, budgeting and strategy development.
- The degree of emphasis on breadth, as opposed to depth, of knowledge and skills may vary between qualifications granted at this level.

Distinguishing features of learning outcomes

- Demonstrate the self-directed development and achievement of broad and highly specialised areas of knowledge and skills, building on prior knowledge and skills.
- Initiate, analyse, design, plan, execute and evaluate major functions, both broad and within highly varied and highly specialised contexts.
- Generate and evaluate complex ideas through the analysis of information and concepts at an abstract level.
- Demonstrate an expert command of wide-ranging, highly specialised, technical, creative or conceptual skills in complex and highly specialised or varied contexts.
- Demonstrate full responsibility and accountability for personal outputs.
- Demonstrate full responsibility and accountability for all aspects of the work or functions of others, including planning, budgeting and strategy.

Overview of MAR13 Maritime Training Package Qualifications and Packaging Rules

Overview

The qualifications described in the MAR13 Maritime Training Package fall into three categories:

- Qualifications and related units of competency for regulated maritime commercial occupations on commercial vessels engaged in coastal operations as described in the National Standard for Commercial Vessels (NSCV).
- Qualifications and related units of competency for regulated maritime commercial occupations falling within the jurisdiction of the Australian Maritime Safety Authority (AMSA) and the Marine Orders Part 3: Seagoing Qualifications under the Australian Navigation Act 2012.
- Qualifications and related units of competency not specifically aligned with regulated maritime occupations but that may lead to regulatory occupations.

Consequently, MAR13 Maritime Training Package qualifications use a core only model to reflect the regulatory nature of the work.

For qualifications related to vessels involved in coastal operations, these requirements were based on National Standards for Commercial Vessels (Part D) as well as other regulatory requirements of individual State and Territory marine authorities.

For qualifications related to larger vessels engaged in ocean-going operations, the requirements were based on information contained in Marine Orders Part 3: Seagoing Qualifications, information on educational requirements provided by AMSA and the sections of the STCW Code (issued by the International Maritime Organisation [IMO]) dealing with crew competencies involving safety, survival, environmental protection, emergency procedures, etc.

Skill Sets

Definition

Skill Sets are defined as single units of competency, or combinations of units of competency from an endorsed Training Package, which link to a licence or regulatory requirement, or defined industry need.

Wording on Statements of Attainment

Skill Sets are a way of publicly identifying logical groupings of units of competency which meet an identified need or industry outcome. Skill Sets are not qualifications.

Where skill sets are identified in a Training Package, the Statement of Attainment can set out the competencies a person has achieved in a way that is consistent and clear for employers and others. This is done by including the wording ‘these competencies meet [insert skill set title or identified industry area] need’ on the Statement of Attainment. This wording applies only to skill sets that are formally identified as such in the endorsed Training Package. See the 2010 edition of the AQF Implementation Handbook for advice on wording on Statements of Attainment. http://www.aqf.edu.au/Portals/0/Documents/Handbook/AQF_Handbook_07.pdf

Skill Sets in this Training Package

This section provides information on Skill Sets within this Training Package, with the following important disclaimer: Readers should ensure that they have also read the part of the Training Package that outlines licensing and regulatory requirements.

MARSS00002 Safety Training Certification Skill Set
MARSS00003 Shipboard Safety Skill Set
MARSS00001 Coxswain Grade 1 and Grade 2 Skill Set *NOTE: Entry requirement for this Skill Set is the MAR20113 Certificate II in Maritime Operations (Coxswain)

Assessment Guidelines

Introduction

These Assessment Guidelines provide the endorsed framework for assessment of units of competency in this Training Package. They are designed to ensure that assessment is consistent with the Australian Quality Training Framework (AQTF) Essential Standards for Initial and Continuing Registration. Assessments against the units of competency in this Training Package must be carried out in accordance with these Assessment Guidelines.

Assessment System Overview

This section provides an overview of the requirements for assessment when using this Training Package, including a summary of the AQTF requirements; licensing and registration requirements; and assessment pathways.

Quality assessment underpins the credibility of the vocational education and training sector. The Assessment Guidelines of a Training Package are an important tool in supporting quality assessment.

Assessment within the National Skills Framework is the process of collecting evidence and making judgements about whether competency has been achieved to confirm whether an individual can perform to the standards expected in the workplace, as expressed in the relevant endorsed unit of competency.

Assessment must be carried out in accordance with the:

- benchmarks for assessment
- specific industry requirements
- principles of assessment
- rules of evidence
- assessment requirements set out in the AQTF.

Benchmarks for Assessment

The endorsed units of competency in this Training Package are the benchmarks for assessment. As such, they provide the basis for nationally recognised Australian Qualifications Framework (AQF) qualifications and Statements of Attainment issued by Registered Training Organisations (RTOs).

Principles of Assessment

All assessments carried out by RTOs are required to demonstrate compliance with the principles of assessment:

- validity
- reliability
- flexibility
- fairness
- sufficiency.

These principles must be addressed in the:

- design, establishment and management of the assessment system for this Training Package
- development of assessment tools
- the conduct of assessment.

Validity

Assessment is valid when the process is sound and assesses what it claims to assess. Validity requires that:

- (a) assessment against the units of competency must cover the broad range of skills and knowledge that are essential to competent performance
- (b) assessment of knowledge and skills must be integrated with their practical application
- (c) judgement of competence must be based on sufficient evidence (that is, evidence gathered on a number of occasions and in a range of contexts using different assessment methods). The specific evidence requirements of each unit of competency provide advice on sufficiency

Reliability

Reliability refers to the degree to which evidence presented for assessment is consistently interpreted and results in consistent assessment outcomes. Reliability requires the assessor to have the required competencies in assessment and relevant vocational competencies (or to assess in conjunction with someone who has the vocational competencies). It can only be achieved when assessors share a common interpretation of the assessment requirements of the unit(s) being assessed.

Flexibility

To be flexible, assessment should reflect the candidate's needs; provide for recognition of competencies no matter how, where or when they have been acquired; draw on a range of methods appropriate to the context, competency and the candidate; and support continuous competency development.

Fairness

Fairness in assessment requires consideration of the individual candidate's needs and characteristics, and any reasonable adjustments that need to be applied to take account of them. It requires clear communication between the assessor and the candidate to ensure that the candidate is fully informed about, understands and is able to participate in, the assessment process, and agrees that the process is appropriate. It also includes an opportunity for the person being assessed to challenge the result of the assessment and to be reassessed if necessary.

Sufficiency

Sufficiency relates to the quality and quantity of evidence assessed. It requires collection of enough appropriate evidence to ensure that all aspects of competency have been satisfied and that competency can be demonstrated repeatedly. Supplementary sources of evidence may be necessary. The specific evidence requirements of each unit of competency provide advice on sufficiency. Sufficiency is also one of the rules of evidence.

Rules of Evidence

The rules of evidence guide the collection of evidence that address the principles of validity and reliability, guiding the collection of evidence to ensure that it is valid, sufficient, current and authentic.

Valid

Valid evidence must relate directly to the requirements of the unit of competency. In ensuring evidence is valid, assessors must ensure that the evidence collected supports demonstration of the outcomes and performance requirements of the unit of competency together with the knowledge and skills necessary for competent performance. Valid evidence must encapsulate the breadth and depth of the unit of competency, which will necessitate using a number of different assessment methods.

Sufficient

Sufficiency relates to the quality and quantity of evidence assessed. It requires collection of enough appropriate evidence to ensure that all aspects of competency have been satisfied and that competency can be demonstrated repeatedly. Supplementary sources of evidence may be necessary. The specific evidence requirements of each unit of competency provide advice on sufficiency.

Current

In assessment, currency relates to the age of the evidence presented by a candidate to demonstrate that they are still competent. Competency requires demonstration of current performance, so the evidence collected must be from either the present or the very recent past.

Authentic

To accept evidence as authentic, an assessor must be assured that the evidence presented for assessment is the candidate's own work.

Assessment Requirements of the Australian Quality Training Framework

Assessment leading to nationally recognised AQF qualifications and Statements of Attainment in the vocational education and training sector must meet the requirements of the AQTF as expressed in the AQTF 2010 Essential Standards for Registration.

The AQTF 2010 Essential Standards for Initial and Continuing Registration can be downloaded from <www.training.com.au>.

The following points summarise the assessment requirements.

Registration of Training Organisations

Assessment must be conducted by, or on behalf of, an RTO formally registered by a State or Territory Registering Body in accordance with the AQTF. The RTO must have the specific units of competency and/or AQF qualifications on its scope of registration.

Quality Training and Assessment

Each RTO must provide quality training and assessment across all its operations. See the AQTF 2010 Essential Standards for Initial and Continuing Registration, Standard 1.

Assessor Competency Requirements

Each person involved in training and assessment must be competent for the functions they perform. See the AQTF 2010 Essential Standards for Initial and Continuing Registration, Standard 1 for assessor (and trainer) competency requirements. See also the AQTF 2010 Users' Guide to the Essential Standards for Registration – Appendix 2.

Assessment Requirements

The RTOs assessments, including RPL, must meet the requirements of the relevant endorsed Training Package. See the AQTF 2010 Essential Standards for Initial and Continuing Registration.

Assessment Strategies

Each RTO must have strategies for training and assessment that meet the requirements of the relevant Training Package or accredited course and are developed in consultation with industry stakeholders. See the AQTF 2010 Essential Standards for Initial and Continuing Registration.

National Recognition

Each RTO must recognise the AQF qualifications and Statements of Attainment issued by any other RTO. See the AQTF 2010 Essential Standards for Initial and Continuing Registration.

Access and Equity and Client Outcomes

Each RTO must adhere to the principles of access and equity and maximise outcomes for its clients. See the AQTF 2010 Essential Standards for Initial and Continuing Registration.

Monitoring Assessments

Training and/or assessment provided on behalf of the RTO must be monitored to ensure that it is in accordance with all aspects of the AQTF 2010 Essential Standards for Initial and Continuing Registration.

Recording Assessment Outcomes

Each RTO must manage records to ensure their accuracy and integrity. See the AQTF 2010 Essential Standards for Initial and Continuing Registration.

Issuing AQF qualifications and Statements of Attainment

Each RTO must issue AQF qualifications and Statements of Attainment that meet the requirements of the current AQF Implementation Handbook and the endorsed Training Packages within the scope of its registration. An AQF qualification is issued once the full requirements for a qualification, as specified in the nationally endorsed Training Package are met. A Statement of Attainment is issued when an individual has completed one or more units of competency from nationally recognised qualification(s)/courses(s). See the AQTF and the edition of the AQF Implementation Handbook—available on the AQF Council website <www.aqf.edu.au>

Licensing/Registration Requirements

This section provides information on licensing/registration requirements for this Training Package, with the following important disclaimer.

Licensing and registration requirements that apply to specific industries, and vocational education and training, vary between each State and Territory, and can regularly change. The developers of this Training Package consider that the licensing/registration requirements described in this section apply to RTOs, assessors or candidates with respect to this Training Package. While reasonable care has been taken in its preparation, the developers of this Training Package and the Department cannot guarantee that the list is definitive or accurate at the time of reading; the information in this section is provided in good faith on that basis.

Contact the relevant State or Territory Department(s) to check if the licensing/registration requirements described below still apply, and to check if there are any others with which you must comply. For further information contact www.tlisc.org.au

Certification and approval requirements: AMSA and marine authorities

Users of the MAR13 Maritime Training Package should check with AMSA or the relevant marine authorities to confirm the current requirements for issuing maritime certificates of competency and approving RTOs to train and assess people preparing for such certification.

For further information contact:

Transport & Logistics Industry Skills Council

Website: <http://www.tlisc.org.au>

Tel: 03 9604 7200

Requirements for RTOs

Selected units of competency and qualifications in this Training Package provide the basis for a range of certification and provider approval arrangements. To satisfy these certification and approval arrangements, RTOs should contact AMSA or the relevant State or Territory marine authority to check and confirm requirements. Contact details are listed below.

Requirements for Assessors

In order to conduct assessment for the units and qualifications related to regulated maritime occupations, assessors must meet the requirements determined by AMSA or the relevant State or Territory marine authorities in addition to the AQTF requirements. Assessors should carry out assessment under the direction of an RTO with approval from AMSA and the relevant State and Territory marine authorities. Contact details are listed below.

Organisation	Website	Telephone
Australian Maritime Safety Authority (AMSA)	http://www.amsa.gov.au/	(02) 6279 5000
NSW Maritime	http://www.maritime.nsw.gov.au/	(02) 9563 8511
Marine Safety Victoria (MSV)	http://www.marinesafety.vic.gov.au/	(03) 9655 3399

Maritime Safety Queensland (MSQ)	http://www.msq.qld.gov.au/	(07) 3120 7462
Marine and Safety Tasmania (MAST)	http://www.mast.tas.gov.au/	(03) 6233 8801
WA Department for Planning and Infrastructure (Marine Safety Section)	http://www.dpi.wa.gov.au/imarine/	(08) 9264 7777
NT Department of Planning and Infrastructure (Marine Safety Section)	http://www.ipe.nt.gov.au/whatwedo/marinesafety/index.html	(08) 8999 5285
Transport SA (Marine Safety Section)	http://www.marine.transport.sa.gov.au/index.asp	(08) 8343 2222

Requirements for Candidates

Individuals being assessed under statutory licensing and industry registration systems must comply with training and experience requirements additional to the minimum requirements identified in this Training Package, as outlined by AMSA or the relevant State or Territory marine authority. Important reference documents include:

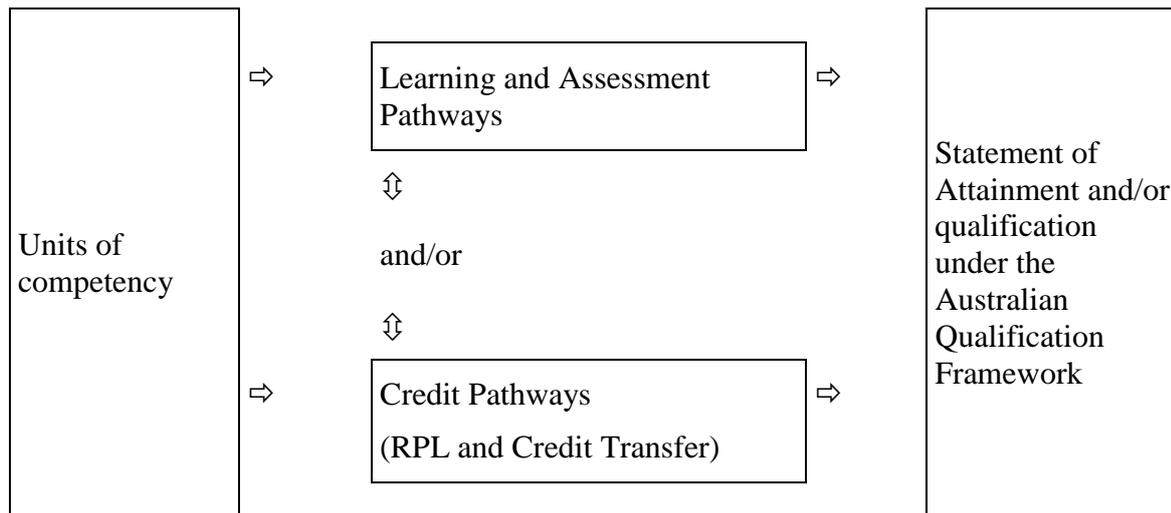
- For regulated occupations involved in ocean-going operations: Marine Orders – Part 3: Seagoing Qualifications under the Australian Navigation Act 2012, downloadable from the AMSA website <<http://www.amsa.gov.au>>.
- For regulated occupations involved in coastal operations: Part D of the National Standard for Commercial Vessels, downloadable from the National Marine Safety Committee (NMSC) website <<http://www.nmsc.gov.au>>.

Pathways

The competencies in this Training Package may be attained in a number of ways including through:

- formal or informal education and training
- experiences in the workplace
- general life experience, and/or
- any combination of the above.

Assessment under this Training Package leading to an AQF qualification or Statement of Attainment may follow a learning and assessment pathway, or a recognition pathway, or a combination of the two as illustrated in the following diagram.



Each of these assessment pathways leads to full recognition of competencies held – the critical issue is that the candidate is competent, not how the competency was acquired.

Assessment, by any pathway, must comply with the assessment requirements set out in the Assessment Guidelines of the Training Package, the AQTF and, where relevant, the Australian Qualifications Framework.

Learning and Assessment Pathways

Usually, learning and assessment are integrated, with evidence being collected and feedback provided to the candidate at anytime throughout the learning and assessment process.

Learning and assessment pathways may include structured programs in a variety of contexts using a range of strategies to meet different learner needs. Structured learning and assessment programs could be: group-based, work-based, project-based, self-paced, action learning-based; conducted by distance or e-learning; and/or involve practice and experience in the workplace.

Learning and assessment pathways to suit Australian Apprenticeships have a mix of formal structured training and structured workplace experience with formative assessment activities through which candidates can acquire and demonstrate skills and knowledge from the relevant units of competency.

Credit Pathways

Credit is the value assigned for the recognition of equivalence in content between different types of learning and/or qualifications which reduces the volume of learning required to achieve a qualification.

Credit arrangements must be offered by all RTOs that offer Training Package qualifications. Each RTO must have a systematic institutional approach with clear, accessible and transparent policies and procedures.

Competencies already held by individuals can be formally assessed against the units of competency in this Training Package, and should be recognised regardless of how, when or where they were acquired, provided that the learning is relevant to the unit of competency outcomes.

Recognition of Prior Learning

Recognition of Prior Learning (RPL) is an assessment process which determines the credit outcomes of an individual application for credit.

The availability of Recognition of Prior Learning (RPL) provides all potential learners with access to credit opportunities.

The recognition of prior learning pathway is appropriate for candidates who have previously attained skills and knowledge and who, when enrolling in qualifications, seek to shorten the duration of their training and either continue or commence working. This may include the following groups of people:

- existing workers;
- individuals with overseas qualifications;
- recent migrants with established work histories;
- people returning to the workplace; and
- people with disabilities or injuries requiring a change in career.

As with all assessment, RPL assessment should be undertaken by academic or teaching staff with expertise in the subject, content of skills area, as well as knowledge of and expertise in RPL assessment policies and procedures.

Assessment methods used for RPL should provide a range of ways for individuals to demonstrate that they have met the required outcomes and can be granted credit. These might include:

- questioning (oral or written)
- consideration of a portfolio and review of contents
- consideration of third party reports and/or other documentation such as documentation such as articles, reports, project material, papers, testimonials or other products prepared by the RPL applicant that relate to the learning outcomes of the relevant qualification component
- mapping of learning outcomes from prior formal or non-formal learning to the relevant qualification components
- observation of performance, and
- participation in structured assessment activities the individual would normally be required to undertake if they were enrolled in the qualification component/s.

In a Recognition of Prior Learning (RPL) pathway, the candidate provides current, quality evidence of their competency against the relevant unit of competency. This process may be directed by the candidate and verified by the assessor. Where the outcomes of this process indicate that the candidate is competent, structured training is not required. The RPL requirements of the AQTF must be met.

As with all assessment, the assessor must be confident that the evidence indicates that the candidate is currently competent against the endorsed unit of competency. This evidence may take a variety of forms and might include certification, references from past employers, testimonials from clients, work samples and/or observation of the candidate. The onus is on candidates to provide sufficient evidence to satisfy assessors that they currently hold the relevant competencies. In judging evidence, the assessor must ensure that the evidence of prior learning is:

- authentic (the candidate's own work);
- valid (directly related to the current version of the relevant endorsed unit of competency);
- reliable (shows that the candidate consistently meets the endorsed unit of competency);
- current (reflects the candidate's current capacity to perform the aspect of the work covered by the endorsed unit of competency); and
- sufficient (covers the full range of elements in the relevant unit of competency and addresses the four dimensions of competency, namely task skills, task management skills, contingency management skills, and job/role environment skills).

Credit Transfer

Credit transfer is a process which provides learners with agreed and consistent credit outcomes based on equivalences in content between matched qualifications.

This process involves education institutions:

- mapping, comparing and evaluating the extent to which the defined learning outcomes and assessment requirements of the individual components of one qualification are equivalent to the learning outcomes and assessment requirements of the individual components of another qualification
- making an educational judgment of the credit outcomes to be assigned between the matched components of the two qualifications
- setting out the agreed credit outcomes in a documented arrangement or agreement, and
- publicising the arrangement/agreement and credit available.

Combination of Pathways

Credit may be awarded on the basis of a combination of credit transfer plus an individual RPL assessment for additional learning. Once credit has been awarded on the basis of RPL, subsequent credit transfer based on these learning outcomes should not include revisiting the RPL assessment but should be based on credit transfer or articulation or other arrangements between providers.

Where candidates for assessment have gained competencies through work and life experience and gaps in their competence are identified, or where they require training in new areas, a combination of pathways may be appropriate.

In such situations, the candidate may undertake an initial assessment to determine their current competency. Once current competency is identified, a structured learning and assessment program ensures that the candidate acquires the required additional competencies identified as gaps.

Assessor Requirements

This section identifies the specific requirements on the vocational competence and experience for assessors, to ensure that they meet the needs of industry and their obligations under AQTF, and clarifies how others may contribute to the assessment process where one person alone does not hold all the required competencies.

Assessor Competencies

The AQTF specifies mandatory competency requirements for assessors. For information, Element 1.4 from the AQTF 2007 Essential Standards for Registration follows:

- 1.4 Training and assessment are conducted by trainers and assessors who:
- have the necessary training and assessment competencies as determined by the National Quality Council or its successors, and
 - have the relevant vocational competencies at least to the level being delivered or assessed, and
 - can demonstrate current industry skills directly relevant to the training/assessment being undertaken, and
 - continue to develop their Vocational Education and Training (VET) knowledge and skills as well as their industry currency and trainer/assessor competence.

* See AQTF 2010 Users' Guide to the Essential Standards for Registration – Appendix 2

Designing Assessment Tools

This section provides an overview on the use and development of assessment tools.

Use of Assessment Tools

Assessment tools provide a means of collecting the evidence that assessors use in making judgements about whether candidates have achieved competency.

There is no set format or process for the design, production or development of assessment tools. Assessors may use prepared assessment tools, such as those specifically developed to support this Training Package, or they may develop their own.

Using Prepared Assessment Tools

If using prepared assessment tools, assessors should ensure these relate to the current version of the relevant unit of competency. The current unit of competency can be checked on the National Register <www.training.gov.au>.

Developing Assessment Tools

When developing their own assessment tools, assessors must ensure that the tools:

- are benchmarked against the relevant unit or units of competency;
- are reviewed as part of the validation of assessment strategies required under the AQTF;
- and

- meet the assessment requirements expressed in the AQTF 2010 Essential Standards for Initial and Continuing Registration.

A key reference for assessors developing assessment tools is TAE10 Training and Education Training Package.

Language, Literacy and Numeracy

The design of assessment tools must reflect the language, literacy and numeracy competencies required for the performance of a task in the workplace and not exceed these expectations.

Conducting Assessment

This section details the mandatory assessment requirements and provides information on equity in assessment including reasonable adjustment.

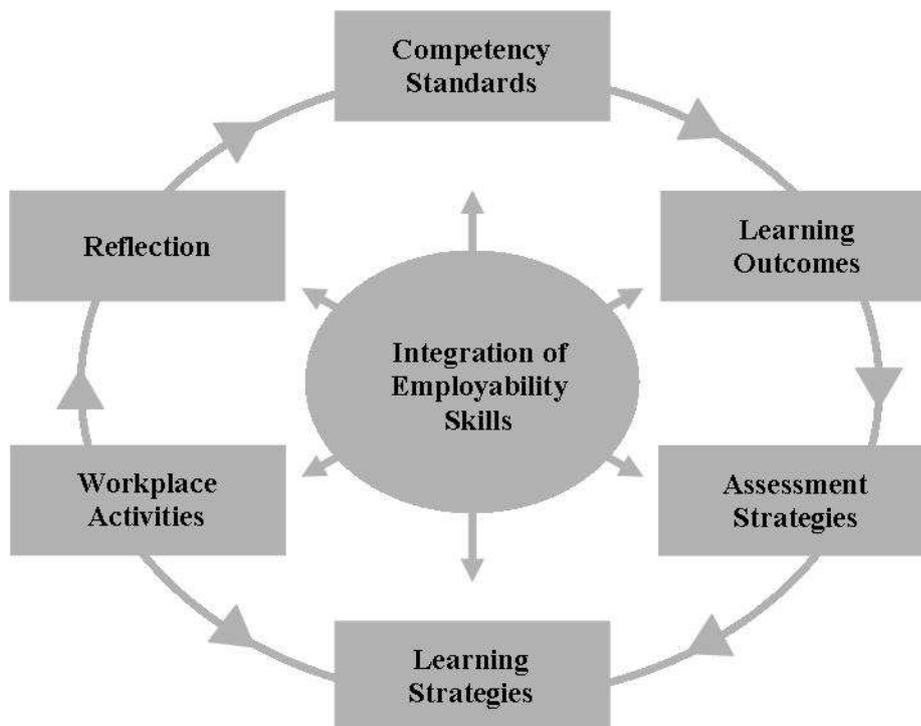
Mandatory Assessment Requirements

Assessments must meet the criteria set out in the AQTF 2010 Essential Standards for Initial and Continuing Registration. For information, the mandatory assessment requirements from Standard 1 from the AQTF 2010 Essential Standards for Initial and Continuing Registration are as follows:

- 1.5 Assessment, including Recognition of Prior Learning (RPL):
- meets the requirements of the relevant Training Package or accredited course
 - is conducted in accordance with the principles of assessment and the rules of evidence
 - meets workplace and, where relevant, regulatory requirements
 - is systematically validated.

Assessment of Employability Skills

Employability Skills are integral to workplace competency. As such, they must be considered in the design, customisation, delivery and assessment of vocational education and training programs in an integrated and holistic way, as represented diagrammatically below.



Employability Skills are embedded within each unit of competency, and an Employability Skills Summary is available for each qualification. Training providers must use Employability Skills information in order to design valid and reliable training and assessment strategies. This analysis could include:

- reviewing units of competency to locate relevant Employability Skills and determine how they are applied within the unit
- analysing the Employability Skills Summary for the qualification in which the unit or units are packaged to help clarify relevant industry and workplace contexts and the application of Employability Skills at that qualification outcome
- designing training and assessment to address Employability Skills requirements.

The National Skills Standards Council (NSSC) has endorsed a model for assessing and reporting Employability Skills, which contains further suggestions about good practice strategies in teaching, assessing, learning and reporting Employability Skills. The model is available from <http://www.training.com.au/>.

The endorsed approach includes learners downloading qualification specific Employability Skills Summaries for Training Package qualifications from an online repository at <http://employabilityskills.training.com.au>

For more information on Employability Skills in MAR13 Maritime Training Packages go to the Transport & Logistics ISC website at www.tlisc.org.au.

Employability Skills are reported on each qualification using the following statement on the qualification testamur: "A summary of the Employability Skills developed through this qualification can be downloaded from <http://employabilityskills.training.com.au>".

Access and Equity

An individual's access to the assessment process should not be adversely affected by restrictions placed on the location or context of assessment beyond the requirements specified in this Training Package: training and assessment must be bias-free.

Under the rules for their development, Training Packages must reflect and cater for the increasing diversity of Australia's VET clients and Australia's current and future workforce. The flexibilities offered by Training Packages should enhance opportunities and potential outcomes for all people so that we can all benefit from a wider national skills base and a shared contribution to Australia's economic development and social and cultural life.

Reasonable Adjustments

It is important that education providers take meaningful, transparent and reasonable steps to consult, consider and implement reasonable adjustments for students with disability.

Under the Disability Standards for Education 2005, education providers must make reasonable adjustments for people with disability to the maximum extent that those adjustments do not cause that provider unjustifiable hardship. While 'reasonable adjustment' and 'unjustifiable hardship' are different concepts and involve different considerations, they both seek to strike a balance between the interests of education providers and the interests of students with and without disability.

An adjustment is any measure or action that a student requires because of their disability, and which has the effect of assisting the student to access and participate in education and training on the same basis as students without a disability. An adjustment is reasonable if it achieves this purpose while taking into account factors such as the nature of the student's disability, the views of the student, the potential effect of the adjustment on the student and others who might be affected, and the costs and benefits of making the adjustment.

An education provider is also entitled to maintain the academic integrity of a course or program and to consider the requirements or components that are inherent or essential to its nature when assessing whether an adjustment is reasonable. There may be more than one adjustment that is reasonable in a given set of circumstances; education providers are required to make adjustments that are reasonable and that do not cause them unjustifiable hardship.

The Training Package Guidelines provides more information on reasonable adjustment, including examples of adjustments. Go to

<http://www.innovation.gov.au/tpdh/Pages/home.aspx>

Further Sources of Information

The section provides a listing of useful contacts and resources to assist assessors in planning, designing, conducting and reviewing of assessments against this Training Package.

Contacts

Transport & Logistics ISC
Level 4, 411 Collins St
Melbourne VIC 3000
www.tlisc.org.au

(03) 9604 7200

For information on the TAE10 Training and Education Training Package contact:

Innovation & Business Skills Australia

Telephone: (03) 9815 7000

Facsimile: (03) 9815 7001

Email: virtual@ibsa.org.au

Web: www.ibsa.org.au

General Resources

AQF Implementation Handbook, Fourth Edition 2007. Australian Qualifications Framework Advisory Board, 2002 <www.aqf.edu.au>

Australian Quality Training Framework (AQTF) and AQTF 2010 Users' Guide to the Essential Standards for Registration –
<http://www.training.com.au/pages/menuitem5cbe14d51b49dd34b225261017a62dbc.aspx>

For general information and resources go to <http://www.training.com.au/>.

The National Register is an electronic database providing comprehensive information about RTOs, Training Packages and accredited courses - www.training.gov.au.

Assessment Resources

Registered training organisations (RTOs) are at the forefront of vocational education and training (VET) in Australia. They translate the needs of industry into relevant, quality, client-focussed training and assessment.

RTOs should strive for innovation in VET teaching and learning practices and develop highly flexible approaches to assessment which take cognisance of specific needs of learners, in order to improve delivery and outcomes of training.

Resources can be downloaded free of charge from the TLISC Resources website
www.resources.tlisc.org.au

Competency Standards

What is Competency?

The broad concept of industry competency concerns the ability to perform particular tasks and duties to the standard of performance expected in the workplace. Competency requires the application of specified skills, knowledge and attitudes relevant to effective participation in an industry, industry sector or enterprise.

Competency covers all aspects of workplace performance and involves performing individual tasks; managing a range of different tasks; responding to contingencies or breakdowns; and, dealing with the responsibilities of the workplace, including working with others. Workplace competency requires the ability to apply relevant skills, knowledge and attitudes consistently over time and in the required workplace situations and environments. In line with this concept of competency Training Packages focus on what is expected of a competent individual in the workplace as an outcome of learning, rather than focussing on the learning process itself.

Competency standards in Training Packages are determined by industry to meet identified industry skill needs. Competency standards are made up of a number of units of competency each of which describes a key function or role in a particular job function or occupation. Each unit of competency within a Training Package is linked to one or more AQF qualifications.

Contextualisation of units of competency by RTOs

Registered Training Organisation (RTOs) may contextualise units of competency to reflect local outcomes required. Contextualisation could involve additions or amendments to the unit of competency to suit particular delivery methods, learner profiles, specific enterprise equipment requirements, or to otherwise meet local needs. However, the integrity of the overall intended outcome of the unit of competency must be maintained.

Any contextualisation of units of competency in this endorsed Training Package must be within the bounds of the following advice. In contextualising units of competency, RTOs:

- must not remove or add to the number and content of elements and performance criteria
- may add specific industry terminology to performance criteria where this does not distort or narrow the competency outcomes
- may make amendments and additions to the range statement as long as such changes do not diminish the breadth of application of the competency and reduce its portability, and/or
- may add detail to the evidence guide in areas such as the critical aspects of evidence or resources and infrastructure required where these expand the breadth of the competency but do not limit its use.

Components of Units of Competency

The components of units of competency are summarised below, in the order in which they appear in each unit of competency.

Unit Title

The unit title is a succinct statement of the outcome of the unit of competency. Each unit of competency title is unique, both within and across Training Packages.

Unit Descriptor

The unit descriptor broadly communicates the content of the unit of competency and the skill area it addresses. Where units of competency have been contextualised from units of competency from other endorsed Training Packages, summary information is provided. There may also be a brief second paragraph that describes its relationship with other units of competency, and any licensing requirements.

Employability Skills

See reference to Employability Skills in next section of this volume.

Pre-requisite Units (optional)

If there are any units of competency that must be completed before the unit, these will be listed.

Application of the Unit

This sub-section fleshes out the unit of competency's scope, purpose and operation in different contexts, for example, by showing how it applies in the workplace.

Competency Field (Optional)

The competency field either reflects the way the units of competency are categorised in the Training Package or denotes the industry sector, specialisation or function. It is an optional component of the unit of competency.

Sector (optional)

The industry sector is a further categorisation of the competency field and identifies the next classification, for example an elective or supervision field.

Elements of Competency

The elements of competency are the basic building blocks of the unit of competency. They describe in terms of outcomes the significant functions and tasks that make up the competency.

Performance Criteria

The performance criteria specify the required performance in relevant tasks, roles, skills and in the applied knowledge that enables competent performance. They are usually written in passive voice. Critical terms or phrases may be written in bold italics and then defined in range statement, in the order of their appearance in the performance criteria.

Required Skills and Knowledge

The essential skills and knowledge are either identified separately or combined. Knowledge identifies what a person needs to know to perform the work in an informed and effective manner. Skills describe the application of knowledge to situations where understanding is converted into a workplace outcome.

Range Statement

The range statement provides a context for the unit of competency, describing essential operating conditions that may be present with training and assessment, depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts. As applicable, the meanings of key terms used in the performance criteria will also be explained in the range statement.

Evidence Guide

The evidence guide is critical in assessment as it provides information to the Registered Training Organisation (RTO) and assessor about how the described competency may be demonstrated. The evidence guide does this by providing a range of evidence for the assessor to make determinations, and by providing the assessment context. The evidence guide describes:

- conditions under which competency must be assessed including variables such as the assessment environment or necessary equipment
- relationships with the assessment of any other units of competency
- suitable methodologies for conducting assessment including the potential for workplace simulation
- resource implications, for example access to particular equipment, infrastructure or situations
- how consistency in performance can be assessed over time, various contexts and with a range of evidence
- the required underpinning knowledge and skills.

Employability Skills in units of competency

The detail and application of Employability Skills facets will vary according to the job role requirements of each industry. In developing Training Packages, industry stakeholders are consulted to identify appropriate facets of Employability Skills which are incorporated into the relevant units of competency and qualifications.

Employability Skills are not a discrete requirement contained in units of competency (as was the case with Key Competencies). Employability Skills are specifically expressed in the context of the work outcomes described in units of competency and will appear in elements, performance criteria, range statements and evidence guides. As a result, users of Training Packages are required to review the entire unit of competency in order to accurately determine Employability Skills requirements.

How Employability Skills relate to the Key Competencies

The eight nationally agreed Employability Skills now replace the seven Key Competencies in Training Packages. Trainers and assessors who have used Training Packages prior to the introduction of Employability Skills may find the following comparison useful.

Employability Skills	Mayer Key Competencies
Communication	Communicating ideas and information
Teamwork	Working with others and in teams
Problem solving	Solving problems Using mathematical ideas and techniques
Initiative and enterprise	
Planning and organising	Collecting, analysing and organising

	information Planning and organising activities
Self-management	
Learning	
Technology	Using technology

When analysing the above table it is important to consider the relationship and natural overlap of Employability Skills. For example, using technology may involve communication skills and combine the understanding of mathematical concepts.

Explicitly embedding Employability Skills in units of competency

This Training Package seeks to ensure that industry-endorsed Employability Skills are explicitly embedded in units of competency. The application of each skill and the level of detail included in each part of the unit will vary according to industry requirements and the nature of the unit of competency.

Employability Skills must be both explicit and embedded within units of competency. This means that Employability Skills will be:

- embedded in units of competency as part of the other performance requirements that make up the competency as a whole
- explicitly described within units of competency to enable Training Packages users to identify accurately the performance requirements of each unit with regard to Employability Skills.

This Training Package also seeks to ensure that Employability Skills are well-defined and written into units of competency so that they are apparent, clear and can be delivered and assessed as an essential component of unit work outcomes.

The following table contains examples of embedded Employability Skills for each component of a unit of competency. Please note that in the examples below the bracketed skills are provided only for clarification and will not be present in units of competency within this Training Package.

Unit Component	Example of embedded Employability Skill
Unit Title	Give formal presentations and take part in meetings (communication)
Unit Descriptor	This unit covers the skills and knowledge required to promote the use and implementation of innovative work practices to effect change (initiative and enterprise)
Element	Proactively resolve issues (problem solving)

Performance Criteria	Information is organised in a format suitable for analysis and dissemination in accordance with organisational requirements (planning and organising)
Range Statement	Software applications may include email, internet, word processing, spreadsheet, database or accounting packages (technology)
Required Skills and Knowledge	<p>Modify activities depending on differing workplace contexts, risk situations and environments (learning)</p> <p>Work collaboratively with others during a fire emergency (teamwork)</p> <p>Instructions, procedures and other information relevant the maintenance of vessel and port security (communication)</p>
Evidence Guide	<p>Evidence of having worked constructively with a wide range of community groups and stakeholders to solve problems and adapt or design new solutions to meet identified needs in crime prevention. In particular, evidence must be obtained on the ability to:</p> <ul style="list-style-type: none"> • assess response options to identified crime-prevention needs and determine the optimal action to be implemented • in consultation with relevant others, design an initiative to address identified issues (initiative and enterprise).

Employability Skills

Background to Employability Skills

In May 2005, the approach to incorporate Employability Skills within Training Package qualifications and units of competency was endorsed. As a result, from 2006 Employability Skills will progressively replace Key Competency information in Training Packages.

Employability Skills are also sometimes referred to as generic skills, capabilities or Key Competencies. The Employability Skills discussed here build on the Mayer Committee's Key Competencies, which were developed in 1992 and attempted to describe generic competencies for effective participation in work.

The Business Council of Australia (BCA) and the Australian Chamber of Commerce and Industry (ACCI), produced the Employability Skills for the Future report in 2002 in consultation with other peak employer bodies and with funding provided by the Department of Education, Science and Training (DEST) and the Australian National Training Authority (ANTA). Officially released by Dr Nelson (Minister for Education, Science and Training) on 23 May 2002, copies of the report are available from the DEST website at:

<http://www.dest.gov.au/archive/ty/publications/employability_skills/index.htm>.

Employability Skills Framework

The report indicated that business and industry now require a broader range of skills than the Mayer Key Competencies Framework and featured an Employability Skills Framework identifying eight Employability Skills:¹

¹Personal attributes that contribute to employability were also identified in the report but are not part of the Employability Skills Framework.

- communication
- teamwork
- problem solving
- initiative and enterprise
- planning and organising
- self-management
- learning
- technology.

The report demonstrated how Employability Skills can be further described for particular occupational and industry contexts by sets of facets. The facets listed in the report are the aspects of the Employability Skills that the sample of employers surveyed identified as being important work skills. These facets were seen by employers as being dependent both in their nature and priority on an enterprise's business activity.

Employability Skills facets

The following table contains the Employability Skills facets identified in the report Employability Skills for the Future.

Skill	Facets
	Aspects of the skill that employers identify as important. The nature and application of these facets will vary depending on industry and job type.
Communication that contributes to productive and harmonious relations across employees and customers	<ul style="list-style-type: none"> • listening and understanding • speaking clearly and directly • writing to the needs of the audience • negotiating responsively • reading independently • empathising • using numeracy effectively • understanding the needs of internal and external customers • persuading effectively • establishing and using networks • being assertive • sharing information

Skill	Facets Aspects of the skill that employers identify as important. The nature and application of these facets will vary depending on industry and job type.
	<ul style="list-style-type: none"> • speaking and writing in languages other than English
Teamwork that contributes to productive working relationships and outcomes	<ul style="list-style-type: none"> • working across different ages irrespective of gender, race, religion or political persuasion • working as an individual and as a member of a team • knowing how to define a role as part of the team • applying teamwork to a range of situations e.g. futures planning and crisis problem solving • identifying the strengths of team members • coaching and mentoring skills, including giving feedback
Problem solving that contributes to productive outcomes	<ul style="list-style-type: none"> • developing creative, innovative and practical solutions • showing independence and initiative in identifying and solving problems • solving problems in teams • applying a range of strategies to problem solving • using mathematics, including budgeting and financial management to solve problems • applying problem-solving strategies across a range of areas • testing assumptions, taking into account the context of data and circumstances • resolving customer concerns in relation to complex project issues
Initiative and enterprise that contribute to innovative outcomes	<ul style="list-style-type: none"> • adapting to new situations • developing a strategic, creative and long-term vision • being creative • identifying opportunities not obvious to others • translating ideas into action • generating a range of options • initiating innovative solutions
Planning and organising that contribute to long-term and short-term strategic planning	<ul style="list-style-type: none"> • managing time and priorities – setting time lines, coordinating tasks for self and with others • being resourceful • taking initiative and making decisions • adapting resource allocations to cope with contingencies • establishing clear project goals and deliverables • allocating people and other resources to tasks • planning the use of resources, including time management • participating in continuous improvement and planning processes

Skill	Facets Aspects of the skill that employers identify as important. The nature and application of these facets will vary depending on industry and job type.
	<ul style="list-style-type: none"> • developing a vision and a proactive plan to accompany it • predicting – weighing up risk, evaluating alternatives and applying evaluation criteria • collecting, analysing and organising information • understanding basic business systems and their relationships
Self-management that contributes to employee satisfaction and growth	<ul style="list-style-type: none"> • having a personal vision and goals • evaluating and monitoring own performance • having knowledge and confidence in own ideas and visions • articulating own ideas and visions • taking responsibility
Learning that contributes to ongoing improvement and expansion in employee and company operations and outcomes	<ul style="list-style-type: none"> • managing own learning • contributing to the learning community at the workplace • using a range of mediums to learn – mentoring, peer support and networking, IT and courses • applying learning to technical issues (e.g. learning about products) and people issues (e.g. interpersonal and cultural aspects of work) • having enthusiasm for ongoing learning • being willing to learn in any setting – on and off the job • being open to new ideas and techniques • being prepared to invest time and effort in learning new skills • acknowledging the need to learn in order to accommodate change
Technology that contributes to the effective carrying out of tasks	<ul style="list-style-type: none"> • having a range of basic IT skills • applying IT as a management tool • using IT to organise data • being willing to learn new IT skills • having the OHS knowledge to apply technology • having the appropriate physical capacity

Employability Skills Summary

An Employability Skills Summary exists for each qualification in the Maritime Training Package. These are located at the front of Volumes 2, 3 and 4 of this Training Package for qualifications relevant to each volume.

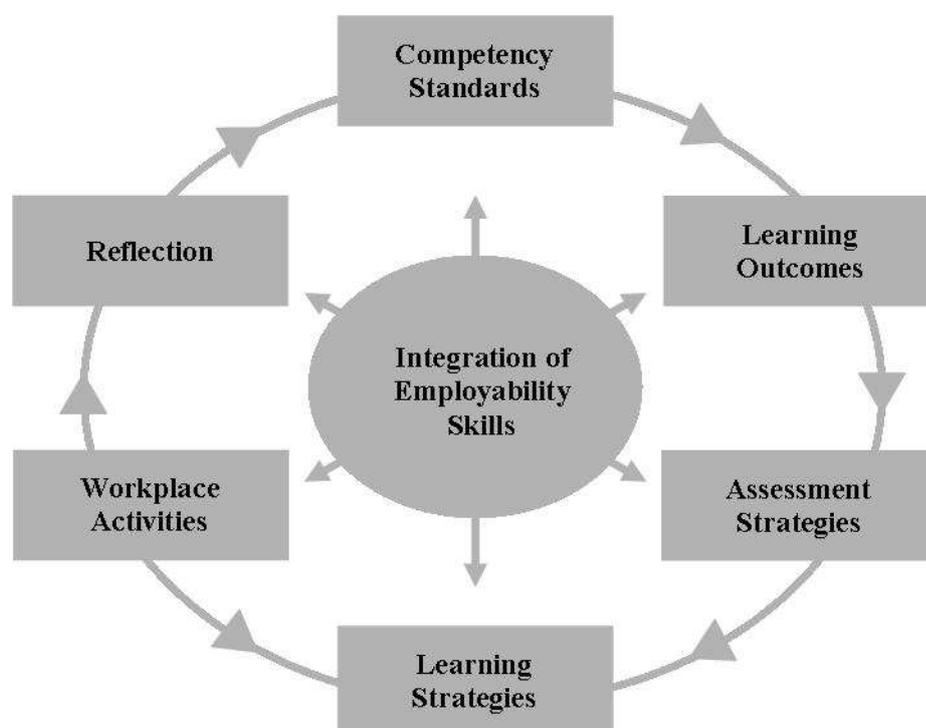
Summaries provide a lens through which to view Employability Skills at the qualification level and capture the key aspects or facets of the Employability Skills that are important to the job roles covered by the qualification. Summaries are designed to assist trainers and assessors to identify and include important industry application of Employability Skills in learning and assessment strategies.

The following is important information for trainers and assessors about Employability Skills Summaries.

- Employability Skills Summaries provide examples of how each skill is applicable to the job roles covered by the qualification.
- Employability Skills Summaries contain general information about industry context which is further explained as measurable outcomes of performance in the units of competency in each qualification.
- The detail in each Employability Skills Summary will vary depending on the range of job roles covered by the qualification in question.
- Employability Skills Summaries are not exhaustive lists of qualification requirements or checklists of performance (which are separate assessment tools that should be designed by trainers and assessors after analysis at the unit level).
- Employability Skills Summaries contain information that may also assist in building learners' understanding of industry and workplace expectations.

Delivery and Assessment of Employability Skills

Employability Skills are integral to workplace competency and, as such, must be considered in the design, customisation, delivery and assessment of vocational education and training programs in an integrated and holistic way, as represented diagrammatically below.



Training providers must analyse the Employability Skills information contained in units of competency in order to design valid and reliable learning and assessment strategies. This analysis includes:

- reviewing unit(s) of competency to determine how each relevant Employability Skill is found and applied within the unit
- analysing the Employability Skills Summary for the qualification in which the unit(s) is/are packaged to help clarify relevant industry/workplace contexts with regard to the application of Employability Skills at that qualification level
- designing learning and assessment activities that address the Employability Skills requirements.

For more information on Employability Skills, go to the Department of Industry, Innovation, Science, Research and Tertiary Education website at <www.innovation.gov.au>.

Pathways information

There are many pathways into and through occupations within the Maritime Industry. These occupations are subject to a wide range of state, territory, national and international regulatory requirements, codes and conventions.

For many of the occupations, it is necessary to hold a Certificate of Competency or at least to have completed specific certification requirements before you can be actively employed on the types of vessels concerned in particular operational areas. These certification requirements include educational requirements (e.g. the vocational qualifications contained in this Training Package) but also involve a range of other requirements such as periods of sea time on particular vessels, medical certificates, radio operator certificates and first aid certificates. In other words, for most occupations on vessels, the achievement of Training Package qualification is only a partial fulfilment of the regulatory requirements that must be demonstrated by a person seeking a Certificate of Competency from the relevant State or Territory marine authority or Australian Maritime Safety Authority.

The information described here only explains the more significant pathways between qualifications and does not represent the only pathways. The information describes only the pathway relationships between the 'education pathways' and is not intending to provide information on the diverse range of occupations and positions on various types of vessels operating within unlimited or restricted conditions.

Users of the MAR13 Maritime Training Package are therefore encouraged to access the pertinent documents from the relevant marine authorities to understand the various regulated occupations in the Maritime Industry and the full certification requirements for each. Contact details of the various marine authorities are listed in the Assessment Guidelines section of this general introduction volume.

Two key documents that describe regulatory requirements for occupations in the Maritime Industry are:

- Part D of the National Standard for Commercial Vessels (Applicable to regulated occupations involved in coastal operations and downloadable from the National Marine Safety Committee (NMSC) website – <http://www.nmsc.gov.au>)

- Marine Orders – Part 3: Seagoing Qualifications under the Australian Navigation Act 2012. (Applicable to regulated occupations involved in ocean-going operations and downloadable from the AMSA website – <http://www.amsa.gov.au>).

Figure 2 describes the main qualification pathways for Maritime Operations.

Figure 3 describes the main qualification pathways for Marine Surveying.

It should be noted that the qualifications shown in the charts represent only those specifically aligned to Certificates of Competency that are issued by the relevant marine authorities. There is a range of other persons employed on the various types of ‘coastal’ vessels who may be engaged in activities related to hospitality, catering, tourism, emergency services, retail, fishing, salvage, maritime survey, harbour services, etc. who may not be specifically operating and maintaining the vessel but who may need to fulfil the basic competency requirements specified by marine authorities for maritime safety, survival, environmental protection, emergency procedures, etc. To provide for these needs a series of unregulated qualifications is also provided in the Training Package.

Figure 2 Pathways Chart: Maritime Operations

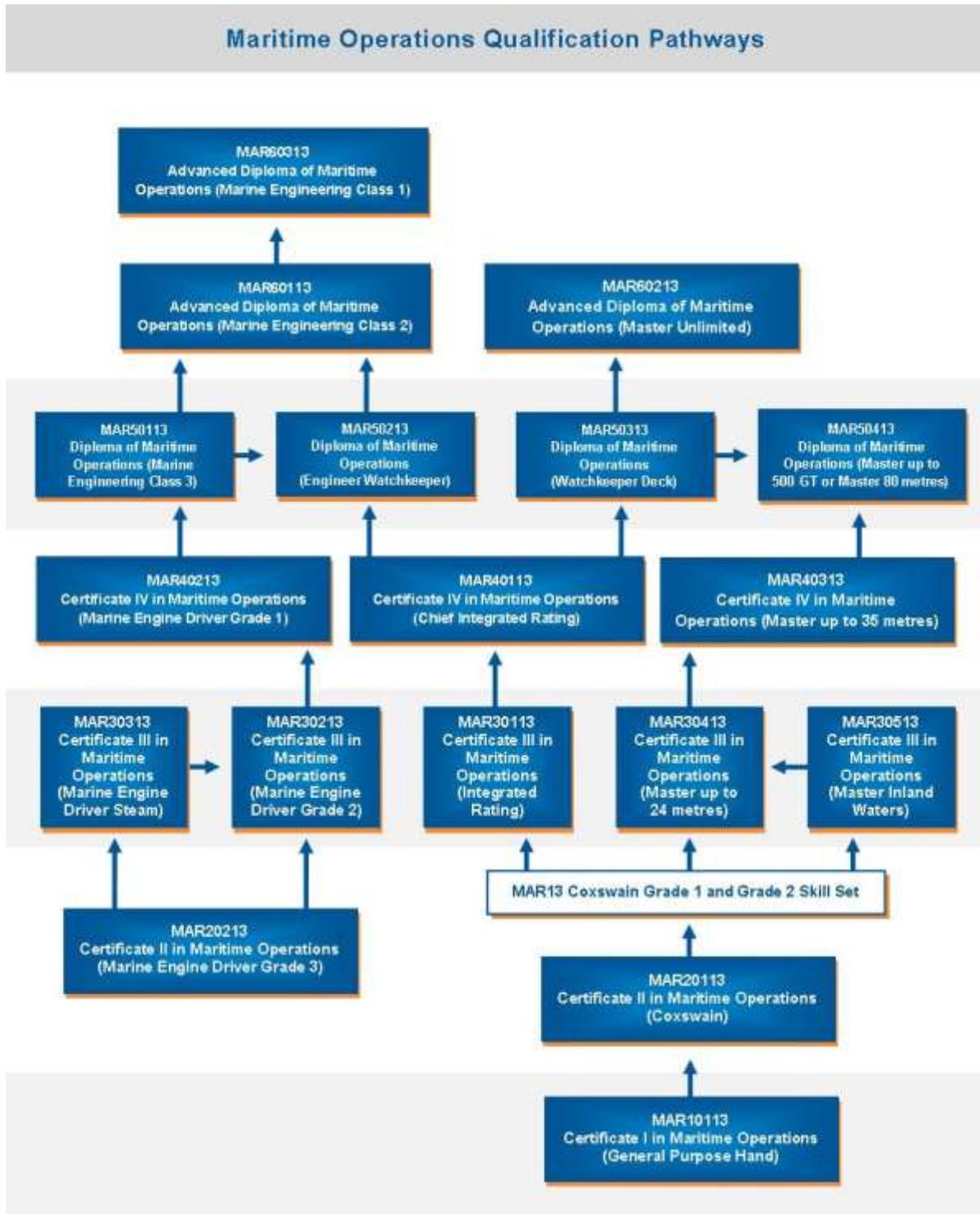


Figure 3 Pathways chart: Marine Surveying



MAR10113 Certificate I in Maritime Operations (General Purpose Hand)

Modification History

Release 1	This is the first release of this qualification in the MAR13 Maritime Training Package.
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Description

This qualification is suitable for people working in entry level positions in the maritime industry as deckhands or general purpose hands.

Pathways Information

Pathways into the qualification

Not applicable

Pathways from the qualification

MAR20213 Certificate II in Maritime Operations (Coxswain)

Licensing/Regulatory Information

This qualification is currently cited as meeting some of the requirements for certification as a General Purpose Hand as described in Part D of the National Standard for Commercial Vessels (NSCV) by the Australian Maritime Safety Authority (AMSA).

Certification will require achievement of the MAR10113 Certificate I in Maritime Operations (General Purpose Hand) and other requirements; people seeking certification should check the requirements with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the maritime industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The

outcomes described here are broad industry requirements that may vary depending on packaging options.	
Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	<p>Communicate effectively with other personnel and passengers during simulated and actual abandon vessel musters and emergencies</p> <p>Complete workplace forms</p> <p>Follow simple spoken instructions</p>
Teamwork	<p>Assist others to maximise their chances of survival</p> <p>Request advice, receive feedback and work with others</p> <p>Barricade work area or provide warning signs, as appropriate, to reduce risk to self and other crew members</p>
Problem-solving	<p>Apply problem solving skills to investigate and identify causes of WHS/OHS incidents</p> <p>Demonstrate safe and environmentally responsible work practices</p> <p>Take action promptly to address problems that may arise when following vessel abandonment procedures</p>
Initiative and enterprise	<p>Provide ideas to control the level of risk associated with work tasks</p> <p>Monitor and anticipate hazards and risks that may arise during lookout duties</p> <p>Use effective questioning to seek assistance from other crew when difficulties arise in achieving allocated tasks</p>
Planning and organising	<p>Plan work tasks</p> <p>Select and use correct tools and equipment for the cleaning or maintenance task</p> <p>Select and use suitable personal protective clothing according to WHS/OHS requirements</p>
Self-management	<p>Maintain housekeeping standards in work area</p> <p>Ration water and food</p> <p>Respond to instructions promptly</p>
Learning	<p>Participate in abandon vessel drills</p> <p>Participate in training, musters and emergency drills</p> <p>Undertake participation in fire drills and musters to ensure readiness for fire emergencies</p>

Technology	Monitor VHF equipment Operate deck machinery and emergency stops Operate radio equipment
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Packaging Rules

Total number of units = 8 units

8 core units

Core units			
Field			
B	Equipment Checking and Maintenance	MARB1001A	Assist with routine maintenance of a vessel
F	Operational Quality and Safety	MARF1001A	Apply basic survival skills in the event of vessel abandonment
		MARF1002A	Follow procedures to minimise and fight fires on board a vessel
		MARF1005A	Meet work health and safety requirements
		MARF1006A	Survive at sea using survival craft
G	Teamwork	MARG1001A	Work effectively as part of a crew on a vessel up to 80 metres
N	Seamanship	MARN1001A	Apply general purpose hand skills aboard a vessel
O	Watchkeeping	MARO1001A	Perform basic lookout duties

Custom Content Section

Not applicable.

MAR10213 Certificate I in Maritime Operations (Linesperson)

Modification History

Release 1	<p>This is the first release of this qualification in the MAR13 Maritime Training Package.</p> <p>This qualification replaces TDM10207 Certificate I in Transport Distribution (Maritime Operations - Shore-Based Linesperson).</p>
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Description

This qualification is suitable for people working in entry level positions in the maritime industry as a linesperson.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the maritime industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on packaging options.

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	<p>Communicate effectively with others when mooring and untying a vessel</p> <p>Record and report safety incidents and emergencies</p>

	Use appropriate methods to communicate with foreign crews on vessels
Teamwork	<p>Make vessel crew aware of planned heaving line return operations</p> <p>Promptly and clearly communicate any safety concerns to pilot prior to and during, mooring and untying operations</p> <p>Work effectively as a member of a mooring and untying team</p>
Problem-solving	<p>Promptly report and/or rectify any identified problems that may arise when manually lifting and handling materials and goods in accordance with regulatory requirements and workplace procedures</p> <p>Recognise problems that may occur when communicating with others during mooring and untying operations and take appropriate action to report and resolve them</p> <p>Solve routine problems</p>
Initiative and enterprise	<p>Communicate safety concerns to pilot of vessel with due care not to interfere with tug and vessel communications</p> <p>Recognise potential security threats</p> <p>Report, rectify or replace faulty communication equipment</p>
Planning and organising	<p>Identify factors affecting the achievement of work objectives and incorporate contingencies into work plans</p> <p>Organise work priorities according to work goals and objectives</p> <p>Take precautions to ensure all personnel are well clear of vicinity of gangway</p>
Self-management	<p>Monitor own work performance</p> <p>Organise and complete own work schedule</p> <p>Recognise own role and responsibilities</p>
Learning	<p>Access, complete and record professional development opportunities to facilitate continuous learning and career development</p> <p>Identify personal learning and professional development needs and skill gaps using self-assessment and advice from colleagues and clients in relation to role and organisational requirements</p> <p>Incorporate formal and informal feedback into review of further learning needs</p>
Technology	<p>Check functioning of radios and communication equipment</p> <p>Operate security equipment</p> <p>Prepare communications equipment and set to correct channels</p>

Packaging Rules

Total number of units = 7 units

7 core units

Core units			
Field			
C	Equipment Operations	MARC1001A	Carry out shore-based mooring and untying operations
E	Communication	MARE1001A	Communicate during shore-based mooring and untying operations
F	Operational Quality and Safety	MARF1003A	Follow vessel security procedures
		MARF1004A	Follow work health and safety, and emergency procedures during shore-based mooring operations
	Imported	BSBWOR301B	Organise personal work priorities and development
		HLTFA311A	Apply first aid
		TLID1001A	Shift materials safely using manual handling methods

Custom Content Section

Not applicable.

MAR20113 Certificate II in Maritime Operations (Coxswain)

Modification History

Release 1	<p>This is the first release of this qualification in the MAR13 Maritime Training Package.</p> <p>This qualification replaces TDM20307 Certificate II in Transport Distribution (Coastal Maritime Operations - Coxswain).</p>
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Description

This qualification is suitable for people who work as a coxswain in the maritime industry and command a commercial marine vessel up to 12 metres in length that operates up to 15 nautical miles out to sea (such as fishing boats, ferries, water taxis, jet boats, yachts, catamarans and tourist craft).

People who work as a Coxswain Grade 1 operate:

- within the inshore waters limit of 15 nautical miles.

People who work as a Coxswain Grade 2 operate:

- in sheltered waters.

People who work as a Coxswain Grade 3:

- operate in smooth waters within port limits.

Pathways Information

Pathways into the qualification

MAR10113 Certificate I in Maritime Operations (General Purpose Hand)

Pathways from the qualification

MARSS00001 Coxswain Grade 1 and Grade 2 Skill Set

Licensing/Regulatory Information

Coxswain Grade 1 and Grade 2

This qualification is currently cited as meeting some of the requirements for certification as a Coxswain Grade 1 and Grade 2 as described in Part D of the National Standard for Commercial Vessels (NSCV) by the Australian Maritime Safety Authority (AMSA).

Certification will require achievement of the MAR20113 Certificate II in Maritime Operations (Coxswain), the Coxswain Grade 1 and Grade 2 Skill Set, sea-service, first aid and appropriate radio certificates; people seeking certification should check the requirements with AMSA.

Coxswain Grade 3

This qualification is currently cited as meeting some of the requirements for certification as a Coxswain Grade 3 as described in Part D of the National Standard for Commercial Vessels (NSCV) by the Australian Maritime Safety Authority (AMSA).

Certification will require achievement of the MAR20113 Certificate II in Maritime Operations (Coxswain), sea-service, first aid and appropriate radio certificates; people seeking certification should check the requirements with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the maritime industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on packaging options.

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	Communicate details of action to relevant personnel clearly and concisely using standard maritime vocabulary Prepare and keep environmental records Read and interpret company standard operating procedures (SOPs) about operating inboard and outboard engines
Teamwork	Recognise risks to fellow workers and other people, and take action to eliminate or reduce them Render assistance to others in distress Use consultation processes to consult others on WHS/OHS issues
Problem-solving	Apply problem solving skills to investigate and identify causes of WHS/OHS incidents Identify and respond to typical emergency situations Identify irregularities and take appropriate action to rectify the situation

Initiative and enterprise	<p>Make contributions to workplace meetings, inspections and other WHS/OHS activities</p> <p>Provide ideas to control the level of risk associated with work tasks</p> <p>Recognise and report to appropriate personnel/authorities, signs or symptoms of a potential environmental threat</p>
Planning and organising	<p>Identify and address implications of any changes to the safety management system (SMS)</p> <p>Identify and handle hazardous chemicals according to workplace procedures</p> <p>Review operational procedures to reflect changes in legislation and regulations</p>
Self-management	<p>Demonstrate through own behaviour, commitment to comply with industry and professional codes of practice</p> <p>Identify responsibilities as the person in charge of a vessel</p> <p>Maintain situational awareness to ensure safety of manoeuvres</p>
Learning	<p>Conduct inductions for crew where applicable</p> <p>Maintain evidence of current authorisation, training and relevant licences according to legislative and regulatory requirements</p> <p>Undertake participation in fire drills and musters to ensure readiness for fire emergencies</p>
Technology	<p>Operate a fire extinguisher</p> <p>Undertake safety checks on all equipment and machinery before operation according to workplace procedures</p> <p>Use and monitor propulsion equipment to assist in completing manoeuvres safely</p>

Packaging Rules

Total number of units = 8 units

8 core units

Coxswain Grade 3:

- MARC2005A Operate inboard and outboard motors

Coxswain Grade 1 and Grade 2:

- MARC2006A Operate main propulsion unit and auxiliary systems

Core units			
Field			
C	Equipment Operations	MARC2005A	Operate inboard and outboard motors
		OR	
		MARC2006A	Operate main propulsion unit and auxiliary systems
F	Operational Quality and Safety	MARF1001A	Apply basic survival skills in the event of vessel abandonment
		MARF1002A	Follow procedures to minimise and fight fires on board a vessel
		MARF1005A	Meet work health and safety requirements
I	Regulations and Port Operations	MARI2001A	Comply with regulations to ensure safe operation of a vessel up to 12 metres
J	Environment	MARJ2001A	Follow environmental work practices
K	Manoeuvring Vessels	MARK2001A	Handle a vessel up to 12 metres
N	Seamanship	MARN2001A	Apply seamanship skills aboard a vessel up to 12 metres

Custom Content Section

Not applicable.

MAR20213 Certificate II in Maritime Operations (Marine Engine Driver Grade 3)

Modification History

Release 1	<p>This is the first release of this qualification in the MAR13 Maritime Training Package.</p> <p>This qualification replaces TDM20207 Certificate II in Transport Distribution (Marine Engine Driving - Grade 3).</p>
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Description

This qualification is suitable for people who work in the maritime industry in charge of operating vessels with a propulsion power up to 500 kW.

Pathways Information

Pathways into the qualification

Nil

Pathways from the qualification

MAR30213 Certificate III in Maritime Operations (Marine Engine Driver Grade 2)

MAR30313 Certificate III in Maritime Operations (Marine Engine Driver Steam)

Licensing/Regulatory Information

This qualification is currently cited as meeting some of the requirements for certification as a Marine Engine Driver Grade 3 as described in Part D of the National Standard for Commercial Vessels (NSCV) by the Australian Maritime Safety Authority (AMSA).

Certification will require achievement of the MAR20213 Certificate II in Maritime Operations (Marine Engine Driver Grade 3) and other requirements; people seeking certification should check with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the maritime industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on packaging options.

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	Complete relevant log books and service reports Implement appropriate communication skills and techniques during emergency and survival situations Read and interpret manufacturer specifications
Teamwork	Develop and sequence work plan in conjunction with others involved in or affected by plan, according to organisational procedures Provide support to team members to ensure workgroup goals are met Request advice, receive feedback and work with a team
Problem-solving	Identify faults and take appropriate action to rectify them Make suggestions for improved environmental work practices Recognise and repair basic operational faults or organise maintenance assistance
Initiative and enterprise	Confirm timelines, jobs and work priorities with Master and other relevant authorities, when applicable Provide assistance to preserve fire scene prior to investigation, if appropriate Ration water and food
Planning and organising	Implement work practices and work instructions relating to potential environmental impacts Plan and sequence tasks in conjunction with others involved in or affected by maintenance work Reorder stock and consumables as required
Self-management	Confirm timelines, jobs and work priorities with Master and other relevant authorities, when applicable Identify own responsibilities and duties in relation to workgroup members and undertake activities in a manner that promotes cooperation and good relationships

	Organise survival equipment to maximise chances of survival
Learning	Identify and implement regulatory requirements and company procedures for musters and drills Participate in abandon vessel drills Participate in fire drills and musters to ensure readiness for fire emergencies
Technology	Make distress calls using radio equipment on distress call frequency, if time allows, to communicate the nature of the emergency Operate radio equipment Select and use technology appropriate to a task

Packaging Rules

Total number of units = 12 units

12 core units

Core units			
Field			
B	Equipment Checking and Maintenance	MARB2002A	Service marine internal combustion engines, and propulsion and auxiliary systems
C	Equipment Operations	MARC2001A	Complete engine room tasks
		MARC2002A	Maintain hull out of water
		MARC2003A	Operate and maintain extra low and low voltage electrical systems and equipment
		MARC2004A	Operate deck machinery
		MARC2007A	Operate marine internal combustion engines, and propulsion and auxiliary systems
F	Operational Quality and Safety	MARF1001A	Apply basic survival skills in the event of vessel abandonment
		MARF1002A	Follow procedures to minimise and fight fires on board a vessel

		MARF1005A	Meet work health and safety requirements
		MARF1006A	Survive at sea using survival craft
J	Environment	MARJ2001A	Follow environmental work practices
	Imported	BSBWOR203B	Work effectively with others

Custom Content Section

Not applicable.

MAR30113 Certificate III in Maritime Operations (Integrated Rating)

Modification History

Release 1	<p>This is the first release of this qualification in the MAR13 Maritime Training Package.</p> <p>This qualification replaces TDM30307 Certificate III in Transport Distribution (Maritime Operations - Integrated Rating).</p>
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Description

This qualification is suitable for people working in entry level positions in the maritime industry as a general crew member on a ship, carrying out maintenance and lookout duties on decks and in commercial ship engine rooms.

Integrated ratings steer a vessel under the direction of the officer of the watch and work in the engine room under the direction of engineering officers.

Pathways Information

Pathways into the qualification

MARSS00001 Coxswain Grade 1 and Grade 2 Skill Set

Pathways from the qualification

MAR40113 Certificate IV in Maritime Operations (Chief Integrated Rating)

Licensing/Regulatory Information

This qualification is currently cited as meeting some of the requirements for certification as an Integrated Rating as described in Marine Orders Part 3: Seagoing Qualifications under the Australian Navigation Act 2012 by the Australian Maritime Safety Authority (AMSA).

Certification will require achievement of the MAR30113 Certificate III in Maritime Operations (Integrated Rating), sea-service, a valid first aid certificate and completion of a task record book; people seeking certification should check the requirements with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the maritime industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on packaging options.

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	Complete any required records when performing routine remedial, preventative and survey deck maintenance on a vessel Read and interpret SDS/MSDS Use basic signals to operate equipment including winches, cranes, windlasses and hoists
Teamwork	Maintain effective communication with crew during fuelling and transferring operations to ensure the safety and integrity of the vessel and crew Provide instructions to crew and passengers to maximise chances of survival Work safely and collaboratively with others when entering and working in a confined space
Problem-solving	Identify problems that can occur during the operation of engines on vessels Recognise faulty equipment and take appropriate action Recognise unsafe conditions and potential hazards, and assess and report risk according to organisational procedures
Initiative and enterprise	Follow instructions to monitor engine-room machinery and equipment Make suggestions for improved environmental work practices Select and use relevant tools and equipment
Planning and organising	Follow required work schedule according to organisational requirements Obtain permission to enter confined space Plan and prepare for work
Self-management	Maintain situational awareness Make distress calls using radio equipment on distress call frequency to communicate nature of emergency Select, prepare and use personal protective equipment and emergency

	rescue equipment
Learning	Organise abandon vessel musters and drills Practise realistic drills and musters to ensure pre-incident readiness of response personnel Review musters and drills against objectives
Technology	Maintain integrity of emergency and distress alerting systems Monitor VHF and communicate information to the Master if appropriate Use portable radio equipment, pyrotechnics and other signalling equipment

Packaging Rules

Total number of units = 18 units

18 core units

Core units			
Field			
A	Handling Cargo and Vessel Stability	MARA3001A	Contribute to safe cargo operations on liquefied gas tankers
		MARA3002A	Contribute to safe cargo operations on oil and chemical tankers
B	Equipment Checking and Maintenance	MARB3002A	Perform routine engine maintenance on a vessel
		MARB3003A	Perform routine maintenance and repairs on a vessel
C	Equipment Operations	MARC3006A	Operate deck machinery, cargo handling gear and equipment on a vessel
		MARC3008A	Operate engine equipment and associated propulsion plant
F	Operational Quality and Safety	MARF3001A	Assist in an emergency response
		MARF3002A	Observe personal safety and social responsibility
		MARF3003A	Operate emergency equipment and apply

			emergency procedures
		MARF3004A	Operate survival craft and other lifesaving appliances
		MARF3005A	Prevent and fight fires on board a vessel
		MARF3006A	Survive at sea in the event of vessel abandonment
		MARF3007A	Work safely in confined spaces on a vessel
J	Environment	MARJ2001A	Follow environmental work practices
K	Manoeuvring Vessels	MARK3002A	Steer a vessel under direction of the Master
N	Seamanship	MARN3002A	Use seamanship skills on board a vessel
O	Watchkeeping	MARO3001A	Contribute to monitoring and controlling a safe engine watch
		MARO3002A	Contribute to monitoring and controlling a safe navigational watch

Custom Content Section

Not applicable.

MAR30213 Certificate III in Maritime Operations (Marine Engine Driver Grade 2)

Modification History

Release 1	This is the first release of this qualification in the MAR13 Maritime Training Package. TDM30207 Certificate III in Transport Distribution (Marine Engine Driving - Grade 2).
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Description

This qualification is suitable for people who work in the maritime industry in charge of operating vessels with a propulsion power of up to 750 kW.

Pathways Information

Pathways into the qualification

MAR20213 Certificate II in Maritime Operations (Marine Engine Driver Grade 3)

Pathways from the qualification

MAR40213 Certificate IV in Maritime Operations (Marine Engine Driver Grade 1)

Licensing/Regulatory Information

This qualification is currently cited as meeting some of the requirements for certification as a Marine Engine Driver Grade 2 as described in Part D of the National Standard for Commercial Vessels (NSCV) by the Australian Maritime Safety Authority (AMSA).

Certification will require achievement of the MAR30213 Certificate III in Maritime Operations (Marine Engine Driver Grade 2) and other requirements; people seeking certification should check with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the maritime industry for this qualification. This table should be interpreted in conjunction with

the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on packaging options.	
Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	<p>Complete required records</p> <p>Read and interpret manufacturer specifications and safety data sheets (SDS)/material safety data sheets (MSDS)</p> <p>Write simple reports</p>
Teamwork	<p>Encourage, acknowledge and act upon constructive feedback provided by others in the workgroup</p> <p>Plan and sequence tasks in conjunction with others involved in or affected by maintenance work</p> <p>Provide support to team members to ensure work group goals are met</p>
Problem-solving	<p>Make suggestions for improved environmental work practices</p> <p>Recognise risks to fellow workers and other people and take action to eliminate or reduce them</p> <p>Take action promptly to address problems that may arise when following vessel abandonment procedures</p>
Initiative and enterprise	<p>Provide ideas to control the level of risk associated with work tasks</p> <p>Recognise faulty equipment and take appropriate action</p> <p>Take appropriate action in response to an accidental spillage or safety incident during refuelling and fuel transfer operations</p>
Planning and organising	<p>Develop work plan and sequence in conjunction with others involved in or affected by plan, according to organisational procedures</p> <p>Monitor and maintain stock levels and consumables at required levels</p> <p>Plan maintenance activities according to technical, legislative, safety and procedural specifications</p>
Self-management	<p>Identify threats to survival and outline treatment options</p> <p>Maintain collaboration and communication with others to support the safety and efficiency of the firefighting operation</p> <p>Make contributions to the review of environmental work practices and policies within limits of own responsibility</p>
Learning	<p>Participate in training, musters and emergency drills</p> <p>Practise survival techniques</p>

	Undertake participation in fire drills and musters to ensure readiness for fire emergencies
Technology	Operate survival radio equipment according to manufacturer instructions and regulatory protocols Regularly check firefighting equipment and take appropriate action to ensure that it is operational Select and use technology appropriate to a task

Packaging Rules

Total number of units = 16 units

16 core units

Core units			
Field			
B	Equipment Checking and Maintenance	MARB3006A	Maintain marine internal combustion engines, propulsion plant and auxiliary systems
		MARB3007A	Undertake basic maintenance of electrical systems
C	Equipment Operations	MARC2001A	Complete engine room tasks
		MARC2002A	Maintain hull out of water
		MARC2003A	Operate and maintain extra low and low voltage electrical systems and equipment
		MARC2004A	Operate deck machinery
		MARC2007A	Operate marine internal combustion engines, and propulsion and auxiliary systems
		MARC3001A	Manage fuel systems
		MARC3005A	Operate and monitor marine internal combustion engines, propulsion plant and auxiliary systems
	MARC3007A	Operate electrical systems	
F	Operational	MARF1001A	Apply basic survival skills in the event of vessel

	Quality and Safety		abandonment
		MARF1002A	Follow procedures to minimise and fight fires on board a vessel
		MARF1005A	Meet work health and safety requirements
		MARF1006A	Survive at sea using survival craft
J	Environment	MARJ2001A	Follow environmental work practices
	Imported	BSBWOR203B	Work effectively with others

Custom Content Section

Not applicable.

MAR30313 Certificate III in Maritime Operations (Marine Engine Driver Steam)

Modification History

Release 1	This is the first release of this qualification in the MAR13 Maritime Training Package.
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Description

This qualification is suitable for a Chief Engineer of a vessel that has steam as its main method of propulsion with propulsion power up to 750 kW within the exclusive economic zone (EEZ).

Pathways Information

Pathways into the qualification

MAR20213 Certificate II in Maritime Operations (Marine Engine Driver Grade 3)

Pathways from the qualification

MAR30213 Certificate III in Maritime Operations (Marine Engine Driver Grade 2)

Licensing/Regulatory Information

This qualification is currently cited as meeting some of the requirements for certification as a Marine Engine Driver (Steam) by the Australian Maritime Safety Authority (AMSA).

Certification will require achievement of the MAR30313 Certificate III in Maritime Operations (Marine Engine Driver Steam) and other requirements; people seeking certification should check with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the maritime industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on

packaging options.	
Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	<p>Complete maintenance report according to workplace procedures</p> <p>Read and interpret system specifications</p> <p>Test means of communication between bridge and engine room</p>
Teamwork	<p>Discuss environmental issues and their relationship to work practices with colleagues and appropriate personnel</p> <p>Maintain collaboration and communication with others to support the safety and efficiency of the firefighting operation</p> <p>Recognise and carry out worker/employee responsibilities prescribed in WHS/OHS legislation</p>
Problem-solving	<p>Apply problem solving skills to investigate and identify causes of WHS/OHS incidents</p> <p>Recognise electrical system faults and where necessary, take steps to make them immediately safe</p> <p>Recognise problems and hazards during refuelling and fuel transfer operations, and take appropriate action</p>
Initiative and enterprise	<p>Implement contingency plans for emergencies</p> <p>Provide ideas to control the level of risk associated with work tasks</p> <p>Take appropriate action to prevent pollution of marine environment</p>
Planning and organising	<p>Plan and sequence tasks in conjunction with others involved in or affected by maintenance work</p> <p>Plan maintenance activities</p> <p>Plan timing and sequence of individual survival actions to be appropriate to prevailing circumstances and conditions of emergency, and minimise potential dangers and threats to other survivors</p>
Self-management	<p>Assist others to maximise their chances of survival</p> <p>Collect, manage and interpret information on use of lifesaving equipment</p> <p>Ration water and food</p>
Learning	<p>Practise survival techniques</p> <p>Participate in abandon vessel drills</p> <p>Participate in training, musters and emergency drills</p>

Technology	<p>Make distress calls using radio equipment on distress call frequency, if time allows, to communicate the nature of the emergency</p> <p>Operate emergency position indicating radio beacon (EPIRB) to transmit distress signal</p> <p>Operate radio equipment</p>
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Packaging Rules

Total number of units = 12 units

12 core units

Core units			
Field			
B	Equipment Checking and Maintenance	MARB3001A	Maintain firefighting appliances
		MARB3007A	Undertake basic maintenance of electrical systems
C	Equipment Operations	MARC3001A	Manage fuel systems
		MARC3002A	Operate and maintain a boiler
		MARC3003A	Operate and maintain a steam engine up to 750 kW and steam auxiliary equipment
		MARC3004A	Operate and maintain engines for auxiliary systems other than steam auxiliary systems
		MARC3007A	Operate electrical systems
F	Operational Quality and Safety	MARF1001A	Apply basic survival skills in the event of vessel abandonment
		MARF1002A	Follow procedures to minimise and fight fires on board a vessel
		MARF1005A	Meet work health and safety requirements
		MARF1006A	Survive at sea using survival craft
J	Environment	MARJ2001A	Follow environmental work practices

Custom Content Section

Not applicable.

MAR30413 Certificate III in Maritime Operations (Master up to 24 metres)

Modification History

Release 1	<p>This is the first release of this qualification in the MAR13 Maritime Training Package.</p> <p>This qualification replaces TDM30407 Certificate III in Transport Distribution (Coastal Maritime Operations - Master Class 5).</p>
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Description

This qualification is suitable for people working in the maritime industry as a Master on commercial vessels up to 24 metres in length, within the exclusive economic zone (EEZ).

Pathways Information

Pathways into the qualification

MAR20113 Certificate II in Maritime Operations (Coxswain)

MAR30513 Certificate III in Maritime Operations (Master Inland Waters)

Pathways from the qualification

MAR40313 Certificate IV in Maritime Operations (Master up to 35 metres)

Licensing/Regulatory Information

This qualification is currently cited as meeting some of the requirements for certification as a Master Class 5 as described in Part D of the National Standard for Commercial Vessels (NSCV) by the Australian Maritime Safety Authority (AMSA).

Certification will require achievement of the MAR30413 Certificate III in Maritime Operations (Master up to 24 metres), sea-service, a valid first aid certificate and an appropriate radio qualification; people seeking certification should check the requirements with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the maritime industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on packaging options.

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	<p>Communicate effectively with others about watchkeeping issues, arrangements and requirements</p> <p>Complete required records when performing routine remedial, preventative and survey deck maintenance on a vessel</p> <p>Read and interpret instructions on emergency procedures, safety management systems and plans, and use of lifesaving and survival equipment</p>
Teamwork	<p>Facilitate consultation processes to allow employees to contribute to issues related to their work, and promptly communicate outcomes of consultation to the work team</p> <p>Supervise crew in completing maintenance tasks</p> <p>Support others to follow environmental management procedures</p>
Problem-solving	<p>Identify and solve problems that may arise during watchkeeping duties</p> <p>Identify and solve problems to do with the implementation of regulations relating to the operations, security and maintenance of a vessel up to 80 metres</p> <p>Recognise routine problems when performing routine remedial, preventative and survey deck maintenance on a vessel</p>
Initiative and enterprise	<p>Follow required work schedule according to organisational requirements</p> <p>Identify and raise opportunities for improving environmental performance with appropriate personnel</p> <p>Provide information relevant for the debrief of a fire incident</p>
Planning and organising	<p>Organise workload in order of priority, taking into consideration all listed work including survey work</p> <p>Plan maintenance tasks</p> <p>Prepare listed work plan to rectify all identified faults</p>
Self-management	<p>Adjust interpersonal styles and methods in relation to the organisation's social and cultural environment</p>

	Maintain situational awareness to ensure safe manoeuvres Monitor personal behaviour to ensure it is consistent with environmental management procedures
Learning	Participate in abandon vessel drills Practise survival techniques Provide training, inductions and briefings to crew and passengers
Technology	Check wheelhouse equipment for errors and make allowances in planning passage Operate radio equipment Use and monitor propulsion equipment to assist in completing manoeuvres safely

Packaging Rules

Total number of units = 14 units

14 core units

Core units			
Field			
B	Equipment Checking and Maintenance	MARB3004A	Perform routine maintenance on a vessel up to 24 metres
		MARB3005A	Slip or dock a vessel and maintain hull on a vessel up to 80 metres
F	Operational Quality and Safety	MARF1001A	Apply basic survival skills in the event of vessel abandonment
		MARF1002A	Follow procedures to minimise and fight fires on board a vessel
		MARF1005A	Meet work health and safety requirements
		MARF1006A	Survive at sea using survival craft
H	Navigation	MARH3002A	Manage and maintain a navigational watch on board vessels up to 80 metres
		MARH3003A	Plan and navigate a passage for a vessel up to 80 metres

		MARH3004A	Use wheelhouse equipment for safe navigation
I	Regulations and Port Operations	MARI3001A	Observe regulations to ensure safe operation of a vessel up to 80 metres
J	Environment	MARJ3001A	Monitor environmental management on a vessel
K	Manoeuvring Vessels	MARK3001A	Manoeuvre a vessel up to 24 metres within near coastal waters
N	Seamanship	MARN3001A	Perform seamanship operations on board a vessel up to 24 metres
	Imported	BSBFLM303C	Contribute to effective workplace relationships

Custom Content Section

Not applicable.

MAR30513 Certificate III in Maritime Operations (Master Inland Waters)

Modification History

Release 1	This is the first release of this qualification in the MAR13 Maritime Training Package.
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Description

This qualification is suitable for people working in the maritime industry as a Master Inland Waters.

Pathways Information

Pathways into the qualification

MAR13 Coxswain Grade 1 and Grade 2 Skill Set

Pathways from the qualification

MAR30413 Certificate III in Maritime Operations (Master up to 24 metres)

Licensing/Regulatory Information

This qualification is currently cited as meeting some of the requirements for certification as a Master of a commercial vessel up to 24 metres operating in inland waters by the Australian Maritime Safety Authority (AMSA).

Certification will require achievement of the MAR30513 Certificate III in Maritime Operations (Master Inland Waters), sea-service, first aid and appropriate radio certificates; people seeking certification should check with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the maritime industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on

packaging options.	
Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	<p>Communicate effectively with other personnel and passengers during simulated and actual abandon vessel musters and emergencies</p> <p>Complete maintenance records</p> <p>Read, interpret and apply weather information</p>
Teamwork	<p>Clearly brief crew members on their responsibility, maintenance tasks and WHS/OHS requirements</p> <p>Facilitate consultation processes to allow employees to contribute to issues related to their work, and promptly communicate outcomes of consultation to the work team</p> <p>Inform crew of environmental hazards and risk control measures relating to their work responsibilities</p>
Problem-solving	<p>Identify and minimise risks and hazards that may occur when abandoning vessel, according to SMS, and established safety practice and procedures</p> <p>Identify and solve problems that may arise during watchkeeping duties</p> <p>Recognise routine problems when performing routine remedial, preventative and survey deck maintenance on a vessel</p>
Initiative and enterprise	<p>Contribute to review and development of advice on appropriate WHS/OHS procedures</p> <p>Provide ideas to control the level of risk associated with work tasks</p> <p>Select and use relevant tools, equipment and materials according to instructions</p>
Planning and organising	<p>Organise workload in order of priority, taking into consideration all listed work including survey work</p> <p>Plan timing and sequence of individual survival actions to be appropriate to prevailing circumstances and conditions of emergency, and minimise potential dangers and threats to other survivors</p> <p>Prepare plan for docking or slipping vessel</p>
Self-management	<p>Adjust interpersonal styles and methods in relation to organisation's social and cultural environment</p> <p>Model work policies and procedures to support environmental management in own work</p> <p>Monitor personal behaviour to ensure it is consistent with environmental management procedures</p>

Learning	<p>Participate in abandon vessel drills</p> <p>Practise survival techniques</p> <p>Instigate training and instruction, including induction training, on procedures to ensure crew comply with regulations</p>
Technology	<p>Operate radio equipment</p> <p>Select and use relevant instruments and equipment according to instructions</p> <p>Use and monitor propulsion equipment to assist in completing manoeuvres safely</p>

Packaging Rules

Total number of units = 12 units

12 core units

Core units			
Field			
B	Equipment Checking and Maintenance	MARB3004A	Perform routine maintenance on a vessel up to 24 metres
		MARB3005A	Slip or dock a vessel and maintain hull on a vessel up to 80 metres
F	Operational Quality and Safety	MARF1001A	Apply basic survival skills in the event of vessel abandonment
		MARF1002A	Follow procedures to minimise and fight fires on board a vessel
		MARF1005A	Meet work health and safety requirements
H	Navigation	MARH3001A	Apply weather information when navigating inland waters as Master
		MARH3002A	Manage and maintain a navigational watch on board vessels up to 80 metres
I	Regulations and Port Operations	MARI3001A	Observe regulations to ensure safe operation of a vessel up to 80 metres
J	Environment	MARJ3001A	Monitor environmental management on a

			vessel
K	Manoeuvring Vessels	MARK3001A	Manoeuvre a vessel up to 24 metres within near coastal waters
N	Seamanship	MARN3001A	Perform seamanship operations on board a vessel up to 24 metres
	Imported	BSBFLM303C	Contribute to effective workplace relationships

Custom Content Section

Not applicable.

MAR30613 Certificate III in Maritime Operations (Marine Surveying)

Modification History

Release 1	This is the first release of this qualification in the MAR13 Maritime Training Package.
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Description

This qualification is suitable for people who assist marine surveyors or who undertake administration duties in the maritime industry and/or marine surveying sector.

Pathways Information

Pathways into the qualification

Not applicable

Pathways from the qualification

MAR40413 Certificate IV in Maritime Operations (Marine Surveying)

Licensing/Regulatory Information

This qualification is currently cited as meeting some of the requirements for accreditation as a statutory marine surveyor of domestic commercial vessels by the Australian Maritime Safety Authority (AMSA).

Accreditation will require achievement of other requirements; people seeking accreditation should check with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the maritime industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on packaging options.

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	<p>Complete WHS/OHS records</p> <p>Prepare simple documents such as summary reports, audit reports and memos for a range of personnel including surveyors, managers, supervisors and seafarers</p> <p>Read and interpret vessel specifications and drawings</p>
Teamwork	<p>Determine personal requirements for diary and schedule items for individual personnel</p> <p>Identify range of clients and stakeholders who would require marine surveyor and/or inspector services</p> <p>Work under supervision of a marine surveyor</p>
Problem-solving	<p>Identify conflicts of interest and other vested interests that would affect survey outcome and/or report and resolve with surveyor</p> <p>Negotiate alternative arrangements and confirm when established appointments are changed</p> <p>Solve routine problems</p>
Initiative and enterprise	<p>Contribute to WHS/OHS participation processes</p> <p>Identify and apply appropriate conduct and ethical behaviour</p> <p>Seek learning opportunities</p>
Planning and organising	<p>Document inspection requirements for materials and components and verify with surveyor</p> <p>Plan and conduct work safely</p> <p>Scope framework for marine surveys</p>
Self-management	<p>Develop a rapport with colleagues and people external to the organisation</p> <p>Outline behavioural characteristics and personal conduct required of a marine surveyor</p> <p>Recognise limits of own expertise and legal responsibilities, and access appropriate sources of expertise as required</p>
Learning	<p>Identify Master and crew member legal obligations and duties for training employees</p> <p>Identify WHS/OHS training needs of crew</p> <p>Regularly update knowledge of SMS, relevant legislation, standards, and workplace policies and procedures</p>

Technology	<p>Accurately operate technical and electronic equipment</p> <p>Operate workplace equipment</p> <p>Use business technology efficiently and effectively to manage and monitor scheduling and completion of tasks</p>
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Packaging Rules

Total number of units = 9 units

9 core units

Core units			
Field			
F	Operational Quality and Safety	MARF3002A	Observe personal safety and social responsibility
M	Marine Surveying	MARM3001A	Apply knowledge of safety management system legal framework in the workplace
		MARM3002A	Apply vessel construction theory to marine survey tasks
		MARM3003A	Identify factors that affect a commercial vessel's fitness for purpose
		MARM3004A	Work in the marine surveying sector
	Imported	BSBADM307B	Organise schedules
		BSBWOR301B	Organise personal work priorities and development
		PSPGOV314A	Contribute to conflict management
		PSPREG201A	Carry out inspections and monitoring under guidance

Custom Content Section

Not applicable.

MAR30713 Certificate III in Maritime Operations (Marine Cookery)

Modification History

Release 1	This is the first release of this qualification in the MAR13 Maritime Training Package.
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Description

This qualification is suitable for persons carrying out marine cook duties on a ship.

Pathways Information

Pathways into the qualification

Completion of an approved training course in hospitality or completion of at least six months documented qualifying sea service as a marine cook.

Pathways from the qualification

Hospitality industry qualifications; marine hospitality roles.

Licensing/Regulatory Information

This qualification is currently cited as meeting some of the requirements for certification as a Marine Cook by the Australian Maritime Safety Authority (AMSA).

Certification will require achievement of the MAR30713 Certificate III in Maritime Operations (Marine Cookery), a valid first aid certificate and a Certificate of Safety Training; people seeking certification should check the requirements with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the maritime industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on packaging options.

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	Communicate with crew about WHS/OHS matters Count and check quantities of stock Recognise communication modes and use appropriately
Teamwork	Identify work team goals jointly with colleagues and relevant others Negotiate changes to individual responsibilities to meet reviewed work goals Offer assistance to colleagues when required to ensure designated work goals are met
Problem-solving	Deal with minor problems such as shortages, variations and errors Promptly identify and report any problems Respond to conflicts and customer complaints
Initiative and enterprise	Identify, prioritise and complete individual tasks within designated timeframes Make contributions to risk assessments Recognise emergency and potential emergency situations promptly and determine or take required actions within the scope of individual responsibility
Planning and organising	Follow up orders Process stock orders Rotate supplies according to enterprise policy
Self-management	Maintain personal presentation standards Recognise own role and responsibilities Use language and tone appropriate to a given situation in both written and spoken communication
Learning	Identify WHS/OHS training needs of crew Participate in consultation forums Practise realistic drills and musters to ensure pre-incident readiness of response personnel
Technology	Explain types and purpose of security equipment Make distress calls using radio equipment on distress call frequency to communicate nature of emergency

	Operate security equipment
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Packaging Rules

Total number of units = 14 units

14 core units

Core units			
Field			
F	Operational Quality and Safety	MARF1003A	Follow vessel security procedures
		MARF3002A	Observe personal safety and social responsibility
		MARF3005A	Prevent and fight fires on board a vessel
		MARF3006A	Survive at sea in the event of vessel abandonment
	Imported	SITHCCC001B	Organise and prepare food
		SITHCCC002A	Present food
		SITHCCC003B	Receive and store kitchen supplies
		SITHCCC004B	Clean and maintain kitchen premises
		SITHCCC005A	Use basic methods of cookery
		SITHCCC027A	Prepare, cook and serve food for food service
		SITXCOM001A	Work with colleagues and customers
		SITXINV002A	Control and order stock
		SITXOHS001B	Follow health, safety and security procedures
		SITXOHS002A	Follow workplace hygiene procedures

Custom Content Section

Not applicable.

MAR40113 Certificate IV in Maritime Operations (Chief Integrated Rating)

Modification History

Release 1	This is the first release of this qualification in the MAR13 Maritime Training Package.
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Description

This qualification is suitable for people working the maritime industry in charge of the Integrated Ratings on a ship and is responsible for implementing the planned maintenance system and maintaining relevant stores.

Pathways Information

Pathways into the qualification

MAR30113 Certificate III in Maritime Operations (Integrated Rating)

Pathways from the qualification

MAR50213 Diploma of Maritime Operations (Engineer Watchkeeper)

MAR50313 Diploma of Maritime Operations (Watchkeeper Deck)

Licensing/Regulatory Information

This qualification is currently cited as meeting some of the requirements for certification as a Chief Integrated Rating as described in Marine Orders Part 3: Seagoing Qualifications under the Australian Navigation Act 2012 by the Australian Maritime Safety Authority (AMSA).

Certification will require achievement of the MAR40113 Certificate IV in Maritime Operations (Chief Integrated Rating), sea-service, a valid first aid certificate and completion of a task record book; people seeking certification should check the requirements with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the

maritime industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on packaging options.	
Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	Effectively communicate ideas and information to crew Maintain communications with others to facilitate emergency response process Present reports
Teamwork	Carry out effective and appropriate information provision with management Communicate priority of tasks to crew or individuals Discuss workload with crew or individuals on a regular basis
Problem-solving	Adjust scheduling to meet contingencies Initiate appropriate action and provide solutions to problems with firefighting equipment and operations during a fire emergency Make recommendations for prevention or correction of problems in order to achieve established standards
Initiative and enterprise	Assist with recovery from emergency or incident Research information related to inventory including the relevant technical, regulatory, environmental and safety requirements Select and use relevant tools, equipment and materials according to instructions
Planning and organising	Develop continuous improvement strategies Establish and monitor performance targets for maintenance teams within performance planning and appraisal processes Prepare contingency plans
Self-management	Perform allocated duties for emergency situations according to organisational procedures Provide instruction to achieve the required standard Provide leadership to crew
Learning	Organise abandon vessel drills Prepare, practise and debrief training exercises according to regulatory and organisational requirements, to ensure readiness for any fire

	<p>emergency</p> <p>Provide mentoring, training and assessment where required, to develop and enhance crew or individual skills and knowledge in line with work role requirements</p>
Technology	<p>Operate radio equipment</p> <p>Select and use emergency and distress alerting systems</p> <p>Use navigational equipment to steer a steady course</p>

Packaging Rules

Total number of units = 22 units

22 core units

Core units			
Field			
A	Handling Cargo and Vessel Stability	MARA3001A	Contribute to safe cargo operations on liquefied gas tankers
		MARA3002A	Contribute to safe cargo operations on oil and chemical tankers
B	Equipment Checking and Maintenance	MARB3002A	Perform routine engine maintenance on a vessel
		MARB3003A	Perform routine maintenance and repairs on a vessel
		MARB4002A	Implement vessel planned maintenance system
		MARB4004A	Manage stores for planned maintenance system
C	Equipment Operations	MARC3006A	Operate deck machinery, cargo handling gear and equipment on a vessel
		MARC3008A	Operate engine equipment and associated propulsion plant
F	Operational Quality and Safety	MARF3001A	Assist in an emergency response
		MARF3002A	Observe personal safety and social responsibility
		MARF3003A	Operate emergency equipment and apply

			emergency procedures
		MARF3004A	Operate survival craft and other lifesaving appliances
		MARF3005A	Prevent and fight fires on board a vessel
		MARF3006A	Survive at sea in the event of vessel abandonment
		MARF3007A	Work safely in confined spaces on a vessel
		MARF4001A	Manage firefighting and fire prevention activities on board a vessel
G	Teamwork	MARG4003A	Supervise a crew
J	Environment	MARJ2001A	Follow environmental work practices
K	Manoeuvring Vessels	MARK3002A	Steer a vessel under direction of the Master
N	Seamanship	MARN3002A	Use seamanship skills on board a vessel
O	Watchkeeping	MARO3001A	Contribute to monitoring and controlling a safe engine watch
		MARO3002A	Contribute to monitoring and controlling a safe navigational watch

Custom Content Section

Not applicable.

MAR40213 Certificate IV in Maritime Operations (Marine Engine Driver Grade 1)

Modification History

Release 1	<p>This is the first release of this qualification in the MAR13 Maritime Training Package.</p> <p>This qualification replaces TDM40207 Certificate IV in Transport Distribution (Marine Engine Driving - Grade 1).</p>
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Description

This qualification is suitable for people who work in the maritime industry in charge of operating vessels with a propulsion power up to 1500 kW.

Pathways Information

Pathways into the qualification

MAR30213 Certificate III in Maritime Operations (Marine Engine Driver Grade 2)

Pathways from the qualification

MAR50113 Diploma of Maritime Operations (Marine Engineering Class 3)

Licensing/Regulatory Information

This qualification is currently cited as meeting some of the requirements for certification as a Marine Engine Driver Grade 1 as described in Part D of the National Standard for Commercial Vessels (NSCV) by the Australian Maritime Safety Authority (AMSA).

Certification will require achievement of the MAR40213 Certificate IV in Maritime Operations (Marine Engine Driver Grade 1) and other requirements; people seeking certification should check with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the maritime industry for this qualification. This table should be interpreted in conjunction with

<p>the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on packaging options.</p>	
Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	<p>Complete required records</p> <p>Effectively communicate maintenance schedules and procedures to the team</p> <p>Read and interpret work specifications and drawings</p>
Teamwork	<p>Counsel team members and provide feedback</p> <p>Supervise maintenance tasks</p> <p>Work safely and collaboratively with others when carrying out basic welding, brazing, cutting and machining operations on a vessel</p>
Problem-solving	<p>Apply problem solving skills to investigate and identify causes of WHS/OHS incidents</p> <p>Deal effectively with issues, problems and conflict</p> <p>Negotiate effectively</p>
Initiative and enterprise	<p>Identify risks to self, others and the environment according to organisational procedures</p> <p>Prepare contingency plans</p> <p>Recognise faulty equipment and take appropriate action</p>
Planning and organising	<p>Implement recommendations to improve maintenance plan safety, efficiency and effectiveness under regular review of safety management system</p> <p>Manage contingencies to ensure quality of work is maintained and work is completed within agreed timeframe</p> <p>Monitor, adjust and report on implementation of maintenance plan</p>
Self-management	<p>Display sound personnel management</p> <p>Lead team members</p> <p>Monitor personal behaviour to ensure it is consistent with environmental management procedures</p>
Learning	<p>Participate in training, musters and emergency drills</p> <p>Practise survival techniques</p> <p>Provide mentoring and coaching to support individuals/crew to implement</p>

	procedures to support environmental management
Technology	Operate auxiliary machinery systems Operate radio equipment Select and use technology appropriate to a task

Packaging Rules

Total number of units = 27 units

27 core units

Core units			
Field			
A	Handling Cargo and Vessel Stability	MARA4002A	Manage vessel stability
B	Equipment Checking and Maintenance	MARB3007A	Undertake basic maintenance of electrical systems
		MARB4001A	Carry out basic welding, brazing, cutting and machining operations on a coastal vessel
		MARB4003A	Manage refuelling
		MARB4006A	Undertake maintenance of 240 to 440 voltage alternating current electrical systems
		MARB4007A	Undertake maintenance of machinery, machinery systems and structural components
C	Equipment Operations	MARC2001A	Complete engine room tasks
		MARC2002A	Maintain hull out of water
		MARC2003A	Operate and maintain extra low and low voltage electrical systems and equipment
		MARC2004A	Operate deck machinery
		MARC2007A	Operate marine internal combustion engines, and propulsion and auxiliary systems
		MARC3001A	Manage fuel systems

		MARC3005A	Operate and monitor marine internal combustion engines, propulsion plant and auxiliary systems
		MARC3007A	Operate electrical systems
		MARC4003A	Operate auxiliary machinery systems up to 1500 kW
		MARC4005A	Operate marine internal combustion engines and associated systems up to 1500 kW
		MARC4006A	Operate propulsion transmission systems up to 1500 kW
		MARC4007A	Operate 240 to 440 voltage alternating current electrical systems
F	Operational Quality and Safety	MARF1001A	Apply basic survival skills in the event of vessel abandonment
		MARF1002A	Follow procedures to minimise and fight fires on board a vessel
		MARF1005A	Meet work health and safety requirements
		MARF1006A	Survive at sea using survival craft
G	Teamwork	MARG4002A	Manage an engine room and small engineering team
J	Environment	MARJ2001A	Follow environmental work practices
		MARJ3001A	Monitor environmental management on a vessel
L	Marine Engineering	MARL4001A	Carry out engineering calculations
	Imported	BSBWOR203B	Work effectively with others

Custom Content Section

Not applicable.

MAR40313 Certificate IV in Maritime Operations (Master up to 35 metres)

Modification History

Release 1	<p>This is the first release of this qualification in the MAR13 Maritime Training Package.</p> <p>This qualification replaces TDM40307 Certificate IV in Transport Distribution (Coastal Maritime Operations - Master Class 4).</p>
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Description

This qualification is suitable for those sailing as Master on vessels up to 35 metres in length within the exclusive economic zone (EEZ), Master on vessels up to 80 metres in length in inshore waters and Mate on vessels up to 80 metres in length.

Pathways Information

Pathways into the qualification

MAR30413 Certificate III in Maritime Operations (Master up to 24 metres)

Pathways from the qualification

MAR50313 Diploma of Maritime Operations (Watchkeeper Deck)

MAR50413 Diploma of Maritime Operations (Master up to 500 GT or Master 80 metres)

Licensing/Regulatory Information

This qualification is currently cited as meeting some of the requirements for certification as a Master Class 4 as described in Part D of the National Standard for Commercial Vessels (NSCV) by the Australian Maritime Safety Authority (AMSA).

Certification will require achievement of the MAR40313 Certificate IV in Maritime Operations (Master up to 35 metres), sea-service, a valid first aid certificate and an appropriate radio qualification; people seeking certification should check the requirements with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the maritime industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on packaging options.

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	Communicate ideas and information to enable input from crew and understanding by crew of plans developed Complete relevant documentation and submit to appropriate personnel Prepare reports on outcomes of inspection and maintenance activities
Teamwork	Investigate and negotiate proposed variations in consultation with crew members Supervise crew compliance with regulatory requirements Work collaboratively with other shipboard personnel and passengers during vessel operations
Problem-solving	Identify and act on potential and current, issues and problems arising within crew and/or individuals according to organisational and legislative requirements Recommend and implement preventative and/or corrective action Undertake a job safety analysis for working in areas of high risk
Initiative and enterprise	Build and motivate teams Provide ideas to control the level of risk associated with work tasks Recognise problems that may occur when interpreting weather and oceanographic information
Planning and organising	Develop maintenance program for vessel to meet requirements of planned maintenance system Develop operational strategies and procedures Plan resources for vessel operations
Self-management	Maintain housekeeping standards in work area Meet organisational requirements through personal performance and behaviour and leadership, which serves as a positive role model for other crew members Monitor and adjust own performance to ensure it aligns with key

	performance indicators and organisational goals
Learning	Develop strategies to ensure crew and individuals are actively encouraged and supported in assessing their own competence and identifying their learning needs Identify training opportunities for development of the individual's job role Induct and train crew
Technology	Operate radio equipment Record and file weather and oceanographic information and forecasts according to organisational procedures Use radar to navigate safely

Packaging Rules

Total number of units = 22 units

22 core units

Core units			
Field			
A	Handling Cargo and Vessel Stability	MARA4001A	Manage loading, discharging and stowage of cargo
		MARA4002A	Manage vessel stability
B	Equipment Checking and Maintenance	MARB3005A	Slip or dock a vessel and maintain hull on a vessel up to 80 metres
		MARB4005A	Plan and supervise routine maintenance on a vessel up to 80 metres
C	Equipment Operations	MARC4001A	Manage a propulsion unit using appropriate engine systems and support services
		MARC4002A	Monitor and manage vessel operations
		MARC4004A	Operate deck machinery and steering gear on a vessel up to 80 metres
F	Operational Quality and Safety	MARF1001A	Apply basic survival skills in the event of vessel abandonment

		MARF1002A	Follow procedures to minimise and fight fires on board a vessel
		MARF1005A	Meet work health and safety requirements
		MARF1006A	Survive at sea using survival craft
		MARF3007A	Work safely in confined spaces on a vessel
G	Teamwork	MARG4001A	Manage a small crew
H	Navigation	MARH3002A	Manage and maintain a navigational watch on board vessels up to 80 metres
		MARH3003A	Plan and navigate a passage for a vessel up to 80 metres
		MARH3004A	Use wheelhouse equipment for safe navigation
		MARH4001A	Forecast weather and oceanographic conditions
I	Regulations and Port Operations	MARI3001A	Observe regulations to ensure safe operation of a vessel up to 80 metres
J	Environment	MARJ3001A	Monitor environmental management on a vessel
K	Manoeuvring Vessels	MARK4001A	Manoeuvre a vessel up to 80 metres
N	Seamanship	MARN4001A	Manage seaworthiness of a vessel up to 80 metres
	Imported	HLTFA403C	Manage first aid in the workplace

Custom Content Section

Not applicable.

MAR40413 Certificate IV in Maritime Operations (Marine Surveying)

Modification History

Release 1	This is the first release of this qualification in the MAR13 Maritime Training Package.
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Description

This qualification is suitable for people working in the maritime industry as a domestic commercial vessel surveyor assistant.

Pathways Information

Pathways into the qualification

MAR30613 Certificate III in Maritime Operations (Marine Surveying)

Pathways from the qualification

MAR50513 Diploma of Maritime Operations (Marine Surveying)

Licensing/Regulatory Information

This qualification is currently cited as meeting some of the requirements for accreditation as a statutory marine surveyor of domestic commercial vessels by the Australian Maritime Safety Authority (AMSA).

Certification will require achievement of the MAR40413 Certificate IV in Maritime Operations (Marine Surveying) and other requirements; people seeking certification should check with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the maritime industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on

packaging options.	
Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	<p>Communicate effectively verbally and in writing</p> <p>Read and interpret instructions and procedures related to environmental considerations</p> <p>Write reports using appropriate formats</p>
Teamwork	<p>Seek input from surveyors, SMS specialists and technical advisors when required</p> <p>Work safely and collaboratively with others when surveying environmental considerations</p> <p>Work under supervision of a marine surveyor</p>
Problem-solving	<p>Detect faults in machinery, confirm with surveyor and document agreed actions to rectify issues in survey report</p> <p>Identify problems and arrange appropriate corrective action</p> <p>Recognise pollution control problems and hazards that may occur on a commercial vessel and take appropriate mitigating action</p>
Initiative and enterprise	<p>Accept and act on feedback</p> <p>Provide ideas to control the level of risk associated with work tasks</p> <p>Use critical analysis, evaluation and deductive reasoning</p>
Planning and organising	<p>Develop survey plan and agree with relevant personnel about survey schedule</p> <p>Identify, document and action areas for improvement</p> <p>Sequence tasks and meet timelines</p>
Self-management	<p>Build relationships with stakeholders (internal and external to organisation)</p> <p>Identify threats to survival and outline treatment options</p> <p>Maintain housekeeping standards in work area</p>
Learning	<p>Participate in abandon vessel drills</p> <p>Provide coaching in effective communication to colleagues and clients as required</p> <p>Undertake participation in fire drills and musters to ensure readiness for fire emergencies</p>

Technology	<p>Identify storage and security of information, and store and file records according to organisational and regulatory requirements</p> <p>Use a range of software and office equipment to access internal and external SMS information and data</p> <p>Use computers for word processing and manipulation of statistical data</p>
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Packaging Rules

Total number of units = 14 units

14 core units

Core units			
Field			
F	Operational Quality and Safety	MARF1001A	Apply basic survival skills in the event of vessel abandonment
		MARF1002A	Follow procedures to minimise and fight fires on board a vessel
		MARF1005A	Meet work health and safety requirements
M	Marine Surveying	MARM3002A	Apply vessel construction theory to marine survey tasks
		MARM4001A	Assess compliance with marine environment protection requirements
		MARM4002A	Assist in the survey of commercial vessels
		MARM4003A	Assist in the survey of vessel mechanical features
		MARM4004A	Evaluate vessel stability
		MARM4005A	Implement a systematic approach to the audit of safety management systems
		MARM4006A	Survey lifesaving appliances, fire and other safety systems
	Imported	CHCCOM403A	Use targeted communication skills to build relationships

		PSPGOV417A	Identify and treat risks
		PSPGOV421A	Exercise delegations
		PSPREG401C	Exercise regulatory powers

Custom Content Section

Not applicable.

MAR50113 Diploma of Maritime Operations (Marine Engineering Class 3)

Modification History

Release 1	<p>This is the first release of this qualification in the MAR13 Maritime Training Package.</p> <p>This qualification replaces TDM50407 Diploma of Transport Distribution (Coastal Marine Engineering - Engineer Class 3).</p>
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Description

This qualification is suitable for people who work in the maritime industry as an Engineer Class 3 on ships powered by main propulsion machinery of any propulsion power in any operating area, or as a second engineer on a vessel of less than 3000 kW operating in near coastal waters.

Pathways Information

Pathways into the qualification

MAR40213 Certificate IV in Maritime Operations (Marine Engine Driver Grade 1)

Pathways from the qualification

MAR60113 Advanced Diploma of Maritime Operations (Marine Engineering Class 2)

Licensing/Regulatory Information

This qualification is currently cited as meeting some of the requirements for certification as an Engineer Class 3 as described in Marine Orders Part 3: Seagoing Qualifications under the Navigation Act 2012 by the Australian Maritime Safety Authority (AMSA).

Certification will require achievement of the MAR50113 Diploma of Maritime Operations (Marine Engineering Class 3) and other requirements; people seeking certification should check with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the maritime industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on packaging options.

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	<p>Correctly and accurately complete engineering reports, running sheets and other engineering documentation relevant to the performance of engineering duties</p> <p>Receive, read and clarify as required, messages concerning vessel safety and operations, and correctly interpret and apply to engineering activities</p> <p>Use appropriate techniques when communicating with multilingual crew to ensure communication is effective and messages are clearly understood</p>
Teamwork	<p>Account for personnel involved and equipment used</p> <p>Seek Master's advice when challenges are beyond own scope of technical competence or when input from environmental specialist may be required</p> <p>Use appropriate strategies to foster the trust and confidence of stakeholders</p>
Problem-solving	<p>Identify and implement control measures to mitigate risk</p> <p>Identify difficult situations and negotiate solutions using a collaborative approach</p> <p>Respond to complaints and requests for information from authorities and authorised personnel</p>
Initiative and enterprise	<p>Identify precautions during entry to protect occupants</p> <p>Recognise unusual situations, unexpected risks/hazards and potential/actual environmental incidents</p> <p>Report opportunities and recommendations for improvements</p>
Planning and organising	<p>Identify, collate and process information required to prepare verbal and written reports</p> <p>Monitor the implementation of environmental management plans, policy and procedures, and specified work methods</p> <p>Prepare appropriate plan for completion of work activity in confined</p>

	space
Self-management	<p>Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices</p> <p>Clarify own scope of authority/responsibility for achieving specific environmental outcomes for the vessel and the roles of other key personnel</p> <p>Impart knowledge and ideas as required through oral, written and visual means</p>
Learning	<p>Develop and provide information and training to ensure all crew members understand their environmental obligations/responsibilities</p> <p>Effectively provide feedback, instruction and training on work performance to engine room crew according to vessel procedures and established engineering practice</p> <p>Monitor effectiveness of the information and training, and provide additional information/training as required</p>
Technology	<p>Use atmospheric detection equipment and interpret the readings</p> <p>Use computer and relevant equipment to enter, access and retrieve engineering information</p> <p>Store records to enable easy access and review by authorised personnel according to regulatory and organisational requirements</p>

Packaging Rules

Total number of units = 20 units

20 core units

Core units			
Field			
A	Handling Cargo and Vessel Stability	MARA3001A	Contribute to safe cargo operations on liquefied gas tankers
		MARA3002A	Contribute to safe cargo operations on oil and chemical tankers
B	Equipment Checking and Maintenance	MARB5001A	Maintain and repair marine electrical and electronic equipment
		MARB5002A	Maintain and repair shipboard machinery and

			equipment
C	Equipment Operations	MARC5001A	Employ tools, equipment and materials in a shipboard context
E	Communication	MARE5001A	Communicate effectively when performing engineering duties
F	Operational Quality and Safety	MARF3007A	Work safely in confined spaces on a vessel
J	Environment	MARJ5001A	Ensure compliance with environmental management legislation
L	Marine Engineering	MARL5001A	Apply basic principles of marine electrotechnology
		MARL5002A	Apply basic principles of marine engineering thermodynamics
		MARL5003A	Apply basic principles of marine mechanics
		MARL5004A	Apply basic principles of naval architecture
		MARL5005A	Demonstrate basic knowledge of marine auxiliary boilers
		MARL5006A	Demonstrate basic knowledge of marine auxiliary machinery and systems
		MARL5007A	Demonstrate basic knowledge of marine control systems and automation
		MARL5008A	Demonstrate basic knowledge of marine diesel engines and systems
		MARL5009A	Demonstrate basic knowledge of marine electrical systems
		MARL5010A	Demonstrate basic knowledge of marine steam turbines and main boilers
		MARL5011A	Demonstrate basic knowledge of ships and ship routines
		MARL5012A	Perform basic marine engineering calculations

Custom Content Section

Not applicable.

MAR50213 Diploma of Maritime Operations (Engineer Watchkeeper)

Modification History

Release 1	<p>This is the first release of this qualification in the MAR13 Maritime Training Package.</p> <p>This qualification replaces TDM50207 Diploma of Transport Distribution (Marine Engineering - Engineer Watchkeeper).</p>
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Description

This qualification is suitable for people who work in the maritime industry as an Engineer Watchkeeper on a seagoing ship powered by main propulsion machinery of any propulsion power in any operating area.

Pathways Information

Pathways into the qualification

MAR40113 Certificate IV in Maritime Operations (Chief Integrated Rating)

MAR50113 Diploma of Maritime Operations (Marine Engineering Class 3)

Pathways from the qualification

MAR60113 Advanced Diploma of Maritime Operations (Marine Engineering Class 2)

Licensing/Regulatory Information

This qualification is currently cited as meeting some of the requirements for certification as an Engineer Watchkeeper by the Australian Maritime Safety Authority (AMSA).

Certification will require achievement of the MAR50213 Diploma of Maritime Operations (Engineer Watchkeeper) and other requirements; people seeking certification should check with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the

maritime industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on packaging options.	
Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	<p>Communicate effectively verbally and in writing</p> <p>Read and interpret written information needed to perform basic marine engineering tasks</p> <p>Use non-verbal communication appropriately when working and communicating with others</p>
Teamwork	<p>Identify difficult situations and negotiate solutions using a collaborative approach</p> <p>Use appropriate strategies to foster the trust and confidence of stakeholders</p> <p>Work safely and collaboratively with others when entering and working in a confined space</p>
Problem-solving	<p>Identify and suggest ways of rectifying faults and malfunctions in control systems on commercial vessels</p> <p>Recognise problems and hazards that can arise when managing safety on a liquefied gas tanker, take appropriate remedial action and initiate appropriate solutions</p> <p>Resolve misunderstandings in written and verbal communication</p>
Initiative and enterprise	<p>Act on becoming aware of a hazardous situation</p> <p>Obtain and use regular feedback to enhance positive relations</p> <p>Report opportunities and recommendations for improvements</p>
Planning and organising	<p>Ensure environmental monitoring and management plans are implemented</p> <p>Identify, collate and process information required to prepare verbal and written reports</p> <p>Monitor the implementation of environmental management plans, policy and procedures, and specified work methods</p>
Self-management	<p>Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices</p> <p>Clarify own scope of authority/responsibility for achieving specific environmental outcomes for the vessel and the roles of other key personnel</p>

	Seek Master's advice when challenges are beyond own scope of technical competence or when input from environmental specialist may be required
Learning	Develop and provide information and training to ensure all crew members understand their environmental obligations/responsibilities Effectively provide feedback, instruction and training on work performance to engine room crew according to vessel procedures and established engineering practice Use environmental management plans and recent incident reports to identify training needs of crew members
Technology	Use a calculator to resolve marine engineering problems Use atmospheric detection equipment and interpret the readings Use computer and relevant equipment to enter, access and retrieve engineering information

Packaging Rules

Total number of units = 17 units

17 core units

Core units			
Field			
A	Handling Cargo and Vessel Stability	MARA3001A	Contribute to safe cargo operations on liquefied gas tankers
		MARA3002A	Contribute to safe cargo operations on oil and chemical tankers
E	Communication	MARE5001A	Communicate effectively when performing engineering duties
F	Operational Quality and Safety	MARF3007A	Work safely in confined spaces on a vessel
J	Environment	MARJ5001A	Ensure compliance with environmental management legislation
L	Marine Engineering	MARL5001A	Apply basic principles of marine electrotechnology

	MARL5002A	Apply basic principles of marine engineering thermodynamics
	MARL5003A	Apply basic principles of marine mechanics
	MARL5004A	Apply basic principles of naval architecture
	MARL5005A	Demonstrate basic knowledge of marine auxiliary boilers
	MARL5006A	Demonstrate basic knowledge of marine auxiliary machinery and systems
	MARL5007A	Demonstrate basic knowledge of marine control systems and automation
	MARL5008A	Demonstrate basic knowledge of marine diesel engines and systems
	MARL5009A	Demonstrate basic knowledge of marine electrical systems
	MARL5010A	Demonstrate basic knowledge of marine steam turbines and main boilers
	MARL5011A	Demonstrate basic knowledge of ships and ship routines
	MARL5012A	Perform basic marine engineering calculations

Custom Content Section

Not applicable.

MAR50313 Diploma of Maritime Operations (Watchkeeper Deck)

Modification History

Release 1	<p>This is the first release of this qualification in the MAR13 Maritime Training Package.</p> <p>This qualification replaces TDM50307 Diploma of Transport Distribution (Maritime Operations - Deck Watchkeeper).</p>
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Description

This qualification is suitable for people who work in the maritime industry as a Watchkeeper Deck.

Pathways Information

Pathways into the qualification

MAR40113 Certificate IV in Maritime Operations (Chief Integrated Rating)

Pathways from the qualification

MAR50413 Diploma of Maritime Operations (Master up to 500 GT or Master 80 metres)

MAR60213 Advanced Diploma of Maritime Operations (Master Unlimited)

Licensing/Regulatory Information

This qualification is currently cited as meeting some of the requirements for the certification as a Watchkeeper (Deck) as described in Marine Orders Part 3: Seagoing Qualifications under the Navigation Act 2012 by the Australian Maritime Safety Authority (AMSA).

Certification will require achievement of the MAR50313 Diploma of Maritime Operations (Watchkeeper Deck), qualifying sea-service, a certificate of medical fitness and short course requirements; people seeking certification should check the requirements with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the maritime industry for this qualification. This table should be interpreted in conjunction with

the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on packaging options.	
Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	<p>Make communications with engine room to ensure main engines are readied for manoeuvring</p> <p>Prepare incident reports</p> <p>Read, interpret and apply instructions, regulations, procedures and information associated with loading, unloading, stowage and care of cargo</p>
Teamwork	<p>Conduct meetings and briefings to maintain understanding and support with crew and stakeholders</p> <p>Provide assistance to crew members to accomplish teamwork and achieve organisational goals</p> <p>Work safely and collaboratively with others working in a confined space</p>
Problem-solving	<p>Identify and resolve or report any problems with persons accessing the vessel</p> <p>Identify and solve problems associated with loading, unloading, stowage and care of cargo</p> <p>Use strategies for resolving differences to negotiate issues and problems</p>
Initiative and enterprise	<p>Identify stakeholders, their relationship to the vessel and perceived attitudes about the vessel</p> <p>Provide suggestions to improve future operations</p> <p>Recognise in time, irregularities beyond own ability to rectify, to enable remedial action to be taken</p>
Planning and organising	<p>Allocate, assign and prioritise resources</p> <p>Plan an appropriate first aid response in line with established first aid principles, policies and procedures</p> <p>Review cargo plan</p>
Self-management	<p>Evaluate effectiveness of decisions to improve future decision making</p> <p>Make decisions consistent with personal and professional values, ethics and regulatory obligations</p> <p>Vary leadership and guidance strategies to meet changing priorities and situations, taking into account the differing needs and skills of individuals and the requirements of the tasks</p>

Learning	<p>Encourage and support crew members to take advantage of learning and development opportunities according to their needs and organisational requirements</p> <p>Provide learning and development activities</p> <p>Support individuals to identify their specific learning and development needs</p>
Technology	<p>Interpret information from bridge equipment to identify navigational hazards and fix vessel position</p> <p>Store data electronically or in hard copy as required by organisational procedures and regulatory requirements</p> <p>Use an electronic chart display and information system for passage planning and navigation</p>

Packaging Rules

Total number of units = 25 units

25 core units

Core units			
Field			
A	Handling Cargo and Vessel Stability	MARA3001A	Contribute to safe cargo operations on liquefied gas tankers
		MARA3002A	Contribute to safe cargo operations on oil and chemical tankers
		MARA5001A	Maintain vessel stability
		MARA5002A	Monitor loading, unloading and stowage of cargo
F	Operational Quality and Safety	MARF1003A	Follow vessel security procedures
		MARF3002A	Observe personal safety and social responsibility
		MARF3004A	Operate survival craft and other lifesaving appliances
		MARF3005A	Prevent and fight fires on board a vessel

		MARF3006A	Survive at sea in the event of vessel abandonment
		MARF3007A	Work safely in confined spaces on a vessel
		MARF4001A	Manage firefighting and fire prevention activities on board a vessel
		MARF5001A	Control safe access to and on vessel
		MARF5002A	Provide medical first aid on board a vessel
		MARF5003A	Respond to emergencies
G	Teamwork	MARG5001A	Provide leadership to crew
H	Navigation	MARH5002A	Plan and conduct a passage
		MARH5003A	Use an electronic chart display and information system to navigate safely
		MARH5004A	Use bridge equipment to determine vessel position
J	Environment	MARJ5001A	Ensure compliance with environmental management legislation
		MARJ5002A	Inspect and report defects and damage to vessel
K	Manoeuvring Vessels	MARK5001A	Perform basic vessel manoeuvres
N	Seamanship	MARN5001A	Maintain seaworthiness of a vessel
O	Watchkeeping	MARO5001A	Maintain a safe navigational watch
		MARO5002A	Transmit and receive information by the Global Maritime Distress and Safety System
		MARO5003A	Transmit and receive information by visual signalling

Custom Content Section

Not applicable.

MAR50413 Diploma of Maritime Operations (Master up to 500 GT or Master 80 metres)

Modification History

Release 1	This is the first release of this qualification in the MAR13 Maritime Training Package.
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Description

This qualification is suitable for people who work in the maritime industry as a Master, Chief Mate or Watchkeeper Deck on ships of less than 500 gross tonnage (GT) in any operating area, or as Master or Chief Mate of vessels less than 3000 GT operating in near coastal waters.

Pathways Information

Pathways into the qualification

MAR40313 Certificate IV in Maritime Operations (Master up to 35 metres)
MAR50313 Diploma of Maritime Operations (Watchkeeper Deck)

Pathways from the qualification

Not applicable

Licensing/Regulatory Information

This qualification is currently cited as meeting some of the requirements for certification as a Master Class 3 as described in Part D of the National Standard for Commercial Vessels (NSCV) by the Australian Maritime Safety Authority (AMSA) and as a Master <500 GT as described in Marine Order 3.

Certification will require achievement of the MAR50413 Diploma of Maritime Operations (Master up to 500 GT or Master 80 metres) and other requirements; people seeking certification should check with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the maritime industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on packaging options.

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	Analyse and compile operational and voyage data, and prepare reports Conduct management meetings Use interpersonal skills and communication techniques to facilitate open communication within crew, ensure understanding and encourage accurate exchange of information
Teamwork	Establish and develop dynamic groups and teams on board a vessel Provide leadership to officers and crew Use consultative and participative decision making in implementing and reviewing the work of the crew and the distribution of responsibilities
Problem-solving	Negotiate solutions to conflict using appropriate mediation and conflict resolution techniques Recognise routine problems that may occur when controlling safe access to and on a vessel and take appropriate action Take action to ensure fatigue management strategies are correctly applied by bridge management team
Initiative and enterprise	Improvise treatment and associated resources Recognise situations warranting alterations to bridge team, including situations where vessel is under pilotage Vary leadership and guidance strategies to meet changing priorities and situations, taking into account the differing needs and skills of individuals and the requirements of the tasks
Planning and organising	Develop and implement vessel safety management system Monitor and control vessel expenditure Plan, implement and monitor goals and performance requirements for vessel operations and emergencies
Self-management	Appropriately challenge and respond to questionable decisions and/or actions Clarify own scope of authority/responsibility for achieving specific

	<p>environmental outcomes for the vessel and the roles of other key personnel</p> <p>Evaluate effectiveness of decisions to improve future decision making</p>
Learning	<p>Assess and confirm crew member competencies, and assign duties to crew according to crew competencies and capabilities</p> <p>Organise training evaluation processes</p> <p>Provide learning and development activities</p>
Technology	<p>Conduct atmospheric assessments with oxygen meter and gas detecting equipment</p> <p>File required records and store according to organisational procedures</p> <p>Maintain charts and publications by applying up-to-date corrections to both paper and electronic charts and publications</p>

Packaging Rules

Total number of units = 28 units

28 core units

Core units			
Field			
A	Handling Cargo and Vessel Stability	MARA3001A	Contribute to safe cargo operations on liquefied gas tankers
		MARA3002A	Contribute to safe cargo operations on oil and chemical tankers
		MARA5001A	Maintain vessel stability
		MARA5002A	Monitor loading, unloading and stowage of cargo
D	Administration and Human Resources	MARD5001A	Manage business and administration on vessels limited by tonnage or near coastal operations
		MARD5002A	Manage operations and maintenance on vessels limited by tonnage or near coastal operations
F	Operational Quality and Safety	MARF1003A	Follow vessel security procedures
		MARF3002A	Observe personal safety and social

			responsibility
		MARF3004A	Operate survival craft and other lifesaving appliances
		MARF3005A	Prevent and fight fires on board a vessel
		MARF3006A	Survive at sea in the event of vessel abandonment
		MARF3007A	Work safely in confined spaces on a vessel
		MARF4001A	Manage firefighting and fire prevention activities on board a vessel
		MARF5001A	Control safe access to and on vessel
		MARF5002A	Provide medical first aid on board a vessel
		MARF5003A	Respond to emergencies
G	Teamwork	MARG5001A	Provide leadership to crew
H	Navigation	MARH5001A	Apply command navigation procedures on vessels limited by tonnage or near coastal operations
		MARH5002A	Plan and conduct a passage
		MARH5003A	Use an electronic chart display and information system to navigate safely
		MARH5004A	Use bridge equipment to determine vessel position
J	Environment	MARJ5001A	Ensure compliance with environmental management legislation
		MARJ5002A	Inspect and report defects and damage to vessel
K	Manoeuvring Vessels	MARK5001A	Perform basic vessel manoeuvres
N	Seamanship	MARN5001A	Maintain seaworthiness of a vessel
O	Watchkeeping	MARO5001A	Maintain a safe navigational watch
		MARO5002A	Transmit and receive information by the Global Maritime Distress and Safety System

		MARO5003A	Transmit and receive information by visual signalling
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Custom Content Section

Not applicable.

MAR50513 Diploma of Maritime Operations (Marine Surveying)

Modification History

Release 1	This is the first release of this qualification in the MAR13 Maritime Training Package.
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Description

This qualification is suitable for people working in the maritime industry as a domestic commercial vessel marine surveyor.

Pathways Information

Pathways into the qualification

MAR40413 Certificate IV in Maritime Operations (Marine Surveying)

Pathways from the qualification

Degree level qualifications as a marine surveyor naval architect or marine engineer

Licensing/Regulatory Information

This qualification is currently cited as meeting some of the requirements for accreditation as a surveyor of domestic commercial vessels by the Australian Maritime Safety Authority (AMSA).

People seeking accreditation should check with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the maritime industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on packaging options.

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	Document and report findings Make effective presentations Write technical reports
Teamwork	Convene investigation team appropriate to level of responsibility in investigation Identify survey purpose, objectives and variations with relevant personnel Liaise with others, share information and listen
Problem-solving	Identify and address barriers to investigation Recommend corrective action and follow-up processes according to regulatory requirements Resolve conflict and negotiate effectively
Initiative and enterprise	Anticipate possible challenges to report and prepare further explanations to promote acceptance Identify areas for improvement with the survey of marine incidents Promptly forward contentious information or findings to key stakeholders, and where necessary, personally brief or have opportunities to discuss report prior to compilation with involved parties
Planning and organising	Collect and accurately interpret valid and reliable data and/or regulations Plan and sequence work Review and analyse relevant workplace information and data
Self-management	Address own health and safety during audit, according to organisational requirements and standards for safe work practices Ethically carry out information and data collection and evaluation activities Work independently and unsupervised
Learning	Determine factors affecting complexity of investigation and surveyor competency to conduct investigation based on required specialised skills and knowledge Develop and use research techniques to identify gaps in knowledge and to recognise professional development opportunities Recognise own professional limitations
Technology	Access and update records electronically

	<p>Use computer applications (word processing, spreadsheet, database, specific purpose computer systems) to assist in achieving required outcomes</p> <p>Use computer-based stability programs as appropriate to assist with assessing compliance</p>
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Packaging Rules

Total number of units = 10 units

10 core units

Core units			
Field			
M	Marine Surveying	MARM5001A	Calculate, assess and report on vessel trim and stability
		MARM5002A	Conduct a range of surveys on domestic commercial vessels
		MARM5003A	Conduct an audit of safety management systems
		MARM5004A	Develop marine survey reports
		MARM5005A	Participate in investigating marine incidents
		MARM5006A	Survey hull and superstructure of a commercial vessel
		MARM5007A	Survey vessel operational systems
		MARM5008A	Undertake a periodic statutory survey
		MARM5009A	Establish a marine surveyor practice
	Imported	PUALAW003B	Give evidence in a judicial or quasi-judicial setting

Custom Content Section

Not applicable.

MAR60113 Advanced Diploma of Maritime Operations (Marine Engineering Class 2)

Modification History

Release 1	<p>This is the first release of this qualification in the MAR13 Maritime Training Package.</p> <p>This qualification replaces TDM60307 Advanced Diploma of Transport Distribution (Marine Engineering - Class 2)</p>
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Description

This qualification is suitable for people who work as an Engineer Class 2 in the maritime industry on ships powered by main propulsion machinery of any propulsion power in any operating area.

Pathways Information

Pathways into the qualification

MAR50113 Diploma of Maritime Operations (Marine Engineering Class 3)

MAR50213 Diploma of Maritime Operations (Engineer Watchkeeper)

Pathways from the qualification

MAR60313 Advanced Diploma of Maritime Operations (Marine Engineering Class 1)

Licensing/Regulatory Information

This qualification is currently cited as meeting some of the requirements for certification as an Engineer Class 2 as described in Marine Orders Part 3: Seagoing Qualifications under the Navigation Act 2012 by the Australian Maritime Safety Authority (AMSA).

Certification will require achievement of the MAR60113 Advanced Diploma of Maritime Operations (Marine Engineering Class 2) and other requirements; people seeking certification should check with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the maritime industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on packaging options.

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	Complete necessary documentation associated with confined space entry Read and interpret technical guides, manuals and information relevant to ship construction Use basic verbal and/or defined communication skills and signals when entering and working in confined spaces
Teamwork	Establish communication links with medical services using relevant communication equipment to ensure prompt control action is taken Provide instructions to crew and passengers to maximise chances of survival Select activities and tactics to combat the fire so that the safety of the vessel and all on board is not compromised
Problem-solving	Identify and apply relevant solutions for addressing problems associated with marine auxiliary boilers Identify and suggest ways of rectifying electrical hazards and emergency situations on a vessel Perform mathematical calculations to solve problems
Initiative and enterprise	Identify and interpret numerical and graphical information Impart knowledge and ideas through oral, written and visual means Recognise defective equipment and take appropriate action
Planning and organising	Identify, collate and process information required to perform basic calculations related to marine mechanics Plan an appropriate first aid response in line with established first aid principles, policies and procedures Prepare appropriate plan for completion of work activity in confined space
Self-management	Interpret and fulfil individual rights and responsibilities on board a vessel Recognise own role and responsibilities

	Undertake WHS/OHS housekeeping in own work area
Learning	Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices Identify WHS/OHS training needs of crew Practise realistic drills and musters to ensure pre-incident readiness of response personnel
Technology	Access online information on ship construction Use calculators to perform mathematical calculations Use electrical measuring and testing instruments

Packaging Rules

Total number of units = 18 units

18 core units

Core units			
Field			
F	Operational Quality and Safety	MARF1003A	Follow vessel security procedures
		MARF3002A	Observe personal safety and social responsibility
		MARF3005A	Prevent and fight fires on board a vessel
		MARF3006A	Survive at sea in the event of vessel abandonment
		MARF3007A	Work safely in confined spaces on a vessel
		MARF5002A	Provide medical first aid on board a vessel
L	Marine Engineering	MARL6001A	Apply intermediate principles of marine electrotechnology
		MARL6002A	Apply intermediate principles of marine engineering thermodynamics
		MARL6003A	Apply intermediate principles of marine mechanics

		MARL6004A	Apply intermediate principles of naval architecture
		MARL6009A	Demonstrate basic knowledge of ship construction
		MARL6010A	Demonstrate basic knowledge of ship operation and maintenance
		MARL6011A	Demonstrate intermediate knowledge of marine auxiliary boilers
		MARL6012A	Demonstrate intermediate knowledge of marine auxiliary machinery and systems
		MARL6013A	Demonstrate intermediate knowledge of marine control systems and automation
		MARL6014A	Demonstrate intermediate knowledge of marine diesel engines and systems
		MARL6015A	Demonstrate intermediate knowledge of marine electrical systems
		MARL6016A	Demonstrate intermediate knowledge of marine steam turbines and main boilers

Custom Content Section

Not applicable.

MAR60213 Advanced Diploma of Maritime Operations (Master Unlimited)

Modification History

Release 1	<p>This is the first release of this qualification in the MAR13 Maritime Training Package.</p> <p>This qualification replaces TDM60407 Advanced Diploma of Transport Distribution (Maritime Operations - Master Unlimited).</p>
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Description

This qualification is suitable for people who work as a Master in the maritime industry on ships of any gross tonnage in any operating area.

Pathways Information

Pathways into the qualification

MAR50313 Diploma of Maritime Operations (Watchkeeper Deck)

Pathways from the qualification

Not applicable

Licensing/Regulatory Information

This qualification is currently cited as meeting some of the requirements for certification as a Master (Unlimited) as described in Marine Orders Part 3: Seagoing Qualifications under the Navigation Act 2012 by the Australian Maritime Safety Authority (AMSA).

Certification will require achievement of the MAR60213 Advanced Diploma of Maritime Operations (Master Unlimited) and other requirements; people seeking certification should check with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the maritime industry for this qualification. This table should be interpreted in conjunction with

the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on packaging options.	
Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	<p>Complete documentation and reporting requirements on matters related to the development of emergency and damage control plans</p> <p>Interpret information relevant to legislative requirements to ensure the security and safety of life of crew, passengers and others at sea</p> <p>Maintain documentation related to legislative requirements</p>
Teamwork	<p>Apply team-building strategies to achieve strengthened crew and individual commitment to organisational vision and goals</p> <p>Coordinate crew in search and rescue operations</p> <p>Develop search and rescue strategy based on all available information and after consultation with others in the established chain of command</p>
Problem-solving	<p>Apply decision-making techniques including situation and risk assessment, identifying and generating options, selecting a course of action and evaluating outcome effectiveness</p> <p>Identify and solve problems that may arise during search and rescue operations, report problems and issues, and take appropriate action based on available information</p> <p>Promote use of problem-solving strategies and techniques to identify and generate options</p>
Initiative and enterprise	<p>Analyse potential collision situations and take appropriate action in ample time according to regulatory requirements</p> <p>Take appropriate action where noncompliance is identified</p> <p>Take appropriate initiative for search and rescue operations</p>
Planning and organising	<p>Define and document responsibilities in job descriptions for applying the environmental management plan and duty statements</p> <p>Develop operational plan in consultation with relevant personnel</p> <p>Develop security risk management plans</p>
Self-management	<p>Clearly define own responsibility for the safety of navigation at all times including periods when the Master is on the bridge and while under pilotage</p> <p>Convey a calm, confident and reassuring personal attitude</p> <p>Provide leadership to crew and individuals</p>

Learning	<p>Conduct relevant training to facilitate compliance</p> <p>Identify and assess training needs of crew and individuals on a regular basis according to organisational procedures</p> <p>Provide training on the environmental management plan procedures and practices</p>
Technology	<p>Conduct performance checks of navigation position fixing instruments and systems</p> <p>Select and use shipboard instruments to assist in forecasting weather and oceanographic conditions</p> <p>Use technology to store and retrieve information</p>

Packaging Rules

Total number of units = 26 units

26 core units

Core units			
Field			
A	Handling Cargo and Vessel Stability	MARA3001A	Contribute to safe cargo operations on liquefied gas tankers
		MARA3002A	Contribute to safe cargo operations on oil and chemical tankers
		MARA6001A	Manage stability of a vessel 500 gross tonnage or more
B	Equipment Checking and Maintenance	MARB6001A	Manage repairs and maintenance of a vessel of 500 gross tonnage or more
D	Administration and Human Resources	MARD6001A	Manage legal requirements of a vessel
F	Operational Quality and Safety	MARF1003A	Follow vessel security procedures
		MARF3002A	Observe personal safety and social responsibility
		MARF3004A	Operate survival craft and other lifesaving appliances

		MARF3005A	Prevent and fight fires on board a vessel
		MARF3006A	Survive at sea in the event of vessel abandonment
		MARF3007A	Work safely in confined spaces on a vessel
		MARF4001A	Manage firefighting and fire prevention activities on board a vessel
		MARF6001A	Coordinate search and rescue operations
		MARF6002A	Manage provision of medical care on board a vessel
		MARF6003A	Manage safety and security of vessel crew and passengers
G	Teamwork	MARG6001A	Manage a vessel and its crew
H	Navigation	MARH5003A	Use an electronic chart display and information system to navigate safely
		MARH5004A	Use bridge equipment to determine vessel position
		MARH6001A	Forecast weather and oceanographic conditions to plan a safe passage
		MARH6002A	Manage the navigation of a vessel 500 gross tonnage or more
J	Environment	MARJ6001A	Manage compliance with environmental management legislation
K	Manoeuvring Vessels	MARK6001A	Manoeuvre a vessel 500 gross tonnage or more
N	Seamanship	MARN6001A	Manage cargo operations
O	Watchkeeping	MARO5001A	Maintain a safe navigational watch
		MARO5002A	Transmit and receive information by the Global Maritime Distress and Safety System
		MARO5003A	Transmit and receive information by visual signalling

Custom Content Section

Not applicable.

MAR60313 Advanced Diploma of Maritime Operations (Marine Engineering Class 1)

Modification History

Release 1	<p>This is the first release of this qualification in the MAR13 Maritime Training Package.</p> <p>This qualification replaces TDM60207 Advanced Diploma of Transport Distribution (Marine Engineering - Class 1).</p>
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Description

This qualification is suitable for people who work as an Engineer Class 1 in the maritime industry on ships powered by main propulsion machinery of any propulsion power in any operating area.

Pathways Information

Pathways into the qualification

MAR60113 Advanced Diploma of Maritime Operations (Marine Engineering Class 2)

Pathways from the qualification

Not applicable

Licensing/Regulatory Information

This qualification is currently cited as meeting some of the requirements for certification as an Engineer Class 1 as described in Marine Orders Part 3: Seagoing Qualifications under the Navigation Act 2012 by the Australian Maritime Safety Authority (AMSA).

Certification will require achievement of the MAR60313 Advanced Diploma of Maritime Operations (Marine Engineering Class 1) and other requirements; people seeking certification should check with AMSA.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by the

maritime industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that may vary depending on packaging options.

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	<p>Prepare incident reports</p> <p>Prepare required documentation and verify accuracy</p> <p>Read and interpret written information needed to perform complex calculations</p>
Teamwork	<p>Ascertain chain of command of designated personnel</p> <p>Identify and follow appropriate actions for maintaining security and safety of self, others and the vessel</p> <p>Make contributions to risk assessments</p>
Problem-solving	<p>Check vessel for hazards using itemised checklists according to the safety management system</p> <p>Evaluate viability and potential problems of new systems and advanced specialist vessels</p> <p>Identify, interpret and process complex numerical and graphical information required to analyse marine engineering functions and shipboard engineering related problems</p>
Initiative and enterprise	<p>Identify and interpret numerical and graphical information, and perform mathematical calculations to perform tasks</p> <p>Improvise treatment and associated resources</p> <p>Provide suggestions to improve future operations</p>
Planning and organising	<p>Evaluate factors involved in commissioning new electrical plant</p> <p>Identify, collate and process information required to perform complex calculations</p> <p>Plan an appropriate first aid response in line with established first aid principles, policies and procedures</p>
Self-management	<p>Interpret and fulfil individual rights and responsibilities on board a vessel</p> <p>Recognise own role and responsibilities</p> <p>Undertake WHS/OHS housekeeping in own work area</p>
Learning	<p>Analyse Standards of Training, Certification & Watchkeeping (STCW) crew training requirements and implications for emergency response,</p>

	<p>administration, operation and maintenance</p> <p>Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices</p> <p>Identify WHS/OHS training needs of crew</p>
Technology	<p>Operate location devices, including radio equipment</p> <p>Use calculators to perform complex mathematical calculations</p> <p>Use electrical measuring and testing instruments</p>

Packaging Rules

Total number of units = 17 units

17 core units

Core units			
Field			
F	Operational Quality and Safety	MARF1003A	Follow vessel security procedures
		MARF3002A	Observe personal safety and social responsibility
		MARF3005A	Prevent and fight fires on board a vessel
		MARF3006A	Survive at sea in the event of vessel abandonment
		MARF3007A	Work safely in confined spaces on a vessel
		MARF5002A	Provide medical first aid on board a vessel
L	Marine Engineering	MARL6005A	Apply advanced principles of marine electrotechnology
		MARL6006A	Apply advanced principles of marine engineering thermodynamics
		MARL6007A	Apply advanced principles of marine mechanics
		MARL6008A	Apply advanced principles of naval architecture
		MARL6017A	Demonstrate advanced knowledge of marine auxiliary boilers

		MARL6018A	Demonstrate advanced knowledge of marine auxiliary machinery and systems
		MARL6019A	Demonstrate advanced knowledge of marine control systems and automation
		MARL6020A	Demonstrate advanced knowledge of marine diesel engines and systems
		MARL6021A	Demonstrate advanced knowledge of marine electrical systems
		MARL6022A	Demonstrate advanced knowledge of marine steam turbines and main boilers
		MARL6023A	Demonstrate advanced knowledge of ship operation and maintenance

Custom Content Section

Not applicable.

MARSS00001 Coxswain Grade 1 and Grade 2 Skill Set

Modification History

Release 1

New Skill Set

Description

Not applicable.

Pathways Information

The MARSS00001 Coxswain Grade 1 and Grade 2 Skill Set is part of the MAR13 Maritime Training Package.

Before undertaking this Skill Set, the candidate must hold the MAR20113 Certificate II in Maritime Operations (Coxswain).

Licensing/Regulatory Information

Readers should ensure that they have also read the part of the Training Package that outlines licensing and regulatory requirements.

Skill Set Requirements

MARB2001A	Perform basic servicing and maintenance of main propulsion unit and auxiliary systems
MARF1006A	Survive at sea using survival craft
MARH2001A	Plan and navigate a passage for a vessel up to 12 metres

Target Group

People who hold a MAR20113 Certificate II in Maritime Operations (Coxswain) and who are interested in Australian Maritime Safety Authority (AMSA) certification.

Suggested words for Statement of Attainment

The MARSS00001 Coxswain Grade 1 and Grade 2 Skill Set forms part of the requirements for certification as a Coxswain Grade 1 and Grade 2 by AMSA.

Certification will require achievement of this Skill Set, the MAR20113 Certificate II in Maritime Operations (Coxswain) and other requirements; people seeking certification should check with AMSA.

Custom Content Section

Not applicable.

MARSS00002 Safety Training Certification Skill Set

Modification History

Release 1

New Skill Set

Description

Not applicable.

Pathways Information

The MARSS00002 Safety Training Certification Skill Set is part of the MAR13 Maritime Training Package.

Licensing/Regulatory Information

Readers should ensure that they have also read the part of the Training Package that outlines licensing and regulatory requirements.

Skill Set Requirements

MARF1003A	Follow vessel security procedures
MARF3002A	Observe personal safety and social responsibility
MARF3005A	Prevent and fight fires on board a vessel
MARF3006A	Survive at sea in the event of vessel abandonment

Target Group

People interested in the Australian Maritime Safety Authority (AMSA) Certificate of Safety Training.

Suggested words for Statement of Attainment

The MARSS00002 Safety Training Certification Skill Set is from the MAR13 Maritime Training Package and meets some of the industry requirements for the AMSA Certificate of Safety Training; people seeking certification should check with AMSA.

Custom Content Section

Not applicable.

MARSS00003 Shipboard Safety Skill Set

Modification History

Release 1

New Skill Set

Description

Not applicable.

Pathways Information

The MARSS00003 Shipboard Safety Skill Set is part of the MAR13 Maritime Training Package.

Licensing/Regulatory Information

Readers should ensure that they have also read the part of the Training Package that outlines licensing and regulatory requirements.

Skill Set Requirements

MARF1001A	Apply basic survival skills in the event of vessel abandonment
MARF1002A	Follow procedures to minimise and fight fires on board a vessel
MARF1005A	Meet work health and safety requirements
MARF1006A	Survive at sea using survival craft

Target Group

People interested in the Australian Maritime Safety Authority (AMSA) Elements of Ship Safety Certificate.

Suggested words for Statement of Attainment

The MARSS00003 Shipboard Safety Skill Set is from the MAR13 Maritime Training Package and meets some of the industry requirements for the AMSA Elements of Ship Safety Certificate; people seeking certification should check with AMSA.

Custom Content Section

Not applicable.

MAR3001A Contribute to safe cargo operations on liquefied gas tankers

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to recognise hazards associated with liquefied gas tankers and to apply appropriate hazard control measures to ensure safe cargo operation.

Application of the Unit

This unit applies to seafarers required to assist in the safe operation of a liquefied gas tanker.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Determine characteristics of tanker cargo and tankers to

1.1 *Features of various types of liquefied gas tankers* are outlined

- ensure safe transfer and transport of cargo**
- 1.2 *Cargo operations* of tankers are identified
 - 1.3 *Properties of cargo* being transported are identified and their impact on safety, the environment and vessel operations are outlined
 - 1.4 *Hazards* associated with the transport of cargo are clarified according to emergency response documentation
 - 1.5 *Hazard controls* associated with tanker cargo are employed according to organisational procedures
- 2 Comply with legislative and organisational requirements for safe transfer and transport of tanker cargo**
- 2.1 Safety data sheets (SDS)/material safety data sheets (MSDS) relevant to cargo are accessed and procedures for tanker safety and safety management are identified
 - 2.2 SDS/MSDS are interpreted to identify relevant cargo-related hazards to the vessel and to personnel
 - 2.3 Legislative and organisational requirements are interpreted to identify appropriate actions for safe transfer and transport of cargo
- 3 Take precautions to prevent hazards**
- 3.1 Organisational policies and procedures to minimise hazards are identified
 - 3.2 Type and severity of the hazard posed by cargo is recognised
 - 3.3 Transfer and transport of cargo is monitored to prevent hazards
 - 3.4 *Gas monitoring equipment* is regularly inspected and used according to organisational procedures
- 4 Act on becoming aware of a hazardous situation**
- 4.1 Source of hazard is identified according to organisational procedures
 - 4.2 Risk is assessed considering severity and likelihood of consequences
 - 4.3 Control measures to minimise risk are implemented to level of responsibility or referred to appropriate person for further action
 - 4.4 Containment procedures are applied where

appropriate

- 4.5 Appropriate safety procedures are followed and personal protective equipment is used according to organisational procedures
 - 4.6 Risk is eliminated where possible, and if not practical, actions are taken to control risk
 - 4.7 Appropriate *firefighting equipment* is identified to carry out firefighting operations
- 5 Take precautions to prevent pollution of the environment from release of liquefied gases**
- 5.1 Procedures to prevent pollution are identified and observed at all times
 - 5.2 *Measures* to prevent pollution during normal and emergency situations are applied according to regulatory requirements and organisational procedures
 - 5.3 All relevant information is immediately reported to appropriate persons when a vapour leak or cloud is detected or a malfunction has occurred that poses a risk of a vapour leak or cloud
 - 5.4 Shore-based response personnel are promptly notified when a vapour leak or cloud occurs

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Communicate clearly and effectively
- Correctly identify SDS/MSDS, relevant cargo-related hazards to vessel and to personnel, and take appropriate action according to organisational procedures
- Ensure cargo operations are carried out according to accepted principles and procedures to ensure safety of operations
- Identify and act on becoming aware of a hazardous situation, according to organisational procedures
- Interpret and apply knowledge of liquefied gas tanker layouts, tanker cargo features, characteristics and hazards, and related hazard prevention strategies to duties on various types of liquefied gas tankers

- Read and interpret SDS/MSDS
- Recognise problems and hazards that can arise when managing safety on a liquefied gas tanker, take appropriate remedial action and initiate appropriate solutions

Required Knowledge:

- Anti-static measures in hazard control
- Atmospheric control
- Cargo handling equipment
- Cargo inhibition in hazard control
- Corrosion hazards associated with tanker operations
- Emergency shut-down system (ESD)
- Environmental hazards associated with tanker operations
- Explosion and flammability hazards associated with tanker operations
- Extremely low temperatures associated with tanker operations
- Gas testing
- General arrangement and construction of liquefied gas tankers
- Health hazards associated with tanker operations
- Importance of cargo compatibility
- Inerting, drying and monitoring techniques in hazard control
- Information on a SDS/MSDS
- Loading, unloading and care in transit
- Piping systems and valves
- Pressure and temperature, including vapour pressure/temperature relationship
- Pressure hazards associated with tanker operations
- Properties and characteristics of liquefied gas
- Reactivity hazards associated with tanker operations
- Relevant chemical symbols
- Relevant firefighting operations and the use of firefighting installations
- Segregation in hazard control
- Sources of ignition associated with tanker operations
- Tanker cleaning, purging, gas-freeing and inerting
- Tanker safety culture and safety management
- Types of electrostatic charge generation
- Types of liquefied gas tankers
- Vapour leaks and clouds associated with tanker operations
- Ventilation in hazard control
- Work health and safety(WHS)/occupational health and safety (OHS) requirements and

work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- timely identification and reporting of potential hazards and risks
- providing the required amount of detail in reports.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where contributing to safe cargo operation of liquefied gas tankers may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate contributing to safe cargo operation of liquefied gas tankers
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Features of various types of liquefied gas tankers must include:

- General arrangement and construction
- Types of liquefied gas tankers

Cargo operations must include:

- Cargo handling equipment
- ESS
- Loading, unloading and care in transit
- Piping systems and valves
- Tank cleaning, purging, gas-freeing and inerting

Properties must include:

- Chemical symbols
- Pressure and temperature including vapour pressure/temperature relationship
- Types of electrostatic charge generation

Cargo must include:

- Ammonia
- Butadiene
- Ethylene
- LNG
- LPG
- Propylene
- Vinyl chloride

Hazards must include:

- Corrosion hazards
- Electrostatic hazards
- Environmental hazards

- Explosion and flammability hazards
 - Extremely low temperatures
 - Health hazards
 - Pressure hazards
 - Reactivity hazards
 - Sources of ignition
 - Toxicity hazards
 - Vapour leaks and clouds
- Hazard controls must include:
- Anti-static measures
 - Atmospheric control
 - Cargo inhibition
 - Gas testing
 - Importance of cargo compatibility
 - Inerting, drying and monitoring techniques
 - Segregation
 - Ventilation
- Gas monitoring equipment must include:
- Gas monitoring instruments
 - Oxygen indicators
- Firefighting equipment must include:
- Firefighting agents
 - Fixed dry chemical systems
 - Fixed foam systems
 - Portable foam systems
- Measures must include:
- Assisting in implementing shipboard spill containment procedures
 - Reporting relevant information to the responsible person

Unit Sector(s)

Not applicable.

Competency Field

Handling Cargo and Vessel Stability

MARA3002A Contribute to safe cargo operations on oil and chemical tankers

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to recognise hazards associated with oil and chemical tankers and apply appropriate hazard control measures to ensure safe cargo operation.

Application of the Unit

Not applicable.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Recognise 1.1 *Features* of various types of oil and chemical tankers are outlined

- | | | |
|---|---|--|
| characteristics of tanker cargo and tankers to ensure the safe transfer and transport of cargo | 1.2 | <i>Cargo operations</i> of tankers are identified |
| | 1.3 | <i>Properties of cargo</i> being transported are identified and their impact on safety, the environment and vessel operations are recognised |
| | 1.4 | <i>Hazards</i> associated with the transport of cargo are clarified according to emergency response documentation |
| | 1.5 | <i>Hazard controls</i> associated with tanker cargo are employed according to organisational procedures |
| | 2 | Comply with legislative and organisational requirements for safe transfer and transport of tanker cargo |
| | 2.1 | Safety data sheets (SDS)/material safety data sheets (MSDS) relevant to cargo are accessed and procedures for tanker safety and safety management are identified |
| | 2.2 | SDS/MSDS are interpreted to identify relevant cargo-related hazards to the vessel and to personnel |
| | 2.3 | Legislative and organisational requirements are interpreted to identify appropriate actions for safe transfer and transport of cargo |
| 3 | Take precautions to prevent hazards | |
| | 3.1 | Organisational policies and procedures to minimise hazards are identified |
| | 3.2 | Type and severity of hazard posed by cargo is recognised |
| | 3.3 | Transfer and transport of cargo is monitored to prevent hazards |
| | 3.4 | Monitoring equipment , where installed, is regularly inspected and used according to organisational procedures |
| 4 | Act on becoming aware of a hazardous situation | |
| | 4.1 | Source of hazard is identified according to organisational procedures |
| | 4.2 | Risk is assessed considering severity and likelihood of consequences |
| | 4.3 | Control measures to minimise risk are implemented to level of responsibility or referred to appropriate person for permission or further action |
| | 4.4 | Containment procedures are applied where appropriate |
| | 4.5 | Appropriate safety procedures are followed and personal protective equipment is used according to organisational procedures |
| | 4.6 | Risk is eliminated where possible, and if not practical, actions are taken to control risk |
| | 4.7 | Appropriate <i>firefighting equipment</i> is identified to carry out firefighting operations |

- 5 Take precautions to prevent pollution of the environment from the release of oil or chemicals**
- 5.1 Procedures to prevent pollution are identified and observed at all times
 - 5.2 *Measures* to prevent pollution during normal and emergency situations are applied according to regulatory requirements and organisational procedures
 - 5.3 All relevant information is immediately reported to appropriate persons when a spill is detected or a malfunction has occurred that poses a risk of a spill
 - 5.4 All required spill containment procedures are correctly implemented according to regulatory requirements and organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Communicate clearly and effectively
- Correctly identify SDS/MSDS, relevant cargo-related hazards to vessel and to personnel, and take appropriate action
- Ensure cargo operations are carried out according to accepted principles and procedures to ensure safety of operations
- Identify and act on becoming aware of hazardous situation
- Interpret and apply knowledge of tanker layouts, tanker cargo features, characteristics and hazards, and related hazard prevention strategies to duties on various types of tankers and gas carriers
- Read and interpret SDS/MSDS
- Recognise problems and hazards that can arise when managing safety on a tanker, take appropriate remedial action and initiate appropriate solutions

Required Knowledge:

- Actions to be taken in the event of spillage
- Cargo pumps
- Corrosion hazards
- Effects of oil and chemical pollution on human and marine life
- Features and characteristics of various types of tanker cargo
- Functions and processes for the calibration of various types of measuring instruments and devices used to test environments on tankers and gas carriers
- General arrangement and construction of tankers

- Hazard controls
- Hazard control procedures on tankers and gas carriers
- Hazards and control measures associated with tanker cargo operations
- Hazards associated with:
 - tanker operations
 - carriage of bulk liquids and gases
- Hazards to the environment
- Information on SDS/MSDS
- Loading and unloading
- Measures to be taken in the event of spillage
- Physical properties of oil and chemicals
- Piping systems and valves
- Principles of chemistry as they relate to tanker operations
- Procedures for the safe use of personal protective equipment
- Procedures to prevent air and water pollution
- Reactivity hazards
- Shipboard procedures to prevent pollution
- Tanker cleaning, purging, gas-freeing and inerting
- Tanker safety culture and safety management
- Terminology relating to the structure capacities and operations of various types of tankers and gas carriers
- Types of oil and chemical tankers
- Work health and safety(WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- timely identification and reporting of potential hazards and risks
- providing the required amount of detail in reports.

Context of and specific

Performance is demonstrated consistently over time and in a

resources for assessment

suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where contributing to safe cargo operations on oil and chemical tankers may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate contributing to safe cargo operation on oil and chemical tankers
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work

environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Features of various types of oil and chemical tankers must include:
- General arrangement and construction
 - Types of oil and chemical tankers
- Cargo operations must include:
- Cargo handling equipment
 - Loading, unloading and care in transit
 - Piping systems and valves
 - Tank cleaning, purging, gas-freeing and inerting
- Properties must include:
- Chemical symbols
 - Pressure and temperature including vapour pressure/temperature relationship
 - Types of electrostatic charge generation
- Cargo must include:
- Chemicals
 - Oil
- Hazards must include:
- Corrosion hazards
 - Electrostatic hazards
 - Environmental hazards
 - Explosion and flammability hazards
 - Health hazards
 - Pressure hazards
 - Reactivity hazards
 - Sources of ignition
 - Toxicity hazards
 - Vapour leaks and clouds
- Hazard controls must include:
- Anti-static measures
 - Atmospheric control
 - Cargo inhibition
 - Gas testing
 - Importance of cargo compatibility
 - Inerting, drying and monitoring techniques
 - Segregation
 - Ventilation
- Firefighting equipment must include:
- Firefighting agents
 - Fixed dry chemical systems
 - Fixed foam systems
 - Portable foam systems
- Measures must include:
- Assisting in implementing shipboard spill containment procedures
 - Reporting relevant information to the responsible person

Unit Sector(s)

Not applicable.

Competency Field

Handling Cargo and Vessel Stability

MAR4001A Manage loading, discharging and stowage of cargo

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMA907B Prepare a cargo plan for cargo loading and unloading operations within limits of responsibility of a Master 4.

Unit Descriptor

This unit involves the skills and knowledge required to manage the loading, discharging and stowage of cargo to prevent damage or deterioration and to deliver it, as far as is possible, in as good a condition and order as it was when received aboard.

Application of the Unit

This unit applies to people working in the maritime industry in the capacity of Master on a range of vessels up to 80 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|---|---|
| 1 Plan the stow | <ul style="list-style-type: none">1.1 Loading manual is interpreted to determine operational loading conditions1.2 Still water shear forces and bending moments in any load or ballast condition are known and not exceeded1.3 Load is planned to ensure stresses in vessel are minimised by evenly distributing <i>cargo</i>1.4 Load is planned to avoid incompatible cargo stowage1.5 Regulations relating to <i>hazardous materials/dangerous goods</i> are observed, where appropriate1.6 Load is planned for unloading sequence1.7 Vessel cargo carrying capacity is not exceeded for appropriate load line1.8 Vessel trim is calculated to allow for optimum vessel performance at sea |
| 2 Plan load/unload with stevedores | <ul style="list-style-type: none">2.1 Available port/vessel <i>cargo handling gear and equipment</i> is determined2.2 Handling capacity of cargo handling gear and equipment is established2.3 Pumping capacity of cargo pumps is verified2.4 Availability and status of human resources is resolved2.5 Cargo manifest is made available2.6 <i>Cargo stowage plan</i> is completed and agreed with stevedores2.7 Stability calculation is made and checked against vessel stability information manual2.8 Notice of readiness to load/unload is provided |
| 3 Prepare for loading | <ul style="list-style-type: none">3.1 Holds are checked to ensure they are clean, dry and free of smell3.2 Safety arrangements in holds are verified to ensure they are operational3.3 Supplies of dunnage and mats are reviewed to ensure there are sufficient available |

- 3.4 Bilges are covered with tarpaulins/wrappers before loading
- 3.5 Checks are made to ensure cargo is correctly identified, inspected and confirmed against documentation
- 3.6 Preparations for loading are monitored according to stowage plan and organisational procedures
- 4 Control loading/unloading of cargo**
 - 4.1 Instructions are given to crew and stevedores involved in cargo loading/unloading according to cargo stowage plan
 - 4.2 Compliance with regulations, procedures and instructions pertaining to type of cargo being handled is managed during loading/unloading operations
 - 4.3 Loading/unloading is monitored to ensure loading rate is not exceeded in the case of bulk or liquid cargo
 - 4.4 Vessel stability is observed during loading/unloading operations
 - 4.5 Loading/unloading operations are checked against stowage plan
 - 4.6 Cargo is secured and lashed according to lashing plan
 - 4.7 All cargo handling documentation is completed according to organisational procedures and regulatory requirements
- 5 Manage ballast management operations**
 - 5.1 Ballast discharge requirements of port authority are complied with
 - 5.2 Ballast management activities are monitored according to organisational procedures and port authority requirements
 - 5.3 ***Ballast management problems*** are identified and appropriate action is taken to minimise risk to the environment
- 6 Monitor care of cargo during voyage**
 - 6.1 Vessel plan for care of cargo during the voyage is implemented according to organisational and customer requirements, and relevant regulations
 - 6.2 Ventilation and humidity control systems are checked
 - 6.3 Action required to maintain the wellbeing of cargo during the voyage is initiated according to customer requirements and organisational procedures
 - 6.4 Compliance with safety and hazard minimisation procedures and regulations related to cargo care is managed at all times during the voyage to maintain safety of personnel, cargo and vessel
 - 6.5 Appropriate action is taken in the event of ***a cargo-related incident or***

emergency to rectify problem, secure cargo and maintain safety of vessel and personnel

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Identify and solve problems related to loading, stowage, security and unloading of cargo
- Interpret stability manual and ensure stability calculations are within appropriate parameters for proposed cargo operation
- Monitor use of equipment involved in loading, stowage, security and unloading of cargo
- Read, interpret and apply instructions, regulations, procedures and information relevant to loading, stowage, security and unloading of cargo

Required Knowledge:

- Ballast management issues and procedures
- Cargo handling documentation requirements
- Container position numbering
- Design of vessel hold
- Effects on cargo handling of sea conditions, wind and weather
- Effects of different types of cargo operations on vessel trim and stability
- Effects upon stability during loading and discharging operations including heeling moments from gear and loads
- Homogenous loading
- Main stresses set up by cargo, hogging, sagging and shearing
- Methods of;
 - handling various types of cargo
 - caring for various types of cargo
- Operational characteristics of different types of shipboard and terminal-based cargo handling equipment and facilities
- Principles of cargo care
- Procedures for carrying out calculations involving weights, capacities, stowage factors, load densities
- Relevant sections of applicable maritime regulations
- Relevant work health and safety (WHS)/occupational health and safety (OHS) and cargo handling legislation, codes of practice, policies and procedures
- Standard stowage position numbering systems used on container vessels

- Static and dynamic loads
- Types of lashing devices
- Typical cargo handling problems and hazards, and appropriate preventative and remedial actions and solutions
- Typical types and sizes of shipping containers
- Usual methods of packing, loading and discharging, stowage, dunnaging etc.
- Use of cargo handling gear including purchases and tackles
- Various types of cargo likely to be carried; their peculiar characteristics, liability to damage, decay or deterioration; their measurements; their hazards and problems, and appropriate preventative and remedial action and solutions
- Ways of restricting vessel stress levels within permitted levels within permitted limits during loading/discharging cargo

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- developing effective planning documents
- producing reliable documentation.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where managing the loading, discharging and stowing of cargo on a vessel up to 80 metres may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing the loading, discharging and stowing of cargo on a vessel up to 80 metres
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Cargo may include:

- Bulk cargo
- Containerised cargo
- Deck cargo
- Liquid cargo
- Refrigerated cargo
- Any other material, equipment or machinery that may be safely handled and stowed on the vessel

Hazardous materials/dangerous goods may include:

- Any cargo described in the International Maritime Dangerous Goods (IMDG) Code as hazardous or dangerous

Cargo handling gear and

- Cargo pumps
- Cranes

equipment may include:

- Derricks
- Grabs
- Hooks, wires and shackles
- Slings

Cargo stowage plan must include:

- Cargo weight
- Correct description and stowage of hazardous and dangerous goods
- Description of cargo to be loaded
- Load/discharge port
- Segregation of non compatible cargo

Ballast management problems may include:

- Confirmation that the stowage plan conforms to stability requirements at all stages of loading and discharging
- Contaminated ballast
- Failure of ballast pumps

Cargo-related incidents or emergencies may include:

- Cargo handling gear failure
- Cargo shift
- Leakage
- Spontaneous combustion

Unit Sector(s)

Not applicable.

Competency Field

Handling Cargo and Vessel Stability

MAR4002A Manage vessel stability

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMA1207B Manage stress and dynamic factors affecting a small vessel's stability.

Unit Descriptor

This unit involves the skills and knowledge required to manage the dynamic factors affecting the stability of a vessel up to 80 metres.

Application of the Unit

This unit applies to those working in the capacity of Master on a range of vessels up to 80 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Calculate
 - 1.1 Vessel stability data book is made available and checked for

stability	endorsement
	1.2 Data is interpreted to determine safety parameters for vessel
	1.3 Stability is accurately calculated using data extracted from vessel stability data book
	1.4 <i>Stability calculations</i> are checked to ensure they correlate with data set out in vessel stability book
	1.5 Miscalculations or unsafe conditions are recognised and recalculated or checked
	1.6 Calculated stability data is recorded using appropriate units and correct number of significant figures
2 Control vessel stress and stability	2.1 Information from vessel stability information is used to determine <i>loading limits</i> and displacement from draft
	2.2 Vessel weight distribution is managed to maintain stability condition within safe limits at all times and regulatory requirements are complied with under all conditions of loading
	2.3 Relevant stability information is correctly communicated to others as required
	2.4 Stability conditions of vessel are managed in adverse weather conditions
	2.5 <i>Emergencies</i> that may jeopardise vessel stability are recognised and appropriate action is taken
3 Maintain records of stability management	3.1 Data and information related to stability management is accurately recorded
	3.2 Data and information related to stability management is filed and stored according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Carry out basic calculations associated with maintaining vessel stability
- Manage loading and weight distribution of vessel to ensure assigned load line conditions are not exceeded

- Manage stability of vessel in a range of conditions
- Recognise problems affecting vessel stability

Required Knowledge:

- Bilging and permeability
- Centroids and centre of gravity
- Change of draught and trim (MCT)
- Conditions of stable, neutral and unstable equilibrium and effects of disturbing vessel from upright
- Construction features and stress characteristics for vessels
- Density and specific gravity
- Dockwater and freshwater allowance
- Effects of free surface of liquids
- Factors that affect the rolling period of vessel
- Forces and moments
- Information contained in stability data books
- Loading and discharging weights
- Principal stresses that act on the structure of a vessel
- Principles of vessel stability
- Procedures for carrying out basic calculations associated with vessel stability
- Relationship between light displacement, loaded displacement and deadweight tonnage
- Stability curves
- Steps involved in bring an unstable vessel to a stable condition
- Tonnes per centimetre immersion (TPC)
- Transverse and longitudinal dynamics
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required

this unit

Knowledge and include:

- attention to appropriate level of detail in recordkeeping
- producing reliable documentation.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site or simulation where managing stability of a vessel up to 80 metres may be demonstrated
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing stability of vessel up to 80 metres
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Stability calculations must include:

- Correlation against stability book data
- Draft
- Final KG
- Trim

Loading limits may include:

- Not exceeding allowable passenger carrying capacity and distribution
- Not exceeding vessel designed cargo carrying capacity
- Understanding the effect of fuel, fresh water and ballast on cargo capacity

Emergencies may include:

- Cargo shift
- Damaged hull
- Flooding of cargo spaces

Unit Sector(s)

Not applicable.

Competency Field

Handling Cargo and Vessel Stability

MARAS5001A Maintain vessel stability

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMA1707A Determine the stability and trim of the vessel.

Unit Descriptor

This unit involves the skills and knowledge required to determine the stability and trim of a vessel to ensure that stability conditions of vessel comply with intact stability criteria under all conditions of loading.

Application of the Unit

This unit has application for a Watchkeeper Deck and Master < 500 GT.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Calculate
 - 1.1 Vessel stability data book is accessed and checked for endorsement

- stability**
- 1.2 Data is interpreted to determine vessel safety parameters
 - 1.3 Stability is accurately calculated using data extracted from vessel stability data book
 - 1.4 *Stability calculations* are checked to ensure they correlate with data set out in vessel stability book
 - 1.5 Spurious or incorrect information is recognised and recalculated
 - 1.6 Trim, draughts and list are adjusted as required
 - 1.7 Stability calculations are conducted at a time, frequency and scope appropriate to voyage
- 2 Manage weight distribution**
- 2.1 Stability calculations are used to plan weight distribution to ensure assigned load line conditions are not exceeded
 - 2.2 Weight distribution is controlled to maintain vessel within acceptable stability and stress limits for loading operation and at all stages of voyage
 - 2.3 *Appropriate* action is taken when weight distribution is compromising vessel safety
- 3 Maintain records of stability management**
- 3.1 *Data and information related to stability management* is accurately recorded
 - 3.2 Data and information related to stability management is filed and stored according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply knowledge of stability, trim and stress tables, diagrams and stress calculating equipment
- Carry out calculations required when determining vessel stability and trim
- Manage the loading and weight distribution of a vessel to ensure assigned load line conditions are not exceeded
- Manage vessel stability in a range of conditions
- Read and interpret vessel specifications and design drawings

- Recognise problems affecting vessel stability and trim

Required Knowledge:

- Calculation of vessels stability using the inclining experiment
- Effects of angle of loll
- Effects of beam and form coefficient on the stability of a vessel
- Effects of density of sea water on the draught and freeboard of a vessel
- Effects of free surface on the stability of a vessel
- Features of the load-line and draught marks of a vessel and methods for performing related calculations
- Fundamental actions to be taken in the event of partial loss of intact buoyancy
- Fundamentals of watertight integrity
- Principal stresses that act on the structure of a vessel
- Principal structural members of a vessel and the proper names for various parts
- Problems related to the control of trim, stability and stresses of vessels and appropriate action and solutions
- Sections of the IMO, STCW and AMSA Marine Orders related to intact stability criteria
- Stability, trim and stress tables, diagrams and stress calculating equipment
- Theory and calculations of vessel stability and dynamics
- Use of computer programs in calculating stability
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- ensuring accuracy of calculations
- attention to appropriate level of detail in recordkeeping.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site or simulation where maintaining vessel stability can be demonstrated
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate maintaining vessel stability
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Stability calculations must include:

- Calculation of areas under the curve
- Changes in draft and trim due to differing water densities
- Correction for free surface effect
- Draft and trim
- Metacentric height
- Moment of statical stability at small angles of heel
- Transverse and longitudinal stability
- Values for righting levers and construction of the curve of stability

Appropriate action may include:

- Amending the vessel loading plan
- Ballast management
- Reduction of free surface

Data and information related to stability management may include:

- Cargo stowage and loading plan
- Records of stability calculations
- Safety management system
- Stability and trim booklet

Unit Sector(s)

Not applicable.

Competency Field

Handling Cargo and Vessel Stability

MARAS5002A Monitor loading, unloading and stowage of cargo

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to monitor the loading, stowage, securing and care of cargo during the voyage and the unloading of cargo according to the cargo plan, organisational procedures and vessel stowage limitations.

Application of the Unit

This unit has application for a Watchkeeper Deck and Master < 500 GT.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|----------------------------|---|
| 1 Review cargo plan | 1.1 <i>Cargo plan</i> is interpreted to determine required cargo operations |
| | 1.2 Cargo plan is checked to ensure cargo is evenly distributed |

- 1.3 Cargo plan is assessed to ensure *incompatible cargo stowage* is avoided
- 1.4 Cargo plan is evaluated to ensure regulations relating to *hazardous materials/dangerous goods* are observed, where appropriate
- 1.5 Cargo plan is checked to ensure unloading sequence is effective
- 2 Prepare for loading**
 - 2.1 Holds are checked to ensure they are clean, dry and free of smell
 - 2.2 Safety arrangements in holds are verified to ensure they are operational
 - 2.3 Supplies of cargo protection and securing material are reviewed to ensure there are sufficient available
 - 2.4 Bilges suction are protected before loading
 - 2.5 Checks are made to ensure *cargo* is correctly identified, inspected and confirmed against documentation
 - 2.6 Preparations for loading are monitored according to stowage plan and organisational procedures
 - 2.7 Ballast discharge plan is identified and understood and appropriate actions to support this plan are undertaken
- 3 Supervise loading/unloading of cargo**
 - 3.1 Instructions are given to crew and stevedores involved in cargo loading/unloading according to cargo stowage plan
 - 3.2 Compliance with regulations, procedures and instructions pertaining to type of cargo being handled is managed during loading/unloading operations
 - 3.3 Loading/unloading is monitored to ensure the loading rate is not exceeded in the case of bulk or liquid cargo
 - 3.4 Vessel stability is observed during loading/unloading operations
 - 3.5 Loading/unloading operations are checked against stowage plan
 - 3.6 Cargo is secured and lashed according to lashing plan
 - 3.7 *Cargo handling documentation* is completed according to organisational procedures and regulatory requirements
- 4 Monitor care of cargo during voyage**
 - 4.1 Vessel plan for care of cargo during voyage is implemented according to organisational and customer requirements, and relevant regulations

- 4.2 Ventilation and humidity control systems are checked
- 4.3 *Actions required to maintain the wellbeing of cargo* during the voyage are initiated according to customer requirements and organisational procedures
- 4.4 Compliance with safety and hazard minimisation procedures and regulations related to cargo care is managed at all times during the voyage to maintain the safety of personnel, cargo and vessel
- 4.5 Appropriate action is taken when *defects or damage to cargo* are detected

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Carry out cargo operations according to cargo plan or other documents and established safety rule/regulations, equipment operating instructions and shipboard stowage limitations
- Establish and maintain effective communications during loading and unloading
- Handle dangerous, hazardous and harmful cargo to comply with international regulations, recognised standards and codes of safe practice
- Identify and solve problems associated with loading, unloading, stowage and care of cargo
- Monitor and anticipate problems and risks associated with loading, unloading, stowage and care of cargo
- Monitor use of equipment in loading, unloading, stowage and care of cargo
- Read, interpret and apply instructions, regulations, procedures and information associated with loading, unloading, stowage and care of cargo

Required Knowledge:

- Ballast management issues and procedures
- Cargo handling documentation requirements
- Cargo lifting equipment and safe working loads
- Container position numbering
- Effect of cargo, including heavy lifts, on the seaworthiness and stability of the vessel
- Effects of different types of cargo operations on vessel trim and stability

- Effects on cargo handling of sea conditions, wind and weather
- Effects on stability during loading and discharging operations including heeling moments from gear and loads
- Methods of caring for various types of cargo
- Methods of handling various types of cargo
- Operational characteristics of different types of shipboard and terminal-based cargo handling equipment and facilities
- Principles of cargo care
- Procedures for carrying out calculations involving weights, capacities, stowage factors
- Relevant sections of applicable maritime regulations
- Relevant work health and safety (WHS)/occupational health and safety (OHS) and cargo handling legislation, codes of practice, policies and procedures
- Safe handling, stowage and securing of cargo including dangerous, hazardous and harmful cargo, and their effect on the safety of life and the vessel
- Standard stowage position numbering systems used on container vessels
- Typical cargo handling problems and hazards, and appropriate preventative and remedial actions and solutions
- Typical types and sizes of shipping containers
- Usual methods of container packing, loading and discharging, stowage, dunnaging
- Various types of cargo likely to be carried; their peculiar characteristics, liability to damage, decay or deterioration; their measurements, hazards and problems; appropriate preventative and remedial action and solutions
- Ways of restricting vessel stress levels within permitted levels within permitted limits during loading/discharging cargo

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- attention to detail when completing documentation
- initiating timely action in response to defects or damage.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where monitoring loading, unloading, stowage and care of cargo on a vessel may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate monitoring loading, unloading, stowage and care of cargo on a vessel
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in

the performance criteria, is detailed below.

Cargo plan must include:

- Cargo weight
- Correct description and stowage of hazardous and dangerous goods
- Description of cargo to be loaded
- Load/discharge port
- Segregation of non-compatible cargo
- Stowage of refrigerated containers

Incompatible cargo stowage may include:

- Cargo liable to taint
- Dangerous and hazardous goods

Hazardous materials/dangerous goods may include:

- Any cargo described in the IMDG Code as hazardous or dangerous

Cargo may include:

- Bulk cargo
- Containerised cargo
- Deck cargo
- Heavy lift cargo
- Liquid cargo
- Refrigerated cargo
- Any other material, equipment or machinery that may be safely handled and stowed on vessel

Cargo handling documentation may include:

- Cargo gear register
- Cargo receipts
- Cargo Securing Manual
- Log book entries
- Note of Protest
- Notice of Readiness to load or discharge
- Operation orders and instructions
- Safety data sheets (SDS)/material safety data sheets (MSDS)
- Safety management system relating to cargo carriage
- Ship/shore safety checklists

Actions required to maintain the wellbeing of cargo may include:

- Maintaining adequate ventilation
- Monitoring cargo spaces
- Temperature control of refrigerated or cooled cargo

Defects or damage to cargo may include:

- Damage caused by cargo movement
- Deterioration of perishable cargo
- Water ingress

Unit Sector(s)

Not applicable.

Competency Field

Handling Cargo and Vessel Stability

MARAF001A Manage stability of a vessel 500 gross tonnage or more

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMA1007B Control trim, stability and stress.

Unit Descriptor

This unit involves the skills and knowledge required to control trim, stability and stress within safe limits at all times on a vessel 500 gross tonnage or more.

Application of the Unit

This unit applies to people working in the maritime industry as a Master Unlimited.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|-----------------------------------|---|
| 1 Manage vessel trim under | 1.1 Stability analysis and weight distribution planning are conducted at a time frequency and scope appropriate to the proposed nature of the |
|-----------------------------------|---|

normal operating conditions	voyage and vessel operation
	1.2 Weight distribution is arranged to maintain vessel within acceptable stability limits for the anticipated operational situations likely to be experienced during the voyage
	1.3 <i>Calculations</i> are made to determine the draught and centre of gravity of vessel after adding, removing or shifting weight
	1.4 Factors affecting the stability and trim of vessel are identified and allowances are made in calculations
	1.5 Trim, draughts and list of vessel are controlled as required to ensure they are suitable to progress all anticipated vessel operations
2 Control vessel stability when compartment is flooded	2.1 <i>Damage to vessel and nature of flooding</i> of compartments is assessed
	2.2 Effect upon vessel stability of flooded and flooding compartments is evaluated
	2.3 <i>Suitable strategy</i> for maintaining or restoring trim and stability is devised
	2.4 Where stress limits of the vessel are exceeded as a consequence of damage and/or flooding, appropriate action is initiated to ensure safety of personnel, including where necessary abandoning the vessel
3 Manage stress conditions of the vessel	3.1 Stress levels of the vessel are assessed according to manufacturer specifications
	3.2 Stability of the vessel is monitored at a frequency and scope relevant to vessel operations and is sufficient to enable stress and stability to be maintained within acceptable limits at all times
	3.3 Appropriate action is taken where weight distribution has or could exceed acceptable safety limits
4 Maintain records of stability management	4.1 <i>Data and information</i> related to stability management is accurately recorded
	4.2 Data and information related to stability management is filed and stored according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply IMO recommendations concerning vessel stability
- Determine stability and trim requirements for docking or slipping the vessel
- Determine the effect on trim and stability of vessel in the event of damage to and consequent flooding of a compartment, and countermeasures to be taken
- Interpret and apply information on the fundamental principles of vessel construction and the theories and factors affecting trim and stability and measures necessary to preserve trim and stability
- Maintain stability and stress conditions within safe limits at all times
- Use automatic data-based equipment

Required Knowledge:

- Causes and repercussions of a heeling vessel
- Effects of density of sea water on the draught and freeboard of a vessel
- Features of the load-line and draught marks of a vessel and procedures for carrying out related calculations
- Fundamental principles of ship construction and the theories and factors that impact on trim and stability, and measures necessary to preserve trim and stability
- IMO recommendations concerning vessel stability
- Levelling arrangements for damaged side compartments
- Principles of synchronous rolling and methods for its control
- Principle stresses that act on the structure of a vessel, including panting and pounding
- Procedures for calculating the required load distribution to achieve the desired trim
- Typical problems related to the control of trim and stability for vessels of 500 gross tonnage and more
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required

this unit

Knowledge and include:

- attention to appropriate level of detail in recordkeeping
- producing accurate and reliable documentation.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site or simulation where managing stability of a vessel of 500 gross tonnage or more may be demonstrated
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing stability of a vessel of 500 gross tonnage or more
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- | | |
|---------------------------------|---|
| Calculations must include: | <ul style="list-style-type: none"> • Calculating required load distribution to achieve desired trim • Calculations for change of draught, trim and heel when entering different water densities and to bilging of compartments • Centre of gravity of a vessel using an inclining experiment and effect of suspended weights • Changes to draught, trim and heel due to adding or removing fuel, ballast or cargo • Determining required correction for height of centre of gravity (kg) for free surface effect • Determining values of righting lever and construction of righting lever curves • Displacement, wetted surface, form coefficients, tonne per centimetre immersion, application of Simpson's rules to first and second moments of area, centroids and centres of pressure • Effect on stability of dry docking and grounding • Hydrostatic stability of a vessel • Moment of statical stability at small angles of heel • Transverse and longitudinal stability using hydrostatic data • Vessel centre of gravity, centre of buoyancy and metacentre |
| Factors may include: | <ul style="list-style-type: none"> • Dry docking • Excessive trim • Free surface of a liquid • Grounding • Handling of heavy weights • Large swell conditions • Shift of cargo • Wind heel |
| Damage to vessel may include: | <ul style="list-style-type: none"> • Damage caused by incorrectly lashed or secured cargo • Damage caused by incorrectly stowed cargo • Damage to cargo handling equipment by exceeding safe working limits |
| Nature of flooding may include: | <ul style="list-style-type: none"> • Flooding due to collision or grounding • Ingress of sea water through hatch covers |
| Suitable strategy may include: | <ul style="list-style-type: none"> • Addition of ballast • Temporary damage repairs |
| Data and information may | <ul style="list-style-type: none"> • Cargo handling equipment • Instructions of relevant maritime authorities |

include:

- Manufacturer instructions and procedures
- Organisational cargo handling procedures
- Relevant Australian and international standards and regulatory requirements
- Relevant WHS/OHS legislation
- Vessel and shore safety checklists
- Vessel Cargo Securing Manual
- Vessel log
- Vessel Register of Materials Handling Equipment

Unit Sector(s)

Not applicable.

Competency Field

Handling cargo and vessel stability

MARB1001A Assist with routine maintenance of a vessel

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to carry out general routine maintenance on a vessel up to 80 metres.

Application of the Unit

This unit applies to general purpose-hands working in the maritime industry on vessels up to 80 metres as part of a vessel crew.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|--|-----|---|
| 1 Select and set up equipment and materials for | 1.1 | <i>Equipment</i> is selected according to type of cleaning to be undertaken |
| | 1.2 | Equipment is checked to ensure it is clean and serviceable |

- cleaning**
- 1.3 Suitable dry and wet cleaning agents and chemicals are selected and prepared according to manufacturer instructions and work health and safety (WHS)/occupational health and safety (OHS) requirements
 - 1.4 Suitable personal protective clothing and equipment is selected and used where necessary
- 2 Clean work area**
- 2.1 Work area to be cleaned is prepared and any hazards are identified
 - 2.2 Work area is barricaded or warning signs are provided, as appropriate, to reduce risk to self and other crew members
 - 2.3 Correct cleaning agents are selected and applied according to manufacturer instructions and WHS/OHS requirements
 - 2.4 Equipment is used correctly and safely
- 3 Follow instructions to carry out routine maintenance of vessel machinery**
- 3.1 Suitable personal protective clothing is selected and used according to WHS/OHS safety requirements
 - 3.2 Greasing, lubrication and other routine servicing of vessel machinery and equipment is carried out according to supervisor and manufacturer instructions
 - 3.3 *Routine adjustments and repairs* are made to vessel machinery and equipment according to supervisor and manufacturer instructions
 - 3.4 Faulty vessel machinery and equipment is identified and reported according to workplace procedures
- 4 Prepare and paint surfaces**
- 4.1 Suitable personal protective clothing is selected and used according to WHS/OHS requirements
 - 4.2 *Surfaces* are prepared using correct equipment
 - 4.3 Rust remover, rust converter and undercoats are applied according to manufacturer specifications
 - 4.4 Paints are mixed in correct proportions according to manufacturer specifications
 - 4.5 Finishing coat is applied using brush, roller or spray gun
- 5 Maintain and store tools, equipment and chemicals**
- 5.1 Equipment and tools are cleaned, returned to operating order and stored according to supervisor and manufacturer instructions
 - 5.2 *Environmental procedures* are followed and waste from cleaning and maintenance tasks is collected, treated and disposed of, or recycled according to workplace procedures

- 5.3 Work area is cleaned and maintained according to workplace requirements
- 5.4 Malfunctions, faults, wear or damage to tools are reported according to workplace procedures
- 5.5 Chemicals are stored according to supervisor and manufacturer instructions

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Complete maintenance records
- Demonstrate safe and environmentally responsible work practices
- Read, interpret and apply manufacturer instructions including all WHS/OHS requirements and data safety sheets (SDS)/material safety data sheets (MSDS)
- Recognise faulty equipment
- Select and use correct tools and equipment for the cleaning or maintenance task

Required Knowledge:

- Component parts, operation and routine maintenance requirements of vessel machinery
- Equipment cleaning and preservation techniques
- Maintenance hazards and problems
- Paint types and applications
- Principles and procedures of machinery lubrication as they relate to vessel machinery
- Procedures for using hand tools for routine maintenance operations
- Relevant WHS/OHS and pollution control legislation
- Rust treatment
- Techniques for maintenance of surfaces including paint, timber, fibre glass, steel and aluminium
- Types, characteristics and functions of:
 - equipment/tools used in cleaning and maintenance
 - vessel machinery and equipment
- Workplace procedures for cleaning and maintenance

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- ensuring currency of relevant WHS/OHS skills and knowledge
- implementing workplace environmental and waste management procedures correctly.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where assisting with routine maintenance of a vessel may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate assisting with routine maintenance of a vessel
- direct observation of the candidate applying relevant

WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Equipment may include:

- Cleaning supplies
- Hand held power tools
- Hand tools
- Grease guns
- Paint and rust prevention material
- Personal protective equipment

Personal protective clothing and equipment may include:

- Boots
- Gloves
- Hat/hard hat
- Hearing protection
- Overalls
- Protective eyewear
- Respirator or face mask
- Safety harness
- Sun protection
- Wet weather gear

Work area may include:

- Battery room
- Engine room
- Exposed deck area
- Firefighting equipment spaces
- Store room
- Wheelhouse and accommodation area

Routine adjustments and repairs may include:

- Checks of cooling system, fuel, grease and oil, battery levels
- Dismantling and assembling

- Surfaces may include:
- Inspections of fan belts, leads, lines, connections, air filters, hydraulics, lighting
 - Minor adjustments
 - Testing
 - External and internal bulkhead
 - Funnel
 - Hatches and coamings
 - Hull
 - Masts
- Environmental procedures must include:
- Preventative measures with regard to damage to natural areas caused by servicing, maintenance and cleaning activities
 - Safely using and disposing of cleaning and maintenance debris including oil containers, fuel and chemical residues, paint

Unit Sector(s)

Not applicable.

Competency Field

Equipment Checking and Maintenance

MARB2001A Perform basic servicing and maintenance of main propulsion unit and auxiliary systems

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to perform basic maintenance and servicing of main propulsion units and auxiliary systems.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 3 on vessels up to 500 kW.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Prepare for
 - 1.1 Manufacturer *equipment* specifications are obtained

- work**
 - 1.2 **Safety requirements** associated with maintaining equipment and workplace environment are implemented
 - 1.3 Tasks are planned and sequenced in conjunction with others involved in or affected by maintenance work
 - 1.4 **Tools and equipment** are selected and checked for serviceability
 - 1.5 Work area is prepared
- 2 Carry out routine service**
 - 2.1 Equipment is inspected and inspection results are compared with manufacturer specification
 - 2.2 **Servicing tasks** are carried out to specification
 - 2.3 Mechanical equipment and system components are checked with appropriate instruments
 - 2.4 **Faulty items or components** are identified and serviceability/unserviceability is determined
 - 2.5 Unserviceable equipment is tagged according to workplace procedures
- 3 Repair/replace faulty components**
 - 3.1 Equipment is safely isolated according to regulations and/or work health and safety (WHS)/occupational health and safety (OHS) requirements
 - 3.2 Faulty items or components are removed using appropriate tools and equipment according to workplace procedures
 - 3.3 Replaceable items are selected or serviceable items are fitted according to manufacturer specifications
 - 3.4 Adjustments are made to equipment or components to comply with specifications
 - 3.5 Operational check is carried out on system to ensure its compliance with manufacturer specification
 - 3.6 Maintenance report is completed according to workplace procedures
- 4 Clean up**
 - 4.1 Work area is cleared and cleaned
 - 4.2 **Materials** are disposed of or recycled according to legislative and workplace requirements
 - 4.3 Tools and equipment are cleaned, checked and stored according to workplace procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Complete relevant log books and service reports
- Demonstrate safe and environmentally responsible work practices in servicing and maintenance activities
- Read and interpret gauges
- Read and interpret manufacturer specifications and safety data sheets (SDS)/material safety data sheets (MSDS)
- Service and maintain propulsion machinery and auxiliary equipment to manufacturer specifications

Required Knowledge:

- Bleeding fuel systems
- Care of low voltage electrical systems on a vessel including precautions necessary when charging batteries
- Environmental impacts and minimisation measures associated with servicing and maintaining propulsion machinery and auxiliary equipment
- Job safety analyses (JSAs) and safe work method statements
- Manufacturer specifications for servicing and maintaining propulsion machinery and auxiliary equipment
- Operating principles and operating methods for propulsion machinery and auxiliary equipment
- Potential risks and hazards associated with servicing and maintaining propulsion machinery and auxiliary equipment
- Processes of maintaining propulsion machinery and auxiliary equipment
- Relevant WHS/OHS and personal protective equipment (PPE) requirements
- Routine checks required when servicing and maintaining propelling machinery, auxiliary equipment and other mechanical equipment

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment

Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- completing all work to specification
- selecting and using appropriate processes, tools and equipment
- providing the required amount of detail in reports.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where basic servicing and maintenance of main propulsion units and auxiliary systems may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate servicing and maintaining main propulsion units and auxiliary systems
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be

combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- | | |
|----------------------------------|---|
| Equipment must include: | <ul style="list-style-type: none">• Auxiliary equipment• Bilge systems• Cooling, lubricating and fuel systems• Drive train assembly• Fire pumping arrangements• Low voltage electrical systems• Monitoring machinery• Petrol, diesel and outboard engines• Shore power leads and connections• Steering gear• Two and four stroke engines |
| Safety requirements may include: | <ul style="list-style-type: none">• WHS/OHS requirements of the state or territory (specifically relating to PPE, use of tools and equipment, workplace environment and safety, handling of materials, hazard control, hazardous materials and substances)• PPE including that prescribed under legislation, regulation and organisational policies and procedures• Safe operating procedures including recognising and preventing hazards associated with the use of tools and equipment, dangerous materials, working at heights, working at proximity to others, worksite visitors and the public• Emergency procedure including emergency shutdown and stopping of equipment, extinguishing fires, organisational first aid requirements, evacuation |
| Tools and equipment may include: | <ul style="list-style-type: none">• Hand and power tools• Ladders• Test equipment |
| Servicing tasks may include: | <ul style="list-style-type: none">• Battery maintenance• Carrying out manufacturer instructions for pre-start checks• Checking: |

- shaft glands
 - strainers
 - cooling system
 - fuel levels
 - fuel systems
 - Greasing
 - Oiling
 - Visual check for oil leaks
 - Visually checking, identifying and reporting obvious equipment faults
- Faulty items or components may include:
- Batteries and connections
 - Engine parts
 - Fuel pump
- Materials may include:
- Rags
 - Spent oil

Unit Sector(s)

Not applicable.

Competency Field

Equipment Checking and Maintenance

MARB2002A Service marine internal combustion engines and propulsion and auxiliary systems

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to perform basic servicing of marine internal combustion engines, and propulsion and auxiliary systems.

Application of the Unit

This unit applies to deck workers working in the maritime industry on vessels up to 12 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|---------------------------|--|
| 1 Prepare for work | 1.1 Planned maintenance program is accessed to determine servicing requirements |
|---------------------------|--|

- 1.2 Inspections are conducted and additional non-routine servicing requirements are determined
- 1.3 Manufacturer specifications for *equipment* are obtained
- 1.4 Tasks are planned and sequenced in conjunction with others involved in or affected by servicing work
- 1.5 Equipment is safely isolated according to regulations and work health and safety (WHS)/occupational health and safety (OHS) requirements
- 1.6 *Tools and equipment* are selected and checked for serviceability
- 1.7 Work area is prepared
- 2 **Carry out routine service**
 - 2.1 Equipment is inspected throughout servicing and inspection results are compared with manufacturer specifications
 - 2.2 *Servicing tasks* are carried out to specification
 - 2.3 Mechanical equipment and system components are checked with appropriate instruments
 - 2.4 Unserviceable equipment is tagged according to workplace procedures and appropriate personnel are notified
- 3 **Repair and replace faulty components**
 - 3.1 Faulty items or components are removed using appropriate tools and equipment according to workplace procedures
 - 3.2 Replaceable items are selected or serviceable items are fitted according to manufacturer specifications
 - 3.3 Adjustments are made to equipment or components to ensure compliance with specifications
 - 3.4 Operational check is carried out on system to ensure compliance with manufacturer specifications
- 4 **Clean up and complete documentation**
 - 4.1 Work area is cleared and cleaned
 - 4.2 *Materials* are disposed of or recycled according to legislative and workplace requirements
 - 4.3 Tools and equipment are cleaned, checked and stored according to workplace procedures
 - 4.4 Maintenance report is completed according to workplace procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Implement safe and environmentally responsible work practices
- Read and interpret:
 - manufacturer specifications
 - safety data sheets (SDS)/material safety data sheets (MSDS)

Required Knowledge:

- Basic combustion process
- Basic electronic control unit and governor maintenance
- Basic reverse/reduction gearbox maintenance
- Basic timing diagrams
- Circulating pumps and maintenance
- Controllable pitch propellers maintenance
- Cooling systems and cooling system maintenance
- Couplings types, fittings, keys and keyways, securing nuts, locking
- Environmental responsibilities, regulations and legislative requirements
- Fuel systems and fuel system maintenance
- Intake system and system maintenance
- Instrumentation maintenance
- Intermediate bearing maintenance
- Lube oil:
 - system and system maintenance
 - contamination
- Lubricating systems and systems maintenance
- Maintenance of:
 - drive systems, belts, clutches, motors
 - hydraulic systems
 - pumping systems
 - refrigeration systems
 - sea water piping including corrosion control
 - shaft seals and rudder stock, glands and packings
 - steering systems
- Marine two- and four- stroke:
 - diesel engines

- petrol engines
- Principles and procedures of lubrication
- Propeller and intermediate shafting alignment
- Routine servicing of:
 - firefighting equipment in engine space
 - valves
- Sterndrive and water jet drive units maintenance
- Types, characteristics and functions of equipment/tools used in maintenance
- WHS/OHS requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- being aware of own ability and limits to rectify irregularities and faults
- implementing workplace environmental and waste management procedures correctly.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where servicing marine internal combustion engines, and propulsion and auxiliary systems can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate servicing marine internal combustion engines, and propulsion and auxiliary systems
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Equipment may include:

- Auxiliary equipment and associated spaces
- Cooling systems
- Firefighting equipment
- Fuel systems
- Gearbox
- Lubricating systems
- Marine two- and four-stroke:
 - diesel engines
 - petrol engines
- Propeller and immediate shafting alignment
- Pumping systems
- Refrigeration systems

- Tools and equipment may include:
- Sterndrive and water jet drive units
 - Steering systems
 - Hand and power tools
 - Specialised tools
 - Test equipment
- Servicing tasks may include:
- Cleaning:
 - coolers
 - filters
 - Greasing
 - Oiling
 - Replacing:
 - anodes
 - shaft seals and gland packing
 - belt drives
 - pumps
 - Topping up oils
- Materials may include:
- Cleaning products
 - Rags
 - Refrigerant gas
 - Spent oil
 - Used components

Unit Sector(s)

Not applicable.

Competency Field

Equipment Checking and Maintenance

MARB3001A Maintain firefighting appliances

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to maintain firefighting equipment. It includes following a maintenance program, working safely, carrying out maintenance and completing necessary maintenance documentation.

Application of the Unit

This unit applies to those working as a Master of a vehicular ferry constrained by cables.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|---|-----|--|
| 1 Prepare to carry out maintenance | 1.1 | Details of <i>firefighting equipment and systems</i> are ascertained from manufacturer documentation and equipment certification documentation |
|---|-----|--|

- 1.2 Extent of maintenance to be conducted is established from maintenance schedule
 - 1.3 Tools, equipment and testing devices needed to carry out maintenance work are obtained and checked for correct operation and safety
- 2 Carry out maintenance**
- 2.1 Work is carried out according to maintenance schedule to ensure all items are correctly maintained
 - 2.2 Equipment and systems are checked and tested according to established procedures to determine whether it functions correctly, complies with approval documentation and is not subject to *deterioration or damage*
 - 2.3 Equipment and systems are adjusted or repaired within limits permitted by equipment certification and according to manufacturer instructions
 - 2.4 Certification documentation for replacement equipment and systems is sighted to ensure it is identical to equipment it replaces, according to regulatory requirements
 - 2.5 Equipment being withdrawn from service is isolated safely according to regulatory requirements
 - 2.6 Spare equipment is maintained and suitably stored where it is not likely to suffer deterioration or damage
- 3 Complete maintenance work inspections and documentation**
- 3.1 Detailed inspection of equipment and systems subject to maintenance work is arranged according to regulatory requirements
 - 3.2 Results of inspections and maintenance activities are recorded according to regulatory and organisational requirements
 - 3.3 Appropriate personnel are notified of completion of maintenance and details are documented according to regulatory and organisational requirements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Adapt to variations in firefighting equipment and systems on different vessels

- Follow procedures to maintain firefighting equipment and systems
- Interpret technical specifications related to maintaining firefighting equipment and systems
- Recognise faults and problems related to maintaining firefighting equipment and systems
- Take appropriate action to prevent pollution of marine environment

Required Knowledge:

- Faults that can occur with firefighting equipment and systems
- Fire pumps and fire main systems
- Fixed installations, closing appliances and remote shut-offs
- ISM Code safety management system
- Organisational policies and procedures related to maintaining firefighting equipment and systems
- Recommended maker instructions for repair equipment
- Relevant regulations and codes of practice related to maintaining firefighting equipment and systems
- Statutory and organisational requirements for documentation related to maintaining firefighting equipment and systems
- Uses of hoses and nozzles
- Valid survey certificates
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- attention to detail when completing documentation
- initiating timely action in response to deterioration or damage.

Context of and specific

Performance is demonstrated consistently over time and in a

resources for assessment

suitable range of contexts.

Resources for assessment include access to:

- marine operations site where maintaining firefighting appliances may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate maintaining firefighting appliances
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in

the performance criteria, is detailed below.

Firefighting equipment and systems must include:

- Closing appliances
- Fire pumps and fire main systems
- Fixed fitted detection and suppression systems
- Fixed installations
- Foam applicators
- Hoses
- International ship-to-shore connection
- Nozzles
- Portable and semi-portable extinguishers
- Remote shut-offs
- Stretchers/ropes and lines
- Incorrect stowage of equipment
- Lack of required maintenance

Deterioration or damage may include:

Unit Sector(s)

Not applicable.

Competency Field

Equipment Checking and Maintenance

MARB3002A Perform routine engine maintenance on a vessel

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to service engines and engine components on a vessel.

Application of the Unit

This unit applies to an Integrated Rating performing a range of engine maintenance activities as required on a range of vessels.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|----------------------------------|--|
| 1 Plan engine maintenance | 1.1 Planned maintenance system is accessed to establish engine maintenance requirements for vessel |
|----------------------------------|--|

- tasks**
- 1.2 **Maintenance tasks** are proposed and prioritised in conjunction with others involved in or affected by the maintenance work
 - 1.3 Resource requirements are identified and allocated to ensure efficient completion of tasks
 - 1.4 Maintenance tasks to be performed are recorded in the maintenance schedule according to organisational procedures
- 2 Prepare for engine service**
- 2.1 Nature and scope of work requirements are confirmed
 - 2.2 Service procedures, workshop manuals and manufacturer specifications are accessed and interpreted
 - 2.3 **Tools, equipment and materials** required for servicing task are identified and prepared
 - 2.4 Engine and components are visually inspected for external signs of defects according to maintenance documentation
 - 2.5 Electrical components are identified and **safe use of electrical equipment** is ensured
 - 2.6 Engine is started, ran up to operating temperature and checked for leaks, abnormal noises and pressures
 - 2.7 Test results are compared with manufacturer/component supplier specifications to determine compliance or non-compliance
 - 2.8 Results are documented with supporting information and recommendations are made as to serviceability and repair
- 3 Service engines and engine components**
- 3.1 Work health and safety (WHS)/occupational health and safety (OHS) requirements are identified and observed
 - 3.2 Service operations are performed according to organisational procedures and manufacturer/component supplier specifications
 - 3.3 Fluid level checks and replenishments are carried out according to manufacturer/component supplier specifications
 - 3.4 Appropriate lubricants are applied to engine
 - 3.5 Equipment/components requiring replacement are changed according to manufacturer/component supplier specifications
 - 3.6 Adjustments are made according to manufacturer/component supplier specifications
- 4 Complete work**
- 4.1 Engine is inspected to ensure protective guards, cowlings and safety

features are in place

- 4.2 Engine is cleaned according to organisational procedures
- 4.3 Materials that can be reused are collected and stored according to manufacturer specifications and organisational procedures
- 4.4 Tools and equipment are cleaned, maintained and stored according to manufacturer specifications and organisational procedures
- 4.5 Waste and scrap is removed according to legislative requirements and organisational procedures
- 4.6 Unserviceable equipment is tagged and faults are identified according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assist in servicing marine:
 - fuel systems/components
 - ignition systems/components
 - intake systems/components
 - exhaust systems/components
 - lubrication systems/components
 - cooling systems/components
 - engine mounting systems/components

Required Knowledge:

- Basic electrical theory covering voltage, current, resistance, power, magnetic and inductance
- Mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems
- Types, functions and limitations of marine:
 - engines
 - fuel systems/components
 - ignition systems/components
 - intake systems/components

- exhaust systems/components
- lubrication systems/components
- cooling systems/components
- engine mounting systems/components
- WHS/OHS requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- ensuring currency of relevant WHS/OHS skills and knowledge
- ensuring behaviour reflects relevant current legislative and regulatory requirements.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where performing routine engine maintenance on a vessel may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or

- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate performing routine engine maintenance on a vessel
- direct observation of candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Maintenance tasks may include:
- Greasing and oiling of machinery
 - Inspection and maintenance of:
 - hoists and lifting equipment
 - hatches, watertight doors ports and deadlights
 - Routine inspection of hand and power tools, measuring instruments and machinery tools
 - Safe disposal of waste materials
 - Surface preparation and painting
- Tools, equipment and materials may include:
- Cleaning materials
 - Hand tools
 - Machine tools
 - Measuring instruments
 - Power tools
- Safe use of electrical equipment must include:
- Awareness of safety precautions to be taken before commencing work
 - Emergency procedures
 - Isolation procedures
 - Precautions to be taken to prevent electric shock

- Voltages in use on board

Unit Sector(s)

Not applicable.

Competency Field

Equipment Checking and Maintenance

MARB3003A Perform routine maintenance and repairs on a vessel

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to perform routine remedial, preventative and survey deck maintenance and repairs. It includes basic deck maintenance, cleaning tasks, marine painting, and servicing deck machinery and systems on vessels.

Application of the Unit

This unit applies to an Integrated Rating in the range of maintenance activities required on a range of vessels.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|---|--|
| 1 Plan and prepare for work | <ul style="list-style-type: none">1.1 <i>Maintenance and repair activities</i> are identified from work orders and clarified with appropriate personnel1.2 Relevant plans, drawings and texts are interpreted to determine job specifications1.3 Resources required to complete tasks are identified, obtained and inspected for compliance with job specifications1.4 Where work at heights or overside is required, appropriate fall arrest and restraint devices are selected and used according to work health and safety (WHS)/occupational health and safety (OHS) requirements1.5 Tasks are sequenced and prioritised1.6 Coordination requirements are resolved with others involved or affected by the work1.7 Potential hazards are identified and prevention and/or control measures are selected according to work plan and organisational procedures |
| 2 Perform basic deck maintenance | <ul style="list-style-type: none">2.1 Suitable personal protective clothing is selected and used according to WHS/OHS requirements2.2 Deck surfaces are checked according to planned maintenance system2.3 Any deterioration or corrosion of vessel deck surfaces is identified and appropriate maintenance action is carried out according to manufacturer instructions and organisational procedures2.4 Minor faults and imperfections in paint surfaces are repaired according to manufacturer instructions and organisational procedures2.5 Weathered surfaces are restored using cleaners and liquid abrasives according to manufacturer instructions and organisational procedures2.6 Tools and equipment are used correctly and safely2.7 Maintenance materials are obtained, prepared and applied according to manufacturer instructions and organisational procedures |
| 3 Carry out cleaning tasks | <ul style="list-style-type: none">3.1 Suitable personal protective clothing is selected and used according to WHS/OHS requirements3.2 <i>Area</i> to be cleaned is prepared and any hazards identified3.3 Work area is barricaded or warning signs provided, as appropriate, to |

- reduce risk to other crew members
- 3.4 Correct chemicals and cleaning agents are selected and applied according to manufacturer instructions and WHS/OHS requirements
 - 3.5 Equipment is used correctly and safely
 - 3.6 Cleaning tasks are completed according to manufacturer instructions and organisational procedures
- 4 Prepare and paint surfaces**
- 4.1 Suitable personal protective clothing is selected and used according to WHS/OHS requirements
 - 4.2 Surfaces are prepared using correct equipment
 - 4.3 Rust remover, rust converter and undercoats are applied according to manufacturer instructions
 - 4.4 Paints are mixed in correct proportions according to manufacturer instructions
 - 4.5 Paint is applied using appropriate application equipment
- 5 Carry out routine maintenance of deck fittings, equipment and systems**
- 5.1 *Fittings and equipment* are inspected and inspection results are compared with manufacturer specification
 - 5.2 Maintenance tasks are carried out to specification
 - 5.3 Mechanical equipment and system components are checked with appropriate instruments
 - 5.4 Faulty items or components are identified and an appropriate maintenance procedure is selected
 - 5.5 Unserviceable equipment is tagged according to organisational procedures
- 6 Repair/replace faulty fittings and equipment**
- 6.1 Fittings and equipment are safely isolated according to regulations and WHS/OHS requirements
 - 6.2 Faulty fittings or equipment are removed using appropriate tools, equipment and procedures
 - 6.3 Replaceable items are selected or serviceable items are repaired according to manufacturer specifications
 - 6.4 Adjustments are made to fittings or equipment to comply with specifications
 - 6.5 Operational check is carried out to ensure compliance with

manufacturer specifications

6.6 Maintenance report is completed according to organisational procedures

7 Clean up

7.1 Work area is cleared and cleaned

7.2 **Materials** are disposed of or recycled according to legislative and organisational requirements

7.3 Tools and equipment are checked, maintained, and stored according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Complete any required records when performing routine remedial, preventative and survey deck maintenance on a vessel
- Demonstrate safe and environmentally responsible work practices when performing routine remedial, preventative and survey deck maintenance on a vessel
- Follow required work schedule according to organisational requirements
- Read and interpret instructions for performing routine remedial, preventative and survey deck maintenance on a vessel
- Read and interpret manufacturer specifications and safety data sheets (SDS)/material safety data sheets (MSDS)
- Recognise routine problems when performing routine remedial, preventative and survey deck maintenance on a vessel
- Select and use relevant tools, equipment and materials according to instructions
- Use fall arrest and restraint devices where appropriate

Required Knowledge:

- Component parts, operation and routine maintenance requirements of vessel machinery
- Equipment cleaning and preservation techniques
- Job safety analyses (JSAs)/safe work method statements
- Maintenance hazards and problems
- Maintenance of steering gear
- Maintenance records for a vessel
- Nature and causes of corrosion of marine surfaces and structures and available methods of

control

- Organisational procedures for cleaning and maintenance
- Paint types and applications
- Planned maintenance systems
- Principal parts of a vessel and basic design methods
- Principles and procedures of machinery lubrication as they relate to vessel machinery
- Procedures for:
 - checking deck areas, machinery and fittings of a vessel as part of the planned routine maintenance on a vessel
 - using hand tools for routine maintenance operations
- Relevant WHS/OHS and:
 - personal protective clothing requirements
 - pollution control legislation
- Rust treatment
- Safety management system as it relates to planned vessel maintenance systems
- Steering gear arrangements and safety features
- Storage principles for paints, chemicals and cleaning agents used in planned maintenance operations
- Types, characteristics and functions of:
 - vessel machinery and equipment
 - equipment/tools used in cleaning and maintenance
- Use of various construction material and regulations governing structure

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- working safely at all times.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where routine

maintenance and repairs on a vessel may be conducted

- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate performing routine maintenance and repairs on a vessel
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Maintenance and repair activities may include:
- Fire and bilge pumps: regular testing with repairs carried out, as necessary, as a result of such tests

- Greasing and oiling
 - Lifebuoys and lifejackets: subject to regular inspection
 - Lifesaving appliances: regular inspection and maintenance of lifeboats and equipment, which may include replacing lashings, wires, expired food and general cleaning and painting
 - Ropes and wires: inspecting for damage; repairing damaged areas (splicing); replacing, where necessary, such items as mooring lines, cargo wires, lashings, lifeboat falls
 - Rust prevention
- Area may include:
- Battery room
 - Engine room
 - Exposed deck area
 - Firefighting equipment spaces
 - Store room
 - Wheelhouse and accommodation area
- Fittings and equipment may include:
- Lifting equipment
 - Fall arrest and restraint devices
 - Fuel, fresh and ballast water, bilge and firefighting pumps
 - Navigation lights and shapes
 - Steering gear
 - Windlass and capstan
- Materials may include:
- Cleaning chemicals
 - Paint residues
 - Rags
 - Spent oil

Unit Sector(s)

Not applicable.

Competency Field

Equipment Checking and Maintenance

MARB3004A Perform routine maintenance on a vessel up to 24 metres

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to perform routine remedial, preventative and survey deck maintenance. It includes basic deck maintenance, cleaning tasks, marine painting, and servicing deck machinery and systems on commercial vessels up to 24 metres.

Application of the Unit

This unit applies to those working in the capacity of Master on a range of vessels up to 24 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|---|--|
| 1 Plan maintenance tasks | <ul style="list-style-type: none">1.1 Planned maintenance system is accessed to establish maintenance requirements for vessel1.2 Maintenance tasks are proposed and prioritised in conjunction with others involved in or affected by the maintenance work1.3 Resource requirements are identified and allocated to ensure efficient completion of tasks1.4 Maintenance tasks to be performed are recorded in a maintenance schedule according to organisational procedures |
| 2 Perform basic deck maintenance | <ul style="list-style-type: none">2.1 Deck surfaces are checked according to planned maintenance system2.2 Any deterioration or corrosion of vessel deck surfaces is identified and appropriate maintenance action is carried out according to planned maintenance system2.3 Minor faults and imperfections in paint surfaces are repaired according to organisational procedures2.4 Weathered surfaces are restored using cleaners and liquid abrasives according to manufacturer instructions and organisational procedures2.5 Tools and equipment are used correctly and safely2.6 Maintenance materials are obtained, prepared and applied according to organisational procedures and manufacturer instructions |
| 3 Carry out cleaning activities | <ul style="list-style-type: none">3.1 Area to be cleaned is prepared and hazards are identified3.2 Work area is barricaded or warning signs provided, as appropriate, to reduce risk to other crew members3.3 Correct chemicals and cleaning agents are selected and applied according to manufacturer instructions and work health and safety (WHS)/occupational health and safety (OHS) requirements3.4 Equipment is used correctly and safely3.5 Cleaning tasks are completed according to organisational procedures and manufacturer instructions |
| 4 Prepare and paint surfaces | <ul style="list-style-type: none">4.1 Suitable personal protective clothing is selected and used according to WHS/OHS requirements4.2 Surfaces are prepared using correct equipment |

- 4.3 Rust remover, rust converter and undercoats are applied according to manufacturer specifications
- 4.4 Paints are mixed in correct proportions according to manufacturer specifications
- 4.5 Paint is applied using appropriate application equipment
- 5 Carry out routine maintenance of deck fittings, equipment and systems**
 - 5.1 *Fittings and equipment* are inspected and inspection results are compared with manufacturer specifications
 - 5.2 Maintenance tasks are carried out to specification
 - 5.3 Mechanical equipment and system components are checked with appropriate instruments
 - 5.4 Faulty items or components are identified and maintenance procedures selected
 - 5.5 Unserviceable equipment is tagged and faults are identified according to organisational procedures
- 6 Repair/replace faulty fittings and equipment**
 - 6.1 Fittings and equipment are safely isolated according to regulations and WHS/OHS requirements
 - 6.2 Faulty fittings or equipment are removed using appropriate tools, equipment and procedures
 - 6.3 Replaceable items are selected or serviceable items are fitted according to manufacturer specifications
 - 6.4 Adjustments are made to fittings or equipment to comply with specifications
 - 6.5 Operational check is carried out to ensure compliance with manufacturer specifications
 - 6.6 Maintenance report is completed according to organisational procedures
- 7 Supervise crew in completing maintenance tasks**
 - 7.1 Workload is organised in order of priority according to planned maintenance system
 - 7.2 Maintenance tasks are allocated to appropriate crew members with consideration of individual experience and qualifications
 - 7.3 Crew members are clearly briefed on their responsibility and maintenance tasks and WHS/OHS requirements
 - 7.4 Guidance is provided appropriate to maintenance task and individual

experience

7.5 Completed work is checked to ensure maintenance is performed according to organisational procedures

8 Clean up

8.1 Work area is cleared and cleaned for serviceable condition

8.2 **Materials** are disposed of or recycled according to legislative and organisational requirements

8.3 Tools and equipment are cleaned, checked and stored according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Complete required records when performing routine remedial, preventative and survey deck maintenance on a vessel
- Demonstrate safe and environmentally responsible work practices when performing routine remedial, preventative and survey deck maintenance on a vessel
- Follow required work schedule according to organisational requirements
- Read and interpret:
 - instructions for performing routine remedial, preventative and survey deck maintenance on a vessel
 - manufacturer specifications and safety data sheets (SDS)/material safety data sheets (MSDS)
- Recognise routine problems when performing routine remedial, preventative and survey deck maintenance on a vessel
- Select and use relevant tools, equipment and materials according to instructions

Required Knowledge:

- Component parts, operation and routine maintenance requirements of vessel machinery
- Equipment cleaning and preservation techniques
- Job safety analyses (JSAs)/safe work method statements
- Maintenance hazards and problems
- Maintenance of steering gear
- Maintenance records for a vessel
- Nature and causes of corrosion of marine surfaces, structures and available methods of

control

- Principal parts of a vessel and basic design methods
- Organisational procedures for cleaning and maintenance to ensure operational readiness
- Paint types and applications
- Principles and procedures of machinery lubrication as they relate to vessel machinery
- Procedures for checking deck areas, machinery and fittings of a vessel as part of the planned routine maintenance on a vessel
- Procedures for using hand tools for routine maintenance operations
- Relevant WHS/OHS and:
 - personal protective equipment requirements
 - pollution control legislation
- Rust treatment
- Safety management system as it relates to planned vessel maintenance
- Steering gear arrangements and safety features
- Storage principles for paints, chemicals and cleaning agents used in planned maintenance operations
- Types, characteristics and functions of:
 - vessel machinery and equipment including safety features
 - equipment/tools used in cleaning and maintenance
- Use of various construction material and regulations governing structure

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- working safely at all times
- attention to appropriate level of detail in recordkeeping.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where routine maintenance on a vessel up to 24 metres may be

conducted

- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate performing routine maintenance on a vessel up to 24 metres
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Maintenance tasks may include:

- Fire and bilge pumps
- Lifesaving appliances

- Area may include:
- Greasing and oiling
 - Ropes and wires
 - Rust prevention
 - Battery room
 - Engine room
 - Exposed deck area
 - Firefighting equipment spaces
 - Store room
 - Wheelhouse and accommodation area
- Fittings and equipment may include:
- Fuel, fresh and ballast water, bilge and firefighting pumps
 - Lifting equipment
 - Navigation lights and shapes
 - Sounding and ventilation arrangements
 - Steering gear
 - Windlass and capstan
- Materials may include:
- Cleaning chemicals
 - Paint residues
 - Rags
 - Spent oil

Unit Sector(s)

Not applicable.

Competency Field

Equipment Checking and Maintenance

MARB3005A Slip or dock a vessel and maintain hull on a vessel up to 80 metres

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMB707B Slip vessel and maintain hull.

Unit Descriptor

This unit involves the skills and knowledge required to slip or dock a vessel of up to 80 metres and carry out all required maintenance procedures to manage hull deterioration and to maintain the watertight integrity of the vessel.

Application of the Unit

This unit applies to those working in the capacity of Master on a range of vessels up to 80 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Safely dock vessel into dry dock or slipway**
 - 1.1 *Slipway or dry dock particulars* are assessed for suitability for dry docking or slipping vessel
 - 1.2 Ship supports, scaffolding and other service systems are assessed for compatibility to dry dock or slipway particulars
 - 1.3 Plan is prepared for docking or slipping vessel
 - 1.4 Cradle, supports and/or slings are prepared prior to slipping vessel
 - 1.5 Vessel is made ready for slipping according to organisational and dry dock requirements
 - 1.6 Vessel is slipped according to environmental safe work practices and safety instructions

- 2 Inspect underwater hull, equipment and fittings**
 - 2.1 Checks of vessel hull, equipment and fittings are carried out according to maintenance schedules and vessel manufacturer instructions
 - 2.2 Deterioration in vessel structure, equipment and fittings is identified
 - 2.3 Checks on watertight integrity of vessel are carried out according to organisational procedures and safety regulations
 - 2.4 Damage to watertight integrity is identified and appropriate action is determined
 - 2.5 Listed work plan is prepared to rectify all identified faults
 - 2.6 Surveyor or authorised person is engaged to ensure appropriate certification can be issued or endorsed on completion of work, where applicable

- 3 Select and use maintenance equipment and materials**
 - 3.1 Tools and equipment are correctly identified, selected and used
 - 3.2 Maintenance materials are obtained, prepared and used according to organisational procedures and manufacturer instructions
 - 3.3 *Environmental procedures* are followed and waste from cleaning and maintenance tasks is collected, treated and disposed of, or recycled, according to organisational procedures
 - 3.4 Malfunctions, faults, wear or damage to tools are reported according to organisational procedures
 - 3.5 Equipment and tools are cleaned, returned to operating order and stored according to organisational procedures and manufacturer

- instructions
- 3.6 Chemicals are used and stored according to organisational procedures and manufacturer instructions
- 3.7 Paint is used and stored according to organisational procedures and manufacturer instructions
- 4 Carry out required maintenance and repairs to hull, equipment and fittings**
- 4.1 Suitable personal protective clothing is selected and used according to work health and safety (WHS)/occupational health and safety (OHS) requirements
- 4.2 Permits for hot work, confined space entry and other high risk activities are completed according to organisational and regulatory requirements
- 4.3 Faults and imperfections in painted surfaces are repaired according to organisational procedures
- 4.4 Weathered surfaces are restored using cleaners and liquid abrasives
- 4.5 Lubricants are applied to moving parts of vessel underwater equipment according to manufacturer instructions
- 4.6 Corrosion control is carried out according to organisational procedures and manufacturer instructions
- 4.7 Action to ensure watertight integrity is completed
- 4.8 ***Routine adjustments*** are made to equipment and fittings according to manufacturer instructions
- 4.9 Faulty vessel machinery and fittings are identified and replacement procedures are implemented
- 5 Supervise crew completing maintenance and repairs to hull, equipment and fittings**
- 5.1 Workload is organised in order of priority, taking into consideration all listed work including survey work
- 5.2 Maintenance tasks are allocated to appropriate crew members with consideration of individual experience and qualifications
- 5.3 Crew members are clearly briefed on their responsibility, maintenance tasks and WHS/OHS requirements
- 5.4 Guidance is provided appropriate to the maintenance task and individual experience
- 5.5 Completed work is checked to ensure maintenance is performed according to dry dock plan and organisational procedures

- 6 Complete duties prior to refloating**
- 6.1 Final internal inspection of vessel is conducted to ensure all listed work is completed to a satisfactory standard
 - 6.2 External inspection of hull and underside is carried out to ensure all listed work is completed to a satisfactory standard
 - 6.3 All tank plugs that have been drawn are replaced
 - 6.4 Crew are instructed on activities to be completed to make vessel ready for sailing
 - 6.5 Check is conducted to ensure a full set of tank soundings has been taken and the distribution of fresh water, fuel and lubricating oil are according to soundings taken on arrival
 - 6.6 Tank quantities are applied to complete stability check to ensure that the vessel has an acceptable GM once she floats clear of the keel blocks or slipway
 - 6.7 All hatch covers are closed and watertight integrity of uppermost deck is assured
 - 6.8 Anchors and cables are heaved up and stowed correctly, and all shore pipelines and powerlines are disconnected
 - 6.9 Confirmation that refloating can proceed is agreed with person in charge of refloating operation

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Complete maintenance records
- Implement safe and environmentally responsible work practices
- Liaise with surveyor to ensure work is carried out to regulatory requirements for the issue or endorsement of relevant certificates
- Read, interpret and apply:
 - operating and service manuals for the slipping/docking of a vessel and the maintenance of its hull
 - manufacturer instructions including all WHS/OHS requirements and safety data sheets (SDS)/material safety data sheets (MSDS)
- Recognise faulty equipment
- Recognise hull damage and deterioration, and take appropriate action according to

organisational procedures

- Select and use correct tools and equipment for maintenance task

Required Knowledge:

- Basic stability and stability terms
- Component parts, operation and routine maintenance requirements of vessel equipment and fittings
- Equipment cleaning and preservation techniques
- Maintenance hazards and problems
- Nature and causes of corrosion of marine surfaces and structures, and the available methods for its control
- Organisational procedures for cleaning and maintenance
- Paint types and applications
- Preservatives and finishes used in marine maintenance and the related procedures for their handling, preparation, application and storage
- Principal features of structure of vessels
- Principles and procedures of lubrication as they relate to underwater vessel equipment and fittings
- Procedures for:
 - working in confined spaces
 - initiating and coordinating repair and/or replacement of underwater equipment and fittings
 - checking and inspecting vessel hull as part of routine maintenance procedures
- Regulatory certification requirements
- Relevant sections of state and territory regulations, National Standard for Commercial Vessels (NSCV) Code and Uniform Shipping Laws (USL) Code dealing with Master responsibilities
- Relevant WHS/OHS and pollution control legislation
- Rust treatment
- Slipping and docking procedures suitable for various types of hull forms
- Stability as it relates to docking or slipping operation and refloating
- Types, characteristics and functions of:
 - underwater vessel machinery and equipment
 - equipment/tools used in cleaning and maintenance

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- developing effective planning documents
- ensuring currency of relevant WHS/OHS skills and knowledge.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where slipping or docking a vessel and maintaining the hull on a vessel up to 80 metres may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate slipping or docking a vessel and maintaining the hull on a vessel up to 80 metres
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for

Holistic assessment with other units relevant to the industry

assessment

sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Slipway or dry dock particulars may include:

- Acceptable draught
- Crane lifting capacities
- Dimensions
- Electric power supply
- Firefighting provisions
- Insurances
- Policy and facility for atmospheric checks of confined spaces
- Responsibility for WHS/OHS
- Safe vessel access
- Safe working load
- Type of floor

Environmental procedures must include:

- Application of paint
- Disposal of waste from hull scraping operations
- Disposal of waste material
- Fuel transfer operations

Routine adjustments may include:

- Ranging and examination of anchors and cables
- Withdrawing and examination of:
 - propeller and shafts
 - rudder and rudder stock

Unit Sector(s)

Not applicable.

Competency Field

Equipment Checking and Maintenance

MARB3006A Maintain marine internal combustion engines, propulsion plant and auxiliary systems

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMB2907B Recognise and correct deteriorated fittings and machinery.

Unit Descriptor

This unit involves the skills and knowledge required to complete basic maintenance of marine internal combustion engines, propulsion plant and auxiliary systems.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 2 on vessels up to 750 kW.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Plan maintenance activities**
 - 1.1 Maintenance plan is accessed to determine *maintenance requirements* for *engines, propulsion plant and auxiliary systems*
 - 1.2 Inspections are conducted and additional non-routine maintenance requirements are determined
 - 1.3 Manufacturer specifications for machinery and equipment are obtained
 - 1.4 Tasks are planned and sequenced in conjunction with others involved in or affected by maintenance work
 - 1.5 *Consumables and equipment* are selected and checked for serviceability
 - 1.6 Maintenance plan is accessed to determine maintenance requirements for engines, propulsion plant and auxiliary systems
- 2 Complete preventative maintenance**
 - 2.1 Machinery and equipment is safely isolated according to work health and safety (WHS)/occupational health and safety (OHS) requirements and organisational practices
 - 2.2 WHS/OHS risk control measures and procedures for carrying out work are followed
 - 2.3 Work area is prepared
 - 2.4 Preventative maintenance is carried out in compliance with technical specifications
 - 2.5 Methods for dealing with unexpected situations are selected on the basis of safety and specified work outcomes
 - 2.6 Maintenance work is checked to verify that it conforms to technical specifications and complies with survey requirements where applicable
- 3 Complete breakdown maintenance**
 - 3.1 *Nature of breakdown* is confirmed using maintenance records and/or logbook entries related to reported breakdown
 - 3.2 Restrictions are applied to operations, where necessary, and Master is informed
 - 3.3 Machinery and equipment is safely isolated according to WHS/OHS requirements and organisational practices
 - 3.4 Repair work is carried out according to technical specifications

- 3.5 Master is notified of completion of repair work and details are documented
- 4 Complete hull maintenance**
- 4.1 *Checks of vessel hull, equipment and fittings* are carried out according to maintenance schedules, survey requirements and vessel manufacturer instructions
- 4.2 Deterioration in vessel structure, equipment and fittings is identified
- 4.3 Checks on propeller, stern tube and rudder are carried out in accordance with organisational procedures, safety regulations and survey requirements
- 4.4 WHS/OHS risk control measures and procedures for carrying out work are followed
- 4.5 Work area is prepared
- 4.6 Maintenance work is checked to verify it conforms to technical specifications and complies with survey requirements where applicable
- 5 Clean up and complete documentation**
- 5.1 Work area is cleared and cleaned
- 5.2 *Materials* are disposed of or recycled according to legislative and workplace requirements
- 5.3 Tools and equipment are cleaned, checked and stored according to workplace procedures
- 5.4 Machinery and equipment is returned to service and monitored for correct operation according to organisational practices
- 5.5 Maintenance report is completed according to workplace procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply safety requirements throughout the work sequence including the use of personal protective equipment (PPE)
- Complete:
 - all work to specification
 - basic user maintenance of marine internal combustion engine, propulsion plant and

auxiliary systems to manufacturer specifications and survey requirements, so as to prevent pollution of the marine environment

- maintenance records
- Implement safe and environmentally responsible work practices
- Plan maintenance activities according to technical, legislative, safety and procedural specifications
- Read and interpret manufacturer specifications and safety data sheets (SDS)/material safety data sheets (MSDS)
- Select and use appropriate processes, tools and equipment

Required Knowledge:

- Basic hydraulic systems and user maintenance requirements
- Basic vessel construction
- Bearing types, materials, installation and lubrication
- Common faults in:
 - steering gear
 - refrigeration systems
- Construction and maintenance of heat exchangers
- Correct pressure and flow conditions
- Corrosion prevention
- Coupling types, fitting, keys and keyways
- Cross connections between:
 - sea water systems and bilge systems
 - bilge/ballast/seawater systems and fire main
- Dangers associated with:
 - back-flooding and methods to prevent back-flooding
 - LPG and petrol vapours
- Dangers of refrigerant gas leaks in confined spaces
- Diesel engine
 - construction
 - fuel injection, timing and control equipment
 - routine maintenance
- Engine:
 - fault finding techniques
 - performance and reasons for lack of performance
 - protection arrangements
- Electro-hydraulic steering gear
- Emergency steering systems

- Faults that can occur with firefighting equipment and systems
- Fire main system and components including pumps, hoses and nozzles
- Fixed firefighting systems and associated remote shut-offs and closing of appliances
- Heat exchanger, keel cooler and raw water cooling systems
- Glands, packing and seals
- Maintenance of watertight openings and hull fittings
- Marine gearbox faults and emergency operation
- Method of propulsion reversal including controllable pitch propeller construction
- Oil:
 - filter changing procedures
 - quality monitoring
- Planned maintenance
- Propeller types, fitting, keys and keyways, securing nuts , locking
- Pump capabilities and requirements for priming
- Refrigeration systems and components
- Relevant regulations and codes of practice relating to the maintenance of engineering equipment and systems such as firefighting
- Routine maintenance:
 - on steering systems
 - of refrigeration systems
- Rudder and stock bearing supports
- Rudder construction and rudder types
- Seawater circulating systems
- Shutting down machinery
- Statutory and organisational requirements for documentation relating to the maintenance of engineering equipment and systems such as firefighting
- Storage of LPG cylinders
- Testing of LPG detectors
- Tiller arm attachment
- Types of:
 - deck machinery
 - pumps and safety devices
- Wet sump lubrication systems

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the

performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- developing effective planning documents
- providing the required amount of detail in reports
- ensuring currency of relevant WHS/OHS skills and knowledge.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where undertaking basic maintenance of marine internal combustion engines, propulsion plant and auxiliary systems can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate undertaking basic maintenance of marine internal combustion engines, propulsion plant and auxiliary systems
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for

Holistic assessment with other units relevant to the industry

assessment

sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Maintenance requirements may include:

- Cleaning:
 - filters
 - coolers
- Greasing
- Maintaining emergency equipment
- Oiling
- Oily water separator
- Overhauling and repairing pumps
- Scheduled survey inspections
- Topping up oils

Engines, propulsion plant and auxiliary systems may include:

- Auxiliary equipment and associated spaces
- Cooling systems
- Deck machinery
- Fixed firefighting systems
- Fuel systems
- Gearbox
- Hull fittings
- Lubricating systems
- Marine two- and four-stroke:
 - diesel engines
 - petrol engines
- Propeller and immediate shafting alignment
- Pumping systems
- Refrigeration systems
- Steering systems

Consumables and equipment may include:

- Sterndrive and water jet drive units
- Cleaning chemicals
- Coolants
- Hand and power tools
- Oils and grease
- Refrigerant gas
- Replacement parts
- Test equipment

Nature of breakdown may include:

- Cooling water system failure
- Engine failure
- Exhaust systems
- Fuel system failure
- Gearbox failure
- Lubricating systems failure
- Power plant failure
- Propeller and shafting arrangements
- Pumping systems failure
- Refrigeration plant failure
- Steering gear failure

Checks of vessel hull, equipment and fittings may include:

- Anodes
- Intake grates
- Keel coolers
- Ship side valves
- Watertight hatches and openings

Materials may include:

- Rags
- Spent oil

Unit Sector(s)

Not applicable.

Competency Field

Equipment Checking and Maintenance

MARB3007A Undertake basic maintenance of electrical systems

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to complete basic maintenance of electrical systems.

Relevant state/territory electrical licensing requirements apply to persons carrying out installation, maintenance and/or repair of electrical circuits or systems that are 50 V alternating current (AC) or above, or 120 V direct current (DC) or above, on a vessel.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 2 on vessels up to 750 kW.

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 2 on vessels up to 750 kW or as a Marine Engine Driver Steam or as a Marine Engine Driver Grade 1 on vessels up to 1500 kW.

WARNING: Relevant state/territory training and qualification requirements need to be fulfilled by any persons carrying out installation, maintenance and/or repair of refrigeration equipment especially with regard to preventing the escape of refrigerants into the atmosphere and to electrical work.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|---|
| 1 Plan maintenance activities | <p>1.1 Maintenance plan is accessed to determine <i>electrical system maintenance requirements</i></p> <p>1.2 Inspections are conducted and additional non-routine maintenance requirements are determined</p> <p>1.3 System specifications and diagrams for electrical systems are obtained</p> <p>1.4 Tasks are planned and sequenced in conjunction with others involved in or affected by maintenance work</p> <p>1.5 <i>Consumables and equipment</i> are selected and checked for serviceability</p> |
| 2 Complete preventative maintenance | <p>2.1 Electrical system is safely isolated according to regulatory and work health and safety (WHS)/occupational health and safety (OHS) requirements</p> <p>2.2 WHS/OHS risk control measures and procedures for carrying out work are followed</p> <p>2.3 Preventative maintenance is carried out in compliance with system specifications</p> <p>2.4 Methods for dealing with unexpected situations are selected on the basis of safety and specified work outcomes</p> <p>2.5 Work is carried out efficiently without waste of materials and damage to equipment and machinery or other services</p> <p>2.6 Maintenance work is checked to verify that it conforms with technical specifications</p> |
| 3 Complete breakdown maintenance | <p>3.1 <i>Nature of breakdown</i> is confirmed using maintenance records and/or log book entries related to reported breakdown</p> <p>3.2 Restrictions are applied to operations, if necessary, and Master is notified</p> |

- 3.3 Limits of repair work that can be carried out are established according to relevant state/territory electrical licensing requirements
 - 3.4 System is isolated
 - 3.5 Repair work is carried out according to system specifications
 - 3.6 Master is notified of completion of repair work and details are documented
- 4 Clean up and complete documentation**
- 4.1 Work area is cleared and cleaned
 - 4.2 *Materials* are disposed of or recycled according to legislative and workplace requirements
 - 4.3 Tools and equipment are cleaned, checked and stored according to workplace procedures
 - 4.4 Electrical system and equipment are put back into service and monitored for correct operation according to organisational practices
 - 4.5 Maintenance report is completed according to workplace procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Carry out simple maintenance of electrical systems
- Implement safe and environmentally responsible work practices
- Read and interpret system specifications

Required Knowledge:

- Battery:
 - charging systems
 - maintenance
 - types and associated hazards
- Connecting batteries in series and parallel
- Connection to shore power
- Earth indicating devices
- Electrical distribution systems

- Isolation of electrical circuits
- Main faults that can occur in:
 - AC electrical systems
 - DC electrical systems
- Maintenance and operation of batteries
- Protection devices
- Single and three-phase AC power
- Starter motors, alternators and associated equipment
- Switchboard and protection devices
- Uses of fuses and circuit breakers
- Use of multi-meter to test voltage and continuity

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- being aware of own ability and limits to rectify irregularities and faults
- ensuring currency of relevant legislative and regulatory knowledge
- implementing workplace environmental and waste management procedures correctly.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where undertaking basic maintenance of electrical systems can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments

- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate undertaking basic maintenance of electrical systems
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Electrical systems may include:

- AC generators
- Alarm systems
- Batteries
- Emergency electrical supply
- Emergency generators
- Generators
- Motor starting circuits
- Power and lighting
- Shore supply

- Maintenance requirements may include:
- Steering gear circuits
 - Switchboards
 - Battery maintenance
 - Motor replacement
 - Replacing:
 - light bulbs
 - faulty wiring
 - Testing:
 - alarm systems
 - emergency generator
 - power and lighting systems
- Consumables and equipment may include:
- Hand and power tools rated for electrical work
 - Replacement parts
 - Test equipment
- Nature of breakdown may include:
- Blown fuses or open circuit breakers
 - Earthing
 - Failure of electricity generating systems
 - Motor brake failure to release
 - Motor failure
 - Shorting
- Materials may include:
- Batteries
 - Damaged wiring
 - Used lamps
 - Rags

Unit Sector(s)

Not applicable.

Competency Field

Equipment Checking and Maintenance

MARB4001A Carry out basic welding, brazing, cutting and machining operations on a coastal vessel

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMR6207A Carry out basic welding, brazing, cutting and machining operations on a coastal vessel.

Unit Descriptor

This unit involves the skills and knowledge required to carry out basic welding, brazing, cutting and machining tasks.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 1 on vessels up to 1500 kW.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|--|
| 1 Carry out basic welding tasks | <ul style="list-style-type: none">1.1 Requirements for welding tasks are correctly interpreted from work instructions1.2 Parts are prepared for welding according to established practice1.3 Parts are welded according to established practice and work requirements1.4 Weld defects are identified and appropriate action is taken according to established practice and standard operating procedures1.5 Flame gouging methods are used to remove plate and weld material according to established practice and standard operating procedures1.6 Finished work is checked against work instructions for accuracy and quality |
| 2 Carry out basic brazing tasks | <ul style="list-style-type: none">2.1 Requirements for brazing tasks are correctly interpreted from work instructions2.2 Parts are prepared for brazing according to established practice and work requirements2.3 Brazing equipment is prepared for brazing operations according to established procedures2.4 Parts are brazed using established procedures2.5 Finished work is checked against work instructions for accuracy and quality |
| 3 Carry out basic cutting tasks | <ul style="list-style-type: none">3.1 Instructions are reviewed, and required size and shape of cut work is correctly identified and interpreted3.2 Work is correctly marked out in preparation for cutting according to established practice and standard operating procedures3.3 Thermal cutting plant and equipment is set up according to established procedures3.4 Steel plate and/or rolled sections are cut to shape and size according to established practice and standard operating procedures3.5 Finished work is checked against work instructions for accuracy and quality according to standard operating procedures |
| 4 Carry out basic machining tasks | <ul style="list-style-type: none">4.1 Requirements for basic machining tasks are correctly interpreted from work instructions according to standard operating procedures |

- 4.2 Work is correctly marked out in preparation for basic machining according to established practice and standard operating procedures
 - 4.3 Machine is set up according to established procedures
 - 4.4 Machining is carried out according to established procedures
 - 4.5 Finished work is checked against work instructions for accuracy and quality according to standard operating procedures
- 5 Follow safety and hazard control procedures**
- 4.1 Required safety precautions and regulations are followed when carrying out basic welding
 - 4.2 *Operational hazards* are identified and action is taken to eliminate, or where elimination is not possible to minimise, risk to personnel

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Clean, sharpen or adjust tools according to standard operating procedures
- Dress and true a grinding wheel
- Follow required work schedule according to company requirements
- Identify a glazed, loaded or untrue grinding wheel condition and take appropriate action
- Mark out work to specifications, and measure and check the quality of finished work
- Perform basic calculations required to carry out basic welding, brazing, cutting and machining operations
- Read and interpret work specifications and drawings
- Read, interpret and apply instructions and standard operating procedures relevant to basic welding, brazing, cutting and machining operations required on a coastal vessel
- Recognise routine problems that may occur when performing basic welding, brazing, cutting and machining operations on a vessel and take appropriate action
- Select and safely use welding, brazing, cutting and machining tools and equipment according to operating procedures
- Store welding, brazing, cutting and machining tools and equipment after use according to standard procedures
- Use effective verbal and other communication skills required when carrying out basic welding, brazing, cutting and machining operations on a vessel
- Work safely and collaboratively with others when carrying out basic welding, brazing, cutting and machining operations on a vessel

Required Knowledge:

- Applicable sections of relevant maritime regulations
- Applicable legislation, regulations and codes of practice:
 - National Standard for Commercial Vessels (NSCV) and USL Code
 - relevant Australian engineering standards
 - relevant state and territory marine regulations
 - relevant work health and safety (WHS)/occupational health and safety (OHS) and pollution control legislation and policies
- Basic operations within area of own responsibility:
 - basic fillet welds
 - basic butt welds
 - basic pad welds
 - manual metal arc welding
 - oxygen acetylene welding
 - basic machining operation
- Characteristics and identifying features of common engineering drill bits
- Documentation and records:
 - maintenance records
 - manufacturer instructions for tools and equipment
 - relevant safety data sheets (SDS)/material safety data sheets (MSDS)
 - safety management system plans, procedures, checklists and instructions
 - work instructions
 - vessel and company procedures
- Environmental protection measures when carrying out basic engineering tasks
- Hazards and related safety precautions when carrying out basic welding, brazing, cutting and machining tasks
- Procedures for:
 - identifying a glazed, loaded or untrue grinding wheel condition
 - dressing and/or truing a grinding wheel
- Safety management system and procedures
- Standard operating procedures for basic welding, brazing, cutting and machining tasks required of a Marine Engine Driver Grade 1
- Standard procedures for marking out work to specifications and measuring and checking the quality of finished work, including the correct use of:
 - adjustable gauge
 - callipers
 - centre punch hammers
 - dividers

- rules and tapes
- scribes
- squares
- trammels
- vernier callipers and micrometer
- Techniques for identifying defective welds within limits of responsibility
- Types, names and identifying features of drilling machines used on coastal maritime vessels
- Typical work specifications and drawings used on a coastal vessel

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- implementing required safety, environmental and hazard control precautions and procedures
- taking action promptly to report operational incidents and problems according to regulations and shipboard procedures
- completing work systematically with required attention to detail
- carrying out basic welding, brazing, cutting and machining tasks while underway, in port and moored or at anchor.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where carrying out basic welding, brazing, cutting and machining operations on a coastal vessel can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments

- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate carrying out basic welding, brazing, cutting and machining operations on a coastal vessel
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Operational hazards may include:

- Moving and rotating machinery
- Moving heavy loads using unsafe procedures
- Non-compliance with safe working procedures
- Poor housekeeping procedures
- Power tools
- Sharp tools and implements
- Unsecured machinery, components or equipment
- Using equipment beyond safe working limits

- Using welding equipment near explosive/flammable liquids and gases

Unit Sector(s)

Not applicable.

Competency Field

Equipment Checking and Maintenance

MARB4002A Implement vessel planned maintenance system

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to establish, organise and implement preventative and reactive maintenance programs to optimise vessel operational performance.

Application of the Unit

This unit applies to those working on vessels as a Chief Integrated Rating.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|-----------------------------------|---|
| 1 Develop maintenance plan | 1.1 Vessel and equipment specifications, service requirements and organisational procedures are checked for recommended maintenance intervals and processes according to the safety management system |
|-----------------------------------|---|

- 1.2 *Special requirements for maintenance* are separated from *routine maintenance tasks*
 - 1.3 Maintenance plan and a related work schedule are developed
 - 1.4 Procedures for safety checks of equipment are developed and documented according to organisational procedures
 - 1.5 Recordkeeping system is developed for maintenance work completed and equipment replaced according to organisational procedures
- 2 Establish maintenance systems**
- 2.1 *Resource requirements* are identified and supplied
 - 2.2 Roles and responsibilities of the crew are clarified and built into position descriptions and work instructions
 - 2.3 Mentoring and training is provided to support the *maintenance strategy*
 - 2.4 Maintenance procedures and schedules are prepared to minimise negative impacts on vessel operations, costs, waste and the environment
 - 2.5 *Potential risks* are analysed and management strategies recommended
 - 2.6 Contingency plans are prepared
 - 2.7 Maintenance schedules and procedures are effectively communicated to crew
- 3 Implement maintenance plan**
- 3.1 Consumables and equipment are coordinated to meet maintenance work schedule
 - 3.2 Maintenance work schedule is completed according to maintenance plan
 - 3.3 Technical assistance is provided to crew in completing maintenance activities as required
 - 3.4 Appropriate readings, measurements and recordings are made and compared to equipment and other relevant specifications
 - 3.5 Areas of vessel and equipment requiring further testing are identified and appropriate procedures for testing are implemented
 - 3.6 Appropriate adjustments to the maintenance plan are made based on experience and required documentation is completed
 - 3.7 Maintenance records are completed and forwarded to appropriate

	personnel
	3.8 Areas where changes to equipment operation or routine maintenance are required to maintain optimum work output and equipment life are noted
4 Monitor and review maintenance management system	4.1 Continuous improvement strategies are developed
	4.2 Performance criteria for <i>maintenance goals</i> are determined and data collection strategies are established
	4.3 Performance information and outcomes are analysed and implications reported to appropriate personnel

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Determine and recommend the need for capital expenditure for the replacement of plant and equipment
- Develop maintenance strategies including establishing criteria for determining maintenance priorities and planning and scheduling routine equipment and overhead maintenance to meet quality system requirements
- Develop recordkeeping procedures to document maintenance costs, problems, priorities, solutions, schedules and completions
- Develop workforce commitment to effective maintenance strategies
- Establish and monitor performance targets for maintenance teams within performance planning and appraisal processes
- Evaluate and recommend alternative maintenance policies and strategies including changes in work roles and responsive/preventative models for maintenance
- Identify and apply relevant work health and safety (WHS)/occupational health and safety (OHS), regulatory and organisational requirements
- Manage maintenance costs
- Monitor performance of the system
- Present reports

Required Knowledge:

- Cleaning materials, and storage and handling of such materials
- Cost elements in maintenance system costing and budgeting

- Costs resulting from poor maintenance and the benefits of a preventative maintenance system
- Health hazards associated with maintenance procedures
- Impacts of poor maintenance on the vessel, and on occupational and environmental safety
- Lubrication and lubricant storage and handling
- Maintenance issues related to the vessel
- Plant and equipment falling under the scope of the maintenance program
- Relevant legislation and regulations, and industrial agreements
- Theory of corrosion and cathodic protection
- Use and care of personal safety equipment

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- developing effective planning documents
- ensuring currency of relevant legislative and regulatory knowledge.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where implementing a vessel planned maintenance system may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate implementing a vessel planned maintenance system
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Special requirements for maintenance may include:

- Damage repair
- Hatch cover watertight arrangements
- Main engine or auxiliary machinery breakdowns
- Replacing defective cargo lifting equipment

Routine maintenance tasks may include:

- Back-ups
- Changing user codes
- Checks of cooling system, fuel, grease and oil, battery levels
- Confirmation of operational effectiveness
- Dismantling and assembling
- Identification and replacement of worn parts
- Inspections of fan belts, leads, lines, connections, air

- Resource requirements may include:
- filters, hydraulics, lighting
 - Minor adjustments
 - Testing
- Maintenance strategy may include:
- Materials
 - Personnel
 - Tools and equipment
 - Training
 - Cleaning
 - Electrical
 - Emergency lighting
 - Evacuation
 - Housekeeping
 - Painting
 - Pests
 - Plumbing
 - Security
- Potential risks may include:
- Working at heights
 - Working in confined spaces
 - Working overside
 - Dealing with hazardous material
 - Hot work
- Maintenance goals may include:
- Changes in attitudes
 - Costs
 - Frequency of breakdowns
 - Length of time out of action
 - Time of repairs

Unit Sector(s)

Not applicable.

Competency Field

Equipment Checking and Maintenance

MARB4003A Manage refuelling

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMR5407B Carry out refueling and fuel transfer operations.

Unit Descriptor

This unit involves the skills and knowledge required to manage refuelling and fuel transfer operations.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 1 on vessels up to 1500 kW.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 **Plan refuelling or fuel transfer operations**
 - 1.1 Fuel tanks are dipped to establish current level of fuel
 - 1.2 Fuel is ordered according to organisational procedures
 - 1.3 Amount and positioning of fuel on board vessel is calculated with reference to tank tables
 - 1.4 ***Impact of refuelling on safety and operation of vessel*** is determined and appropriate strategies are implemented
 - 1.5 Local port authorities are informed of vessel location for bunkering operations and duration of bunkering
- 2 **Prepare vessel for refuelling or fuel transfer operations**
 - 2.1 Vessel is positioned and secured for refuelling
 - 2.2 All ***personal protective equipment*** is accessed and used
 - 2.3 ***Bunkering equipment*** is correctly deployed according to organisational procedures
 - 2.4 ***Safety zone*** for refuelling process is established and maintained for full duration of operation
 - 2.5 ***Procedures for refuelling*** are established with bunker operator and completed lists are checked according to organisation and safety management system (SMS) requirements
 - 2.6 Bunker hose is securely connected to vessel fuel manifold
 - 2.7 Tank valves are opened as necessary and refuelling operations are performed safely according to SMS and regulatory requirements
 - 2.8 Tanks are dipped to ensure correct amount of fuel has been received
 - 2.9 Fuel samples are taken to check quality of fuel received and appropriate action is taken if fuel sample is off speculation
- 3 **Complete refuelling operations**
 - 3.1 ***Shut-down procedures*** are conducted according to organisational procedures
 - 3.2 Malfunctions, faults, irregular performance or damage to refuelling equipment are recorded and repairs are organised, according to organisational procedures
 - 3.3 Refuelling equipment is maintained and secured according to organisational procedures
 - 3.4 ***Refuelling records*** are completed according to organisational

procedures and regulatory requirements

- 4 Manage an emergency**
- 4.1 Appropriate response is made to an *emergency situation* according to organisational procedures
 - 4.2 Safety zone is closed off and isolated according to organisational procedures
 - 4.3 All persons in the safety zone are correctly notified and their activities are managed to ensure safety according to organisational procedures
 - 4.4 Appropriate authorities are notified and actions are taken as directed according to emergency procedures and regulatory requirements
 - 4.5 *Documentation* of emergency is completed according to organisational procedures and relevant maritime authority

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Complete required records
- Implement procedures for dealing with an oil spill
- Measure tank levels
- Recognise faulty equipment and take appropriate action
- Recognise problems and hazards during refuelling and fuel transfer operations, and take appropriate action
- Select and use relevant equipment required for refuelling and fuel transfer operations
- Take appropriate action in an accidental spillage, fire or safety incident during refuelling and fuel transfer operations

Required Knowledge:

- Environmental protection measures to be applied during refuelling or transfer operations
- Functions and responsibilities of crew during refuelling or transfer operations
- Hazards and safety precautions to be observed during refuelling or transfer operations
- Refuelling and fuel transfer procedures applying to commercial vessels
- Requirements for reporting incidents
- Work health and safety (WHS)/occupational health and safety (OHS) and pollution

control legislation and policies

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- being aware of own ability and limits to rectify irregularities and faults
- attention to detail when completing documentation
- attention to appropriate level of detail in recordkeeping
- ensuring currency of relevant WHS/OHS skills and knowledge.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where managing refuelling can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are

appropriate to this unit:

- direct observation of the candidate managing refuelling
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Impact of refuelling on safety and operation of vessel may include:

- Hot work
- Increase in the potential for fire
- Loading and discharging operations
- Stability including the effect of free surface
- Toxic fumes
- Work being conducted by shore contractors

Personal protective equipment may include:

- Gloves
- Overalls
- Work boots

Bunkering equipment may include:

- Bunding
- Bunker flag
- Fire extinguishers
- No-smoking signs
- Radios
- Sample containers
- Scupper plugs
- Sounding tape
- Spill kit

Safety zone may include:

- Area where no-smoking or hot work is permitted
- Area that can contain a spill

Procedures for refuelling may

- Establishing:

- include:
- flow rates
 - system of communication with supplier in relation to starting and shut-down procedures
 - emergency disconnection procedures
- Shut-down procedures may include:
- Blowing through of bunker hoses
 - Disconnecting bunker hose
 - Isolating fuel valves
 - Stowing equipment
- Refuelling records may include:
- Bunker receipt
 - Log book entry
 - Oil record book
- Emergency situations may include:
- Broken mooring lines
 - Fire
 - Oil spill
- Documentation may include:
- Incident report forms
 - Log book entry

Unit Sector(s)

Not applicable.

Competency Field

Equipment Checking and Maintenance

MARB4004A Manage stores for planned maintenance system

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to plan and control inventory levels of materials required for vessel maintenance.

Application of the Unit

This unit applies to working on a vessel as a Chief Integrated Rating.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|--|
| 1 Identify materials requirements | 1.1 Drawings and specifications for vessel and equipment are read and interpreted to determine <i>materials requirements</i> |
| | 1.2 Sources of product supply are identified |

- 1.3 Normal quantity supply and matching storage facilities and equipment are identified
 - 1.4 Safety data sheets (SDS)/material safety data sheets (MSDS) or other supplier information are read, any relevant engineering controls or personal protection equipment are identified and any additional resources required for handling and storing materials are documented
 - 1.5 Procedures to deal with fire or explosion risk, spills or injury are identified and recorded
- 2 Plan inventory levels**
- 2.1 Estimates are calculated according to specification requirements and organisational procedures
 - 2.2 Cost reports are prepared
 - 2.3 Estimates that meet the initial requirements are documented
 - 2.4 Estimates are authorised by appropriate personnel for implementation
- 3 Monitor receipt and dispatch of goods**
- 3.1 Organisational procedures are implemented in the receipt, dispatch and secure storage of materials
 - 3.2 Materials are inspected for quality and quantity on receipt
 - 3.3 Variation to quantity and quality of delivered materials is acted upon according to organisational procedures
 - 3.4 Safe handling and storage of materials is supervised according to organisational procedures
 - 3.5 All information is formatted and entered into inventory system according to organisational procedures and system requirements
- 4 Manage stock control**
- 4.1 Organisational procedures are implemented for *stock control* and inventories
 - 4.2 Procedures are established and implemented to monitor and control stock levels
 - 4.3 Stock levels are monitored and maintained at required levels
 - 4.4 Stock reorder cycles are maintained and adjusted as required
 - 4.5 Stocktaking procedures are established and implemented
 - 4.6 Contingency plans for stock delivery times are established and implemented
 - 4.7 Accurate reports on stock inventories are prepared

4.8 Stock discrepancies are identified and recorded

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Anticipate interruptions to supply
- Avoid surplus holdings and wastage
- Calculate materials and other resource requirements and costs
- Correctly calculate inventory requirements taking into account lead times, re-order triggers, impacts of turnover and supply margins
- Cost and document requirements
- Identify appropriate materials and consumables to match maintenance standards
- Identify commercially viable sources of consumables and materials
- Identify the impact of decisions in terms of commercial, environmental and safety risks
- Plan and organise activities to avoid any back tracking, workflow interruptions or wastage
- Research information related to inventory including the relevant technical, regulatory, environmental and safety requirements

Required Knowledge:

- Authorised maintenance processes and plans, and related materials and consumables
- Commercial supply systems including standard documentation support processes
- Cost-benefit analysis or equivalent techniques
- Inventory and operations management approaches
- Inventory control
- Materials, process characteristics and special requirements
- Systems and equipment for inventory recording and control
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment

Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- accurately forecasting inventory demand
- planning for inventory required to meet special events or contingencies.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where managing stores for planned maintenance system can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing stores for planned maintenance system
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Materials requirements may include:

- Appropriate oils and grease
- Cleaning material
- Machinery spare parts
- Mooring ropes and wires
- Paint
- Shackles and other lifting equipment
- Tools, hand and power

Stock control may include:

- Cyclical counts
- Minimisation of out-of-date stock
- Monitoring stock levels
- Quality control
- Stocktaking

Unit Sector(s)

Not applicable.

Competency Field

Equipment Checking and Maintenance

MARB4005A Plan and supervise routine maintenance on a vessel up to 80 metres

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to implement a maintenance program for a vessel up to 80 metres.

Application of the Unit

This unit applies to those working in the capacity of Master on a range of vessels up to 80 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Develop

1.1 *Planned maintenance system* is accessed to establish maintenance

- maintenance program** requirements for vessel
- 1.2 **Maintenance program** for vessel is developed to meet requirements of planned maintenance system
 - 1.3 Maintenance schedules and budgets are identified
 - 1.4 Suggestions that support effective implementation of maintenance program are offered according to organisational procedures
 - 1.5 Strategies to minimise impact of maintenance activities on vessel operations are identified
- 2 Implement maintenance program**
- 2.1 **Routine maintenance activities** are proposed and prioritised in conjunction with others involved in or affected by maintenance work
 - 2.2 Routine maintenance activities are allocated within scheduled timeframes and budgets according to organisational procedures
 - 2.3 Vessel operations are maintained where possible without interruption
 - 2.4 Safety of crew is maintained at all times according to relevant legislation and organisational procedures
 - 2.5 Requests for assistance from crew to complete maintenance activities are responded to promptly
- 3 Identify failed or unsafe machinery and equipment**
- 3.1 Faulty **machinery and equipment** is identified and clear and noticeable warning signs are erected according to organisational procedures
 - 3.2 Failed or unsafe machinery and equipment is assessed according to organisational procedures
 - 3.3 Repairs are allocated to appropriate crew members according to organisational procedures
 - 3.4 Unsafe machinery and equipment which cannot be repaired is promptly tagged and isolated according to organisational procedures
 - 3.5 Unsafe machinery and equipment is promptly reported according to organisational procedures
 - 3.6 Reports on all repair work undertaken are completed according to organisational procedures
- 4 Monitor supplies**
- 4.1 Supply and stock levels are maintained to ensure ongoing availability
 - 4.2 **Management of supplies** is undertaken according to organisational procedures

- 4.3 Supply and stock levels are reconciled and any discrepancies are rectified or reported
- 4.4 Supply records are maintained according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Interpret planned maintenance system to determine maintenance requirements
- Manage maintenance of vessel
- Monitor selection and use of supplies involved in maintenance of vessel
- Prepare reports on outcomes of inspection and maintenance activities
- Read and interpret safety data sheets (SDS)/material safety data sheets (MSDS)
- Read and interpret vessel, equipment and machinery specifications, drawings, operational manuals and diagrams
- Take appropriate precautions to prevent pollution of marine environment

Required Knowledge:

- Fundamental principles of vessel construction
- Maintenance records that must be maintained on vessel to meet organisational and statutory requirements
- Nature and causes of corrosion of marine surfaces and structures, and available means for control
- Principal structural components
- Procedures for initiation and coordination of repair and/or replacement procedures on board vessel
- Relevant laws and regulations including WHS/OHS and pollution control legislation
- Slipping and docking procedures suitable for various types of hull forms
- Typical problems related to maintenance of vessels and appropriate actions and solutions

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment

Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- attention to appropriate level of detail in recordkeeping
- effectively liaising with internal and external authorities/agencies
- initiating timely action in response to defects or damage.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where planning and supervising routine maintenance on a vessel up to 80 metres may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate planning and supervising routine maintenance on a vessel up to 80 metres
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- | | |
|--|---|
| Planned maintenance system must include: | <ul style="list-style-type: none">• Anchoring equipment• Communications equipment• Compliance with applicable mandatory rules and regulations, including WHS/OHS and environment protection legislation• Continuous improvement and review procedures• Document control procedures• Firefighting equipment• Identifying hazards and risk management• Lifesaving equipment• Navigation equipment• Procedures for updating and correcting charts, publications and electronic chart information• Provision of safe practices in vessel operation and a safe working environment• Reference to applicable codes, guidelines and standards• Steering gear• Systems for recording completed maintenance schedules, including identification of defective equipment and rectification of defects |
| Maintenance program must include: | <ul style="list-style-type: none">• Lines of communication and relationship between vessel and owner• Periodic survey requirements• Procedure for programmed maintenance of hull and machinery• Regular inspection of all equipment referred to in planned maintenance system• Routine maintenance as contained in manufacturer instruction manuals and drawings• Safety and environmental policy |
| Routine maintenance | <ul style="list-style-type: none">• Checking life saving appliances |

- activities may include:
- Inspecting breathing apparatus
 - Navigational equipment
 - Operation of emergency firefighting equipment including fire hoses and nozzles
 - Servicing equipment as required by service manuals and manufacturer instructions relating to vessel equipment
 - Testing communication equipment, including distress calling
 - Testing lifting equipment
- Machinery and equipment may include:
- Fire pumps
 - Navigational equipment
 - Steering gear and emergency steering gear
 - Winches and windlasses
- Management of supplies may include:
- Issue
 - Purchase
 - Receipt
 - Stock control
 - Storage

Unit Sector(s)

Not applicable.

Competency Field

Equipment Checking and Maintenance

MARB4006A Undertake maintenance of 240 to 440 voltage alternating current electrical systems

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to perform establish, organise and implement a preventative and reactive maintenance program and capabilities on 240 to 440 voltage alternating current (AC) electrical systems on a vessel.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 1 on vessels up to 1500 kW.

WARNING: Relevant state/territory qualification requirements apply to persons carrying out installation, maintenance and/or repair of refrigeration equipment, especially with regard to preventing the escape of refrigerants into the atmosphere and to electrical work.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Verify maintenance requirements**
 - 1.1 Regulatory and organisational requirements for *electrical system* maintenance program are identified and followed
 - 1.2 Specifications, diagrams and organisational procedures for electrical systems are checked for recommended maintenance
 - 1.3 *Special requirements for electrical system maintenance* are separated from adjustment and day-to-day maintenance schedules
 - 1.4 Maintenance system goals for electrical systems are outlined
 - 1.5 Maintenance plan and related work schedule for electrical systems are developed according to regulatory requirements and safety management system (SMS)
- 2 Establish maintenance systems**
 - 2.1 Maintenance costs are identified and quantified
 - 2.2 Interruptions, processes and procedures are documented
 - 2.3 Internal and external maintenance providers are specified
 - 2.4 Maintenance plan is prepared to minimise negative impacts on production, costs, waste and the environment
 - 2.5 Approvals for maintenance plan are negotiated and confirmed
 - 2.6 Recordkeeping systems are developed and maintained
- 3 Organise maintenance activities**
 - 3.1 Schedules and rosters are checked to verify time when maintenance process may be scheduled, including optimal timing for shut down
 - 3.2 Agreement from Master is obtained for timing of *maintenance tasks* to optimise maintenance process and minimise operational disruptions
 - 3.3 Detailed work plans are developed in line with schedules, availability of expertise and scheduling of resource availability
 - 3.4 Team members with required competencies are allocated to maintenance activities
 - 3.5 *Consumables and equipment* are secured to meet work plan requirements
 - 3.6 Externally sourced equipment, consumables and expertise are located and procured
 - 3.7 Contingency plans are prepared

- 3.8 Maintenance schedules and procedures are effectively communicated to team
- 4 Supervise maintenance tasks**
 - 4.1 Job specifications and maintenance tasks are communicated effectively to team members
 - 4.2 Maintenance and repair tasks are monitored to ensure they satisfy system specifications
 - 4.3 Work health and safety (WHS)/occupational health and safety (OHS) requirements are monitored and observed at all times
 - 4.4 **Emergency equipment** is made available and working order of this equipment is ensured
 - 4.5 Contingencies are managed to ensure quality of work is maintained and work is completed within agreed timeframe
- 5 Perform planned maintenance activities**
 - 5.1 WHS/OHS risk control measures and procedures for carrying out work are followed
 - 5.2 Maintenance schedule and process compliance requirements are confirmed and work is appropriately sequenced according to job specification
 - 5.3 Appropriate person/s are consulted to ensure work is coordinated effectively with others
 - 5.4 Resources needed to conduct maintenance are obtained according to organisational procedures and are checked against job requirements
 - 5.5 Tools, equipment and testing devices needed to conduct maintenance are obtained according to organisational procedures and checked for correct operation and safety
 - 5.6 Live and operating system is tested or measured strictly according to WHS/OHS requirements and within established safety procedures
 - 5.7 Electrical equipment is checked as being isolated where necessary, strictly according to WHS/OHS requirements and within established safety procedures
 - 5.8 Electrical equipment to be maintained is inspected and evaluated for compliance with system specifications
 - 5.9 Non-compliant electrical equipment components are rectified or repaired according to system specifications
- 6 Perform**
 - 6.1 **Nature of breakdown** is confirmed with appropriate personnel

- breakdown maintenance**
- 6.2 Extent of breakdown is evaluated and confirmed using diagnostic and troubleshooting techniques
 - 6.3 **Restrictions** are applied to operations, if necessary, and agreed to with the Master
 - 6.4 Electrical equipment is checked as being isolated where necessary, strictly according to WHS/OHS requirements and within established safety procedures
 - 6.5 Repair work is carried out according to system specifications
 - 6.6 Master is notified of completion of repair work and details are documented
 - 6.7 Nature of breakdown is confirmed with appropriate personnel
- 7 Monitor, adjust and report on implementation of maintenance plan**
- 7.1 Maintenance tasks are monitored to ensure they are completed according to maintenance plan and statutory survey requirements
 - 7.2 Electrical systems is monitored to ensure achievement of planned outcomes
 - 7.3 Costs are monitored and controlled
 - 7.4 Adjustments are made to maintenance plan to take into account failure to achieve planned outcomes
 - 7.5 **Reports** are completed according to maintenance plan requirements and organisational procedures
 - 7.6 Recommendations to improve maintenance plan safety, efficiency and effectiveness are implemented under regular review of SMS

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply safety requirements throughout work sequence including the use of personal protective equipment (PPE)
- Complete all work to specification
- Ensure correct requirements and details of maintenance of electrical systems and equipment
- Implement safe and environmentally responsible work practices in testing and

maintenance activities

- Locate, interpret and apply manufacturer specifications for electrical systems and equipment
- Operate AC systems and conduct operator preventive maintenance according to manufacturer recommendations, regulations and vessel operating procedures to ensure safe operation
- Operate electrical systems and equipment according to manufacturer recommendations, regulations and vessel operating procedures to ensure safe operation
- Recognise electrical system faults and where necessary take steps to make them immediately safe
- Select and use appropriate processes, tools and equipment

Required Knowledge:

- AC systems not exceeding 440 voltage AC
- Batteries (types, care and maintenance, hazards)
- Care of electrical systems and equipment in general (fault recognition)
- Charging systems:
 - alarms/indicators
 - regulators
- Connecting batteries
- Electric systems (above 240 V AC and up to 440 V AC)
- Fault identification, location and safety implications
- Operation and maintenance of starter motors, alternators and associated equipment
- Personal safety
- Protective devices on switchboards
- Shore power connection
- Use of fuses and circuit breakers (selection of correct capacity)

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required

this unit

Knowledge and include:

- developing effective planning documents
- providing high quality reports
- ensuring currency of relevant WHS/OHS skills and knowledge.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where undertaking planned and breakdown maintenance of 240 to 440 voltage AC electrical systems can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate undertaking planned and breakdown maintenance of 240 to 440 voltage AC electrical systems
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being

performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Electrical systems may include:

- AC generators
- Alarm systems
- Batteries
- Electrical motor starting circuits
- Emergency electrical supply
- Emergency generators
- Generators
- Power and lighting
- Shore supply
- Steering gear
- Switchboards

Special requirements for electrical system maintenance may include:

- Breakdown maintenance
- Periodic inspections and surveys

Maintenance tasks may include:

- Battery maintenance
- Generator servicing
- Replacing faulty wiring
- Testing:
 - alarm systems
 - emergency generator
 - power and lighting systems

Consumables and equipment may include:

- Replacement parts
- Testing equipment
- Tools and equipment rated for electrical work

Emergency equipment may include:

- Alarm systems
- Emergency generator
- Firefighting equipment
- Lifesaving equipment
- Pump operations

Nature of breakdown may include:

- Failure of electricity generating systems
- Generator failure

Restrictions may include:

- Stopping main engine
- Stopping one generator
- Switching to emergency power

Reports may include:

- Incident reports
- Maintenance log
- Operational orders from organisation SMS
- Reports required under planned maintenance system
- Survey reports

Unit Sector(s)

Not applicable.

Competency Field

Equipment Checking and Maintenance

MARB4007A Undertake maintenance of machinery, machinery systems and structural components

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to establish, organise and implement a preventative and reactive maintenance program and capabilities for machinery, machinery systems and structural components to optimise vessel operational performance.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 1 on vessels up to 1500 kW.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Verify maintenance requirements**
 - 1.1 Maintenance program regulatory and organisational requirements for *machinery, machinery systems and structural components* are identified and followed
 - 1.2 Technical specifications, service requirements and organisational procedures for machinery, machinery systems and structural components are checked for recommended maintenance
 - 1.3 *Special requirements for maintenance* of machinery, machinery systems and structural components are separated from normal lubrication, adjustment and day-to-day maintenance schedules
 - 1.4 Maintenance system goals for machinery, machinery systems and structural components are outlined
 - 1.5 Maintenance plan and related work schedule for machinery, machinery systems and structural components is developed
- 2 Establish maintenance systems**
 - 2.1 Maintenance costs are identified and quantified
 - 2.2 Processes, procedures and delays are documented
 - 2.3 Internal and external maintenance providers are specified
 - 2.4 Maintenance plan is prepared to minimise ship operation costs, waste and harm to the environment
 - 2.5 Approvals for maintenance plan are negotiated and confirmed
 - 2.6 Recordkeeping systems are developed and maintained
- 3 Organise maintenance activities**
 - 3.1 Schedules and rosters are checked to verify time when maintenance process may be scheduled, including optimal timing for shut down
 - 3.2 Agreement with the Master is obtained for timing of *maintenance tasks* to optimise maintenance process and minimise operational disruptions
 - 3.3 Detailed work plans are developed in line with schedules, availability of expertise, scheduling of resource availability and environmental requirements
 - 3.4 Team members with required competencies are allocated to maintenance activities
 - 3.5 *Consumables and equipment* are secured to meet work plan requirements

- 3.6 Externally sourced equipment, consumables and expertise are located and procured
- 3.7 Contingency plans are prepared
- 3.8 Maintenance schedules and procedures are effectively communicated to the team
- 4 Supervise maintenance tasks**
 - 4.1 Job specifications and maintenance tasks are communicated effectively to team members
 - 4.2 Maintenance and repair tasks are monitored to ensure they satisfy technical specifications
 - 4.3 Work health and safety (WHS)/occupational health and safety (OHS) requirements are monitored and observed at all times
 - 4.4 ***Emergency equipment*** is made available and working order of this equipment is ensured
 - 4.5 Contingencies are managed to ensure quality of work is maintained and work is completed within agreed time frame
- 5 Perform planned maintenance activities**
 - 5.1 WHS/OHS risk control measures and procedures for carrying out work are followed
 - 5.2 Preventative maintenance is carried out in compliance with technical specifications
 - 5.3 Methods for dealing with unexpected situations are selected on the basis of safety and specified work outcomes
 - 5.4 Ongoing quality checks of maintenance work is undertaken according to technical specifications
 - 5.5 Work is carried out efficiently without waste of materials and damage to equipment, machinery or other services
 - 5.6 Work site is made safe according to organisational safety procedures
 - 5.7 Maintenance work is checked to verify that it conforms with technical specifications
- 6 Perform breakdown maintenance**
 - 6.1 ***Nature of breakdown*** is ascertained and reported to appropriate personnel or authorities
 - 6.2 Maintenance records of machinery, machinery systems and structural components related to reported breakdown are reviewed for possible causes

- 6.3 Extent of breakdown is evaluated and confirmed using diagnostic and troubleshooting techniques
- 6.4 ***Restrictions are applied to operations*** where necessary and agreed to with the Master
- 6.5 Extent of repair work is ascertained from available evidence
- 6.6 Limits of repair work that can be carried out are established
- 6.7 Machinery and equipment is isolated
- 6.8 Repair work is carried out according to technical specifications
- 6.9 Master is notified of completed repair work and details are documented
- 7 Monitor, adjust and report on implementing the maintenance plan**
 - 7.1 Execution of maintenance tasks is monitored to ensure they are completed according to maintenance plan and statutory survey requirements
 - 7.2 Machinery, machinery systems and structural components are monitored to ensure achievement of planned outcomes
 - 7.3 Costs are monitored and controlled
 - 7.4 Adjustments are made to maintenance plan to take into account failure to achieve planned outcomes
 - 7.5 Reports are completed according to maintenance plan requirements and organisational procedures
 - 7.6 Recommendations to improve maintenance plan safety, efficiency and effectiveness are implemented under regular review of safety management system
 - 7.7 Machinery, machinery systems and structural components are maintained in a clean and safe operational condition
- 8 Carry out damage control procedures**
 - 8.1 Damage to vessel hull and watertight integrity is ascertained and monitored according to established procedures and safety regulations
 - 8.2 After hull damage, appropriate damage control measures are implemented to maintain watertight integrity and to control flooding of vessel according to vessel emergency and safety management plans

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Complete maintenance records
- Implement safe and environmentally responsible work practices
- Manage legislative compliance and compliance records
- Plan and organise application of control techniques for hull damage
- Plan and prepare for maintenance including isolating equipment
- Read, interpret and apply:
 - manufacturer instructions including all WHS/OHS requirements and safety data sheets (SDS)/material safety data sheets (MSDS)
 - operating and service manuals
- Recognise damage to hull of small vessel and take appropriate action according to operating instructions
- Recognise faulty equipment including:
 - cooling water system corrosion
 - fuel oil contamination
 - lubricating oil contamination
- Repair pipe work
- Select and use correct tools and equipment for maintenance task
- Service valves

Required Knowledge:

- Appropriate mathematical procedures for estimating and measuring including calculating time to complete tasks
- Back-flooding and down-flooding
- Causes of vibrations and undue wear in power transmission system
- Construction, layout and subdivision requirements of a typical vessel, including freeboard and bulkhead deck, watertight compartments, weather tight compartments and bulkheads of vessel
- Costs of material, consumables and labour
- Environmental protection requirements including safe disposal of waste material, safe use and storage of chemicals, and safe handling and storage of LPG
- Environmental risks and hazards
- Inspections to be undertaken on vessel hull during slipping or dry docking
- Maintenance procedures and methodologies for:
 - batteries
 - cooling water systems including treatment
 - fuel systems including contamination

- heat exchangers
- hull maintenance including use of sacrificial anodes
- hydraulic systems
- lifesaving appliances
- lubricating oil systems including contamination
- power transmission systems
- steering systems
- starter motors, alternators and associated equipment
- Material and stress characteristics in constructing a vessel
- Methods of corrosion and how to prevent corrosion
- Organisational requirements, policies and procedures for organising maintenance programs
- Principal features of structure of a vessel
- Procedures for recording and reporting workplace information
- Types of tools and equipment, and procedures for their safe use and maintenance
- Valve types and construction

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- developing effective planning documents
- providing high quality reports
- attention to detail when completing documentation.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where undertaking planned and breakdown maintenance of machinery, machinery systems and structural components can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities

- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate undertaking planned and breakdown maintenance of machinery, machinery systems and structural components
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Machinery, machinery systems and structural components may include:

- Electrohydraulic steering gear
- Engine and gearbox:
 - cooling systems
 - lubricating systems
- Engine fuel systems
- Gearbox

Special requirements for maintenance may include:

- Hydraulic systems including steering gear
- Pumps and pumping systems for bilge, fuel oil, freshwater and seawater systems
- Refrigeration plant and its operation
- Refrigeration system components
- Steering gear
- Transmission systems from engine output shaft to propeller
- Two- and four-stroke diesel engines
- Asbestos awareness
- Awareness of confined and restricted space operations
- Dry docking
- Handling refrigerant gas within regulatory requirements

Maintenance tasks may include:

- Cleaning:
 - coolers
 - filters
- Greasing
- Maintaining:
 - emergency equipment
 - firefighting and lifesaving equipment
- Oiling
- Oily water separator
- Overhauling and repairing pumps
- Scheduled survey inspections
- Topping up oils

Consumables and equipment may include:

- Cleaning chemicals
- Coolants
- Hand and power tools
- Oils and grease
- Refrigerant gas
- Replacement parts
- Test equipment

Emergency equipment may include:

- Communication equipment
- Emergency lighting
- Firefighting equipment
- First aid provisions
- Lifesaving equipment

Nature of breakdown may include:

- Cooling water system failure
- Engine failure

- Exhaust systems
 - Fuel system failure
 - Gearbox failure
 - Loss of control systems
 - Lubricating systems failure
 - Power plant failure
 - Propeller and shafting arrangements
 - Pumping systems failure
 - Refrigeration plant and its operation
 - Steering gear failure
- Restrictions applied to operations may include:
- Stopping or slowing main engine
 - Switching to emergency power
- Reports may include:
- Incident reports
 - Maintenance log
 - Reports required under planned maintenance system
 - Survey reports

Unit Sector(s)

Not applicable.

Competency Field

Equipment Checking and Maintenance

MARB5001A Maintain and repair marine electrical and electronic equipment

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to maintain and repair marine electrical and electronic equipment on a vessel. This includes carrying out routine maintenance of marine generators, switchboards, electric motors, motor starters, direct current (DC) electrical systems and electrical distribution systems; and identifying faults in automated control systems.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 3.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|--|-----|--|
| 1 Maintain marine generators | 1.1 | Safety requirements associated with working on marine electrical generation systems are complied with |
| | 1.2 | Marine generators are inspect using appropriate manuals and drawings according to regulatory, organisational and manufacturer requirements |
| | 1.3 | Routine maintenance and <i>testing of marine generators</i> is performed according to regulatory, organisational and manufacturer requirements |
| | 1.4 | Alternators are synchronised according to organisational and manufacturer requirements |
| | 1.5 | Testing and maintenance records are maintained according to regulatory, organisational and manufacturer requirements |
| 2 Maintain marine switchboards | 2.1 | Safety requirements associated with handling circuit breakers are complied with |
| | 2.2 | Routine maintenance is performed on main circuit breaker according to with regulatory, organisational and manufacturer requirements |
| | 2.3 | <i>Faults in circuit breakers</i> are detected and corrected according to regulatory, organisational and manufacturer requirements |
| | 2.4 | Testing and maintenance records are maintained according to regulatory, organisational and manufacturer requirements |
| 3 Maintain marine electrical motors | 3.1 | Safety requirements associated with working on marine electrical motors are complied with |
| | 3.2 | Equipment required for maintenance of electrical motors is selected and checked for serviceability |
| | 3.3 | Routine maintenance procedures are applied on marine electrical motors according to regulatory, organisational and manufacturer requirements |
| | 3.4 | Maintenance records are maintained according to regulatory, organisational and manufacturer requirements |
| 4 Test marine electrical motor starters | 4.1 | Safety requirements associated with working on marine electrical motor starters are complied with |
| | 4.2 | <i>Faults in electrical motor starters</i> are detected and rectified according to regulatory, organisational and manufacturer |

- requirements
- 4.3 Starting and running current load testing is performed on electrical motors according to regulatory, organisational and manufacturer requirements
- 4.4 Procedures for finding start and finish of electrical motor windings are applied according to regulatory, organisational and manufacturer requirements
- 4.5 Testing and maintenance records are maintained according to regulatory, organisational and manufacturer requirements
- 5 Maintain marine electrical distribution systems**
- 5.1 Safety requirements associated with working on marine electrical distribution systems are complied with
- 5.2 Causes and potential dangers associated with earth faults in multi earth neutral and floating neutral systems are identified
- 5.3 Earth faults are detected and repaired using correct equipment according to regulatory, organisational and manufacturer requirements
- 5.4 Hazards associated with working on fluorescent lamp circuits are identified
- 5.5 Fluorescent lamp circuit using appropriate manuals and drawings is constructed according to regulatory, organisational and manufacturer requirements
- 5.6 Components, function and operation of watertight and flame proof fittings are identified
- 5.7 Reasons for earthing high voltage systems via a resistor are outlined
- 5.8 Routine maintenance, inspection and testing of marine electrical distribution systems is performed according to regulatory, organisational and manufacturer requirements
- 5.9 Temporary repairs to insulation are performed according to regulatory, organisational and manufacturer requirements
- 5.10 Limitation of temporary repairs to insulation in terms of survey requirements are identified
- 6 Maintain DC electrical systems**
- 6.1 Safety requirements associated with working on marine DC electrical systems are complied with
- 6.2 Operation of a rectifier is identified

- 6.3 Single-phase full wave rectifier fitted with filters is built and operated
- 6.4 Routine battery maintenance is carried out according to organisational and manufacturer requirements
- 6.5 Correct procedures for checking specific gravity of electrolyte in lead acid and alkaline batteries are applied according to manufacturer requirements
- 6.6 Methods for supplying back up power for remote/automatic control equipment are identified
- 6.7 Procedure for testing back up power is identified and applied
- 7 Identify faults in automated control systems**
 - 7.1 Pneumatic, hydraulic, electronic/electrical control systems are compared and contrasted
 - 7.2 Function and operation of *main components of automated control systems* is outlined
 - 7.3 *Faults in automated control systems* are detected and rectified using standard fault finding procedures
 - 7.4 Testing procedures for identifying function and performance of automatic control systems in *vessel operating systems* are identified and applied
- 8 Operate electrical testing and measuring equipment**
 - 8.1 Insulation tester is operated safely according to manufacturer procedures
 - 8.2 Continuity testing on electrical circuits is performed according to organisational and manufacturer procedures
 - 8.3 Clamp meter is operated safely according to manufacturer procedures
 - 8.4 Multimeter is operated safely according to manufacturer procedures
- 9 Test automatic control devices**
 - 9.1 Operational functions are performed on a monitor
 - 9.2 Different types and *operation of control valves* are identified
 - 9.3 Control system control functions are applied using different control devices

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply relevant procedures
- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Communicate procedures associated with maintaining and repairing marine electrical and electronic equipment verbally and in writing
- Extract information from basic electrical and electronic diagrams required to build electrical and electronic circuits
- Identify and interpret numerical and graphical information in vessel electrical diagrams and specifications
- Identify and suggest ways of rectifying faults and malfunctions in marine electrical and electronic systems on vessels
- Identify methods, procedures and materials needed for operating, maintaining and repairing marine electrical and electronic systems on vessels
- Read and interpret written information related to operating and maintaining marine electrical and electronic systems, including specifications, drawings, technical manuals, and electrical and electronic circuit diagrams
- Use testing equipment to gather information on function and performance of marine electrical and electronic systems

Required Knowledge:

- Alternating current (AC)/DC voltage
- Batteries
- Circuit breakers and interlocks fitted to circuit breakers
- Circuits
- Current protection relays:
 - operate on fault and request
 - operate on fault and request and demand
 - operate on fault and request and under voltage
- Earthing
- Electrical measuring and testing instruments
- Electrical symbols, basic electrical and electronic diagrams and circuits
- Fault protection equipment:
 - differential protection device
 - fuses

- over voltage devices
- over current devices
- reverse power devices
- thermal overload devices
- thermistor protection devices
- under voltage devices
- Function and performance testing of system monitoring devices including:
 - alarm printer
 - data logger
- Nature and causes of typical start up and shut down malfunctions of main and auxiliary electrical and associated systems and available methods for their detection and rectification
- Operation of:
 - boiler, purifier and generator shut down systems
 - main engine shut down protective devices
 - protective devices found on board vessels
- Operational characteristics and performance specifications for different types of electrical and electronic systems found on vessels
- Principles and procedures of electrical maintenance
- Purpose and content of safety data sheets (SDS)/material safety data sheets (MSDS)
- Relevant procedures such as those relating to:
 - adjusting, testing and maintaining fault protection devices on switchboards
 - carrying out start up and shut down of electrical machinery and associated systems to ensure compliance with company and survey requirements and regulations
 - changing alarm-setting values in monitoring systems
 - confirming the accuracy of measuring monitoring
 - detecting electrical malfunctions and preventing damage
 - electrical safety and isolation
 - fault finding
 - marine maintenance, including difference between breakdown repair, planned maintenance and condition monitoring; purpose of maintenance recording and reporting procedures
 - routine maintenance on marine electrical motors (cleaning inspection, deterioration of insulation, removal of dust and oil, renew of bearings)
 - safety and emergency
 - testing function and performance of protection devices as part of vessel statutory survey
- Risks and safety procedures associated with working in high voltage environments
- Safety, environmental and hazard control precautions and procedures relevant to start up and shut down of marine electrical machinery and associated systems
- Safety requirements associated with working on marine electrical systems, including:
 - dangers associated with the spaces in the vicinity of busbars
 - potential dangers associated with instrument voltage/current transformer circuits

- protection normally provided on doors of switchboard cubicles
- Types of electrical and electronic equipment and components
- Vessel safety management systems
- Work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- Working safely with electricity:
 - appropriate method of removing an electric shock victim from a live electrical situation
 - common causes of electrical accidents
 - effects of electric shock on the human body
 - electrical safe working practices
 - need for ensuring safe isolation of an electrical supply
 - precautions that can minimise chance of electric shock

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- ensuring behaviour reflects relevant current legislative and regulatory requirements
- ensuring currency of relevant WHS/OHS skills and knowledge
- initiating timely action in response to defects or damage.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where maintaining and repairing marine electrical and electronic equipment can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the

workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate maintaining and repairing marine electrical and electronic equipment
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Testing of marine generators may include:

- Functional test of AVR
- Insulation
- Reading of alternator:
 - excitation circuit
 - stator

Faults in circuit breakers may include:

- Alignment of contactors
- Condition of:
 - closing and opening mechanisms
 - insulation barriers

- Faults in electrical motor starters may include:
- Wear and tear on linkages
 - Earthing
 - Open circuit
- Main components of automated control systems may include:
- Actuator
 - Control valve
 - Controller
 - Positioner
 - Regulator
 - Relay
 - Sensor
 - Servomotor
 - Transducer
- Faults in automated control systems may include:
- Failure of components
 - Intermittent functional faults
- Vessel operating systems may include
- Auxiliary machinery
 - Boilers
 - Main engine
 - Power generation and distribution
- Operation of control valves may include:
- Electrical
 - Hydraulic
 - Manual
 - Pneumatic

Unit Sector(s)

Not applicable.

Competency Field

Equipment Checking and Maintenance

MARB5002A Maintain and repair shipboard machinery and equipment

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to maintain and repair shipboard machinery and equipment on a vessel. This includes maintaining marine pumps, valves, air compressors, heat exchangers, diesel engines, turbochargers, marine lubricating systems and deck machinery as well as conducting inspections of marine boilers and marine refrigeration units.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 3.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Follow safe work practices**
 - 1.1 Work health and safety (WHS)/occupational health and safety (OHS) procedures relevant to maintaining shipboard machinery and equipment are complied with
 - 1.2 Safety hazards are identified and reported according to safety and vessel procedures
 - 1.3 Prior to use, tools, equipment and testing devices needed to carry out maintenance activities for correct operation and safety are checked according to safety and vessel procedures
 - 1.4 Before commencing maintenance activities, isolation precautions are implemented according to safety and vessel procedures

- 2 Maintain marine pumps**
 - 2.1 Maintenance requirements for *pump* are determined according to safety, manufacturer and vessel procedures and documentation
 - 2.2 Appropriate procedures, materials, tools and equipment for maintaining pump are selected according to safety, manufacturer and vessel procedures
 - 2.3 Relevant information is extracted from drawings and technical specifications required to perform maintenance activities
 - 2.4 Pump is disassembled, inspected and *serviced* according to safety, manufacturer and vessel procedures
 - 2.5 Pump is reassembled and tested according to safety, manufacturer and vessel procedures
 - 2.6 Performance of pump is confirmed against recommended performance specifications according to safety, manufacturer and vessel procedures

- 3 Maintain valves**
 - 3.1 Maintenance requirements for *valve* are determined according to safety, manufacturer and vessel procedures and documentation
 - 3.2 Appropriate procedures, materials, tools and equipment for maintaining valve are selected according to safety, manufacturer and vessel procedures
 - 3.3 Relevant information is extracted from drawings and technical specifications required to perform maintenance

activities

- 3.4 Valves are removed for maintenance according to safety, manufacturer and vessel procedures and documentation
- 3.5 Valve is disassembled and ***valve maintenance*** is performed according to safety, manufacturer and vessel procedures and documentation
- 3.6 Valves are reassembled and tested according to safety, manufacturer and vessel procedures and documentation

4 Maintain air compressors

- 4.1 Maintenance requirements for air compressor are determined according to safety, manufacturer and vessel procedures and documentation
- 4.2 Appropriate procedures, materials, tools and equipment for maintaining air compressor are selected according to safety, manufacturer and vessel procedures
- 4.3 Relevant information is extracted from drawings and technical specifications required to perform maintenance activities
- 4.4 ***Air compressor is disassembled and inspected*** according to safety, manufacturer and vessel procedures
- 4.5 Air compressor is reassembled, tested and adjusted according to safety, manufacturer and vessel procedures
- 4.6 Performance of air compressor is confirmed against recommended performance specifications according to safety, manufacturer and vessel procedures

5 Maintain heat exchangers

- 5.1 Maintenance requirements for heat exchanger are determined according to safety, manufacturer and vessel procedures and documentation
- 5.2 Appropriate procedures, materials, tools and equipment for maintaining heat exchanger are selected according to safety, manufacturer and vessel procedures
- 5.3 Relevant information is extracted from drawings and technical specifications required to perform maintenance activities
- 5.4 ***Heat exchanger is disassembled and inspected*** according to safety, manufacturer and vessel procedures
- 5.5 Heat exchanger is reassembled, tested and adjusted according

to safety, manufacturer and vessel procedures

5.6 Performance of heat exchanger is confirmed against recommended performance specifications according to safety, manufacturer and vessel procedures

6 Maintain diesel engines

6.1 Maintenance requirements for diesel engine are determined according to safety, manufacturer and vessel procedures and documentation

6.2 Appropriate procedures, materials, tools, measuring instruments and equipment for maintaining diesel engine are selected according to safety, manufacturer and vessel procedures

6.3 Relevant information is extracted from drawings and technical specifications required to perform maintenance activities

6.4 *Diesel engine components are disassembled and inspected* for wear and deterioration according to safety, manufacturer and vessel procedures

6.5 *Routine maintenance on diesel engines* is performed according to manufacturer and vessel procedures

6.6 *Diesel engine components are refurbished*, as required, according to manufacturer and vessel procedures

6.7 Specialised tools and measuring instruments are used to maintain and refurbish diesel engines/components according to safety, manufacturer and vessel procedures

6.8 Diesel engine is reassembled, tested and adjusted according to safety, manufacturer and vessel procedures

6.9 Performance of diesel engine is confirmed against recommended performance specifications according to safety, manufacturer and vessel procedures

7 Maintain turbochargers

7.1 Maintenance requirements for turbocharger are determined according to safety, manufacturer and vessel procedures and documentation

7.2 Appropriate procedures, materials, tools and equipment for maintaining turbocharger are selected according to safety, manufacturer and vessel procedures

7.3 Relevant information is extracted from drawings and technical specifications required to perform maintenance

activities

- 7.4 All *components of turbocharger* are disassembled and inspected for wear and deterioration according to safety, manufacturer and vessel procedures
- 7.5 Turbocharger is reassembled, tested and adjusted according to safety, manufacturer and vessel procedures
- 7.6 Performance of turbocharger is confirmed against recommended performance specifications according to safety, manufacturer and vessel procedures

8 Inspect marine boilers

- 8.1 *Inspection requirements for marine boiler* are determined according to safety, manufacturer and vessel procedures and documentation
- 8.2 Appropriate procedures for inspecting marine boiler are selected according to safety, manufacturer and vessel procedures
- 8.3 Relevant information is extracted from drawings and technical specifications required to perform inspection activities
- 8.4 Marine boiler is inspected for repair or general maintenance according to safety, manufacturer and vessel procedures
- 8.5 Performance of marine boiler is confirmed against recommended performance specifications according to safety, manufacturer and vessel procedures

9 Inspect marine refrigeration units

- 9.1 Inspection requirements for marine refrigeration unit are determined according to safety, manufacturer and vessel procedures and documentation
- 9.2 Appropriate procedures for inspecting marine refrigeration unit are selected according to safety, manufacturer and vessel procedures
- 9.3 Relevant information is extracted from drawings and technical specifications required to perform inspection activities
- 9.4 Marine refrigeration unit is inspected for repair or general maintenance according to safety, manufacturer and vessel procedures
- 9.5 Performance of marine refrigeration unit is confirmed against recommended performance specifications according to safety,

manufacturer and vessel procedures

10 Maintain marine lubricating systems

- 10.1 Inspection and maintenance requirements for lubricating systems are determined according to safety, manufacturer and vessel procedures and documentation
- 10.2 Relevant information is extracted from drawings and technical specifications required to perform inspection and maintenance activities
- 10.3 Purifier maintenance procedures are applied according to safety, manufacturer and vessel procedures
- 10.4 *Components of lubricating system* are inspected according to safety, manufacturer and vessel procedures

11 Maintain and repair deck machinery

- 11.1 Maintenance and/or repair requirements for *deck machinery* are determined according to safety, manufacturer and vessel procedures and documentation
- 11.2 Appropriate procedures, materials, tools and equipment for maintaining and/or repairing deck machinery are selected according to safety, manufacturer and vessel procedures
- 11.3 Relevant information is extracted from drawings and technical specifications required to perform maintenance activities
- 11.4 Deck machinery maintenance and/or repair procedures are implemented according to safety, manufacturer and vessel procedures
- 11.5 Deck machinery is tested and adjusted according to safety, manufacturer and vessel procedures
- 11.6 Performance of deck machinery is confirmed against recommended performance specifications according to safety, manufacturer and vessel procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Carry out cargo operations according to cargo plan or other documents and established safety rule/regulations, equipment operating instructions and shipboard stowage limitations

- Establish and maintain effective communications during loading and unloading
- Handle dangerous, hazardous and harmful cargo to comply with international regulations, recognised standards and codes of safe practice
- Identify and solve problems associated with loading, unloading, stowage and care of cargo
- Monitor and anticipate problems and risks associated with loading, unloading, stowage and care of cargo
- Monitor use of equipment in loading, unloading, stowage and care of cargo
- Read, interpret and apply instructions, regulations, procedures and information associated with loading, unloading, stowage and care of cargo

Required Knowledge:

- Ballast management issues and procedures
- Cargo handling documentation requirements
- Cargo lifting equipment and safe working loads
- Container position numbering
- Effect of cargo, including heavy lifts, on the seaworthiness and stability of the vessel
- Effects of different types of cargo operations on vessel trim and stability
- Effects on cargo handling of sea conditions, wind and weather
- Effects on stability during loading and discharging operations including heeling moments from gear and loads
- Methods of caring for various types of cargo
- Methods of handling various types of cargo
- Operational characteristics of different types of shipboard and terminal-based cargo handling equipment and facilities
- Principles of cargo care
- Procedures for carrying out calculations involving weights, capacities, stowage factors
- Relevant sections of applicable maritime regulations
- Relevant work health and safety (WHS)/occupational health and safety (OHS) and cargo handling legislation, codes of practice, policies and procedures
- Safe handling, stowage and securing of cargo including dangerous, hazardous and harmful cargo, and their effect on the safety of life and the vessel
- Standard stowage position numbering systems used on container vessels
- Typical cargo handling problems and hazards, and appropriate preventative and remedial actions and solutions
- Typical types and sizes of shipping containers
- Usual methods of container packing, loading and discharging, stowage, dunnaging
- Various types of cargo likely to be carried; their peculiar characteristics, liability to damage, decay or deterioration; their measurements, hazards and problems; appropriate preventative and remedial action and solutions
- Ways of restricting vessel stress levels within permitted levels within permitted limits during

loading/discharging cargo

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- ensuring currency of relevant WHS/OHS skills and knowledge
- ensuring currency of relevant legislative and regulatory knowledge
- initiating timely action in response to defects or damage.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where maintaining and repairing shipboard machinery and equipment can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are

appropriate to this unit:

- direct observation of the candidate maintaining and repairing shipboard machinery and equipment
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Pumps may include:

- Axial
- Centrifugal
- Gear
- Reciprocating
- Screw

Serviced may include:

- Dismantling rod and gears, seals, bearings and relief valve
- Identifying wear and deterioration
- Measuring wear in cylinders, neck rings and rods
- Protecting finished surfaces
- Removing:
 - gland packing
 - studs, intact and broken
- Replacing and adjusting seals

Valves may include:

- Ball
- Butterfly
- Check
- Diaphragm
- Gate
- Globe:

- screw down non return
 - screw lift
- Valve maintenance may include:
- Examining seats, valves, spindles and glands
 - Gland packing:
 - selection
 - removal
 - repacking
 - Lapping valves and seats
 - Machining valves and seats
- Air compressor is disassembled and inspected may include:
- Coolers and cooling passages
 - Lubricating systems
 - Piston and rings
 - Suction and delivery valves and seats
- Heat exchanger is disassembled and inspected may include:
- Corrosion
 - Erosion
 - Fouling
 - Leakage
 - Provision for tube expansion
- Diesel engine components are disassembled and inspected may include
- Bearings
 - Cooling system
 - Crankshaft alignment
 - Liners
 - Lubrication system
 - Pistons
 - Rings
 - Valves
- Routine maintenance on diesel engines may include:
- Air intake system:
 - inspecting and changing air filters
 - inspecting turbocharger to make sure there is no fouling of compressor blades from crankcase gases
 - Cooling system:
 - fluid level checks
 - coolant sampling for trending analysis
 - draining, flushing and refilling system when required
 - Emissions systems:
 - inspecting crankcase ventilation systems, selective catalytic reduction (SCR) systems and diesel particulate filters (if so equipped)
 - Exhaust system:
 - inspecting for leaks, corrosion, wet stacking
 - Fuel system:

- changing fuel filters, fuel injectors
- checking water separators
- Lubrication:
 - checking levels
 - changing oil, oil filters
 - taking oil samples for trending analysis to optimise oil change intervals and to detect engine wear
- Mechanical systems:
 - inspecting resilient engine mounts and torsional couplings
 - generally inspecting for leaks, wear or deterioration
- Operating systems:
 - downloading data from digital engine management system to note and review alarm conditions
- Valves and heads:
 - inspecting, adjusting and recording valve train wear for trending analysis
 - inspecting and recording cylinder head wear for trending analysis

Diesel engine components are refurbished may include:

- Air start valves
- Cylinder heads
- Exhaust valves
- Fuel injectors
- Relief valves

Components of turbocharger may include:

- Air casing
- Air filters
- Bearings
- Diffuser
- Gas inlet grid
- Impeller
- Inducer
- Nozzle ring
- Rotor
- Volute

Inspection requirements for marine boiler may include:

- Fire side
- Water side

Inspection requirements for marine refrigeration unit may include:

- Compressors
- Condensers
- Evaporators
- Expansion valves
- Oil separators

Components of lubricating system may include:

- Settling tank
- System bearings
- System filters

Deck machinery may include:

- Cranes
- Lifeboat davits and gear
- Mooring winch
- Winch
- Windlass

Unit Sector(s)

Not applicable.

Competency Field

Equipment Checking and Maintenance

MARB6001A Manage repairs and maintenance of a vessel 500 gross tonnage or more

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMB4307A Monitor and manage the seaworthiness of the vessel.

Unit Descriptor

This unit involves the skills and knowledge required to implement a vessel planned maintenance system to ensure effective maintenance of a vessel 500 gross tonnage or more to ensure its seaworthiness.

Application of the Unit

This unit applies to maritime workers working in the maritime industry as a Master Unlimited.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|---|
| 1 Define maintenance targets | <ul style="list-style-type: none">1.1 <i>Compliance documentation</i> relevant to the maintenance of the vessel is interpreted1.2 <i>Vessel planned maintenance system</i> is interpreted to establish maintenance activities and priorities according to regulatory and organisational requirements1.3 Current maintenance practices are reviewed to evaluate efficiency, reliability and comparative cost effectiveness1.4 Maintenance targets are set to ensure compliance and cost effectiveness |
| 2 Optimise maintenance management | <ul style="list-style-type: none">2.1 Objectives of maintenance are clearly defined and appropriate maintenance mechanisms are determined2.2 <i>Preventative maintenance activities</i> are forecast, scheduled and matched to resources to ensure work is done on time and within cost2.3 Optimal cost balance between preventative and <i>corrective maintenance activities</i> is determined2.4 Priority system for preventative and corrective maintenance is developed based on critical analysis to maximise quality outcomes2.5 <i>Maintenance plan</i> is negotiated and agreed in consultation with <i>relevant stakeholders</i>2.6 Monitoring and reporting arrangements for maintenance activities are established and documented according to organisational procedures2.7 Risk management plan to identify, assess and control risks is incorporated into maintenance plan according to regulatory and organisational requirements |
| 3 Organise support processes | <ul style="list-style-type: none">3.1 <i>Resource requirements</i> are determined and organised according to the maintenance plan3.2 <i>Targets and milestones</i> are identified and linked to the achievement of outcomes according to the maintenance plan3.3 <i>Documentation</i> and checklists associated with the implementation of the maintenance plan are prepared in established formats and distributed to relevant people3.4 Information related to the implementation of the maintenance plan is distributed according to organisational procedures |

- 3.5 **Contingency arrangements** for the implementation of the maintenance plan are identified
- 4 Monitor implementation of maintenance plan**
- 4.1 Progress is systematically monitored and variations to implementation of the maintenance plan are verified as required with relevant people
- 4.2 Expenditure and resource usage are monitored and controlled to ensure objectives are achieved within specified parameters
- 4.3 Coaching and mentoring assistance is provided to crew members as required to overcome difficulties in implementing the plan
- 4.4 Systems, records and reporting procedures are maintained according to regulatory and organisational requirements
- 5 Evaluate implementation of maintenance plan**
- 5.1 Regular reports on progress and outcomes are provided to relevant stakeholders to ensure completion of activities is in line with maintenance plan
- 5.2 Systematic review processes and established evaluation methods are used to evaluate implementation processes and outcomes
- 5.3 Evaluation results are prepared in required format and presented to relevant people within agreed timeframes
- 5.4 Recommendations for improving implementation processes are presented to relevant people according to organisational procedures
- 5.5 Relevant documentation is completed and processed according to regulatory and organisational requirements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Analyse current practice
- Document information
- Estimate resource and time requirements
- Identify potential barriers to implementing maintenance plan, analyse risks and establish contingencies
- Make decisions
- Prepare appropriate reports on the outcomes of inspection and maintenance activities to

ensure the seaworthiness of a vessel

- Prepare docking requirements including repair lists and survey requirements
- Sequence maintenance activities logically, plan and document strategies to implement maintenance plans, set goals and meet time constraints
- Undertake forecasting
- Undertake scheduling

Required Knowledge:

- Construction, layout and subdivision requirements of a typical vessel, including the freeboard and bulkhead deck, watertight compartments, weather tight compartments, the bulkhead of the vessel and the collision bulkhead
- Corrosion control measures including surface preparation, painting and antifouling
- Nature and causes of corrosion of marine surfaces and structures, and the available methods for its control
- Preservatives and finishes used in marine maintenance, and the related procedures and precautions to be taken for preparation, application and storage
- Principal features of the structure of a vessel
- Properties and application of materials used in vessel construction
- Relevant national and international legislation related to the maintenance of vessels
- Typical problems related to slipping, docking and maintenance of vessels with appropriate action and solutions
- Vessel and machinery specifications, machinery design drawings, operational manuals, specifications, and electrical and control circuit diagrams
- Vessel planned maintenance system

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- preparing a detailed vessel maintenance plan that incorporates strategies addressing risk management, resource needs, monitoring and reporting arrangements, and quality assurance controls

- attention to detail when completing documentation
- providing high quality reports
- ensuring currency of relevant legislative and regulatory knowledge.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where managing repairs and maintenance of a vessel of 500 gross tonnage or more may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing repairs and maintenance of a vessel of 500 gross tonnage or more
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- | | |
|--|---|
| Compliance documentation may include: | <ul style="list-style-type: none"> • Cargo gear and equipment register • Maintenance schedules and records according to the planned maintenance system • Port state control inspection records • Statutory survey certificates • Statutory survey periodic inspection records • Vessel general arrangement plans, docking plan and manuals relevant to maintenance requirements |
| Vessel planned maintenance system may include: | <ul style="list-style-type: none"> • Adequate back-up, either back-up copy on board or a regular exchange of data between ship and office for computerised systems • Documents specifying maintenance jobs carried out and their results • Equipment manufacturer requirements as part of planned maintenance program • Following maintenance procedures • Performance results and measurements taken at certain intervals for trend investigations from delivery stage • Procedures required for docking preparation, including repair lists and survey requirements • Signing instructions to indicate who is responsible for verification of maintenance work carried out • Time intervals at which the maintenance jobs are to take place • Writing description and documentation of planned maintenance system in English |
| Preventative maintenance activities may include: | <ul style="list-style-type: none"> • Applying lubricants to moving parts • Hull cleaning and painting • Identifying deterioration of vessel structure and fittings, including cargo spaces, fresh water and ballast tanks • Inspecting and repairing or replacing cargo handling equipment including wires, blocks, shackles, chains and hooks • Prescribed tank inspections • Restoring weathered and rusted surfaces • Routine maintenance inspections |

- Corrective maintenance activities may include:
- Damage repairs and control measures
 - Replacing defective parts
- Maintenance plan may include:
- Budgets and timetables that enable the commitment of resources at appropriate points
 - Consultative processes to involve stakeholders
 - Contingency plans to cater for changes or significant difficulties
 - Damage control plans
 - Environment plans
 - Life cycle management plans
 - Long-term capital and maintenance financial forecast
 - Maintenance standards
 - Objectives, scope and expected benefits of plan
 - Quality assurance procedures
 - Risk management processes
 - Specifications
 - Vessel and machinery and equipment maintenance, cleaning and lifesaving appliances maintenance
- Relevant stakeholders may include:
- Crew members
 - Engineers
 - Management
 - Subcontractors
 - Technical experts
 - Work health and safety (WHS)/occupational health and safety (OHS) representatives
- Resource requirements may include:
- Contractors
 - Crew members
 - Equipment
 - Materials
 - Specialist advice
 - Technicians
 - Training
- Targets and milestones may include:
- Agreed reporting requirements
 - Completing key tasks and maintenance phases
 - Measurement and achievement of set outcomes
 - Progress reports
- Documentation may include:
- Budgets and operating costs
 - Legal documentation
 - Service and maintenance records
- Contingency arrangements may include:
- Budgetary constraints
 - Competing work demands of contractors

- Evaluation methods may include:
- Environmental factors, such as time and weather
 - Equipment and technology breakdown
 - Industrial disputes
 - Non-availability of resources and materials
 - Unforeseen incidents
 - Workplace hazards, risks and controls
 - Checklists
 - Cost data analysis
 - Interviews
 - Observation
 - Review of quality assurance data
 - Review of safety and planned maintenance systems

Unit Sector(s)

Not applicable.

Competency Field

Equipment Checking and Maintenance

MARC1001A Carry out shore-based mooring and untying operations

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMR5607A Carry out shore-based mooring and untying operations.

Unit Descriptor

This unit involves the skills and knowledge required to carry out shore-based mooring and untying operations according to relevant requirements and regulations.

Application of the Unit

This unit applies to people working in the maritime industry under supervision as a shore-based lines person.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Prepare a berth**
 - 1.1 *Relevant documentation and records* are identified and accessed as required
 - 1.2 Positioning information is obtained, checked and confirmed as accurate
 - 1.3 *Bridge marker* is set
 - 1.4 Briefing is obtained and interpreted on any *issues related to mooring or untying operation*
 - 1.5 Communications equipment is prepared and set to correct channels
 - 1.6 Berth conditions are checked and *made clear and ready for mooring*
 - 1.7 Portainer cranes are correctly positioned for berthing of vessel
 - 1.8 Safety concerns are communicated to pilot of vessel with due care not to interfere with tug and vessel communications
- 2 Receive heaving line from mooring launch**
 - 2.1 First line is received from mooring launch according to operational procedures and pilot directions
 - 2.2 Assistance is provided in pulling mooring line ashore and making it fast to applicable bollard
 - 2.3 Required precautions and safety procedures are followed during receival operations
- 3 Receive heaving lines from vessel**
 - 3.1 First lines are received and are made fast to appropriate bollards
 - 3.2 Where possible, two headlines and two sternlines are made available each to two different bollards
 - 3.3 Spring lines from forward and aft are received from vessel and are attached to applicable bollards
 - 3.4 Additional lines are received from vessel and attached to applicable bollards
- 4 Return heaving line to vessel**
 - 4.1 Vessel crew are made aware of planned heaving line return operations
 - 4.2 Lines are returned according to operational procedures
 - 4.3 Required precautions and safety procedures are followed during heaving line return operations

- 5 Land a gangway**
- 5.1 Precautions are taken to ensure all personnel are well clear of vicinity of gangway
 - 5.2 Vehicle is used to locate gangway in correct position in a safe and efficient manner
- 6 Untie and let go vessel**
- 6.1 Vessel crew is made aware of intentions to let go
 - 6.2 Singling up processes are carried out according to operational procedures and required *safety precautions*
 - 6.3 Due care is taken during singling up processes to ensure aft springs and stern lines are kept clear of propeller
 - 6.4 Due care is taken when waiting for order for remaining lines to be released to stand clear of remaining lines because of strain to which lines may be subjected
 - 6.5 Once order is given, remaining lines are released according to operational procedures and required safety precautions
 - 6.6 When vessel crew inadvertently heaves on a line being handled by shore-side team, line is let go immediately
 - 6.7 Required precautions and safety procedures are followed during untying operations

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Communicate effectively with other personnel when mooring and untying a vessel using standard nautical terms
- Comply with relevant maritime regulations and International Maritime Organization (IMO) Conventions and Codes, including the relevant sections of the Australian Maritime Safety Authority (AMSA) Marine Orders as they apply to mooring and untying operations on ocean-going vessels
- Follow work instructions
- Handle rope appropriately and correctly:
 - storing and caring for ropes and lines
 - tying knots such as bowline, reef knot, overhand knot, figure of eight knot, sheet bend and clove hitch
 - applying a chain stopper to a wire rope

- heaving on a line in collaboration with other members of a mooring team
- applying a stopper to a synthetic fibre rope
- applying a chain stopper to a natural cordage rope
- attaching a line to a bollard or bitt with all lines in correct order such as up through the eye
- flaking down a rope
- forming a bight
- Identify and correctly use:
 - various types of ropes, steel wires and mooring equipment
 - personal protective equipment (PPE)
- Implement port and vessel security procedures
- Interpret and follow procedures for mooring and untying operations, including safety instructions and precautions
- Recognise dangers and hazards before and during mooring operations, and take appropriate action to report and/or rectify them
- Recognise problems that may occur during mooring operations and take appropriate action to report and/or resolve them
- Take proper care of ropes and mooring equipment
- Work effectively as a member of a mooring and untying team

Required Knowledge:

- Communication techniques and equipment required during mooring and untying operations
- Dangers associated with mooring systems:
 - being hit by a line being thrown down from a vessel
 - stepping inside the bight of a line
 - being struck by a parting line
 - mixing rings and wire rope
 - falling off the edge of the wharf into the water
 - back strain from carrying a line, heaving on a line or heaving on a line with one hand
 - ‘snap back’ when a synthetic line breaks
 - trip hazards such as crane lines
- Factors that affect mooring and untying operations, including the effects of wind, weather, tides, sea conditions, currents, draft changes and surges from passing vessels on mooring and untying operations
- Hazards and problems, and appropriate preventative and remedial action and solutions
- Maritime regulations applicable to mooring and untying vessels
- Methods for mooring and untying a vessel, including all required rope handling techniques and precautions

- Operational characteristics of different types of lines, equipment and facilities used in mooring and untying operations
- Operational procedures and layouts of various types of shore-side loading and discharging terminals and wharves
- PPE required for use during mooring and untying operations
- Procedures for assessing stresses on lines and gear used in mooring and untying operations
- Relevant sections of STCW 95 and AMSA Marine Orders
- Relevant manufacturer guidelines relating to use of machinery, including instructions on equipment capability and limitations
- Relevant work health and safety (WHS)/occupational health and safety (OHS) codes of practice, policies and procedures
- Standard nautical terms in relation to mooring activities and related equipment

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- initiating timely action in response to defects or damage
- being aware of own ability and limits to rectify irregularities and faults
- following all orders carefully and systematically
- ensuring behaviour reflects relevant current legislative and regulatory requirements.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where carrying out shore-based mooring and untying operations can be conducted
- tools, equipment and PPE currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other

- simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate carrying out shore-based mooring and untying operations
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Relevant documentation and records may include:

- Mooring and untying plans, procedures, checklists and instructions
- Relevant maritime authority instructions
- Relevant sections of maritime regulations concerning mooring and untying operations
- Reports and records of mooring operations or any safety incident
- Rope and equipment manufacturer instructions and

- procedures
- Bridge marker must include:
- Safety instructions and procedures
 - At night, vehicle with flashing hazard light positioned on bridge marker
 - Flag
- Issues related to mooring or untying operations may include:
- Bollard numbers
 - Special circumstances
- Made clear and ready for mooring may include:
- Removing obstructions
 - Stopping any work that creates excessive dust or noise
- Safety precautions may include:
- Checking:
 - own personal fitness and medical wellbeing
 - whereabouts of edge of wharf
 - whereabouts of other members of mooring/untying team
 - Confirming availability of a personal flotation device upon arrival at mooring operation
 - Keeping work area hazard-free
 - Obtaining and using required PPE (such as safety footwear, safety helmet, suitable gloves, safety vest and reflective braces, personal collar insert for flotation device)
 - Removing rings from fingers to avoid them being caught on steel wire ropes
 - Wearing suitable clothing

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC2001A Complete engine room tasks

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to perform tasks to support the operation of marine internal combustion engines, marine propulsion systems, vessel machinery and auxiliary systems.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 3 on vessels up to 500 kW or as a Marine Engine Driver Grade 2 on vessels up to 750 kW or as a Marine Engine Driver Grade 1 on vessels up to 1500 kW.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 **Plan tasks**
 - 1.1 Work plan is developed and sequenced in conjunction with others

- involved in or affected by plan, according to organisational procedures
- 1.2 Timelines, jobs and work priorities are confirmed with Master and other relevant authorities, when applicable
- 2 Conduct refuelling operations**
- 2.1 Tank levels are correctly measured and reported pre and post fuelling operations
- 2.2 Fuel capacity is calculated
- 2.3 **Tools and equipment** are selected and checked for serviceability
- 2.4 Safety boundary and signage for the refuelling operation is accessed and used
- 2.5 Fire and spill prevention systems are correctly deployed
- 2.6 All personal protective equipment is accessed and used
- 2.7 Refuelling operations are performed safely and effective communication is maintained with relevant personnel to ensure the safety and integrity of vessel and crew
- 2.8 Appropriate action is taken to handle **incidents** arising during fuelling operations according to organisational procedures and regulatory requirements
- 3 Maintain stock and consumables**
- 3.1 **Stock** levels and **consumables** are monitored and maintained at required levels
- 3.2 Stock and consumables are reordered as required
- 3.3 Records of stock inventories and consumables are maintained and discrepancies are identified
- 4 Perform general housekeeping tasks**
- 4.1 **Housekeeping tasks** are clarified against work plan
- 4.2 Appropriate equipment for specific tasks is determined, prepared and used
- 4.3 Housekeeping tasks are performed and assessed against task requirements
- 4.4 Procedures for handling, storing and disposing of cleaning liquids are implemented according to regulatory requirements
- 5 Stow and manage flammable and**
- 5.1 Hazards of **flammable and explosive materials** are identified
- 5.2 Suitability of stowage areas is verified against regulatory

explosive materials	requirements and organisational procedures
	5.3 Procedures for safe handling and stowage of flammable and explosive materials are implemented according to regulatory requirements and organisational practices
6 Prepare simple reports	6.1 Requirements for <i>simple reports</i> are identified
	6.2 Information is prepared according to organisational procedures
	6.3 Calculations for fuel consumption and voyage duration are completed
	6.4 Information is assessed for accuracy, currency and relevance for inclusion in report
	6.5 Report is written using appropriate terminology

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assess information and data for relevance
- Complete all work to specification
- Conduct refuelling
- Convert:
 - units to multiples of base units
 - fractions to decimals
- Keep running and maintenance logs
- Perform calculations involving:
 - volume and capacity of regular shaped tanks
 - consumption of fuel and lubricating oil, hourly fuel consumption, theoretical steaming times and distances
- Perform calculations to determine the area of a circle
- Sequence tasks
- Use relative density/specific gravity to convert quantity in litres and volume to mass
- Write simple reports

Required Knowledge:

- Common SI units such as kilogram, tonne, litre and metre

- Identification of hazardous goods
- Principles of simple report writing
- Procedures and requirements for cleaning and housekeeping
- Safety data sheets (SDS)/material safety data sheets (MSDS)
- Work health and safety (WHS)/occupational health and safety (OHS) practices, including hazard identification, risk assessment and risk control options

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- providing the required amount of detail in reports
- ensuring currency of relevant WHS/OHS skills and knowledge
- performing accurate and reliable calculations.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where completing engine room tasks can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or

- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate completing engine room tasks
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Tools and equipment may include:

- Bunding
- Firefighting equipment
- Personal protective clothing and equipment
- Scupper plugs
- Signage
- Spill kit

Incidents may include:

- Fire
- Spillage on board
- Spillage over the side

Stock and consumables may include:

- Anodes
- Batteries
- Cleaning material and equipment
- Filters
- Fuel
- Lubricants
- Paint
- Spare parts
- Water

Housekeeping tasks may include:

- Correct disposal of waste
- Correct storage of:
 - tools
 - equipment
 - chemicals
- General cleaning
- Pumping of bilges
- Removal or lashing of loose items
- Battery generated gases
- Chemicals
- Fuels
- LPG
- Lubricating oils
- Oil soaked rags (spontaneous combustion)
- Breakdown reports
- Maintenance logs
- Repair requests and reports
- Running logs

Flammable and explosive materials may include:

Simple reports may include:

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC2002A Maintain hull out of water

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMB1907B Carry out basic hull servicing.

Unit Descriptor

This unit involves the skills and knowledge required to carry out basic maintenance to vessel hull while it is out of water.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 3 on vessels up to 500 kW or as a Marine Engine Driver Grade 2 on vessels up to 750 kW or as a Marine Engine Driver Grade 1 on vessels up to 1500 kW.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|---|--|
| 1 Prepare for work | <p>1.1 Planned maintenance program for hull type and construction material is accessed to determine hull maintenance requirements</p> <p>1.2 Vessel is inspected and additional maintenance requirements are determined</p> <p>1.3 <i>Maintenance tasks</i> are planned and sequenced in conjunction with others involved in or affected by maintenance work</p> <p>1.4 <i>Repair tools and equipment</i> are selected and checked for serviceability</p> <p>1.5 Work area is prepared</p> |
| 2 Carry out required maintenance and repairs to hull, equipment and fittings | <p>2.1 Suitable personal protective equipment is selected and used according to work health and safety (WHS)/occupational health and safety (OHS) requirements</p> <p>2.2 Permits for hot work, confined space entry and other high risk activities are completed according to organisational and regulatory requirements</p> <p>2.3 Tasks are performed according to manufacturer specifications, maintenance yard requirements and organisational practices</p> |
| 3 Clean up and complete documentation | <p>3.1 Work area is cleared and cleaned for serviceable condition</p> <p>3.2 <i>Materials</i> are disposed of or recycled according to legislative and organisational requirements</p> <p>3.3 Tools and equipment are cleaned, checked and stored according to organisational procedures</p> <p>3.4 Maintenance report is completed according to workplace procedures</p> |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Ensure work is carried out to regulatory requirements for issue or endorsement of relevant certificates
- Explain procedures and techniques for hull maintenance according to regulations and vessel operating procedures

- Implement safe and environmentally responsible work practices
- Plan and prepare for maintenance including systematic isolation, dismantling and reassembly of parts
- Read, interpret and apply:
 - manufacturer instructions including all WHS/OHS requirements and safety data sheets (SDS)/material safety data sheets (MSDS)
 - operating and service manuals for maintenance of vessel hull
- Recognise:
 - faulty equipment
 - hull damage and deterioration, and take appropriate action according to organisational procedures
- Select and use correct tools and equipment for maintenance task

Required Knowledge:

- Component parts, operation and routine maintenance requirements of vessel, equipment and fittings
- Differences in vessels, hull structures and equipment
- Functions of underwater equipment
- Hazards of working in confined spaces
- Hull maintenance
- Maintenance hazards and problems
- Nature and causes of corrosion of marine surfaces and structures, and available methods for its control
- Organisational procedures for maintenance
- Principles and procedures of lubrication as they relate to underwater vessel equipment and fittings
- Procedures for:
 - checking and inspecting vessel hull as part of routine maintenance program
 - initiating and coordinating repair and/or replacement of underwater equipment and fittings
- Relevant WHS/OHS legislation
- Types, characteristics and functions of equipment/tools used in maintenance
- Use of sacrificial anodes

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the

performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- implementing workplace environmental and waste management procedures correctly
- working safely at all times.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where maintaining vessel hull out of water can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate maintaining vessel hull out of water
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required

Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Maintenance tasks may include:

- Examining anchors and cables
- Inspecting and repairing:
 - hull fittings
 - stern drive and jet drive systems
 - watertight and weather tight hatches
- Inspecting and replacing anodes
- Withdrawing and examining:
 - propeller, shafts and seals
 - rudder, rudder stock and seals

Repair tools and equipment may include:

- Hand and power tools
- Ladders
- Personal protective equipment
- Specialised tools

Materials may include:

- Cleaning chemicals
- Lubricants
- Rags
- Rust treatments
- Spare parts
- Spent oils and grease
- Used components

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC2003A Operate and maintain extra low and low voltage electrical systems and equipment

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to operate, test and maintain extra low and low voltage electrical systems and equipment.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 3 on vessels up to 500 kW or as a Marine Engine Driver Grade 2 on vessels up to 750 kW or as a Marine Engine Driver Grade 1 on vessels up to 1500 kW.

WARNING: Relevant state/territory training and qualification requirements need to be fulfilled by any persons carrying out installation, maintenance and/or repair of refrigeration equipment especially with regard to preventing the escape of refrigerants into the atmosphere and to electrical work.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|--|
| 1 Operate electrical systems and equipment | <ul style="list-style-type: none">1.1 Routine pre-operational checks are carried out on <i>electrical systems and equipment</i> according to manufacturer specifications1.2 Systems and equipment are operated according to manufacturer specifications1.3 <i>Faults</i> are identified and appropriate action is taken to rectify them1.4 Faults are reported and logged promptly and accurately to appropriate personnel |
| 2 Carry out routine maintenance on electrical systems and equipment | <ul style="list-style-type: none">2.1 Tasks are planned and sequenced in conjunction with others involved in or affected by maintenance work2.2 <i>Tools and equipment</i> are selected and checked for serviceability2.3 Components to be maintained are isolated2.4 Systems are tested and test results are compared with manufacturer specifications2.5 <i>Maintenance tasks</i> are carried out to specification2.6 Unserviceable components are tagged according to organisational procedures and appropriate personnel are notified |
| 3 Isolate faulty components for repair | <ul style="list-style-type: none">3.1 Faulty items or components are isolated according to workplace procedures3.2 Serviceable items are fitted according to manufacturer specifications3.3 Operational check is carried out on equipment or system to ensure its compliance with manufacturer specification |
| 4 Clean up and complete documentation | <ul style="list-style-type: none">4.1 Work area is cleared and cleaned4.2 <i>Materials</i> are disposed of or recycled according to legislative and workplace requirements4.3 Tools and equipment are cleaned, checked and stored according to workplace procedures4.4 Maintenance report is completed according to workplace procedures |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply safety requirements throughout the work sequence including the use of personal protective equipment
- Complete all work to specification
- Ensure correct requirements and details of basic maintenance of electrical systems and equipment are available
- Implement safe and environmentally responsible work practices in testing and maintenance activities
- Locate, interpret and apply manufacturer specifications for electrical systems and equipment
- Operate direct current (DC) systems and conduct operator preventive maintenance according to manufacturer recommendations, regulations and vessel operating procedures to ensure safe operation
- Operate electrical systems according to manufacturer recommendations, regulations and vessel operating procedures to ensure safe operation
- Recognise electrical system faults and where necessary take steps to make them immediately safe
- Select and use appropriate processes, tools and equipment

Required Knowledge:

- Basic care and fault recognition of electrical systems and equipment
- Batteries:
 - care and maintenance
 - hazards
 - types
- Charging systems:
 - alarms/indicators
 - regulators
- Connecting batteries
- DC systems not exceeding 32 V DC
- Electrical systems:
 - above 32 V DC and up to 415 V alternating current (AC)
- Fault identification, location and safety implications
- Personal safety
- Protective devices on switchboards

- Relevant state/territory training and qualification requirements for carrying out installation, maintenance and/or repair of refrigeration equipment especially with regard to preventing the escape of refrigerants into the atmosphere and to electrical work
- Shore power connection
- Starter motors, alternators and associated equipment:
 - operation
 - maintenance
- Uses of fuses and circuit breakers – selection of correct capacity
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- initiating timely action in response to defects or damage
- ensuring currency of relevant WHS/OHS skills and knowledge.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where operating and maintaining extra low and low voltage electrical systems and equipment can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate operating and maintaining extra low and low voltage electrical systems and equipment
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Electrical systems and equipment may include:

- Alternators
- Batteries
- Charging systems
- Fuses and circuit breakers
- Generators
- Motors
- Shore power connection
- Starter motors

Faults may include:

- Battery faults
- Failure of alternators to produce voltage
- Failure of starter motors
- Faults with shore power connections including

- Tools and equipment may include:
- Maintenance tasks may include:
- Materials may include:
- phase rotations
 - Operation of fuses and circuit breakers
 - Hand and power tools
 - Test equipment
 - Replacing fuses
 - Testing batteries, voltage, electrolyte and rectifying faults
 - Testing charging system voltage output
 - Distilled water
 - Rags
 - Used components

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC2004A Operate deck machinery

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to safely use deck machinery on a vessel.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 3 on vessels up to 500 kW or as a Marine Engine Driver Grade 2 on vessels up to 750 kW or as a Marine Engine Driver Grade 1 on vessels up to 1500 kW.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|---|---|
| 1 Prepare lifting equipment and deck machinery | 1.1 Appropriate <i>personal protective equipment</i> and machinery is selected, used and stored according to work health and safety (WHS)/occupational health and safety (OHS) requirements |
|---|---|

- for use**
- 1.2 Routine *pre-operational checks* are carried out on *lifting equipment and deck machinery* according to manufacturer specifications, regulatory and organisational requirements
 - 1.3 Deviations from the norm are promptly identified and rectified
 - 1.4 Adjustments are made to achieve a safe and efficient operation
 - 1.5 Inability to start machinery is reported promptly and accurately to appropriate personnel
- 2 Operate lifting equipment and deck machinery**
- 2.1 Machinery is operated in a *safe and controlled manner*
 - 2.2 Machinery is operated within defined operating limits when running, to achieve optimum safety and efficiency
 - 2.3 Deviations from normal operations are promptly identified
 - 2.4 Action is taken to rectify *basic operational faults* to maintain optimum safety and efficiency
 - 2.5 Appropriate action is taken in a malfunction or emergency
- 3 Check and complete lifting equipment and deck machinery operations**
- 3.1 Equipment and machinery shut-down procedures are carried out according to manufacturer specifications and organisational procedures
 - 3.2 Equipment and machinery damage, malfunctions or irregular performance is recorded and reported according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Follow manufacturer recommendations, regulations and vessel operating procedures
- Implement safe work practices
- Use deck machinery

Required Knowledge:

- Basic hydraulic systems and their operation
- Legislation affecting lifting equipment

- Lifting equipment
- Safe working procedures
- Trawling and fishing gear
- Winches, capstans, windlasses
- WHS/OHS requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- being aware of own ability and limits to rectify irregularities and faults
- ensuring currency of relevant WHS/OHS skills and knowledge.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where operating deck machinery can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate operating deck machinery
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Personal protective equipment may include:

- Boots
- Gloves
- Hard hat
- Hearing protection
- Overalls
- Protective eyewear

Pre-operational checks may include:

- Inspecting safety guards, power take off stubs and shafts
- Lifting equipment
- Observing and monitoring noise levels for correct operation
- Pre-start and safety checks including:
 - oils and lubricants
 - lines
 - emergency stops

Lifting equipment and deck machinery may include:

- Basic hydraulic systems
- Capstans
- Cranes
- Trawling and fishing gear

Safe and controlled manner may include:

- Winches
- Windlasses
- Maintaining workloads within specifications
- Selecting and using appropriate machinery and equipment
- Using operational techniques for specific location and weather conditions

Basic operational faults may include:

- Failure of hydraulic lines
- Machinery break downs
- Structural failure

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC2005A Operate inboard and outboard motors

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMR3007B Operate and carry out basic service checks on small vessel marine propulsion systems.

Unit Descriptor

This unit involves the skills and knowledge required to operate inboard and outboard motors, and to diagnose basic faults.

Application of the Unit

This unit applies to deck and engine workers working in the maritime industry on vessels up to 12 metres. They could be working independently or as part a vessel crew.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|---|-----|--|
| 1 Operate inboard and outboard motors | 1.1 | <i>Pre-start checks</i> are performed on the motor |
| | 1.2 | Fuel is checked to ensure there is adequate fuel, including a reserve, on board |
| | 1.3 | Motor is <i>started</i> and stopped safely and correctly |
| | 1.4 | Motor controls are used to manoeuvre the vessel safely to complete work tasks |
| | 1.5 | Motor is operated within safe limits during normal manoeuvres |
| 2 Secure vessel on completion of work task | 2.1 | Vessel is moored safely |
| | 2.2 | Fuel system is closed down |
| | 2.3 | Vessel is secured |
| | 2.4 | Fuel is stored to minimise environmental and fire hazards where appropriate |
| | 2.5 | Unserviceable equipment is reported and tagged out as unserviceable |
| 3 Maintain inboard and outboard motors | 3.1 | Fuel filters are drained of excess water |
| | 3.2 | Batteries and connections are maintained to ensure reliable electrical supply to the motor |
| | 3.3 | Engine and gearbox oil is checked and lubrication is applied |
| | 3.4 | Engine mounting gear is checked as necessary |
| 4 Identify basic inboard and outboard motor faults | 4.1 | Operating difficulties caused by fuel-related factors are identified |
| | 4.2 | Electrical faults are identified, tagged out and reported |
| | 4.3 | Motor <i>propulsion faults</i> are identified, tagged out and reported |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Berth a vessel
- Check and operate an inboard or outboard motor

- Conduct pre-start, running and shut down checks on inboard and outboard motors, and tag out and report faults
- Estimate fuel consumption
- Manoeuvre to maintain a steady course
- Read and interpret company standard operating procedures (SOPs) about operating inboard and outboard engines
- Store an outboard motor
- Use inboard and outboard motor steering system

Required Knowledge:

- Battery connection and hazards
- MARPOL requirements
- Motor:
 - cooling systems
 - fuel systems
 - lubricating systems
- Standard procedures to tag out and report faults
- Troubleshooting techniques
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- working safely at all times
- scheduling manufacturer specified maintenance.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where using an inboard and outboard motor to handle a vessel in sheltered

waters may be conducted

- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate using an inboard and outboard motor to handle a vessel in sheltered waters
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Pre-start checks may include:

- Amount of fuel in the fuel tank
- Appropriate fuel

- Cooling water intake submerged
 - Fuel hose connected, full and free of restrictions
 - Fuel tank depressurised
 - Motor attachment points
 - Water depth
- Started may include:
- Electric start
 - Pull start
- Propulsion faults may include:
- Bent or broken propeller
 - Broken shear pin or drive spline
 - Fouling
 - Spark plugs

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC2006A Operate main propulsion unit and auxiliary systems

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to safely operate the main propulsion unit and auxiliary systems on a vessel up to 12 metres not exceeding 250 kW propulsion power.

Application of the Unit

This unit applies to deck and engine workers working in the maritime industry on vessels up to 12 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|----------------------------------|--|
| 1 Prepare propulsion unit | 1.1 Appropriate <i>personal protective clothing and equipment</i> is selected, used, maintained and stored according to work health and safety |
|----------------------------------|--|

and auxiliary system for use	(WHS)/occupational health and safety (OHS) requirements
	1.2 Routine <i>pre-operational checks</i> are carried out on <i>equipment</i> according to manufacturer specifications and workplace requirements
	1.3 Deviations from the norm are promptly identified and rectified
	1.4 Adjustments are made to achieve a safe and efficient operation
	1.5 Inability to start up equipment is reported promptly and accurately to appropriate personnel
2 Operate propulsion unit and auxiliary system	2.1 Equipment is operated in a <i>safe and controlled manner</i>
	2.2 Performance and efficiency of equipment is monitored according to manufacturer instructions
	2.3 Equipment is maintained within defined operating limits when running, to achieve optimum safety and efficiency
	2.4 <i>Environmental implications</i> associated with the operation of the equipment are identified and controlled
	2.5 Deviations from normal operations are promptly identified
	2.6 Action is taken to rectify irregularities to maintain optimum safety and efficiency
3 Check and complete propulsion unit and auxiliary system operation	3.1 Equipment shut-down procedures are carried out according to manufacturer specifications and workplace procedures
	3.2 Equipment operational records are maintained according to workplace procedures
	3.3 Equipment damage, malfunctions or irregular performance are recorded and reported according to workplace procedures
	3.4 Equipment is cleaned according to manufacturer specifications and workplace procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Implement safe and environmentally responsible work practices

- Measure and calculate volumes, consumption and servicing requirements
- Operate propulsion machinery and ancillary equipment to industry standards

Required Knowledge:

- Environmental impacts and minimisation measures associated with operating propulsion machinery and auxiliary equipment
- Factors associated with the safe operation of propelling and auxiliary equipment
- Manufacturer specifications for operating propulsion machinery and auxiliary equipment
- Operating principles and operating methods for propulsion machinery and auxiliary equipment
- Potential risks and hazards associated with operating propulsion machinery and auxiliary equipment
- Potential risks and hazards involved with types of fuels for example petrol, diesel, LPG
- Preparing for the use of propelling machinery, auxiliary equipment and other mechanical equipment
- Routine checks required with the operation of propelling machinery, auxiliary equipment and other mechanical equipment
- Shore power connections and associated hazards
- Use of low voltage electrical systems
- What to do in the case of malfunctions and emergencies with propelling machinery, auxiliary equipment and other mechanical equipment
- WHS/OHS requirements and work practices.

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- attention to appropriate level of detail in recordkeeping
- providing the required amount of detail in reports.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where operating propulsion and auxiliary equipment on a vessel may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate operating propulsion and auxiliary equipment on a vessel
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in

the performance criteria, is detailed below.

Personal protective clothing and equipment may include:

- Boots
- Gloves
- Hard hat
- Hearing protection
- Overalls
- Protective eyewear
- Respirator or facemask

Pre-operational checks may include:

- Checking and confirming equipment calibration settings
- Inspecting safety guards, power take off stubs and shafts
- Observing and monitoring noise levels for correct operation
- Pre-start and safety checks including:
 - oils and lubricants
 - fuel systems
 - leads
 - lines
 - connections

Equipment must include:

- Auxiliary equipment
- Bilge systems
- Cooling, lubricating and fuel systems
- Drive train assembly
- Fire pumping arrangements
- Low voltage electrical systems
- Monitoring machinery
- Petrol, diesel and outboard engines
- Shore power leads and connections
- Steering gear
- Two- and four-stroke engines

Safe and controlled manner may include:

- Appropriate selection and use of machinery and equipment
- Maintaining workloads within specifications
- Using operational techniques for the specific location and weather conditions

Environmental implications may include:

- Excessive noise and exhaust emissions
- Incorrect use of maintenance debris for example oils, containers, chemical residues
- Hazardous substances

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC2007A Operate marine internal combustion engines, and propulsion and auxiliary systems

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to safely operate marine internal combustion engines, and propulsion and auxiliary systems on a vessel.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 3 on vessels up to 500 kW or as a Marine Engine Driver Grade 2 on vessels up to 750 kW or as a Marine Engine Driver Grade 1 on vessels up to 1500 kW.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 **Prepare engine, and propulsion and auxiliary systems for use**
 - 1.1 Appropriate *personal protective equipment* is selected, used, maintained and stored according to work health and safety (WHS)/occupational health and safety (OHS) requirements
 - 1.2 Routine *pre-operational checks* are carried out on *equipment* according to manufacturer specifications and workplace requirements
 - 1.3 Engine is started according to manufacturer specifications and organisational requirements
 - 1.4 Deviations from the norm are promptly identified and rectified
 - 1.5 Adjustments are made to achieve a safe and efficient operation
 - 1.6 Inability to start equipment is reported, and logged promptly and accurately to appropriate personnel
- 2 **Operate engine, and propulsion and auxiliary systems**
 - 2.1 Engine, and propulsion and auxiliary systems are operated in a safe and controlled manner
 - 2.2 Performance and efficiency of engine, and propulsion and auxiliary systems are monitored according manufacturer instructions
 - 2.3 Engine, and propulsion and auxiliary systems are operated within defined operating limits when running, to achieve optimum safety and efficiency
 - 2.4 *Environmental implications* associated with operation of engine, and propulsion and auxiliary systems are identified and controlled
 - 2.5 Deviations from normal operations are promptly identified
 - 2.6 Action is taken to identify and rectify *basic operational faults* to maintain optimum safety and efficiency
 - 2.7 Appropriate action is taken in the event of a malfunction or *emergency*
- 3 **Complete operations**
 - 3.1 Equipment shut-down procedures are carried out according to manufacturer specifications and workplace procedures
 - 3.2 Engine, propulsion and auxiliary system *operational records* are maintained according to workplace procedures
 - 3.3 Equipment damage, malfunctions or irregular performance is recorded and reported according to workplace procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Arrange maintenance according to technical specifications
- Check pressures, temperatures and revolutions during start-up and warm-up periods according to technical specifications
- Comply with vessel operating procedures and manufacturer recommendations for start-up and making available fuel, lubricants, cooling water and air
- Identify:
 - main difference between two- and four-stroke cycles of operation
 - major parts of marine internal combustion engines
 - marine propulsion systems components and explain their functions
- Implement safe and environmentally responsible work practices
- Manage fuel systems safely according to regulations, manufacturer instructions and vessel procedures and so as to prevent pollution of the marine environment
- Operate:
 - lubricating systems according to established procedures and so as to prevent pollution of the marine environment
 - main propulsion plant auxiliary systems to ensure safe operating conditions
 - marine internal combustion engines within technical specifications
 - pumping systems according to manufacturer instructions, operational procedures and regulations to ensure safety of operation and prevention of pollution of the marine environment
 - refrigeration system according to manufacturer instructions, operational procedures and regulations to ensure safety of operation and prevention of pollution of the marine environment
- Outline operation and servicing of propulsion system within the technical specifications
- Prepare shut-down and supervise cooling down of engine according to vessel operating procedures and manufacturer recommendations
- Read and interpret manufacturer specifications
- Recognise and repair basic operational faults or organise maintenance assistance
- Test steering arrangements according to manufacturer instructions, operational procedures and regulations

Required Knowledge:

- Air filters
- Back-flooding prevention
- Basic:

- combustion process
- governor operation
- timing diagrams
- Bearing types, materials, installation, lubrication
- Causes of vibration and undue wear
- Circulating pumps
- Controllable pitch propellers
- Cooling systems including keel cooling/heat exchangers, circulating pumps, ship's side valves, coolant circulation and thermostats
- Corrosion
- Couplings types, fittings, keys and keyways
- Drive systems, belts, clutches, motors, etc. of pumping systems
- Dual duty systems/cross connection
- Emergency procedures
- Engine watchkeeping
- Fault identification, maintenance, prevention of corrosion
- Fuel system fault-finding and possible emergency operation
- Fuel systems including petrol/diesel, carburettors/fuel injectors, common rail
- Gear box fault identification and emergency operation
- Glands, packing, seals
- Identification of components of refrigeration systems
- Injection pumps
- Inspection and checks of main and auxiliary machinery and associated spaces
- Instrumentation
- Keeping running and maintenance logs
- Lubricating systems including lube oil circulating systems, lube oil system components, general lubrication , cooling effects and lubrication system problems
- Main differences between two- and four-stroke cycles of operation
- Maintenance and inspection
- Marine two- and four-stroke:
 - diesel engines
 - petrol engines
- Major parts of marine internal combustion engines
- Operation of firefighting equipment in engine space
- Power transmission operation
- Propeller and intermediate shafting alignment
- Pumping systems including fire/bilge/tank circulating systems
- Refrigeration systems including hazards of refrigerant gases

- Relevant environmental responsibilities, regulations and legislative requirements
- Rudder and stock support bearings
- Running checks
- Shaft seals and glands, packings
- Start-up and shut-down procedures
- Steering operation of hydraulic, cable, rod and gear
- Steering systems including rudder construction and rudder types
- Sterndrive and water jet drive units
- Strainers, mudboxes, foot valves
- Testing of steering and hydraulic systems
- Tiller arm attachment
- Turbo/supercharging
- Use of flexible materials, hoses
- Valve types:
 - construction and routine servicing
- WHS/OHS requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- being aware of own ability and limits to rectify irregularities
- initiating timely action in response to defects or damage
- attention to appropriate level of detail in recordkeeping.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where operating engine, and propulsion and auxiliary systems on a vessel can be conducted
- tools, equipment and personal protective equipment currently used in industry

- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate operating engine, and propulsion and auxiliary systems on a vessel
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Personal protective equipment may include:
- Boots
 - Gloves
 - Hard hat
 - Hearing protection
 - Overalls

Pre-operational checks may include:

- Protective eyewear
- Respirator or face mask
- Checking coolants levels
- Checking:
 - filters
 - fuel level
 - starting system
 - there is enough power available on switchboard and close isolator
- Confirming correct pressures of auxiliary systems
- Connections
- Dip oil
- Inspecting batteries and turning on isolator
- Inspecting for leaks and faults
- Inspecting safety guards, power take off stubs and shafts
- Leads
- Lines
- Opening valves as appropriate

Equipment may include:

- Auxiliary equipment and associated spaces
- Cooling systems
- Firefighting equipment
- Fuel systems
- Gearbox
- Lubricating systems
- Marine two- and four-stroke:
 - diesel engines
 - petrol engines
- Propeller and immediate shafting alignment
- Pumping systems
- Refrigeration systems
- Steering systems
- Sterndrive and water jet drive units

Environmental implications may include:

- Excessive noise and exhaust emissions
- Loss of fuel and oil overside

Basic operational faults may include:

- Starting faults
- Failure of:
 - cooling systems
 - fuel system
 - lubrication systems
- Gearbox faults

- Emergencies may include:
- Pumping systems failure
 - Refrigeration systems failure
 - Steering failure
 - Failure of main engine
 - Fire
 - Flooding
 - Loss of steering
- Operational records may include:
- Maintenance logs
 - Running logs

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC3001A Manage fuel systems

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to manage the fuel and fuel oil systems of a vessel to ensure safety of operation and to avoid pollution of the marine environment.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 2 on vessels up to 750 kW or as a Marine Engine Driver Steam.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|--------------------------|-----|--|
| 1 Plan refuelling | 1.1 | Fuel tanks are dipped to establish current level of fuel |
| | 1.2 | Amount of fuel on board vessel is calculated and positioning of fuel |

- is determined
- 1.3 ***Impact of refuelling on vessel safety*** is determined
 - 1.4 Fuel is ordered according to organisational procedures
- 2 Prepare vessel for refuelling**
- 2.1 Vessel is positioned and secured for refuelling
 - 2.2 ***Refuelling equipment*** is correctly deployed according to organisational procedures
 - 2.3 Communication between all people involved in refuelling procedures is established
 - 2.4 Tank valves are opened as necessary and refuelling operations are performed according to organisational procedures and regulatory requirements
 - 2.5 Tanks are dipped to ensure correct amount of fuel has been received
- 3 Complete refuelling operations**
- 3.1 ***Shut-down procedures*** are conducted according to organisational procedures
 - 3.2 Refuelling equipment is secured according to organisational procedures
 - 3.3 ***Refuelling records*** are completed according to organisational procedures and regulatory requirements
 - 3.4 Malfunctions, faults, irregular performance or damage to refuelling equipment are recorded according to organisational procedures
- 4 Manage an emergency**
- 4.1 Appropriate response is made to ***emergency situation*** according to organisational procedures
 - 4.2 All personnel are correctly notified and their activities are managed to ensure their safety, according to organisational procedures
 - 4.3 Waste containment measures are implemented to protect the environment
 - 4.4 ***Appropriate authorities*** are notified when applicable
 - 4.5 Incident is recorded according to regulatory requirements and organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Carry out accurate calculations dealing with bunkering capacity, consumption of fuel, speed and range of vessel
- Complete required records
- Manage refuelling to ensure safety of operation and avoid pollution of marine environment
- Measure tank levels
- Read and interpret manufacturer specifications and safety data sheets (SDS)/material safety data sheets (MSDS)
- Recognise faulty equipment and take appropriate action
- Recognise problems and hazards during refuelling and fuel transfer operations, and take appropriate action
- Select and use relevant equipment required for refuelling and fuel transfer operations
- Take appropriate action in response to an accidental spillage or safety incident during refuelling and fuel transfer operations

Required Knowledge:

- Arrangement of fuel oil systems
- Calculations involving specific fuel consumption, speed and range
- Calculations of volumes
- Condensation in fuel tanks
- Conversion of volumes to litres
- Effect of slack tanks on vessel stability
- Environmental protection measures to be applied during refuelling or transfer operations
- Fuel oil tank components
- Fuel tank filling
- Functions and responsibilities of crew during refuelling or transfer operations
- Hazards and safety precautions to be observed during refuelling or transfer operations
- Methods of fuel oil tank content measurement
- Refuelling and fuel transfer procedures applying to commercial vessels
- Specific fuel consumption
- Specific gravity
- Work health and safety (WHS)/occupational health and safety (OHS) and pollution control, legislation and policies

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- performing accurate and reliable calculations dealing with bunkering capacity, consumption of fuel, speed and range of vessel
- managing refuelling to ensure safety of operation and avoid pollution of marine environment
- taking appropriate action when accidental spillage or safety incident occurs during refuelling and fuel transfer operations.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where managing the fuel systems of a vessel can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess

practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing the fuel systems of a vessel
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- | | |
|--|---|
| Impact of refuelling on vessel safety may include: | <ul style="list-style-type: none"> • Ignition of released fuel vapours • Loss of stability |
| Refuelling equipment may include: | <ul style="list-style-type: none"> • Bunding • Bunker flag (B Flag) • Firefighting equipment • No smoking signs • Scupper plugs • Spill kit |
| Shut-down procedures may include: | <ul style="list-style-type: none"> • Communications with fuel supplier • Valve closure |
| Refuelling records may include: | <ul style="list-style-type: none"> • Log book • Oil record book • Port authority documentation |
| Emergency situations may include: | <ul style="list-style-type: none"> • Fire • Hose rupture • Spillage |
| Appropriate authorities may include: | <ul style="list-style-type: none"> • Environmental protection authority • Fire and emergency services • Port authority |

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC3002A Operate and maintain a boiler

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to operate and perform basic maintenance on a boiler according to relevant workplace practices and codes of practice. It includes operating a boiler, monitoring performance and maintaining its operational condition during use.

Application of the Unit

This unit applies to engine workers working in the maritime industry as a Marine Engine Driver Steam.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Select and use 1.1 *Personal protective equipment* (PPE) is selected for use according to

- personal protective equipment** statutory requirements and workplace procedures
- 1.2 Functions that require use of personal PPE are selected to enable function to be risk assessed
- 2 Carry out pre-operational safety checks**
- 2.1 **Boiler components** are identified and operated according to organisational operating procedures
- 2.2 Boiler **pre-operational safety checks** are conducted according to statutory requirements and standard operating procedures
- 2.3 Maintenance requirements are identified and reported according to workplace procedures
- 3 Maintain health and safety standards in work area**
- 3.1 **Hazards and potential hazards** in work area are identified according to statutory requirements and workplace procedures
- 3.2 Hazards are reported according to statutory requirements and workplace procedures
- 3.3 Prevention/control measures are selected according to organisational practice
- 3.4 Boiler **chemicals** are stored and handled according to statutory requirements, manufacturer recommendations and workplace procedures
- 4 Operate and monitor boiler**
- 4.1 Boiler is started and brought online safely, according to statutory requirements, workplace procedures and organisational safety management systems (SMS)
- 4.2 Operating status of boiler is monitored according to statutory requirements, workplace procedures and organisational SMS
- 4.3 Boiler water quality tests are conducted according to workplace procedures and organisational SMS
- 4.4 Boiler water is adjusted as a result of tests, to meet manufacturer recommendations and workplace criteria
- 4.5 **Operating log** is maintained clearly and accurately, according to statutory requirements
- 5 Shut down boiler**
- 5.1 Boiler is shut down according to statutory requirements, workplace procedures and organisational SMS
- 5.2 **Documentation** is maintained according to workplace and organisational requirements
- 6 Carry out**
- 6.1 **Maintenance requirements** are identified and reported according to

**routine
maintenance on
boiler**

workplace requirements

- 6.2 Boiler is cleaned internally and externally according to statutory requirements and workplace procedures
- 6.3 Boiler valves and fittings are removed for maintenance according to statutory requirements and organisational SMS
- 6.4 Precautions for entry into confined spaces are observed according to and organisational SMS

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply precautions and required action to minimise, control or eliminate hazards that may exist when operating and monitoring boiler
- Communicate effectively with others when operating and monitoring boiler performance
- Complete documentation related to operating and monitoring boiler performance
- Identify and assess boiler defects and deficiencies, and take appropriate action to report, isolate, repair or replace identified defective equipment
- Implement contingency plans for emergencies
- Read and interpret instructions, procedures, information and signs relevant to operating and monitoring boiler
- Select and use required personal protective equipment conform to industry and WHS/OHS standards

Required Knowledge:

- Applicable legislation relating to steam plant and nationally approved compliance codes and/or guidelines, and codes of practice
- Basic principles of boiler operation, monitoring devices, ancillary systems
- Boiler controls, instruments and indicators and their purpose, location and use
- Methods for:
 - adjusting controls to maximise efficient and safe running
 - carrying out minor maintenance, cleaning and servicing boiler
 - managing safety incidents and hazardous situations that may arise when operating and monitoring boiler performance
 - operating and monitoring performance of boiler ancillary equipment

- PPE required when operating boiler and procedures for its use
- Principles for starting up, operating, monitoring and shutting down boiler
- Procedures to be followed:
 - when there is an emergency when operating boiler
 - for confined space entry
- Relevant licensing, legislative, regulatory or certification requirements
- Relevant work health and safety (WHS)/occupational health and safety (OHS) and environmental procedures and regulations
- Requirements for completing relevant documentation during and after operating and monitoring boiler performance
- Typical faults that can occur with boiler and related action that should be taken to repair, isolate, replace, report and record faulty equipment

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- initiating timely action in response to defects or damage
- attention to appropriate level of detail in recordkeeping
- providing required amount of detail in reports
- ensuring behaviour reflects relevant current legislative and regulatory requirements.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where operating and maintaining a boiler can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the

workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate operating and maintaining a boiler
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Personal protective equipment may include:

- Chemical resistant gloves and apron
- Ear protection (muffs or plugs)
- Eye protection
- Fire-resistant clothing
- Hard hat head protection
- Respiratory devices
- Thermally insulated gloves
- Working protective gloves

Boiler components of a must

- Ash pan and damper
- Boiler controls and safety devices

include:

- Lighting and visual warning systems
- Oil burning apparatus
- Valves

Pre-operational safety checks must include:

- Boiler water level
- Checks of feed water supply and system
- Combustion air supply system
- Combustion equipment
- Essential fittings
- Firefighting equipment
- Fuel supply/heat source system
- Identifying and managing hazards and maintenance problems
- Inspecting and locating explosion doors
- Operation and position of boiler valves
- Selecting PPE

Hazards and potential hazards may include:

- Boiler low water condition
- Chemical hazards
- Excessive noise
- Hot exposed steam pipe
- Lack of machinery guards
- Leakage of:
 - boiler
 - fuel
 - gas
- Manual handling hazards
- Obstructions and defects in work area
- Poor illumination of work area
- Rubbish and combustibles in area
- Thermal hazards

Chemicals may include:

- Extinguishing agent's carbon dioxide
- Feed water additives
- Organic foam and dry powder
- Oxygen scavenger
- Soda acid

Operating log must include:

- Boiler status and operation
- Chemical treatment
- Maintenance/repair requirements
- Steam pressure
- Test results
- Time in use

Documentation may include:

- Boiler certificate

Maintenance requirements may include:

- Boiler operational records and user log books
- Emergency procedures and instructions
- Maintenance notices, records and requests
- Operational instructions, policies and procedures
- Blow down valve
- Boiler steam pressure gauge
- Feed water stop valve
- Flame failure detection device
- Gauge glasses
- Main steam stop valve
- Safety valves
- Water level controller

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC3003A Operate and maintain a steam engine up to 750 kW and steam auxiliary equipment

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to operate and perform basic maintenance on a reciprocating steam engine up to 750 kW nominal propulsion power according to relevant workplace practices and codes of practice. It includes operating controls, monitoring performance and maintaining operational condition of reciprocating steam engines and steam auxiliary equipment during use.

Application of the Unit

This unit applies to engine workers working in the maritime industry as a Marine Engine Driver Steam.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|---|---|
| 1 Prepare vessel for sea | <ul style="list-style-type: none">1.1 Spares and stores on board are checked to ensure those required for proposed voyage are available1.2 <i>Personal protective equipment</i> (PPE) is selected for use1.3 Hazardous materials are stowed and managed according to regulatory and organisational requirements1.4 Work health and safety (WHS)/occupational health and safety (OHS) <i>hazards and potential hazards</i> in engine room are identified and corrective action is taken according to organisational practices1.5 <i>Pre-start checks</i> are conducted on machinery and equipment according to organisational procedures1.6 <i>Means of communication</i> between bridge and engine room are tested1.7 Engines are started according to vessel procedures and organisation safety management systems (SMS) |
| 2 Operate and monitor steam engine and steam auxiliary machinery | <ul style="list-style-type: none">2.1 <i>Marine steam plant components</i> are identified and operated according to organisational operating procedures2.2 Steam engine handling techniques are interpreted and applied to eliminate or minimise risk of injury to personnel or damage to equipment2.3 Steam plant controls are identified and operated safely according to organisational procedures and technical specifications2.4 <i>Steam engine auxiliary equipment</i> is monitored and operated to maintain optimum running conditions2.5 Operational faults are recognised, assessed and rectified according to organisational procedures2.6 Hazards and potential hazards are recognised and interpreted, and appropriate initiatives and action is taken to minimise risk to personnel and equipment according to workplace procedures and applicable regulatory requirements2.7 <i>Operating log</i> is maintained clearly and accurately according to statutory requirements |
| 3 Shut down steam engine | <ul style="list-style-type: none">3.1 Engine is shut down according to vessel procedures and organisation SMS3.2 Steam auxiliary systems are shut down according to vessel |

procedures and organisation SMS

3.3 **Documentation** is maintained according to workplace and organisational requirements

4 Carry out maintenance of steam plant

4.1 **Maintenance requirements** are identified, repairs are carried out and reported according to workplace procedures

4.2 Engine and auxiliary equipment is regularly inspected and maintained for maintenance according to statutory requirements and workplace procedures

4.3 Steam plant maintenance schedule is developed and implemented according to organisational planned maintenance system

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Carry out lubrication processes on an item of steam plant
- Communicate effectively with others when operating and monitoring performance of an item of steam plant
- Complete documentation related to operating and monitoring performance of an item of steam plant
- Identify and assess steam plant defects and deficiencies, and take appropriate action to report, isolate, repair or replace identified defective equipment according to workplace procedures
- Implement contingency plans for emergency situations
- Monitor performance of an item of steam plant
- Operate an item of steam plant
- Read and interpret instructions, procedures, information and signs relevant to operating and monitoring an item of steam plant
- Recognise problems that may arise when operating and monitoring an item of steam plant and take appropriate action
- Select and use required PPE conforming to industry and WHS/OHS standards

Required Knowledge:

- Applicable legislation relating to steam plant and nationally approved compliance codes and/or guidelines and codes of practice
- Basic principles of steam plant operation, monitoring devices and auxiliary systems

- Methods for:
 - adjusting controls to maximise efficient and safe running
 - operating and monitoring performance of auxiliary steam plant equipment
 - identifying equipment defects and assessing them for appropriate action
- PPE required when operating an item of steam plant and procedures for its use
- Procedures for:
 - operating and monitoring an item of steam plant
 - managing safety incidents and hazardous situations that may arise when operating and monitoring performance of an item of steam plant
 - maintaining, cleaning, lubricating and servicing an item of steam plant
- Procedures to be followed in event of an emergency when operating an item of steam plant
- Relevant licensing, legislative, regulatory or certification requirements
- Relevant WHS/OHS and environmental procedures and regulations
- Requirements for completing relevant documentation during and after operation and monitoring of performance of an item of steam plant
- Steam plant controls, instruments and indicators and their purpose, location and use
- Typical problems that can occur with an item of steam plant and related action that should be taken to repair, isolate, replace, report and record faulty equipment

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- attention to appropriate level of detail in recordkeeping
- being aware of own ability and limits to rectify irregularities and faults
- providing required amount of detail in reports
- ensuring behaviour reflects relevant current legislative and regulatory requirements.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where operating

and maintaining a steam engine up to 750 kW and steam auxiliary equipment can be conducted

- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate operating and maintaining a steam engine up to 750 kW and steam auxiliary equipment
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Personal protective equipment may include:

- Chemical resistant gloves and apron
- Ear protection (muffs or plugs)
- Eye protection
- Fire-resistant clothing
- Hard hat head protection
- Respiratory devices
- Thermally insulated gloves
- Working protective gloves

Hazards and potential hazards may include:

- Chemical hazards
- Excessive noise
- Hot exposed pipes
- Lack of machinery guards
- Leakage of:
 - fuel
 - gas
- Manual handling hazards
- Obstructions and defects in work area
- Poor illumination of work area
- Rubbish and combustibles in work area
- Thermal hazards

Pre-start checks may include:

- Checks of cooling water supply and system
- Essential fittings
- Firefighting equipment
- Fuel supply/heat source system
- Identifying and managing hazards and maintenance problems
- Operation and position of steam engine valves
- Selecting PPE

Means of communication may include:

- Bell systems
- Telegraphs
- Voice pipe

Marine steam plant components may include:

- Boiler controls and safety devices
- Condensers
- Cylinder cocks
- Economisers
- Feed water controls
- Lubricators
- Operational controls
- Short stroke pump
- Steam plant instrumentation (gauges)
- Vacuum pumps

Steam engine auxiliary equipment may include:

- Valve gear
- Blower
- Feed water pump
- Generator
- Injectors
- Valves
- Water treatment systems
- Whistle

Operating log may include:

- Chemical treatment
- Maintenance/repair requirements
- Status and operation
- Test results
- Time in use

Documentation may include:

- Emergency procedures instructions
- Maintenance notices, records and requests
- Operational:
 - instructions, policies and procedures
 - records and user log books

Maintenance requirements may include:

- Bilge pumps
- Cooling water valves
- Gauge glasses
- Safety valves

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC3004A Operate and maintain engines for auxiliary systems other than steam auxiliary systems

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to operate and perform basic maintenance on non steam driven auxiliary systems according to relevant workplace practices and codes of practice. It includes operating controls, monitoring performance and maintaining operational condition of auxiliary equipment during use.

Application of the Unit

This unit applies to engine workers working in the maritime industry as a Marine Engine Driver Steam.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 **Prepare for sea**
 - 1.1 *Spares and stores* required for proposed voyage are acquired
 - 1.2 *Preparations and checks* are completed prior to sailing
 - 1.3 *Flammable/explosive materials* are stowed and managed according to regulatory and organisational requirements
 - 1.4 Engines are started according to manufacturer specifications and organisational requirements
 - 1.5 Deviations from norm are promptly identified and rectified or referred
 - 1.6 Adjustments are made to achieve a safe and efficient operation
 - 1.7 Inability to start engine is reported, and logged promptly and accurately to appropriate personnel
- 2 **Operate internal combustion engines and auxiliary systems**
 - 2.1 *Engines and auxiliary systems* are operated within technical specifications
 - 2.2 Engines and auxiliary systems are operated and monitored to ensure they are within operating limits specified by organisational procedures and manufacturer recommendations
 - 2.3 *Environmental implications* associated with operating engines and auxiliary systems are identified and controlled
 - 2.4 Operational faults are recognised and rectified according to manufacturer specifications and fault-finding methods
 - 2.5 Appropriate action is taken in a malfunction or *emergency*
- 3 **Secure machinery after voyage**
 - 3.1 Vessel, equipment and machinery are locked down according to manufacturer specifications and organisational procedures
 - 3.2 *Operational records* are completed according to workplace procedures
 - 3.3 Damage and repairs requiring action are reported according to workplace procedures
- 4 **Plan maintenance activities**
 - 4.1 Maintenance plan is accessed to determine *maintenance requirements* for engines and auxiliary systems
 - 4.2 Inspections are conducted and additional non-routine maintenance requirements are determined

- 4.3 Tasks are planned and sequenced in conjunction with others involved in or affected by maintenance work

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Explain two- and four-stroke cycles of operation
- Identify basic constructional parts of marine auxiliary internal combustion engines
- Manage:
 - refrigerant gases
 - lubricating systems and prevent pollution of marine environment
 - cooling systems
 - pumping systems and prevent pollution of marine environment
- Operate and maintain steering systems
- Operate marine auxiliary internal combustion engines within technical specifications
- Prepare machinery for sea
- Recognise and rectify operational faults
- Secure machinery after voyage

Required Knowledge:

- Bilge pumping for vessels with several compartments
- Common faults in steering gear
- Construction and maintenance of heat exchangers
- Corrosion prevention
- Cross connections between bilge/ballast/seawater systems and fire main
- Dangers associated with:
 - back-flooding and methods to prevent back-flooding
 - LPG and petrol vapour
- Dangers of refrigerant gas leaks in confined spaces
- Diesel engine:
 - construction
 - fuel injection, timing and control equipment
 - operation and routine maintenance
- Dry sump and wet sump lubrication systems

- Electro-hydraulic steering gear
- Emergency steering
- Engine:
 - performance and reasons for lack of performance
 - protection arrangements
- Heat exchanger, keel cooler and raw water cooling systems
- Oil:
 - quality monitoring
 - filter changing procedures
- Planned maintenance
- Preparations and checks necessary before sailing
- Pump capabilities and requirements for priming
- Relevant licensing, legislative, regulatory or certification requirements
- Routine maintenance on steering systems
- Seawater circulating systems
- Securing machinery after voyage
- Shutting down machinery
- Storage and testing of LPG cylinders
- Testing of steering gear
- Types of pumps and safety devices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- attention to appropriate level of detail in recordkeeping
- being aware of own ability and limits to rectify irregularities and faults.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where operating

and maintaining engines for auxiliary systems other than steam auxiliary systems can be conducted

- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate operating and maintaining engines for auxiliary systems other than steam auxiliary systems
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Spares and stores may include:

- Appropriate oils and grease
- Cleaning material
- Machinery spare parts
- Shackles and other lifting equipment
- Tools, hand and power

Preparations and checks may include:

- Checking:
 - coolants levels
 - fuel level
 - filters
- Confirming correct pressures of auxiliary systems
- Dip oil
- Inspecting:
 - batteries and turn on isolator
 - for leaks and faults
 - safety guards, power take off stubs and shafts
- Lubrication
- Opening valves as appropriate
- Power leads
- Spares and stores
- Stowage of LPG cylinders

Flammable/explosive materials may include:

- Liquid fuels
- LPG
- Refrigerant gas

Engines and auxiliary systems may include:

- Auxiliary equipment and associated spaces
- Cooling systems
- Lubricating systems
- Marine two- and four-stroke diesel engines
- Paddle and shafting arrangements
- Propeller and immediate shafting alignment
- Pumping systems
- Refrigeration systems
- Steering systems

Environmental implications may include:

- Excessive noise and exhaust emissions
- Loss of fuel and oil overside

Emergency may include:

- Failure of the auxiliary engines
- Fire
- Flooding
- Loss of steering

Operational records may include:

- Maintenance logs
- Running logs

Maintenance requirements may include:

- Cleaning:
 - coolers
 - filters
- Greasing
- Maintaining emergency equipment
- Oiling
- Oily water separator
- Overhauling and repairing pumps
- Scheduled survey inspections
- Topping up oils

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC3005A Operate and monitor marine internal combustion engines, propulsion plant and auxiliary systems

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMR2707B Operate and maintain marine internal combustion engines within the limits of responsibility of a Marine Engine Driver Grade 2.

Unit Descriptor

This unit involves the skills and knowledge required to safely operate marine internal combustion engines, propulsion plant and auxiliary systems on a vessel up to 750 kW.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 2 on vessels up to 750 kW or as a Marine Engine Driver Steam.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 **Prepare for sea**
 - 1.1 Fuels and lubricating fluids required for proposed voyage are acquired
 - 1.2 *Spares and stores* required for proposed voyage are acquired
 - 1.3 *Flammable/explosive materials* are stowed and managed according to regulatory and organisational requirements
 - 1.4 *Work health and safety (WHS)/occupational health and safety (OHS) hazards* in engine room are identified, risk assessed and corrective actions taken according to organisational practices
 - 1.5 Pre-start checks are conducted on machinery and equipment according to organisational procedures and manufacturer specifications
 - 1.6 Engines are started according to manufacturer specifications and vessel procedures
 - 1.7 Starting faults are recognised and rectified according to manufacturer specifications and fault-finding procedures
- 2 **Operate engines, propulsion plant and auxiliary systems**
 - 2.1 *Engines, propulsion plant and auxiliary systems* are operated within technical specifications
 - 2.2 Main propulsion plant and auxiliary systems are operated and monitored to ensure they are within operating limits specified by vessel procedures and manufacturer recommendations
 - 2.3 *Environmental implications* associated with operation of engine, propulsion plant and auxiliary systems are identified and controlled where possible
 - 2.4 Accidental or operational discharge of *polluting substances* are recorded according to regulatory requirements and organisational procedures
 - 2.5 Operational faults are recognised and rectified in accordance with manufacturer's specifications and fault-finding procedures
 - 2.6 *Operational records* are kept according to regulatory requirements and organisational procedures
 - 2.7 Appropriate action is taken when a malfunction or *emergency* occurs
- 3 **Secure vessel after voyage**
 - 3.1 Engines, propulsion plant and auxiliary systems are shut-down according to manufacturer specifications and vessel procedures

3.2 All damage and repairs requiring action are recorded according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Explain:
 - method of propulsion plant reversal
 - operation of marine gearboxes
 - two- and four-stroke cycles of operation
- Identify constructional parts of marine internal combustion engines
- Keep running and maintenance logs
- Manage:
 - lubricating systems and prevent pollution of marine environment
 - cooling systems
 - pumping systems and prevent pollution of marine environment
 - stowage of flammable/explosive materials and refrigerant gases
- Operate:
 - refrigeration system
 - marine internal combustion engines within technical specifications
- Operate main propulsion plant and auxiliary systems within recommended parameters
- Operate and maintain steering systems
- Prepare vessel and machinery for sea
- Recognise and rectify operational faults
- Secure vessel and machinery after voyage

Required Knowledge:

- Bilge pumping for vessels with several compartments
- Common faults:
 - in steering gear
 - of deck machinery
- Construction of heat exchangers
- Controllable pitch propellers (CPP) construction and operation
- Coolant circulation and thermostats

- Correct pressure and flow conditions
- Corrosion prevention
- Cross connections between:
 - bilge/ballast/seawater systems and fire main
 - seawater systems and bilge systems
- Dangers associated with:
 - back-flooding and methods to prevent back-flooding
 - LPG and petrol vapours
 - refrigerant gas leaks in confined spaces
- Diesel engine:
 - construction
 - operation
 - fuel injection, timing and control equipment
- Dry sump and wet sump lubrication systems and components
- Electrohydraulic steering gear
- Emergency steering
- Engine:
 - protection arrangements
 - performance and reasons for lack of performance
 - watchkeeping duties
- Environmental responsibilities , regulations and legislative requirements
- Gearbox fault identification and emergency operation
- Governor operation
- Hazards of refrigerants
- Heat exchanger, keel cooler and raw water cooling systems
- Lubrication and cooling:
 - of gearboxes
 - effects
- Lubricating oil system faults
- Method of propulsion plant reversal including CPP
- Preparations and checks necessary before sailing
- Pump capabilities and requirements for priming
- Refrigeration system and components
- Reverse/reduction gearbox operation
- Routine for operating and maintaining steering systems
- Seawater circulating systems
- Securing vessel after voyage
- Ship side valves

- Shutting down machinery
- Spares and stores required for proposed voyage
- Storage of LPG cylinders
- Testing:
 - steering gear
 - LPG detectors
- Turbo charging and supercharging arrangements
- Types and operation of deck machinery including basic hydraulic systems
- Types of:
 - gear trains
 - pumps and safety devices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- being aware of own ability and limits to rectify irregularities and faults
- implementing workplace environmental and waste management procedures correctly.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where operating marine internal combustion engines, propulsion plant and auxiliary systems on a vessel up to 1500 kW can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the

workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate operating marine internal combustion engines, propulsion plant and auxiliary systems on a vessel up to 1500 kW
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Spares and stores may include:

- Cleaning products and materials
- Grease
- LPG
- Machinery spare parts
- Oils
- Paint
- Refrigeration gas
- Tools, hand and power

Flammable/explosive materials must include:

- Liquid fuels
- LPG
- Refrigerant gas

Work health and safety (WHS)/occupational health and safety (OHS) hazards may include:

- Heavy objects securely lashed
- Leaking fuel
- Loose machinery guards
- Slippery decks

Engines, propulsion plant and auxiliary systems may include:

- Auxiliary equipment and associated spaces
- Cooling systems
- Fuel systems
- Gearbox
- Lubricating systems
- Marine two- and four-stroke:
 - diesel engines
 - petrol engines
- Propeller and immediate shafting alignment
- Pumping systems
- Refrigeration systems
- Steering systems
- Sterndrive and water jet drive units

Environmental implications may include:

- Accidental release of refrigeration gas
- Excessive noise
- Exhaust emissions
- Loss of fuel and oil overboard
- Pumping bilges

Polluting substances may include:

- Chemicals
- Oils
- Refrigeration gases
- Sewage

Operational records may include:

- Ballast log
- Maintenance logs
- Oil record book
- Running logs

Emergencies may include:

- Emergency steering
- Failure of the main engine
- Fire
- Flooding

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC3006A Operate deck machinery, cargo handling gear and equipment on a vessel

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMR3407B Operate deck machinery.

Unit Descriptor

This unit involves the skills and knowledge required to operate deck machinery and cargo handling gear and equipment on a vessel.

Application of the Unit

This unit applies to an Integrated Rating.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Prepare for 1.1 Routine pre-operational checks of *deck machinery* or *cargo handling*

- operation** *gear and equipment* are completed prior to use according to manufacturer specifications and organisational procedures
- 1.2 **Preparations** for operations are made and lifting equipment is set up according to organisational procedures
- 1.3 Tools and equipment appropriate to work requirements are selected, checked for safety and set up for operation
- 1.4 **Safety equipment** appropriate to work requirements are made ready and are in good condition
- 1.5 **Methods of communication** are established and agreed to
- 1.6 Equipment faults or malfunctions are identified and reported according to organisational procedures
- 1.7 Work health and safety (WHS)/occupational health and safety (OHS) **hazards** in the work area are identified and risks are assessed and reported according to organisational procedures
- 2 Operate deck machinery, cargo handling gear and equipment**
- 2.1 Suitable personal protective equipment is selected and used according to organisational procedures
- 2.2 **Hazard control procedures** are identified and applied to ensure safe operation of deck machinery and cargo handling equipment
- 2.3 Deck machinery and cargo handling gear and equipment are operated in a safe and controlled manner
- 2.4 Performance and efficiency of deck machinery and cargo handling gear and equipment operations is monitored
- 2.5 Safe operational practices are used to anticipate and control hazards
- 2.6 Adverse sea and weather conditions that may impact on the operation of deck machinery, and cargo handling gear and equipment are identified and operational practices are adjusted to maintain safety of vessel and personnel
- 3 Complete operations**
- 3.1 Shut-down procedures are conducted according to manufacturer instructions and organisational procedures
- 3.2 Malfunctions, faults, irregular performance or damage to deck machinery and cargo handling gear and equipment are reported according to organisational procedures
- 3.3 Deck machinery and cargo handling gear and equipment are maintained and secured according to organisational procedures

3.4 Operational records are completed according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply risk assessment and hazard control strategies
- Complete any required records related to the operation of deck machinery and cargo handling gear and equipment
- Follow work schedules laid down in organisational instructions and safety management systems
- Operate anchoring equipment under various conditions such as anchoring, weighing anchor, securing for sea and in emergencies
- Read, interpret and apply instructions on the operation of deck machinery and cargo handling gear and equipment
- Recognise faulty equipment and take appropriate action
- Recognise routine hazards and problems while operating deck machinery and cargo handling gear and equipment
- Select and use relevant tools and equipment
- Use and handle deck and cargo handling gear and equipment
- Use basic signals to operate equipment including winches, cranes, windlasses and hoists
- Work safely and collaboratively with others when operating and maintaining deck machinery and cargo handling gear and equipment
- Work safely at heights and correctly apply and use safety equipment

Required Knowledge:

- Basic signals for the operation of equipment including winches, cranes, windlasses and hoists
- Communication techniques and signals needed during the operation of deck machinery and cargo handling gear and equipment
- Correct application and use of all rigging and associated equipment
- Fibre and wire ropes, cables and chains including their construction, use markings, maintenance and proper stowage
- Function and uses of:
 - valves and pumps, hoists, cranes, booms and related equipment
 - winches, windlasses, capstans and related equipment

- Hatches, watertight doors, ports and related equipment
- Principal features and operating characteristics of steering gear and deck machinery used on a range of vessel types
- Procedures for:
 - checking and inspecting deck machinery and cargo handling gear and equipment used on vessels
 - safe operation of deck machinery and cargo handling gear and equipment
- Problems related to operating deck machinery and cargo handling gear and equipment and appropriate actions and solutions
- Records that must be maintained on a vessel
- Relevant regulatory, WHS/OHS and pollution control regulations and policies
- Safe working loads of ropes, wires, blocks, chains and lifting gear
- Safety, environmental and hazard control precautions and procedures relevant to the operation of deck machinery and cargo handling gear and equipment
- Types and functions of rigging, safety and associated equipment, and their limitations

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- exercising all safety, environmental and hazard control precautions and procedures during operation of deck machinery, cargo handling gear and equipment on a vessel
- effectively communicating with others when operating deck machinery, cargo handling gear and equipment on a vessel.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where operating deck machinery, cargo handling gear and equipment on a vessel may be conducted
- tools, equipment and personal protective equipment currently used in industry

- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate operating deck machinery, cargo handling gear and equipment on a vessel
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Deck machinery may include:
- Anchoring equipment
 - Blocks and tackle
 - Booms
 - Cables and chains
 - Cranes

- Derricks
 - Fibre and wire ropes
 - Freeing ports
 - Hatches and hatch covers
 - Hoists
 - Internal ramps associated with bow and stern door loading arrangements
 - Pipeline systems – bilge and ballast suctions and wells
 - Side/bow/stern doors or elevators
 - Valves and pumps
 - Watertight doors
 - Winches and capstans
 - Windlasses
- Cargo handling gear and equipment may include:
- Chain blocks
 - Chains
 - Eye bolts
 - Fibre ropes
 - Flexible steel wire rope (FSWR)
 - Rigging screws
 - Shackles
 - Sheaves
 - Turnbuckles
 - Wire and synthetic slings
- Preparations must include:
- Cargo gear record book entries
 - Checking safe working load of equipment
 - Establishing communications
 - Identifying hazards
 - Identifying locations of load site and destination
 - Planning for lifting operations
 - Pre-operational checks
 - Safety devices
- Safety equipment must include:
- Free fall arrest devices
 - Safety harness
 - Safety nets
 - Static safety lines
- Methods of communication may include:
- Hand signals
 - Hand held radios
 - Listening
 - Questioning to confirm understanding and appropriate worksite protocol
 - Signage
 - Written instructions

Hazards may include:

- Insufficient lighting
- Overhead obstructions
- Other personnel in area of operation
- Weather conditions

Hazard control procedures may include:

- Ensuring operation is visible to operator at all times or a watchperson is utilised to ensure a lift is monitored at all times
- Identifying hazards and assessing risks of the operation
- Inspecting equipment and record books before commencing operations
- Providing adequate lighting
- Wearing appropriate protective clothing

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC3007A Operate electrical systems

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMR2907B Operate and maintain marine low and medium voltage electrical systems.

Unit Descriptor

This unit involves the skills and knowledge required to operate 220 to 440 voltage alternating current (AC) electrical systems.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 2 on vessels up to 750 kW or as a Marine Engine Driver Steam.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|---|-----|---|
| 1 Prepare electrical systems and equipment for operation | 1.1 | Risks to self, others and the environment are identified according to organisational procedures |
| | 1.2 | Pre-operational checks are carried out according to manufacturer specifications and organisational procedures |
| 2 Operate electrical systems and equipment | 2.1 | <i>Electrical systems and equipment</i> are operated according to manufacturer specifications, regulations and vessel procedures |
| | 2.2 | Performance of electrical equipment is monitored |
| | 2.3 | AC electrical supply is monitored and demand is <i>adjusted</i> |
| | 2.4 | <i>Operational faults</i> are recognised and recorded, and corrective action is taken according to manufacturer specifications and fault-finding procedures |
| 3 Connect and disconnect ship to shore electrical supply | 3.1 | Vessel is positioned and secured for connecting to shore electrical supply |
| | 3.2 | Power cable is inspected and connected to shore supply |
| | 3.3 | Procedures for changing from vessel supply to shore supply are implemented following vessel procedures |
| | 3.4 | Electrical supply is monitored for correct operation according to vessel procedures |
| | 3.5 | Operational faults are recognised and recorded, and corrective action is taken according to vessel procedures |
| | 3.6 | Procedures for changing from shore supply to vessel supply are implemented following vessel procedures |
| | 3.7 | Power cable is disconnected, inspected and stored |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Adjust electrical supply to accommodate load demand
- Connect and disconnect shore supply
- Locate, interpret and apply manufacturer specifications for electrical systems and

equipment

- Operate and monitor alternating current (AC) electrical systems according manufacturer recommendations, regulations and vessel operating procedures to ensure safe operation
- Operate and monitor direct current (DC) systems according to manufacturer recommendations, regulations and vessel operating procedures to ensure safe operation
- Recognise electrical system faults and where necessary, take steps to make them immediately safe

Required Knowledge:

- Basic care of electrical systems and equipment in general - fault recognition
- Batteries:
 - care
 - hazards
 - types
- Charging systems:
 - alarms/indicators
 - regulators
- Connecting batteries in series and parallel
- DC systems not exceeding 32V DC
- Earth indicating devices
- Electric systems (above 32 V DC and up to 415 V AC)
- Emergency supply and regulatory requirements
- Fault identification, location, and safety implications
- Operation of starter motors, alternators and associated equipment
- Personal safety
- Protective devices on switchboards
- Shore power connection
- Single and three-phase SC power
- Uses of fuses and circuit breakers
 - selection of correct capacity
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the

performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- working safely at all times
- attention to appropriate level of detail in recordkeeping.
- Performance is demonstrated consistently over time and in a suitable range of contexts.

Context of and specific resources for assessment

Resources for assessment include access to:

- industry-approved marine operations site where operating electrical systems can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate operating electrical systems
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Electrical systems and equipment may include:

- Batteries
- Charging systems
- Fuses and circuit breakers
- Generators/alternators
- Motors
- Shore power connection
- Starter motors
- Switchboards

Adjusted may include:

- Changing electrical supply to a larger alternator
- Connecting further alternators in parallel
- Requesting non-essential electrical systems be isolated

Operational faults may include:

- Battery faults
- Earth faults
- Failure of:
 - starter motors
 - alternators to produce voltage
- Faults with shore power connections including phase rotations
- Operation of fuses and circuit breakers
- Operation of protection devices on the switchboard

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC3008A Operate engine equipment and associated propulsion plant

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to operate, monitor and evaluate engine performance and associated propulsion plant.

Application of the Unit

This unit applies to an Integrated Rating who assists in the operation engine equipment and associated propulsion plant as required on a range of vessels.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Plan and 1.1 *Safety issues* are identified to comply with organisational procedures

- prepare work**
- 1.2 Work requirements of *engine and plant* are identified from relevant personnel and documentation
 - 1.3 Localised engine and plant inspection is carried out according to manufacturer specifications and organisational procedures
 - 1.4 *Engine and plant operational prerequisites* are established according to manufacturer specifications and organisational procedures
 - 1.5 Sequence of recommissioning of plant is determined to suit existing circumstances according to manufacturer specifications and organisational procedures
- 2 Operate engines and associated propulsion plant**
- 2.1 Engines and plant are operated according to manufacturer specifications and organisational procedures
 - 2.2 Performance of engines and plant is monitored to detect deviations from normal operating conditions
 - 2.3 Corrective actions are taken to rectify abnormalities according to manufacturer specifications and organisational procedures
 - 2.4 Faulty and worn engine equipment and components are identified and reported according to manufacturer specifications and organisational procedures
 - 2.5 Action is taken when an engine fails or *emergencies* occur to secure the engine or machinery and to maintain the safety of the vessel and persons involved according to organisational procedures
- 3 Test engines and associated propulsion plant**
- 3.1 *Tests* are performed according to manufacturer specifications and organisational procedures
 - 3.2 Engines and associated propulsion equipment are observed for correct operational response
 - 3.3 Corrective actions are taken to rectify abnormalities according to manufacturer specifications and organisational procedures
- 4 Analyse engines and associated propulsion plant faults**
- 4.1 Cause of abnormal operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
 - 4.2 Corrective actions are taken to rectify abnormalities according to manufacturer specifications and organisational procedures
 - 4.3 Plant integrity is maintained according to manufacturer specifications and organisational procedures

- 5 Complete documentation**
- 5.1 Correct records are logged relating to the operation and performance of engines and associated propulsion equipment according to regulatory requirements and organisational procedures
 - 5.2 Documentation is updated and engine and plant problems, abnormalities and status are reported according to regulatory requirements and organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Avoid polluting the environment
- Carry out calculations required when operating, monitoring and evaluating the performance of engines on vessels
- Identify problems that can occur during the operation of engines on vessels
- Interpret and follow procedures for the operation, monitoring and evaluation of the performance of engines on vessels
- Operate and maintain bilge and ballast systems according to manufacturer instructions and organisational procedures
- Read and interpret:
 - equipment performance readings and instrumentation
 - safety data sheets (SDS)/material safety data sheets (MSDS)
 - vessel and machinery specifications, machinery design drawings, machine drawings, operational manuals, specifications, and electrical and control circuit diagrams
- Recognise and report electrical hazards and unsafe equipment
- Select and use tools required for operating, monitoring and evaluating the performance of engines on vessels

Required Knowledge:

- Causes of electric shock and precautions to be observed to prevent shock
- Hazards and problems that can occur during the operation and performance of engines, propulsion plant and auxiliary machinery and appropriate preventative and remedial actions and solutions
- Methods of providing air for combustion
- National and international regulations, IMO Conventions and Codes, class rules applicable to the operation and performance evaluation of engines, propulsion plant and auxiliary machinery on vessels

- Nature and causes of typical malfunctions and/or poor performance of engines, propulsion plant and auxiliary machinery and the available methods for their detection and rectification
- Procedures for:
 - carrying out performance evaluation of engines, propulsion plant and auxiliary machinery
 - testing and treating auxiliary boiler water, machinery cooling water and lubricating oil
- Principles and functions of machinery space monitoring and alarm systems
- Principles and operational characteristics of:
 - internal combustion engines
 - marine gas engines
 - steam turbines, gearing and associated equipment as they apply to auxiliary systems
 - auxiliary boilers and associated equipment
- Principles of:
 - fuel systems
 - engine cooling and lubrication
 - marine control systems
 - thermodynamics and heat and heat engines relevant to detection, identification and repair of faults
- Principles of operation of hydraulic and electronic governors and overspeed trips
- Relevant work health and safety (WHS)/occupational health and safety (OHS) legislation, policies and procedures
- Safe function, operation and maintenance of bilge and ballast systems
- Safe operation of equipment including valves and pumps
- Safe use and operation of electrical equipment including safety precautions before commencing work or repair, isolation procedures, emergency procedures and different voltages on board
- Safety, environmental and hazard control precautions and procedures relevant to the operation and performance of engines, propulsion plant and auxiliary machinery
- Theory and preventative strategies for scavenge and uptake fires, and starting air-line, crankcase and gearbox explosions
- Typical SDS/MSDS, vessel and machinery specifications, machinery design drawings, machine drawings, operational manuals, specifications, and electrical and control circuit diagrams

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment

Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- attention to appropriate level of detail in recordkeeping
- producing reliable documentation.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where operating engine equipment and associated propulsion plant may be conducted or simulated
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate operating engine equipment and associated propulsion plant in actual or simulated emergency situations
- direct observation of candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required

Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Safety issues may include:

- Entry into pump-room, fuel tanks and other confined spaces on a vessel
- Hazards involved in engines, propulsion plan and auxiliary equipment operation
- Pollution control

Engine and plant may include:

- Alarm systems
- Auxiliary boilers and associated equipment
- Auxiliary machinery
- Fuel systems
- Gas turbines
- Hydraulic and electronic governors
- Internal combustion engines
- Marine control systems
- Overspeed trips

Engine and plant operational prerequisites may include:

- Anti-pollution rules and regulations
- Bridge orders
- Hazard control precautions and procedures
- Safety rules and regulations
- Survey requirements
- Technical specifications

Emergencies may include:

- Scavenge and uptake fires
- Starting air-line, crankcase and gearbox explosions

Tests may include:

- Auxiliary boiler water
- Lubricating oil
- Machinery cooling water

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC4001A Manage a propulsion unit using appropriate engine systems and support services

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMC607B Manage a propulsion unit using the appropriate engine systems and support services.

Unit Descriptor

This unit involves the skills and knowledge required to operate a propulsion unit using appropriate engine systems and support services according to technical specifications and safe operating limits.

Application of the Unit

This unit applies to those working in the capacity of Master on a range of vessels up to 80 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 **Prepare for operation**
 - 1.1 Routine pre-operational checks of *propulsion unit, engine systems and support services* are completed prior to use according to manufacturer specifications and organisational procedures
 - 1.2 Propulsion unit, engine systems and support services are calibrated or set up correctly
 - 1.3 Faults or malfunctions are identified and reported according to organisational procedures
 - 1.4 Work health and safety (WHS)/occupational health and safety (OHS) hazards in the work area are identified and risk is assessed and reported according to organisational procedures
- 2 **Operate propulsion unit, engine systems and support services**
 - 2.1 Risks to self, others and the environment are identified according to organisational procedures
 - 2.2 Suitable personal protective equipment is selected and used according to organisational procedures
 - 2.3 Controls of propulsion unit, engine systems and support services are operated in a safe and controlled manner
 - 2.4 Performance and efficiency of propulsion unit, engine systems and support services operations is monitored
 - 2.5 Safe operational practices are used to anticipate and control hazards
 - 2.6 Adverse sea and weather conditions that may impact on operation of propulsion unit, engine systems and support services are identified and operational practices are adjusted to maintain safety of vessel and personnel
 - 2.7 Procedures to be undertaken in the event of *emergencies* are recognised and implemented
- 3 **Complete operations and check propulsion unit, engine systems and support services**
 - 3.1 Shut-down procedures are conducted according to manufacturer instructions and organisational procedures
 - 3.2 Malfunctions, faults, irregular performance or damage to propulsion unit, engine systems and support services are reported according to organisational procedures
 - 3.3 Propulsion unit, engine systems and support services are cleaned and secured according to organisational procedures
 - 3.4 *Operational records* are completed according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Carry out necessary calculations associated with managing propulsion unit
- Communicate effectively with other personnel
- Keep records of monitoring and operation of safety and fire detection/suppression equipment, and any required remedial action
- Maintain records of operation and maintenance of propulsion unit, ancillary power units, equipment and any related safety incidents
- Monitor and evaluate performance of propulsion unit, ancillary power units and equipment
- Read and interpret:
 - manufacturer instructions for operation of propulsion systems and auxiliary systems
 - maritime regulations, rules and instructions
- Recognise problems that may occur with remote control of propulsion unit, ancillary power units and equipment, and take appropriate preventative and remedial action
- Recognise when performance of propulsion unit or ancillary power units and equipment is unsatisfactory or outside specified limits and take appropriate action
- Work collaboratively with other shipboard personnel and passengers during vessel operations

Required Knowledge:

- Characteristics of propulsion units, ancillary power units and equipment including operational limits, vessel stopping distances and turning circles at various draughts, speeds and conditions of loading
- Dangers associated with operation of shipboard ancillary power units and related hazard prevention strategies
- Marine engineering terms
- Methods for controlling and managing operation of shipboard propulsion units, ancillary power units and equipment
- Principles of operation and control of various shipboard emergency systems
- Problems associated with remote control of propulsion unit, ancillary power units and equipment and appropriate preventative and remedial action and solutions
- Procedures for monitoring and evaluating performance of propulsion unit, ancillary power units and equipment
- Relevant sections of state and territory maritime regulations, National Standard for Commercial Vessels (NSCV) and Uniform Shipping Laws (USL) Code
- Relationship between vessel speed and fuel consumption, including meaning of economical

revolutions per minute (RPM) and its application

- Relevant WHS/OHS legislation and policies
- Requirements for waste management and control systems under the MARPOL Convention
- Sequence of required action when power unit becomes overloaded

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- working as part of a team
- attention to appropriate level of detail in recordkeeping
- providing the required amount of detail in reports.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- appropriate sized vessel or simulator where managing a propulsion unit using appropriate engine systems and support services may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess

practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing a propulsion unit using appropriate engine systems and support services
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Propulsion unit and engine systems must include:

- Ancillary systems and controls
- Bow and stern thrusters units
- Controllable pitch propellers (CPP)
- Diesel engines
- Engine systems and controls
- Gearing systems
- Hydraulic systems and controls
- Performance indicators
- Power generating units and controls
- Propeller shafting arrangements
- Pumps and pumping systems
- Safety alarm systems
- Speed and fuel consumption indicators
- Steering gear

Support services may include:

- Air conditioning systems
- Air starting systems
- Bilge systems
- Cooling water systems
- Fire detection and suppression systems
- Fuel pumps, lines and tanks

- Emergencies must include:
- Lubrication systems
 - Refrigeration systems
 - Steering gear systems
 - Waste management and pollution control systems
 - Water pumping systems
 - Fire or explosion
 - Flooding
 - Loss of:
 - propulsion
 - electrical power
 - steering
- Operational records must include:
- Instructions of relevant maritime authorities
 - Log books
 - Operational orders from the organisation's safety management system
 - Plant and equipment manufacturer instructions and recommended procedures
 - Relevant sections of state and territory maritime regulations, NCSV and USL Code related to operation of propulsion plants and ancillary equipment

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC4002A Monitor and manage vessel operations

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to plan and oversee activities associated with the regulatory and operational requirements for the continued performance and safety of a coastal vessel.

Application of the Unit

This unit applies to people working in the maritime industry in the capacity of Master on a range of vessels up to 80 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|------------------------------|--|
| 1 Develop operational | 1.1 <i>Action plan</i> is developed to provide a clear and coherent direction according to organisational goals and objectives |
|------------------------------|--|

- strategies and procedures**
- 1.2 ***Work health and safety (WHS)/occupational health and safety (OHS) and environmental issues*** are identified, and strategies are implemented to minimise risk factors
 - 1.3 Quality system is developed for vessel in line with industry standards, compliance and organisational requirements
 - 1.4 Performance measures and ***operational targets*** are developed to conform with business plan
 - 1.5 Procedures are established and implemented according to organisational and legislative requirements
 - 1.6 Procedures are communicated to crew members
- 2 Supervise crew compliance with regulatory requirements**
- 2.1 Regulatory body requirements are correctly interpreted and applied
 - 2.2 Instructions for crew members are developed and implemented
 - 2.3 Crew members are briefed
 - 2.4 Liaison with regulatory body officials is undertaken
- 3 Plan resources for vessel operations**
- 3.1 ***Vessel resource and equipment requirements*** are investigated and documented
 - 3.2 Resource needs are prioritised and matched to vessel budget, and priorities are confirmed after consultation with crew members
 - 3.3 Procurement plan with prioritised purchasing is devised and resources are procured accordingly
- 4 Plan vessel operations logistics**
- 4.1 ***Operational work plans*** are developed
 - 4.2 Operations are checked to ensure optimum use of human and physical resources
 - 4.3 Tasks are implemented according to plans and specifications
 - 4.4 Operational plans are implemented and crew members are briefed as to roles and responsibilities
 - 4.5 Operational plans are documented and amended according to procedures and crew expectations
 - 4.6 Proposed variations are investigated and negotiated in consultation with crew members
- 5 Evaluate operational**
- 5.1 Operational progress is closely monitored against required quality of work and adherence to both budget and time schedule

processes

- 5.2 Opportunities for preventative or corrective changes are identified using outcomes of monitoring activities and feedback from crew members
- 5.3 Preventative and/or corrective action is recommended and implemented
- 5.4 Changes are communicated to appropriate persons in a logical and easily understood manner
- 5.5 Changes are monitored to confirm improvement in crew efficiency
- 5.6 Records are maintained of key information pertaining to operational processes according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Collect, organise and understand information related to vessel resource and logistic requirements
- Communicate ideas and information to enable input from crew and understanding by crew of plans developed
- Liaise with other crew members on a range of operational issues and challenges
- Monitor and respond to compliance issues and measure progress against agreed objectives
- Plan and organise activities including consulting with crew to determine resource and logistics requirements, and developing, implementing and reviewing operational plans
- Undertake a job safety analysis for working in areas of high risk
- Use information gathering techniques to determine crew requirements and develop strategies to address these
- Use mathematical techniques to correctly interpret budgets and estimate material requirements

Required Knowledge:

- Analytical tools
- Decision-making models and techniques
- Information gathering strategies
- Logistics and procurement management techniques
- Operational plan development

- Resource availability

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- developing effective planning documents
- completing a review of and updating the process for vessel operations.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site or simulation where monitoring and managing vessel operations may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate monitoring and

managing vessel operations

- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Action plan must include:

- Cargo plan
- Dry-docking and slipping operations
- Planned maintenance system
- Safety management plan
- Voyage planning

Work health and safety (WHS)/occupational health and safety (OHS) and environmental issues must include:

- Working at heights
- Working in:
 - confined spaces
 - freezer spaces

Operational targets may include:

- Working overside on stages
- Achievement of key performance indicators (KPIs) from the business plan
- Optimum fuel usage
- On time completion of survey and docking operations
- Passage planning to achieve safe and efficient routing

Vessel resource and equipment requirements may include:

- Charts and publications for the intended voyage
- Stores, fuel and spare parts sufficient for the voyage
- Tools and equipment necessary to

Operational work plans may include:

- conduct planned maintenance
- Docking and repair plans
- Managing confined space entry
- Passage planning
- Periodic survey requirements

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC4003A Operate auxiliary machinery systems up to 1500 kW

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to operate auxiliary machinery systems up to 1500 kW according to technical specifications and safe operating limit.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 1 on vessels up to 1500 kW.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Prepare for operation 1.1 Risks to self, others and the environment are identified

- according to organisational procedures
- 1.2 Routine pre-operational checks of *auxiliary machinery systems* are completed prior to use according to manufacturer specifications and organisational procedures
- 2 Operate auxiliary machinery systems**
- 2.1 Suitable personal protective equipment is selected and used according to organisational procedures
- 2.2 Auxiliary machinery systems are operated in a safe and controlled manner
- 2.3 Performance of auxiliary machinery system operations are monitored
- 2.4 Adverse sea and weather conditions that may impact on operation of auxiliary machinery systems are identified and operational practices are adjusted to maintain safety of vessel and personnel
- 2.5 Faults or malfunctions are identified and recorded according to organisational procedures
- 2.6 Faults or malfunctions are rectified and corrective actions are taken and recorded according to organisational procedures
- 2.7 Procedures to be undertaken in *emergencies* are recognised and implemented
- 3 Complete operations and check auxiliary machinery systems**
- 3.1 Shut-down procedures are conducted according to manufacturer instructions and organisational procedures
- 3.2 *Operational records* are completed as required according to organisational procedures and regulatory requirements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Maintain records of the operation and maintenance of auxiliary machinery systems and any related safety incidents
- Monitor and evaluate performance of auxiliary machinery systems
- Operate all equipment

- Read and interpret:
 - manufacturer instructions for the operation of auxiliary machinery systems
 - maritime regulations, rules and instructions
- Recognise when the performance of auxiliary machinery systems is unsatisfactory or outside specified limits and take appropriate action
- Recognise problems that may occur with auxiliary machinery systems and take appropriate preventative and remedial action

Required Knowledge:

- Alarm panels
- Auxiliary systems, materials and construction
- Causes of deck machinery faults
- Characteristics of auxiliary machinery systems
- Closing devices and remote shut offs
- Dangers associated with operating shipboard auxiliary machinery systems and related hazard prevention strategies
- Drive systems, belts, clutches and motors
- Electro-hydraulic steering gear
- Emergency operation in electrical or hydraulic failure
- Emergency shut offs and closures
- Fire detection and fire alarm systems
- Fixed firefighting installations including CO₂, foam and water mist
- Function of:
 - grease
 - lubricating oil
- Hydraulic systems including steering gear
- Identification of:
 - refrigeration system components
 - faults in refrigeration systems
- Instrumentation used
- Methods for controlling and managing operation of shipboard auxiliary machinery systems
- Operation of deck machinery
- Problems associated with auxiliary machinery systems, and appropriate preventative and remedial action and solutions
- Procedures for monitoring and evaluating performance of auxiliary machinery systems
- Pumps and pumping systems for bilge, fire, fuel oil, freshwater and seawater systems
- Refrigeration:

- cycle
- plant and its operation
- Relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- Relevant sections of commonwealth, state and territory maritime regulations, National Standard for Commercial Vessels (NSCV)
- Requirements for waste management and pollution control under the MARPOL Convention from auxiliary machinery systems
- Rudder and stock support bearings, glands, packing and seals
- Rudder construction and rudder types
- Safe:
 - operation practices
 - working procedures
- Safeguards and protective devices for deck machinery
- Simple hydraulic circuits
- Strainers, mud-boxes and foot valves
- Terminology of materials technology
- Types of:
 - fixed firefighting systems including gas and foam flooding systems
 - pumps and associated safety devices
 - refrigerant
- Winches and windlass

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- being aware of own ability and limits to rectify irregularities or faults
- awareness of one's surroundings and changes to these surroundings
- attention to appropriate level of detail in recordkeeping.

Context of and specific

Performance is demonstrated consistently over time and in a

resources for assessment

suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where operating auxiliary machinery systems up to 1500 kW can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate operating auxiliary machinery systems up to 1500 kW
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work

environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Auxiliary machinery systems must include:
- Cargo discharging or loading systems
 - Commercial refrigeration and freezer plants
 - Compressed air
 - Control air systems
 - Deck machinery
 - Hydraulics
 - Fire, bilge and ballast pumping systems
 - Fixed gas and foam firefighting systems
 - Fresh water generation
 - Fuel and lubricating oil purification systems
 - Sewage treatment
 - Steering system including rudder
- Emergencies must include:
- Loss of:
 - control air pressure
 - electrical power
 - Failure of steering system
 - Hydraulic failure
- Operational records must include:
- Log books
 - Maintenance records
 - Plant and equipment manufacturer instructions and recommended procedures
 - Relevant maritime authority documentation relating to operating auxiliary machinery systems
 - Standard operating procedures from the organisation's safety management system

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC4004A Operate deck machinery and steering gear on a vessel up to 80 metres

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to operate steering gear and deck machinery on a vessel up to 80 metres.

Application of the Unit

This unit applies to working in the capacity of Master on a range of vessels up to 80 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|----------------------|--|
| 1 Prepare for | 1.1 Routine pre-operational checks of <i>steering gear or deck machinery</i> are completed prior to use according to manufacturer specifications |
|----------------------|--|

- operation** and organisational procedures
- 1.2 Equipment is set up
 - 1.3 **Tools and equipment** appropriate to work requirements are selected, checked for safety and set up for operation
 - 1.4 Equipment faults or malfunctions are identified and reported according to organisational procedures
 - 1.5 Work health and safety (WHS)/occupational health and safety (OHS) hazards in the work area are identified, and risks are assessed and reported according to organisational procedures
- 2 Operate steering gear and deck machinery**
- 2.1 Suitable personal protective equipment is selected and used according to organisational procedures
 - 2.2 Steering gear and deck machinery are operated in a safe and controlled manner
 - 2.3 Performance and efficiency of steering gear and deck machinery operations is monitored
 - 2.4 Safe operational practices are used to anticipate and control hazards
 - 2.5 Adverse sea and weather conditions which may impact on the operation of steering gear and deck machinery are identified and operational practices are adjusted to maintain safety of vessel and personnel
- 3 Complete operations**
- 3.1 Shut-down procedures are conducted according to manufacturer instructions and organisational procedures
 - 3.2 Malfunctions, faults, irregular performance or damage to steering gear and deck machinery are reported according to organisational procedures
 - 3.3 Steering gear and deck machinery is cleaned and secured according to organisational procedures
 - 3.4 Operational records are completed according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Complete required records relating to the operation of steering gear and deck machinery
- Follow work schedules laid down in organisational instructions and safety management systems
- Initiate and operate emergency steering systems
- Read, interpret and apply instructions on the operation of steering gear and deck machinery
- Recognise faulty equipment and take appropriate action
- Recognise routine hazards and problems while operating steering gear and deck machinery
- Select and use relevant tools and equipment
- Work safely and collaboratively with others when operating and maintaining deck machinery and steering gear

Required Knowledge:

- Basic principles of hydraulics
- Communication techniques and signals needed during the operation of steering gear and deck machinery on vessels up to 80 metres
- Principal features and operating characteristics of steering gear and deck machinery used on vessels up to 80 metres
- Problems related to the operation of steering gear and deck machinery and appropriate actions and solutions
- Procedures for checking and inspecting steering gear and deck machinery used on vessels up to 80 metres
- Procedures for the safe operation of steering gear and deck machinery
- Procedures for, and operation of, emergency steering systems
- Records that must be maintained on a vessel up to 80 metres
- Relevant state and territory maritime WHS/OHS and pollution control regulations and policies
- Safety, environmental and hazard control precautions and procedures relevant to the operation of steering gear and deck machinery

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- communicating effectively with others
- providing the required amount of detail in reports
- attention to appropriate level of detail in recordkeeping.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where operating steering gear and deck machinery on a vessel up to 80 metres may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate operating steering gear and deck machinery on a vessel up to 80 metres
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Steering gear or deck machinery may include:

- Basic hydraulic systems
- Cranes
- Emergency steering gear
- Fishing gear
- Steering gear
- Winches and capstans
- Windlass

Tools and equipment may include:

- Greasing and lubrication tools
- Hand and power tools, including screwdrivers, drills, grinders, spanners, wrenches, wire cutters
- Protective clothing and equipment

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC4005A Operate marine internal combustion engines and associated systems up to 1500 kW

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to operate a marine internal combustion engine and associated systems up to 1500 kW according to technical specifications and safe operating limits.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 1 on vessels up to 1500 kW.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|--|
| 1 Prepare for operation | 1.1 Risks to self, others and the environment are identified according to organisational procedures |
| | 1.2 Routine pre-operational checks of marine internal combustion engines and <i>associated systems</i> are completed prior to use according to manufacturer specifications and organisational procedures |
| 2 Operate marine internal combustion engines and associated systems | 2.1 Suitable personal protective equipment is selected and used according to organisational procedures |
| | 2.2 Marine internal combustion engines and associated systems are operated in a safe and controlled manner |
| | 2.3 Performance of marine internal combustion engines and associated systems operations is <i>monitored</i> |
| | 2.4 Adverse sea and weather conditions that may impact on operating marine internal combustion engines and associated systems are identified and operational practices are adjusted to maintain safety of vessel and personnel |
| | 2.5 Faults or malfunctions are identified and recorded according to organisational procedures |
| | 2.6 Faults or malfunctions are rectified where possible and corrective actions are taken and recorded according to organisational procedures |
| | 2.7 Restrictions are applied to operations if necessary and are agreed to with the Master |
| | 2.8 Procedures to be undertaken in of <i>emergencies</i> are recognised and implemented |
| 3 Complete operations | 3.1 Shut-down procedures are conducted according to manufacturer instructions and organisational procedures |
| | 3.2 <i>Operational records</i> are completed according to organisational procedures |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Carry out necessary calculations associated with managing marine internal combustion engines and associated systems including calculating:
 - areas and volumes of various shapes and circumference of circles
 - calibration tables
 - lubricating oil and fuel oil consumption, rate of fuel consumption (RFC), specific fuel consumption (SFC), effects on RFC and fuel requirements due to change in vessel speed or voyage deviations
 - relationship between vessel speed and fuel consumption, including the meaning of economical RPM and its application
 - tank capacities and pumping capacities for filling and emptying
- Maintain records of operating and maintaining marine internal combustion engines and associated systems, and any related safety incidents
- Read and interpret:
 - manufacturer instructions for operating marine internal combustion engines and associated systems
 - maritime regulations, rules and instructions
- Read and monitor various gauges and instruments to evaluate the performance of marine internal combustion engines and associated systems
- Recognise problems that may occur with marine internal combustion engines and associated systems, and take appropriate preventative and remedial action
- Recognise when performance of marine internal combustion engines and associated systems is unsatisfactory or outside of specified limits and take appropriate action

Required Knowledge:

- Characteristics of marine internal combustion engines and associated systems including operational limits
- Control systems
- Cooling water system and components
- Crankcase explosions and appropriate preventative and remedial action and solutions
- Dangers associated with operating shipboard marine internal combustion engines and associated systems, and related hazard prevention strategies
- Engine protection arrangements
- Force diagrams
- Fuel system including pumps and injectors
- Lubricating oil systems and components
- Materials and construction techniques of marine internal combustion engines and associated systems
- Methods for controlling and managing the operation of shipboard marine internal combustion engines and associated systems
- Pollution control measures under relevant local, state, territory and commonwealth

legislation

- Problems associated with marine internal combustion engines and associated systems, and appropriate preventative and remedial action and solutions
- Procedures for monitoring and evaluating performance of marine internal combustion engines and associated systems
- Relationship between vessel speed and fuel consumption, including the meaning of economical RPM and its application
- Relevant sections of state and territory maritime regulations and NSCV
- Relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- Requirements under MARPOL Convention for emission control from internal combustion engines
- Sequence of required action when there is a major fault on main propulsion engine
- Technological changes in engine and control system designs
- Turbocharging systems

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- attention to appropriate level of detail in recordkeeping
- being aware of own ability and limits to rectify irregularities and faults
- awareness of surroundings and changes to these surroundings.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where operating marine internal combustion engines and associated systems up to 1500 kW can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities

- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate operating marine internal combustion engines and associated systems up to 1500 kW
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Associated systems must include:
- Air start
 - Control systems
 - Cooling system
 - Dual fuel systems
 - Exhaust systems
 - Lubrication systems

Monitored may include:

- Conducting performance tests
- Reading gauges and instruments
- Responding to alarms

Emergencies must include:

- Explosion
- Failure or major fault in propulsion engines and associated control systems
- Fire
- Loss of:
 - bridge control
 - electrical supply
 - propulsion power
 - steering
- Major breakdowns

Operational records must include:

- Log books
- Maintenance records
- Operational orders from organisational safety management system
- Plant and equipment manufacturer instructions and recommended procedures
- Relevant maritime authorities documentation relating to operating marine internal combustion engines and associated systems

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC4006A Operate propulsion transmission systems up to 1500 kW

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to operate propulsion transmission systems up to 1500 kW according to technical specifications and safe operating limits.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 1 on vessels up to 1500 kW.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|----------------------|---|
| 1 Prepare for | 1.1 Risks to self, others and the environment are identified and precautions are taken to minimise risk according to organisational |
|----------------------|---|

operation	procedures
	1.2 Routine pre-operational checks of <i>propulsion transmission systems</i> are completed prior to use according to manufacturer specifications and organisational procedures
2 Operate propulsion transmission systems	2.1 Suitable personal protective equipment is selected and used according to organisational procedures
	2.2 Propulsion transmission systems are operated in a safe and controlled manner
	2.3 Performance of propulsion transmission system operations is monitored
	2.4 Faults or malfunctions are identified and recorded according to organisational procedures
	2.5 Faults or malfunctions are rectified and corrective actions are taken and recorded according to organisational procedures
	2.6 Procedures to be undertaken in <i>emergencies</i> are recognised and implemented
	2.7 Suitable personal protective equipment is selected and used according to organisational procedures
3 Complete operations	3.1 Shut-down procedures are conducted according to manufacturer instructions and organisational procedures
	3.2 <i>Operational records</i> are completed according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Carry out necessary calculations associated with managing propulsion transmission systems including:
 - calculating gear box ratios, theoretical distance and propeller slip
- Maintain records of operating maintaining propulsion transmission systems and any related safety incidents
- Operate emergency power transmission system
- Read and interpret:

- manufacturer instructions for operating propulsion transmission systems
- maritime regulations, rules and instructions
- Read and monitor various gauges and evaluate performance of propulsion transmission systems
- Recognise problems that may occur with propulsion transmission systems and take appropriate preventative and remedial action
- Recognise when performance of propulsion transmission systems is unsatisfactory or outside of specified limits and take appropriate action

Required Knowledge:

- Characteristics of propulsion transmission systems including operational limits
- Fault identification on gearbox
- Gearbox:
 - construction and materials
 - lubricating and cooling systems and components
- Methods for controlling and managing the operation of shipboard propulsion transmission systems
- Problems associated with propulsion transmission systems and appropriate preventative and remedial action and solutions
- Procedures for monitoring and evaluating performance of propulsion transmission systems
- Propeller shape, design and materials
- Propeller types and arrangements including fixed pitch and controllable pitch propellers
- Relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- Reverse and reduction gearbox construction and operation
- Shaft:
 - bearings
 - seals and glands
- Shafting materials
- Steerable/rudder propellers
- Stern and jet water drive
- Stern tube bearing systems including lubrication, materials and components
- Types of gear trains

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the

performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- attention to appropriate level of detail in recordkeeping
- being aware of own ability and limits to rectify irregularities and faults.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where operating propulsion transmission systems up to 1500 kW can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate operating propulsion transmission systems up to 1500 kW
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be

combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Propulsion transmission systems must include:

- Control system
- Fixed pitch and controllable pitch propellers
- Gearbox and reduction gear arrangements
- Intermediate bearings
- Propeller types and arrangements
- Shafting arrangements
- Stern tube and their systems
- Transmission system

Emergencies must include:

- Failure or major fault in:
 - propulsion transmission system or associated systems

Operational records must include:

- Log books
- Maintenance scheduling and maintenance records from organisation's safety management system
- Plant and equipment manufacturer instructions and recommended procedures

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC4007A Operate 240 to 440 voltage alternating current electrical systems

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to operate a 240 to 440 voltage alternating current (AC) electrical system according to technical specifications and safe operating limits.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 1 on vessels up to 1500 kW.

WARNING: Relevant state/territory training and qualification requirements need to be fulfilled by any persons carrying out installation, maintenance and/or repair of refrigeration equipment especially with regard to preventing the escape of refrigerants into the atmosphere and to electrical work.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|---|-----|---|
| 1 Prepare for operation | 1.1 | Risks to self, others and the environment are identified according to organisational procedures |
| | 1.2 | Routine pre-operational checks of <i>electrical systems</i> are completed prior to use according to manufacturer specifications and organisational procedures |
| 2 Operate electrical systems | 2.1 | Suitable personal protective equipment is selected and used according to organisational procedures |
| | 2.2 | Electrical systems are operated in a safe and controlled manner |
| | 2.3 | Performance of direct current (DC) and AC electrical systems is monitored |
| | 2.4 | AC electrical demand is monitored and additional generators are paralleled or disconnected as required |
| | 2.5 | Ship to shore electrical supply is connected and disconnected when required following established practices and organisational procedures |
| | 2.6 | Faults or malfunctions are identified and reported according to organisational procedures |
| | 2.7 | Faults or malfunctions are rectified and corrective actions are taken and recorded according to organisational procedures |
| | 2.8 | Procedures to be undertaken in <i>emergencies</i> are recognised and implemented |
| 3 Complete operations and check electrical systems | 3.1 | Shut-down procedures are conducted according to manufacturer instructions and organisational procedures |
| | 3.2 | <i>Operational records</i> are completed according to organisational procedures |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Carry out necessary calculations associated with managing electrical systems including:
 - battery ampere-hours and efficiency

- series and parallel configuration of battery supply
- adding resistors in series and parallel, and calculating current
- Connect to shore power
- Isolate electrical circuits
- Maintain records of operating and maintaining electrical systems, and any related safety incidents
- Monitor and evaluate performance of electrical systems
- Perform switchboard operations including the monitoring of electrical supply and procedures for paralleling generators
- Read and interpret:
 - manufacturer instructions for the operation of electrical systems
 - maritime regulations, rules and instructions
- Recognise problems that may occur with electrical systems and take appropriate preventative and remedial action
- Recognise when performance of electrical systems is unsatisfactory or outside of specified limits and take appropriate action
- Start emergency generator and supply switchboard where available
- Use hydrometer
- Use multi-meter to test for voltage and continuity

Required Knowledge:

- Battery:
 - operation
 - charging circuits and hazards associated with charging batteries
 - types, care and hazards
- Characteristics of electrical systems
- Dangers associated with operation of shipboard electrical systems and related hazard prevention strategies
- Earth detection devices
- Electrical distribution systems including emergency arrangements
- Faults associated with electrical systems and appropriate preventative and remedial action, and solutions
- Methods for managing operation of shipboard electrical systems
- Motor and alternator construction
- Motor starter circuits
- Principles of operation of various shipboard emergency systems including fire detection system, internal communications system and emergency generator
- Procedures for monitoring and evaluating performance of electrical systems

- Relevant sections of state and territory maritime regulations, NSCV and USL Code
- Relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- Safety devices fitted to switchboard and other electrical systems including fuses and circuit breakers
- Sequence of required action when power unit becomes overloaded
- Shore power arrangements
- Single and three phase AC power generation

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- attention to appropriate level of detail in recordkeeping
- being aware of own ability and limits to rectify irregularities and faults.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where operating 240 to 440 voltage AC electrical systems can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate operating 240 to 440 voltage AC electrical systems
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Electrical systems must include:

- Alternators
- Batteries and associated circuits
- Control circuits
- Fire detection
- Motors
- Starter circuits
- Switchboard

Emergencies must include:

- Failure of:
 - generator
 - emergency generator
- Fire
- Flooding

Operational records must include:

- Log books
- Maintenance records
- Operational orders from the organisation's safety management system
- Plant and equipment manufacturer instructions and

- recommended procedures
- Relevant maritime authorities documentation relating to operating electrical systems

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARC5001A Employ tools, equipment and materials in a shipboard context

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMB3707B Fabricate simple shipboard components.

Unit Descriptor

This unit involves the skills and knowledge required to employ tools, equipment and materials to perform maintenance activities on a vessel. It includes the use of hand, power and machine tools, welding equipment, heat treatment processes, soldering operations, adhesives and bonding materials in performing routine and non-routine maintenance activities.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 3.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Follow safe work practices**
 - 1.1 Work health and safety (WHS)/occupational health and safety (OHS) procedures relevant to using tools and equipment in a shipboard context are complied with
 - 1.2 Safety hazards are identified and reported according to safety and vessel procedures
 - 1.3 Prior to use, tools and equipment needed to carry out maintenance activities are checked for correct operation and safety according to safety and vessel procedures
 - 1.4 Before commencing maintenance activities, isolation precautions are implemented according to safety and vessel procedures
- 2 Carry out heat treatment**
 - 2.1 Requirements of job are determined from engineering drawings, job sheet or supervisor
 - 2.2 Heat treatment equipment is selected for required heat treatment according to safety, workplace and manufacturer requirements
 - 2.3 Equipment is set up and used according to standard operating procedures and manufacturer instructions
 - 2.4 Personal protective equipment (PPE) is used according to standard operating procedures
 - 2.5 Emergency procedures are complied with according to approved safety instructions
 - 2.6 Safety signs and symbols are identified and complied with according to approved safety instructions
 - 2.7 *Heat treatment process* is applied according to job, safety and workplace requirements
 - 2.8 Hazardous conditions are identified and risk control measures are implemented to maintain a safe work environment
- 3 Use hand tools**
 - 3.1 Hand tools are used according to workplace procedures, WHS/OHS requirements and manufacturer instructions.
 - 3.2 Faults with hand tools and equipment are identified and reported to appropriate personnel
- 4 Use hand power tools**
 - 4.1 Hand power tools are used according to workplace procedures, WHS/OHS requirements and manufacturer instructions.
 - 4.2 Faults with hand power tools and equipment are identified and

- reported to appropriate personnel
- 5 Perform onboard pipe work**
- 5.1 Job requirements are determined from engineering drawings, job sheet or supervisor
 - 5.2 Sequence of operations is determined according to workplace, WHS/OHS and job requirements
 - 5.3 Pipe work is fabricated and joined according to relevant standards, and job, safety and workplace requirements
 - 5.4 Pipe work is inspected for *defects* according to workplace procedures
 - 5.5 Pipe work is installed in specified location without damage or distortion to pipe work, surrounding environment or other services
 - 5.6 Type of filters and strainers in shipboard piping systems are located and determined using relevant engineering drawings and specifications
 - 5.7 Pipe work is tested for compliance with job specification and workplace requirements
- 6 Use machine tools**
- 6.1 Job requirements are determined from engineering drawings, job sheet or supervisor
 - 6.2 Sequence of operations is determined according to workplace, WHS/OHS and job requirements
 - 6.3 *Machine tools* are selected according to workplace procedures, WHS/OHS requirements and manufacturer instructions
 - 6.4 Machining operations are performed according to workplace, WHS/OHS and job requirements
 - 6.5 Components are measured in line with workplace, WHS/OHS and job requirements
 - 6.6 Machine is adjusted and maintained according to workplace, safety, manufacturer and job requirements
- 7 Perform welding and thermal cutting operations**
- 7.1 Job requirements are determined from engineering drawings, job sheet or supervisor
 - 7.2 Materials are prepared for welding using correct tools, equipment, materials and procedures
 - 7.3 Materials are welded using appropriate *welding process* according to relevant standards and job, safety and workplace requirements

- 7.4 **Joints** are welded according to relevant standards and job, safety and workplace requirements
- 7.5 Oxygen fuel gas cutting torch is used to cut straight lines and curves in mild steel plate up to 10 mm thick according to relevant standards and job, safety and workplace requirements
- 7.6 Weld is inspected according to relevant standards, and job and workplace requirements
- 8 Perform soldering operations**
- 8.1 Job requirements are determined from engineering drawings, job sheet or supervisor
- 8.2 Materials are prepared for soldering using correct tools, equipment, materials and procedures
- 8.3 Materials are soldered according to relevant standards and job, safety and workplace requirements
- 8.4 **Soldered joints** are performed according to relevant standards and job, safety and workplace requirements
- 8.5 Soldered joints are inspected according to relevant standards and job, and workplace requirements
- 8.6 Materials are desoldered using correct procedure and minimising damage to materials/components
- 9 Select and use sealants, adhesives, bonding agents, gaskets and packings**
- 9.1 Job requirements are determined from engineering drawings, job sheet or supervisor
- 9.2 Gaskets and packings are selected and used according to job requirements and manufacturer/component supplier instructions
- 9.3 Sealants and adhesives are selected and used according to job requirements and manufacturer/component supplier instructions
- 9.4 Plastic bonding is performed according to job requirements and manufacturer/component supplier instructions
- 9.5 Sealants, adhesives, bonding agents, gaskets and packings are stored according to workplace and manufacturer/component supplier instructions

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Communicate procedures associated with using hand and machine tools and equipment verbally and in writing
- Identify methods, procedures and materials needed for operating hand and power tools on vessels
- Read and interpret written information related to operating tools and equipment used for maintenance operations on board vessels, including technical manuals and specifications
- Safely use hand and machine tools

Required Knowledge:

- Characteristics, limitations and use of metals and non-metallic materials used in ship construction and repair
- Hand and power tools and component:
 - types
 - operational characteristics and performance specifications
 - maintenance
- Heat treatment:
 - material characteristics
 - applications, equipment and processes
 - emergency procedures
 - material preparation, quenching, preheating requirements
 - material condition during heat treating process
 - batch and/or piece loading of furnaces
 - safe loading of furnaces
 - hazards and control measures associated with heat treatment, including housekeeping
 - use and application of PPE
 - safe work practices and procedures
- Machine tools:
 - reasons for selecting chosen sequence of operations
 - methods of work holding
 - basic marking out techniques including datum points/lines
 - geometry of cutting tools for a range of materials and applications
 - benefits of using correctly sharpened cutting tools

- machine operation
- selection of feeds and speeds to suit a range of materials and operations within the scope of this unit
- correct methods of mounting a variety of cutting tools
- safety issues with regard to correct clamping, guards and shields
- tolerances and limits of size
- situations indicating need for machine adjustment, lubrication and cleaning
- techniques, tools and equipment to measure materials and machined components
- use and application of PPE
- safe work practices and procedures
- hazards and control measures associated with general machining
- Materials used in ship construction and repair:
 - metallurgy principles
 - types of materials
 - limitations of materials
 - properties of materials
- National and international regulations, IMO Conventions and Codes, including AMSA Marine Orders applicable to managing shipboard plant and equipment maintenance and repair operations on vessels
- Pipe work:
 - installation techniques
 - purging techniques, applications and precautions
 - capping/sealing pipe work and assembly methods
 - identifying location/layout of pipe work and assemblies, and application and characteristics of enclosure/hanging/supporting systems
 - pipe work, ancillary installation and joining procedures
 - leak testing applications and uses
- Procedures for completing temporary and permanent repair and/or replacement procedures for plant and equipment on board vessels at sea, alongside and in dry dock
- Properties and parameters of engineering materials
- Safety data sheets (SDS)/Material safety data sheets (MSDS)
- Sealants, gaskets, bonding agents, adhesives and packing:
 - dangers of working with sealants and adhesives
 - operating principles of gaskets and their relationship to other components
 - types, characteristics, uses and limitations of sealants and adhesives
 - gasket installation procedures
 - sealant and adhesives application techniques
- Soldering:
 - cleaning solutions and properties, and cleaning procedures
 - use and application of PPE for manual soldering/desoldering

- methods of joint preparation
- properties of fluxes and their uses
- heat and damage protection procedures
- procedures for preventing electrostatic discharge damage
- soldered joint testing and inspection procedures
- reworking procedures and precautions
- Testing procedures for materials under load:
 - compressive load testing procedures
 - shear load testing procedures
 - tensile load testing procedures
- Welding:
 - characteristics and properties of common metals and welding materials
 - effect of gas and electrical welding operations on metals
 - hazards and control measures associated with gas and electrical welding, including housekeeping
 - welding safety practices and procedures
 - effect of various treatments on a range of commonly used metals
 - use and application of PPE
- WHS/OHS legislation, policies and procedures

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- being aware of own ability and limits to rectify irregularities and faults
- ensuring currency of relevant WHS/OHS skills and knowledge
- initiating timely action in response to defects or damage.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where employing tools, equipment and materials in a shipboard context can

be conducted

- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate employing tools, equipment and materials in a shipboard context
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Heat treatment process may include:

- Annealing
- Hardening

- Hand tools may include:
- Normalising
 - Tempering
 - Anvil
 - Benders
 - Brushes
 - Chisels
 - Chucks
 - Cutters
 - Drills
 - Drivers
 - Files
 - Gear pullers
 - Hacksaws
 - Hammers
 - Nippers
 - Pliers
 - Punchers
 - Reamers
 - Scissors
 - Scrapers
 - Spanners
 - Swage block
 - Taps and dies
 - Vises
 - Wrenches
- Hand power tools may include:
- Drills
 - Grinders
 - Hand shear and nibbler
 - Impact wrenches
 - Portable jigsaw
 - Sanders
- Pipe work defects may include:
- Ovality
 - Thinning
- Machine tools may include:
- Drills
 - Grinder
 - Lathes
 - Milling machines
- Welding process may include:
- Gas metal arc welding
 - Gas tungsten arc welding
 - Oxy-acetylene welding
 - Shielded metal arc welding

Joints may include:

- Butt
- Filet joints:
 - corner joints
 - lap joints
 - tee joint plate edge preparations
 - throat length with concave and convex reinforcement

Soldered joints may include:

- Hard
- Soft

Unit Sector(s)

Not applicable.

Competency Field

Equipment Operations

MARD5001A Manage business and administration on vessels limited by tonnage or near coastal operations

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMML507A Manage business and administration on vessels limited by tonnage or near coastal operations.

Unit Descriptor

This unit involves the skills and knowledge required to manage the business and administration of a commercial ocean-going vessel and its personnel in compliance with Australian and international regulations and guidelines, and to ensure the protection of the marine environment and the safety of the vessel and people on board.

Managing vessel business operations and resources includes legal and commercial responsibilities, the safety management system (SMS), procedures to obtain a safety management certificate and subsequent audits, managing work health and safety (WHS)/occupational health and safety (OHS) procedures and practices, monitoring and controlling expenditure, and analysing and preparing reports.

It also involves organising and managing crew, and includes allocating duties, conducting required training, and assessing and maintaining expected standards of work and behaviour.

Application of the Unit

This unit applies to people who work in the maritime industry as Master or Chief Mate on a vessel of up to 500 gross tonnage (GT) or as a Watchkeeper on a vessel up to 3000 GT or as Master or Chief Mate on vessels up to 3000 GT operating in near coastal waters.

The unit is consistent with the relevant sections of STCW 95 and Marine Orders under the Australian Navigation Act 2012.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Develop plans for general and specific vessel operations

- 1.1 *Vessel* operation goals and objectives are identified according to company procedures, operational orders, regulatory requirements and established marine management practice
- 1.2 General and specific *vessel operations* plans are drawn up according to company procedures
- 1.3 Correct procedures for emergency response on board a vessel are developed according to company procedures, operational orders, regulatory requirements and established marine management practice
- 1.4 Appropriate validation measures and standards are devised to monitor progress in operations against plans, and appropriate contingency plans are developed for any discrepancies or variations that may occur during operations
- 1.5 Service procedures and systems improvement opportunities are identified and appropriate measures are taken to act on these opportunities according to company procedures and established marine management practice
- 1.6 Plans, goals, objectives and instructions for general and specific vessel operations and emergency and contingency procedures are distributed to relevant personnel according to company procedures and established marine management practice

2 Ensure legal requirements are

- 2.1 Legal basis under which a commercial vessel operates is interpreted and followed, and shipmaster safety, legal and commercial obligations are identified and carried out in a

- fulfilled** relevant range of operational circumstances
- 2.2 National and international conventions, *laws and regulations pertaining to vessel operations and contingencies* are implemented
 - 2.3 Entries are made into vessel log books as required and carriage of all required vessel certification is confirmed and ensured
 - 2.4 Appropriate arrangements are made for preparing vessel for statutory survey and certification
 - 2.5 Relevant code of conduct and industrial agreements are applied to vessel operations and management, and shipmaster responsibilities as they relate to crew health and safety are implemented
 - 2.6 Vessel security procedures are consistent with IMO International Ship and Port Facility Security Code (ISPS Code)
 - 2.7 Procedures and requirements relating to state port control are implemented
 - 2.8 Procedures and requirements relating to customs, quarantine and immigration clearances are implemented
- 3 Ensure commercial and business requirements are fulfilled**
- 3.1 Contracts of carriage and bills of lading under which vessel owners and cargo owners operate are interpreted and adhered to according to company procedures, legal requirements and established marine management practice
 - 3.2 Commercial and legal aspects of general average, salvage and towage are identified, interpreted and implemented according to company procedures, legal requirements and established marine management practice
 - 3.3 Commercial and legal aspects of marine hull and cargo insurance are identified, interpreted and implemented according to company procedures, legal requirements and established marine management practice
 - 3.4 Accident and incident investigation processes are identified and implemented according to company procedures, legal requirements and established marine management practice
- 4 Monitor and control**
- 4.1 Accrual accounting procedures are correctly used to monitor and control vessel expenditure and where relevant,

- vessel expenditure** vessel budget is prepared according to established vessel financial procedures and established accounting practice, with relevance to commercial market in which a vessel operates
- 4.2 Plans and appropriate contingency procedures are developed to correct any variation from vessel budget and identified expenditure, and records are maintained according to established vessel financial procedures and established accounting practice
- 4.3 Appropriate action is taken when expenditure varies from vessel budget according to contingency plans, company procedures and established accounting practice
- 5 Develop and implement vessel safety management system**
- 5.1 Vessel SMS is developed according to relevant maritime regulations and company procedures
- 5.2 SMS safety procedures and related documentation are developed in collaboration with relevant vessel personnel
- 5.3 SMS documentation structure and content is maintained according to requirements, and appropriate action is taken to ensure correct procedures are followed to obtain a safety management certificate according to maritime regulatory requirements
- 5.4 Appropriate measures are taken to ensure all personnel on board vessel are familiar with SMS documentation, that familiarisation arrangements for new crew members are carried out, and that all personnel apply SMS procedures relevant to their functions
- 5.5 Correct procedures are followed to obtain a safety management certificate according to maritime regulatory requirements
- 6 Monitor and control vessel physical resources**
- 6.1 *Vessel inventory of plant, equipment and other physical resources* is maintained accordance to company procedures, vessel survey requirements and established marine management practice
- 6.2 Reports on status of *vessel physical resources* are prepared and submitted to relevant personnel within company and regulatory authorities according to company procedures, vessel survey requirements and established practice
- 7 Analyse and compile operational and**
- 7.1 Operational and voyage data is collected and compiled according to company practice, regulatory requirements

- voyage data** and established marine management practice
- 7.2 Voyage report is prepared and validated according to company procedures, vessel survey requirements and established marine management practice
- 7.3 Voyage report is submitted to designated personnel according to company procedures, vessel survey requirements and established practice
- 8 Provide leadership to officers and crew**
- 8.1 Feedback and support are provided to crew on achievements and performance in their day-to-day work
- 8.2 Crew are treated fairly, equitably, effectively and honestly in matters related to their day-to-day work
- 8.3 Appropriate action is taken to prevent harassment and where it has occurred, harassment is dealt with promptly, effectively and fairly
- 8.4 Crew suggestions for work improvements are listened to, acted upon and credit for achievements is shared with crew
- 8.5 Good example is provided of a responsible, fair, sympathetic, equitable and diligent member of shipboard team
- 9 Allocate duties and maintain set standards of work on board vessel**
- 9.1 Work requirements and crew competencies required for work duties are identified and clarified
- 9.2 Crew member competencies are assessed and confirmed, and duties are assigned to crew according to crew competencies and capabilities
- 9.3 Competency deficiencies in personnel are identified and remedial action is initiated through counselling and **training**
- 9.4 Crew members are advised of rostered duties and required performance standards are set in conjunction with crew members according to company procedures
- 9.5 Crew members are motivated to achieve set standards of work performance using appropriate methods
- 9.6 Performance of crew members is monitored as required using appropriate methods according to company procedures, performance assessments are discussed with relevant crew members and agreement is reached on appropriate action to be taken where performance is below

set standards

10 Resolve conflict

10.1 Conflict situations are recognised and issues are clarified with personnel involved

10.2 Solutions to conflict are negotiated using appropriate mediation and conflict resolution techniques

11 Plan, organise, promote and evaluate shipboard training and assessment

11.1 Workplace trainer and assessor requirements are identified and appropriate staff are trained and assigned as required

11.2 Work related training opportunities are planned and organised for crew according to identified needs and company policy

11.3 Shipboard drills are organised according to regulations and company procedures

11.4 Assessment of crew members during and after training activities and shipboard drills is carried out to confirm required competencies and related knowledge have been acquired

11.5 Crew members are debriefed after training, drill and assessment activities using appropriate methods and efficacy of training, drill and assessment activities is evaluated based on feedback from participating crew members and other relevant evidence

11.6 Outcomes of evaluations of training and assessment are discussed with trainers and assessors, and appropriate action is taken to make required improvements

11.7 Reports on training and assessment are evaluated and resultant action is maintained and/or entered into vessel log as required

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Analyse and compile operational and voyage data, and prepare reports
- Communicate effectively verbally and in writing
- Comply with mandatory rules and regulations and IMO Conventions and Codes, including the relevant sections of Australian Maritime Safety Authority (AMSA) Marine Orders and

ensure applicable codes, guidelines and standards recommended by IMO, classification societies and maritime industry organisations are taken into account

- Conduct management meetings
- Coordinate an audit to maintain a safety management certificate
- Establish and develop dynamic groups and teams on board a vessel
- Follow correct procedures for obtaining a safety management certificate
- Implement human resources management responsibilities
- Interpret and apply information on contracts of carriage, marine insurance, salvage and towage
 - national administrative procedures for accident investigation, and vessel and port security
 - procedures relating to customs, quarantine and immigration clearance
 - labour-related regulations
- Investigate and arbitrate shipboard conflict
- Investigate, analyse and compile casualty data and prepare related reports
- Lead officers and crew
- Maintain vessel security
- Motivate shipboard personnel
- Organise training evaluation processes
- Plan, implement and monitor goals and performance requirements for vessel operations and emergencies
- Plan, implement and monitor requirements related to:
 - Master duties, obligations, commercial and legal responsibilities under national and international laws and conventions
 - state port control
 - vessel documentation, certification and survey
- Plan, implement and monitor WHS/OHS procedures and practices
- Plan, organise and promote shipboard training programs
- Promote correct safety management on board vessels
- Recognise and interpret non-verbal communication
- Use management skills effectively

Required Knowledge:

- Competency requirements for typical shipboard operations
- Conflict resolution and mediation strategies and techniques
- Contracts of carriage, marine insurance, salvage and towage
- Established marine resource management procedures and practice
- Equal employment policies and regulations

- General principles of integrated vessel and bridge management
- Human resource management problems, and appropriate action and solutions
- Legal issues relevant to Master responsibilities such as:
 - functions and responsibilities of Master, vessel owner and charterer in various types of charters and contracts of carriage
 - vessel owner obligation of reasonable dispatch
 - lay time, demurrage and dispatch
 - functions of a bill of lading
 - characteristics of a contract of carriage
 - international conventions relating to liability of a sea carrier
 - salvage and towage contracts
 - tort liability
 - legal principles of pilotage
 - insurance arrangements
 - vessel registration requirements
 - investigations and courts of marine inquiry
- Maritime communication techniques, including barriers to effective communication and how to overcome them
- Methods for:
 - evaluating efficacy of shipboard training, drills and competency assessment
 - motivating shipboard personnel
 - identifying problems in services to other departments or in procedures and systems
- National administrative procedures for accident investigation, and vessel and port security
- National Training Packages and competency standards relevant to shipboard personnel
- Principles of effective leadership and teamwork
- Procedures for:
 - collecting, compiling, analysing and reporting on safety incidents and casualties on board a vessel, including format and characteristics of a good safety incident report
 - obtaining a safety management certificate and undergoing subsequent audits to maintain it
 - planning, implementing and monitoring goals and performance requirements for vessel operations and emergencies
 - relating to customs, quarantine and immigration clearance
- Regulatory requirements for shipboard drills
- Relevant:
 - industrial award requirements as they relate to shipboard personnel responsibilities, obligations and entitlements
 - maritime regulations
 - WHS/OHS and marine pollution control legislation, codes of practice, policies and procedures

- Requirements related to:
 - state port control
 - vessel documentation, certification and survey
- Role of vessel Master, including duties, obligations, and commercial and legal responsibilities under national and international laws and conventions
- Techniques for:
 - evaluating and seeking alternatives for improvement of shipboard operational and emergency procedures and systems
 - setting of performance standards and evaluating performance of shipboard personnel
- Training and competency assessment techniques and options suitable for shipboard personnel
- Vessel SMS and:
 - its aims, objectives, advantages and disadvantages
 - general provisions for developing and monitoring vessel SMS
 - requirements of relevant maritime authorities for SMS

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- taking action promptly to report and/or rectify management problems according to established procedures
- completing work systematically with required attention to detail
- developing effective planning documents
- providing high quality reports
- ensuring currency of relevant legislative and regulatory knowledge
- providing accurate and reliable information.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where managing business and administration on vessels limited by tonnage

- or near coastal operations can be conducted
- tools, equipment and personal protective equipment currently used in industry
 - relevant regulatory and equipment documentation that impacts on work activities
 - range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
 - appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing business and administration on vessels limited by tonnage or near coastal operations
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Vessel may include:

- Vessels up to 500 GT (in the case of a Master or Chief Mate)

Vessel operations may include:

- Vessels up to 3000 GT (in the case of a Watchkeeper)
- Vessels up to 3000 GT (in the case of a Master or Chief Mate) operating in near coastal operations
- Berthing and unberthing
- Bridge operations
- Cargo handling and care
- Catering operations
- Commercial operations (Australian and international regulations and conventions)
- Deck operations and maintenance
- Emergency and damage control operations
- Engine room operations and maintenance
- Mooring operations
- Navigation
- Passenger service operations
- Personnel training
- Pollution control operations
- Radio operations
- Safety/emergency drills
- Slipping operations
- State port control

Laws and regulations pertaining to vessel operations and contingencies may include:

- Agency
- Customs and quarantine
- Deaths and disappearances
- Drugs
- Immigration
- Marine pollution (Australian laws and IMO conventions)
- Operational safety (Australian regulations and IMO conventions)
- Security and anti-terrorism
- Smuggling and piracy
- Stowaways and refugees
- Wrecks, salvage and towage

Vessel inventory of plant, equipment and other physical resources may include:

- Recording resources that are:
 - faulty
 - worn
 - damaged

Vessel physical resources may include:

- Accommodation equipment and facilities
- Bridge equipment and resources

Training may include:

- Catering equipment and facilities
- Documents and certification
- Engine room propulsion plant and equipment and related auxiliary systems
- Navigation charts, marine publications, manufacturer manuals and other reference documentation
- Radio equipment and facilities
- Tools and maintenance equipment
- Vessel deck equipment, fittings and related systems
- Vessel structures and fittings
- Distance learning for shipboard personnel
- Onboard:
 - group training activities
 - individual instruction
- Shipboard drills required by regulations or company policies
- Shore-based training for shipboard personnel

Unit Sector(s)

Not applicable.

Competency Field

Administration and Human Resources

MARD5002A Manage operations and maintenance on vessels limited by tonnage or near coastal operations

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMB4807A Manage the operations and maintenance on vessels limited by tonnage or near coastal operations.

Unit Descriptor

This unit involves the skills and knowledge required to manage the operations of a commercial ocean-going vessel limited by tonnage or near coastal operations. It includes administration of vessel stability, cargo operations and planned maintenance system in compliance with Australian and international regulations and guidelines, protection of the marine environment and the safety of the vessel and people on board.

Application of the Unit

This unit applies to people who work in the maritime industry as Master or Chief Mate on a vessel of up to 500 gross tonnage (GT) or as a Watchkeeper on a vessel up to 3000 GT or as Master or Chief Mate on vessels up to 3000 GT operating in near coastal waters.

The unit is consistent with the relevant sections of STCW 95 and Marine Orders under the Australian Navigation Act 2012.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the Performance criteria describe the required performance needed to

essential outcomes of a unit of competency.

demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|--|-----|--|
| 1 Manage maintenance of vessel stability and safety parameters | 1.1 | <i>Vessel</i> dynamic stability is interpreted and analysed |
| | 1.2 | Vessel stability is correctly maintained in normal and adverse operational conditions |
| | 1.3 | Vessel safety parameters are correctly maintained within normal operational limits during cargo operations |
| 2 Administer planning of cargo operations on vessel limited by tonnage or near coastal operations | 2.1 | Impact of cargo operations on vessel stability is managed |
| | 2.2 | Draft survey is conducted and used |
| | 2.3 | Appropriate procedures are administered for all cargo operations |
| 3 Administer planned maintenance system | 3.1 | Vessel routine preventative maintenance plan is correctly interpreted and implemented |
| | 3.2 | Arrangements are made for maintenance activities to be carried out at required times |
| | 3.3 | Repairs to vessel hull or equipment and/or repair or replacement of equipment or components are organised according to procedures |
| 4 Dock or slip vessel limited by tonnage or near coastal operations | 4.1 | Type of slipway, dock or vessel lifting facility is identified and suitability for type of hull assessed |
| | 4.2 | Hull data is correctly interpreted and recorded |
| | 4.3 | Appropriate plan is prepared for procedures to be taken onboard vessel prior to, during and on completion of proposed slipping or docking operations |
| | 4.4 | Cradle is correctly prepared prior to slipping of vessel |
| | 4.5 | Appropriate precautions are taken prior to slipping and refloating of vessel and when shoring/supporting vessel |
| | 4.6 | Vessel is correctly refloated after slipping and maintenance operations |

- | | | |
|--|-----|---|
| 5 Carry out inspection and maintenance procedures on vessel limited by tonnage or near coastal operations | 5.1 | Inspections of vessel hull, equipment and components are carried out according to company maintenance schedules and vessel manufacturer instructions |
| | 5.2 | <i>Deterioration of vessel structure and fittings</i> is identified and appropriate maintenance action is initiated according to work health and safety (WHS)/occupational health and safety (OHS) and pollution control requirements, company procedures and manufacturer instructions |
| | 5.3 | Lubricants, marine preservatives or finishes are applied correctly using appropriate application equipment according to WHS/OHS requirements, company procedures and manufacturer instructions |
| | 5.4 | Problems in application of lubricants, marine preservatives, finishes and other maintenance materials and chemicals are identified and reported, and appropriate remedial action is initiated |
| | 5.5 | Records of maintenance and lubrication work carried out are completed according to procedures |
| 6 Administer correct selection and use of maintenance equipment and materials | 6.1 | Tools and equipment are correctly identified and used according to WHS/OHS requirements |
| | 6.2 | Maintenance materials are obtained |
| | 6.3 | Defective equipment and materials are identified and reported |
| | 6.4 | Maintenance equipment and materials are correctly cleaned and stored after use |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Communicate effectively with other personnel when managing operations and maintenance of vessel limited by tonnage or near coastal operations
- Communicate with multilingual crew using established techniques
- Comply with relevant maritime regulations
- Identify problems that can occur when managing operations and maintenance of vessel and initiate appropriate action
- Interpret and follow all safety management procedures and precautions when managing operations and maintenance of vessel limited by tonnage or near coastal operations

- Interpret and monitor application procedures for managing operations and maintenance of vessel limited by tonnage or near coastal operations
- Monitor selection and use of publications, materials, tools and other equipment involved in managing operations and maintenance of vessel limited by tonnage or near coastal operations
- Prepare appropriate reports on outcomes of inspection and maintenance activities
- Provide leadership to other shipboard personnel when managing operations and maintenance of vessel limited by tonnage or near coastal operations
- Read and interpret:
 - safety data sheets (SDS)/material safety data sheets (MSDS)
 - vessel and machinery specifications, gross and net tonnage, machinery design drawings, machine drawings, operational manuals, specifications, and electrical and control circuit diagrams
- Take appropriate precautions to prevent pollution of marine environment

Required Knowledge:

- Applicable legislation, regulations and codes of practice
- Documents and records, including:
 - relevant maritime regulations
 - company maintenance procedures
 - instructions of relevant maritime authorities related to operations and maintenance of vessels
 - maintenance schedules and records
 - vessel and equipment manufacturer instructions, specifications and recommended procedures
 - stability and cargo documents pertaining to vessel limited by tonnage or near coastal operations
- Maintenance records that must be kept on vessel to meet requirements of company and regulatory authorities
- Nature and causes of corrosion of marine surfaces and structures, and available methods for its control
- Operational management and maintenance:
 - routine maintenance inspections
 - administering repairs of minor faults and imperfections in painted surfaces and managing preparation of marine surfaces prior to application of prescribed marine coating
 - identifying deterioration of vessel structure and fittings
 - identifying faulty equipment or fittings and arranging for repair or replacement
 - managing application of lubricants to moving parts of vessel equipment
 - managing vessel stability both normal and adverse operational conditions

- managing vessel cargo operation procedures
- Principal features of structure of vessel, with a basic understanding of properties and application of materials used in vessel construction
- Procedures for:
 - checking and inspecting vessel stability during a range of operational conditions, including loading and discharging of cargo as part of routine procedures to ensure compliance with company requirements and established safety rules and regulations
 - initiating and coordinating repair and/or replacement procedures on board vessels
- Publications, tools and equipment required for operational management and maintenance:
 - cargo and stability calculators and publications
 - electric and pneumatic power tools such as grinders, sanders, drills and hand tools, including chipping hammers and scrapers
 - marine preservative finish application equipment such as brushes, spay guns, rollers and greasing and lubrication tools
 - rinsing and storing equipment
 - protective clothing and equipment (eye and ear protection, safety boots, dust and fume masks)
- Relevant sections of applicable maritime regulations
- Relevant WHS/OHS and pollution control legislation and policies
- Safety, environmental and hazard control precautions and procedures relevant to inspection and maintenance operations
- Slipping and docking procedures suitable for various types of hull forms, including communication techniques used
- Typical problems relating to slipping and maintaining vessels and appropriate action and solutions

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- taking prompt action to report and/or rectify operational and maintenance problems
- completing work systematically with required attention to detail
- recognising and adapting appropriately to cultural

differences in the workplace, including modes of behaviour and interactions among crew and others

- carrying out operational management of vessel while underway, when berthed or moored, when slipped or in dry dock, during routine or unplanned events.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where managing the operations and maintenance on vessels limited by tonnage or near coastal operations can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing the operations and maintenance on vessels limited by tonnage or near coastal operations
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being

performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Vessel may include:

- Vessel up to 500 GT operating in international waters
- Vessel up to 3000 GT operating in near coastal waters

Deterioration of vessel structure and fittings may include:

- Corrosion of hull fittings and equipment
- Decay of timber surfaces
- Osmosis and underwater blistering of painted and fibreglass finishes

Unit Sector(s)

Not applicable.

Competency Field

Administration and Human Resources

MARD6001A Manage legal requirements of a vessel

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMF307B Manage business and legal requirements on a vessel.

Unit Descriptor

This unit involves the skills and knowledge required to comply with legislative obligations and requirements specific to the vessel.

Application of the Unit

This unit applies to maritime workers working in the maritime industry as a Master Unlimited.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|--|-----|--|
| 1 Determine legislative obligations and requirements | 1.1 | <i>Legal obligations</i> in relation to vessel operations are ascertained |
| | 1.2 | <i>Legislative requirements</i> relating to operation of a vessel are recognised |
| | 1.3 | Obligations and legislative requirements are clarified with relevant government and licensing agencies |
| 2 Develop strategies for compliance with legislative obligations and requirements | 2.1 | Obligations and legislative requirements are analysed to develop <i>strategies for compliance</i> |
| | 2.2 | Strategies are reviewed with relevant stakeholders to determine suitability |
| | 2.3 | Strategies are used to develop regular, cyclical compliance checks |
| | 2.4 | Strategies and compliance requirements are communicated to crew members |
| | 2.5 | Relevant training is conducted to facilitate compliance |
| 3 Undertake scheduled compliance checks | 3.1 | Compliance checks are delegated to relevant crew members |
| | 3.2 | Problems that may lead to potential noncompliance are identified and reported |
| | 3.3 | Timing and outcomes of compliance checks are recorded according to regulatory and organisational requirements |
| | 3.4 | Information from compliance checks is analysed to identify instances of noncompliance or potential noncompliance |
| 4 Rectify noncompliance with legislative obligations and requirements | 4.1 | Course of action to take to address instances of noncompliance is determined |
| | 4.2 | Timely remedial action is undertaken and legislative obligations and requirements are complied with |
| | 4.3 | Training and instruction is conducted to ensure compliance with regulations |
| | 4.4 | Checks are made to ensure noncompliance has been addressed |
| | 4.5 | Specific area is monitored to ensure continuing compliance |
| | 4.6 | Reason for noncompliance is analysed to guide future compliance |
| 5 Maintain | 5.1 | <i>Documentation</i> held by the vessel is completed against authorised |

required certification of shipboard items and equipment	inventory
	5.2 Continuous validity of certification extensions and requirements for renewals is ensured through timely attention
	5.3 Continuing effectiveness of tests, checks and maintenance programs is reflected in certificate conditions of surveyed items and equipment
	5.4 Organisational and issuing authority requirements are complied with through timely survey arrangements
6 Maintain documentation related to legislative requirements	6.1 Certificates and documentation are stored in a manner that optimises their use and accessibility for vessel operations
	6.2 Clear, concise and accurate records are kept
	6.3 Regulatory and organisational requirements, and format for records are complied with
	6.4 Validity of records is maintained when required corrections to records are made
	6.5 Documentation is secured and confidentiality is maintained according to organisational procedures
	6.6 Organisational procedures are followed to back-up computer
	6.7 Records and reports are distributed to required authorities at appropriate times

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Ensure procedures for monitoring operations and maintenance comply with legislative requirements
- Interpret information relevant to legislative requirements to ensure the security and safety of life of crew, passengers and others at sea
- Plan renewal and extension of certificates to ensure continued validity of surveyed items and equipment
- Promptly and fully identify potential noncompliance

Required Knowledge:

- International maritime law embodied in international agreements and conventions in relation to:
 - certificates and other documents to be carried on board ships by international conventions, how they may be obtained and their period of validity
 - responsibilities under the relevant requirements of the International Convention on Load Lines, 1966, as amended
 - responsibilities under the relevant requirements of the International Convention for Safety of Life at Sea, 1974, as amended
 - responsibilities under the International Convention for Prevention of Pollution from Ships, as amended
 - maritime declarations of health and the requirements of International Health Regulations
 - responsibilities under international instruments affecting the safety of the ship, passengers, cargo and crew
 - methods and aids to prevent pollution of the maritime environment by ships
 - national legislation for implementing international agreements and conventions
- Procedures for maintaining security and confidentiality of information
- Relevant regulations, codes and conventions related to business and legal requirements, security and safety of life of crew, passengers and others on a vessel
- Sources of reference and information on detailed survey and certification requirements
- Systems and methods for recording, retrieving and storing information
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- ensuring currency of relevant legislative and regulatory knowledge
- ensuring currency of relevant reference material
- developing effective planning documents
- attention to appropriate level of detail in recordkeeping.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where managing the legal requirements of a vessel may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing the legal requirements of a vessel
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Legal obligations must include:
- Responsibilities under the relevant requirements of the International Convention on Load Lines, 1966, as amended
 - Responsibilities under the relevant requirements of the International Convention for Safety of Life at Sea, 1974, as amended
 - Responsibilities under the International Convention for Prevention of Pollution from Ships, as amended
 - Responsibilities under international instruments affecting the safety of the ship, passengers, cargo and crew
- Legislative requirements must include:
- Certificates and other documents to be carried on board ships by international conventions
 - Maritime declarations of health and the requirements of International Health Regulations
 - Methods and aids to prevent pollution of the maritime environment by ships
 - National legislation for implementing international agreements and conventions
- Strategies for compliance may include:
- Conducting drills required under SOLAS and relevant Marine Orders applicable to firefighting and lifesaving appliances
 - Ensuring survey items are subject to required checks, inspections and maintenance programs
 - Maintaining correct documentation and records
 - Maintaining valid certification dates
 - Using relevant safety management system checklists
- Documentation must include:
- Cargo record book
 - Daily log book
 - Official log book
 - Radio log book
 - Statutory certificates
 - Survey reports
 - Waste disposal logs

Unit Sector(s)

Not applicable.

Competency Field

Administration and Human Resources

MARE1001A Communicate during shore-based mooring and untying operations

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMME907A Communicate during shore-based mooring and untying operations.

Unit Descriptor

This unit involves the skills and knowledge required to communicate effectively with others involved in mooring and untying vessels.

Application of the Unit

This unit applies to people working in the maritime industry under supervision as a shore-based linesperson.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|---|---|
| 1 Prepare to communicate with others during mooring and untying operations | <p>1.1 Prior to mooring or untying activities, all radios and other communication equipment are checked to confirm they are functioning correctly</p> <p>1.2 Safety precautions are followed</p> <p>1.3 Relevant documentation and records are identified and accessed as required</p> |
| 2 Check all communication equipment | <p>2.2 Batteries are checked to confirm they are operational and fully charged</p> <p>2.3 Faulty communication equipment is reported, rectified or replaced</p> <p>2.4 Radios are set to operate on channels required for mooring or untying operations</p> |
| 3 Communicate with others during mooring and untying operations | <p>3.1 Correct communication is maintained throughout mooring and untying operations with others involved in mooring and untying vessels</p> <p>3.2 Clear and concise verbal communication is used and appropriate action is taken to confirm that other person/s concerned have correctly heard and interpreted the communication</p> <p>3.3 Radio communication is conducted using required procedures and protocols</p> <p>3.4 Appropriate methods are used to communicate with foreign crews on vessels</p> <p>3.5 Any safety concerns are promptly and clearly communicated to pilot prior to and during, mooring and untying operations</p> <p>3.6 Due care is taken when using radio communication equipment not to interfere with operational communication between tug crews and pilot of vessel</p> |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Check functioning of radios and communication equipment

- Communicate effectively with others when mooring and untying a vessel
- Comply with relevant maritime regulations and IMO Conventions and Codes, including the relevant sections of Australian Maritime Safety Authority (AMSA) Marine Orders as they apply to mooring and untying operations on ocean-going vessels
- Follow work instructions
- Identify and correctly use various types of radios and other relevant communication equipment
- Implement port and vessel security procedures
- Interpret and follow procedures for communicating with others during mooring operations
- Recognise and adapt appropriately to cultural differences in the workplace, including modes of behaviour, interactions and communication with others
- Recognise problems that may occur when communicating with others during mooring and untying operations and take appropriate action to report and resolve them
- Take proper care of radios and communication equipment
- Test and recharge batteries used in radios and other communication equipment

Required Knowledge:

- Basic principles and procedures for marine radio communication:
 - by day or night
 - in normal and emergency situations
 - under any permissible conditions of weather
 - at a range of shore-side terminals and wharves
- Communication techniques and equipment required during mooring and untying operations, including protocols for radio use
- Factors that affect communication during mooring and untying operations, such as effects of noise, faulty equipment, discharged batteries, wind, weather
- Maritime regulations applicable to communication during mooring and untying of vessels
- Operational characteristics of different types of radios and other forms of communication equipment used in mooring and untying operations
- Practices and procedures for communicating with others during mooring operations
- Purpose of silence periods when operating radio equipment
- Radio calling and replying procedures
- Relevant manufacturer instructions relating to use of radios and other communication equipment
- Relevant maritime and radio communication regulations
- Relevant port and vessel security procedures, including operating radio communication channel instructions
- Relevant work health and safety (WHS)/occupational health and safety (OHS) codes of practice, policies and procedures

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- initiating timely action in response to defects or damage
- being aware of own ability and limits to rectify irregularities and faults
- following all orders carefully and systematically
- ensuring behaviour reflects relevant current legislative and regulatory requirements.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where communicating during shore-based mooring and untying operations can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate communicating during shore-based mooring and untying operations
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Safety precautions may include:

- Checking:
 - own personal fitness and medical wellbeing
 - whereabouts of edge of wharf
 - whereabouts of other members of mooring/untying team
- Confirming availability of a personal flotation device upon arrival at mooring operation
- Keeping work area hazard-free
- Obtaining and using required personal protective equipment (such as safety footwear, safety helmet, suitable gloves, safety vest and reflective braces, personal collar insert for flotation device)
- Removing rings from fingers to avoid them being caught on steel wire ropes
- Wearing suitable clothing

Relevant documentation and records may include:

- Mooring and untying plans, procedures, checklists and instructions
- Relevant maritime authority instructions
- Relevant sections of maritime regulations concerning mooring and untying operations
- Reports and records of mooring operations or any safety incident
- Rope and equipment manufacturer instructions and procedures

- Mooring or untying operations may include:
- Safety instructions and procedures
 - Landing a gangway
 - Preparing a berth
 - Receiving heaving line from:
 - a launch
 - a vessel
 - Returning heaving line to a vessel
 - Untying and letting go a vessel
 - Working:
 - by day or night
 - in normal and emergency situations
 - under any permissible conditions of weather
 - at various shoreside terminals and wharves
- Communication may include:
- Oral communication with mooring supervisor or Master and other members of mooring or untying team
 - VHF radio between:
 - tug crew and pilot on vessel
 - tug crew and mooring launch crew
 - mooring launch crew and pilot on vessel
 - radio between mooring supervisor (shore-side) and:
 - pilot on vessel
 - mooring personnel (bow)
 - mooring personnel (stern)
- Others involved in mooring and untying vessels may include:
- Mooring launch crew
 - Mooring master or supervisor
 - Mooring team
 - Pilot and crew on vessel being moored or untied and tug
 - Tug crew
 - Vessel crew

Unit Sector(s)

Not applicable.

Competency Field

Communication

MARE5001A Communicate effectively when performing engineering duties

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMME707B Use English in written and oral form to perform engineering duties.

Unit Descriptor

This unit involves the skills and knowledge required to communicate effectively when performing engineering duties on board a commercial vessel and includes communicating with others; reading and interpreting engineering publications, specifications, instructions and other documents; reading and interpreting equipment performance indications; using available tools to communicate between the bridge, engine control room and main engine room; and using a computer to enter and retrieve engineering information.

Application of the Unit

This unit applies to the work of Marine Engineering Watchkeepers on commercial vessels greater than 750 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Watchkeeper issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance

unit of competency. is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|---|-----|---|
| 1 Apply information to engineering watchkeeping duties | 1.1 | <i>Relevant engineering publications and other documentation</i> are identified and accessed |
| | 1.2 | Required information is extracted from relevant engineering publications and other documentation and is appropriately applied to work activities according to established marine engineering practice |
| | 1.3 | Information in relevant engineering publications and other documentation used in day-to-day work is applied to work activities |
| | 1.4 | Engineering specifications and drawings are correctly read and interpreted, and information is applied according to established marine engineering practice |
| 2 Apply engineering information | 2.1 | Readings on <i>performance indicators</i> are correctly made and interpreted |
| | 2.2 | Engineering information, procedures, instructions and directions are obtained, interpreted and applied |
| | 2.3 | Standard drawing symbols, appropriate instrumentation and process control terms are correctly used in relation to actions and functions of marine equipment and plant |
| | 2.4 | Engineering drawings and control loops are correctly sketched as required |
| | 2.5 | Engineering reports, running sheets and other engineering documentation relevant to the performance of engineering duties are correctly and accurately completed |
| 3 Communicate between bridge, engine control room and main engine room | 3.1 | <i>Available tools</i> are correctly used to communicate between bridge, engine control room and main engine room |
| | 3.2 | Appropriate records of engineering communications are completed according to organisational procedures and regulatory requirements |
| 4 Communicate with officers, crew and others | 4.1 | Clear and precise communication is used and established communication practices are followed |
| | 4.2 | Communication misunderstandings are avoided using appropriate confirmation techniques and established communication practices |

- 4.3 Messages concerning vessel safety and operations are received, read, clarified as required, correctly interpreted and applied to engineering activities
- 4.4 Appropriate techniques are used when communicating with multilingual crew to ensure communication is effective and messages are clearly understood
- 4.5 Non-verbal communication is appropriately used when working and communicating with others
- 4.6 Feedback, instruction and training on work performance is effectively provided to engine room crew according to vessel procedures and established engineering practice

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Communicate effectively verbally and in writing
- Identify and interpret numerical and graphical information in marine engineering publications
- Identify, collate and process information required to prepare verbal and written reports
- Impart knowledge and ideas as required through oral, written and visual means
- Interpret documentation related to marine engineering operations
- Read and interpret written information needed to perform basic marine engineering tasks
- Resolve misunderstandings in written and verbal communication
- Use computer and relevant equipment to enter, access and retrieve engineering information
- Use established marine engineering vocabulary as required

Required Knowledge:

- Established engineering practice for the operation, checking, maintenance and repair of marine plant, machinery, equipment and systems
- Established written, verbal and non-verbal marine engineering communication practices
- Marine engineering communication techniques, including barriers to effective communication and how to overcome them

- National and international regulations, IMO Conventions and Codes, including AMSA Marine Orders applicable to the operation, maintenance and repair of plant, machinery and equipment on vessels of unlimited propulsion power
- Principles of effective communication
- Protocols and procedures for communicating with others on board vessels
- Relevant industrial award requirements as they relate to shipboard engineering personnel responsibilities, obligations and entitlements
- Relevant work health and safety (WHS)/occupational health and safety (OHS) legislation, codes of practice, policies and procedures
- Standard nautical vocabulary as described in IMO Standard Marine Communication Phrases
- Techniques for communicating effectively with a multilingual crew
- Tools typically available for communication between bridge, engine control room and main engine room
- Typical communication problems and appropriate action and solutions
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- attention to detail when communicating with others
- attention to appropriate level of detail in recordkeeping.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where communicating effectively when performing engineering duties can be demonstrated
- technical reference library with current publications on basic marine operations
- tools, equipment and personal protective equipment currently used in industry

- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate communicating effectively when performing engineering duties
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Relevant engineering publications and other documentation may include:

- Anti pollution and environmental protection regulations and procedures, including relevant sections of the MARPOL Convention
- Instructions of relevant maritime authorities and classification societies concerning shipboard machinery operations, maintenance and repair

- ISM Code safety management system plans, procedures, checklists and instructions
 - Machinery and vessel manufacturer specifications, instructions and recommended procedures
 - Marine engineering publications and manuals
 - Relevant sections of national and international regulations, IMO Conventions and Codes, including AMSA Marine Orders and class society rules dealing with shipboard machinery maintenance and repair
 - Operational and maintenance logs, running sheets and records, including computer databases of running information and maintenance records
 - Vessel and organisational planned operational and maintenance procedures and instructions
 - Vessel safety and emergency contingency plans and procedures, including relevant sections of the SOLAS Convention
 - Vessel survey as it relates to shipboard plant, equipment and machinery
- Performance indicators may include:
- Computer screens
 - Gauges
 - Instrumentation
- Available tools may include:
- Alarms
 - Hand held radios
 - Internal communication systems

Unit Sector(s)

Not applicable.

Competency Field

Communication

MARF1001A Apply basic survival skills in the event of vessel abandonment

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to apply basic survival skills in the event of vessel abandonment.

Application of the Unit

This unit applies to deck and engine workers working in the maritime industry on vessels up to 80 metres. They could be working independently or as part of a vessel crew.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Prepare to
 - 1.1 Nature of emergency is determined to minimise potential dangers and

- abandon vessel** threats
- 1.2 Muster and abandon vessel signals are responded to according to vessel safety procedures
 - 1.3 **Survival equipment** is organised to maximise chances of survival
 - 1.4 Emergency position indicating radio beacon (EPIRB) is operated to transmit distress signal
 - 1.5 Distress calls are made using **radio equipment** on distress call frequency, if time allows, to communicate the nature of the emergency
 - 1.6 Others are assisted to maximise their chances of survival
- 2 Determine operational safety requirements**
- 2.1 Relevant maritime legislation is identified, accessed and reviewed
 - 2.2 Safety requirements for a range of near coastal vessels are identified, accessed and reviewed
 - 2.3 **Lifesaving and survival equipment** required on board a near coastal vessel is accurately identified
 - 2.4 Lifesaving equipment on board is checked and confirmed as serviceable
 - 2.5 Lifesaving and survival equipment **certificates and documentation** are checked for validity
 - 2.6 Vessel safety management systems (SMS) and plans are located, interpreted and applied
- 3 Practise survival techniques**
- 3.1 Typical **emergency alarms and types of alarm systems** are accurately identified
 - 3.2 Need to abandon vessel is determined according to established safety practice and procedures
 - 3.3 **In-water survival techniques** are implemented according to established safety practice and procedures
 - 3.4 **Threats to survival** are identified and treatment options are outlined
- 4 Apply survival techniques**
- 4.1 Lookout for vessels and aircraft is maintained and distress signals are released on sighting
 - 4.2 During an emergency, work is carried out collaboratively with other shipboard personnel and passengers as required

- 4.3 During emergency and survival situations, appropriate communication skills and techniques are implemented
- 4.4 Instructions given by rescue personnel to safely access *rescue craft* are followed
- 5 Operate lifesaving and survival equipment**
- 5.1 Range of *pyrotechnic and distress signals* are operated according to established safety practice and procedures
- 5.2 Survival equipment is operated according to instructions and accepted survival practice
- 5.3 Survival radio equipment is operated according to manufacturer instructions and regulatory protocols
- 5.4 Lifejackets and other lifesaving equipment is operated and used according to instructions
- 6 Participate in abandon vessel drills**
- 6.1 Regulatory requirements and company procedures for musters and drills are identified and implemented
- 6.2 Actions required for a range of muster signals are correctly identified
- 6.3 Action is taken promptly to address problems that may arise when following vessel abandonment procedures
- 6.4 *Risks and hazards* that may occur when abandoning vessel are identified and minimised according to SMS, and established safety practice and procedures
- 6.5 Information relevant to use of lifesaving equipment is accessed and correctly interpreted
- 6.6 Range of emergencies that may lead to vessel abandonment are outlined

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Collect, manage and interpret information on use of lifesaving equipment and procedures to be followed when order to abandon vessel is given
- Communicate effectively with other personnel and passengers during simulated and actual abandon vessel musters and emergencies

- Determine type and extent of emergency and appropriate survival action to be taken
- Don various lifejacket and other lifesaving apparel
- Identify signs of hypothermia and provide appropriate treatment
- Operate radio equipment
- Plan timing and sequence of individual survival actions to be appropriate to prevailing circumstances and conditions of emergency, and minimise potential dangers and threats to other survivors
- Read and interpret instructions on emergency procedures, safety management systems and plans, and use of lifesaving and survival equipment
- Recognise and interpret muster signals appropriately for indicated emergency
- Swim in a lifejacket
- Use handheld pyrotechnics

Required Knowledge:

- Action to be taken in an emergency situation
- Appropriate survival techniques
- Construction, outfit and particular characteristics of various types of applicable survival equipment
- Emergency muster and abandon vessel signals
- Emergencies that may lead to vessel abandonment
- Established safety practice and procedures
- First aid techniques
- Importance of being ready for any shipboard emergency including using lifesaving equipment
- Initial actions for survival on vessel abandonment
- Location of:
 - lifesaving appliances on a vessel
 - survival equipment on vessel
- Maintenance of lifesaving appliances
- Maritime communication techniques
- Personal protective equipment (PPE)
 - purpose
 - use
- Procedures for correctly operating and using lifesaving appliances and PPE on board vessels and survival craft, and specifically:
 - donning a lifejacket, and using a lifejacket light and whistle
 - using handheld pyrotechnics
- Procedures for:

- abandoning vessel
- emergency response on board vessels, including abandoning vessel
- Regulatory requirements and company procedures for musters and drills
- Relevant manufacturer guidelines relating to operating and using survival equipment, including instructions on equipment capability and limitations
- Relevant maritime regulations related to required survival equipment on a vessel
- Relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies including SMS, plans, processes and techniques
- Standard safety symbols
- Steps to be taken after collision, grounding or other marine casualty and resulting hull damage
- Survival techniques with a swamped, semi submerged tender or dingy
- Survival at sea techniques
- Symptoms of hypothermia, its prevention and treatment and related use of protective covers and garments
- Techniques for using survival equipment
- Threats to survival after abandoning vessel and:
 - appropriate strategies for countering these threats
 - how to minimise dangers
- Use of distress signals and penalty for misuse
- Value of training and emergency drills for enhancing chances of survival at sea
- Ways of maximising detect-ability using pyrotechnic distress signals, portable VHF radios, satellite EPIRBs

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- donning a lifejacket in water
- ensuring behaviour reflects statutory requirements pertaining to lifesaving appliances
- locating survivors in simulated darkness
- swimming in a lifejacket for a minimum of 50 metres
- towing with a life jacket for a minimum of 25 metres

- remaining afloat without a lifejacket for at least 10 minutes
- assisting a survivor to don a lifejacket
- maintaining a group huddle for at least 10 minutes
- swimming in a group congo line for a minimum of 50 metres
- holding heat escape lessening posture for at least 10 minutes.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where applying basic survival skills in the event of vessel abandonment can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate applying basic survival skills in the event of vessel abandonment
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Survival equipment may include:

- EPIRBs
- Flares
- Immersion suit
- Life jackets
- Person overboard combination light and smoke float
- Search and rescue transponders (SARTs)
- Survival craft

Radio equipment may include:

- HF
- VHF

Lifesaving and survival equipment may include:

- Immersion suit
- Lifebuoy
- Personal floatation devices

Certificates and documentation may include:

- Instructions for use of lifesaving equipment
- Pyrotechnic expiry dates
- Record of inspection of equipment

Emergency alarms and types of alarm systems may include:

- Electronic alarms
- Muster and abandon vessel alarms
- Verbal communication

In-water survival techniques may include:

- Floating with or without a lifejacket
- Heat loss techniques
- Swimming with a lifejacket

Threats to survival may include:

- Dehydration
- Hypothermia
- Ingestion of seawater

Rescue craft may include:

- Another vessel
- Helicopter

Pyrotechnic and distress signals may include:

- Orange smoke flare
- Red handheld flare

Risks and hazards may include:

- Expired pyrotechnics
- Inaccessible lifejackets
- No defined abandon ship procedures established
- Poorly maintained equipment

Unit Sector(s)

Not applicable.

Competency Field

Operational Quality and Safety

MARF1002A Follow procedures to minimise and fight fires on board a vessel

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to apply defined policies and procedures when carrying out fire minimisation procedures and fighting a fire on board a vessel.

Application of the Unit

This unit applies to deck and engine workers working in the maritime industry on vessels up to 80 metres. They could be working independently or as part of a vessel crew.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Carry out fire 1.1 *Fire hazards and risks* on board vessel are identified and reported to

- minimisation procedures** designated personnel according to workplace procedures
- 1.2 Workplace procedures and work instructions for controlling fire risks are followed
- 1.3 **Firefighting equipment** is regularly checked and appropriate action is taken to ensure that it is operational
- 1.4 Participation in fire drills and musters is undertaken to ensure readiness for fire emergencies
- 2 Follow instructions during response to a fire emergency**
- 2.1 Location and **class of fire** is identified and alarm is raised and/or responded to according to workplace procedures
- 2.2 Appropriate **protective clothing and equipment** requirements are made ready
- 2.3 Instructions to contain the spread of fire and smoke are acted upon
- 2.4 Fire is attacked using the appropriate method, firefighting equipment and **extinguishing media/agent** according to instructions
- 2.5 Collaboration and communication is maintained with others to support the safety and efficiency of the firefighting operation
- 3 Support post-fire operations**
- 3.1 Fire watch is carried out as instructed to prevent further outbreak
- 3.2 Equipment is **restored** to operational condition according to workplace instructions
- 3.3 Assistance is provided to preserve fire scene prior to investigation, if appropriate
- 3.4 Information relevant for the debrief of a fire incident is provided

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply extinguishing media to a fire
- Operate a fire extinguisher
- Use a fire blanket to extinguish a fire

Required Knowledge:

- Alarms and signals during onboard emergencies
- Chemistry of fire and its relationship to flash point, vapour density, auto ignition temperature and spontaneous combustion
- Classes of fire applicable to Australian and New Zealand standards
- Detection and suppression systems including fixed firefighting systems
- Extinguishing media including firefighting foams
- Firefighting tactics, techniques and procedures including team dynamics
- Fire tetrahedron
- Hazards and threats to life or health during onboard firefighting operations
- Methods of heat transfer
- Onboard emergency response organisation and procedures
- Portable fire extinguishers – colour codes and suitability for class of fire
- Principles underlying the spread of fire on a vessel
- Principles and methods of extinguishment of each class of fire
- Safe working practices
- Types of fire detection, fire fighting equipment and systems used on vessels, their features, principles of operation, the procedures for their use and problems that can occur
- Ventilation procedures
- Vessel construction as it relates to fire prevention/protection
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- using water spray as an effective firefighting agent
- conducting effective boundary cooling
- communicating and working collaboratively as a member of a team in a firefighting operation.

Context of and specific

Performance is demonstrated consistently over time and in a

resources for assessment

suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where fighting and extinguishing fires on a vessel can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate following instructions to fight and extinguish fires
- direct observation of the candidate applying related WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in

the performance criteria, is detailed below.

Fire hazards and risks must include:

- Cargo
- Clothing
- Cooking oils
- Cordage
- Electrical arcing
- Fuels and lubricants
- Furnishings
- Paints
- Poor housekeeping
- Poor work practices
- Smoking
- Spontaneous combustion

Firefighting equipment may include:

- Fire blankets
- Hydrant hoses and nozzles
- International shore connection
- Portable extinguishers
- Pumps

Classes of fire must include:

- A – Carbonaceous Solids
- B – Flammable liquids
- C – Flammable gases
- E – Electrically energised equipments
- F – Cooking fats or oils

Protective clothing and equipment must include:

- Foot protection
- Hand protection
- Radiant heat protection

Extinguishing media/agent must include:

- Extinguishing powder
- Foam
- Gaseous extinguishing agents
- Water

Restored must include:

- Cleaned
- Serviced if applicable
- Re-stowed

Unit Sector(s)

Not applicable.

Competency Field

Operational Quality and Safety

MARF1003A Follow vessel security procedures

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMO107A Follow maritime security procedures.

Unit Descriptor

This unit involves the skills and knowledge required to recognise and report security threats.

Application of the Unit

This unit applies to deck and engine workers working in the maritime industry requiring a Certificate of Safety Training.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|----------------------------------|---|
| 1 Contribute to enhancing | 1.1 <i>Legislative</i> and organisational <i>requirements</i> related to maintaining security of a vessel are identified and followed |
|----------------------------------|---|

- | | | |
|--|---|---|
| security through heightened awareness | 1.2 | Organisational security procedures are identified and followed |
| | 1.3 | Duty of care requirements are ascertained and complied with |
| | 1.4 | Need for and methods of, maintaining security awareness and vigilance, are appreciated |
| | 1.5 | Own role and responsibilities are recognised |
| | 1.6 | Role of <i>designated personnel</i> for security response is ascertained |
| | 1.7 | Work health and safety (WHS)/occupational health and safety (OHS) requirements are recognised and complied with |
| | 2 Recognise potential security threats | 2.1 |
| 2.2 | | Procedures for monitoring security of a vessel are recognised |
| 2.3 | | Factors with increased security risk are identified |
| 2.4 | | Types and purpose of <i>security equipment</i> are explained |
| 2.5 | | Emergency and evacuation procedures are identified and implemented |
| 2.6 | | <i>Appropriate actions</i> for maintaining security and safety of self, others and the vessel are identified and followed |
| 3 Comply with reporting processes | 3.1 | Organisational <i>procedures for reporting security risks</i> and incidents are accessed and followed |
| | 3.2 | Chain of command of designated personnel is ascertained |
| | 3.3 | <i>Communication modes</i> are recognised and used appropriately |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply basic security legislative requirements applicable to a vessel
- Apply procedures for monitoring security in a marine environment
- Identify the range of security threats and risks relevant to a vessel
- Observe chain of command and communication channels
- Operate security equipment

- Recognise potential security threats
- Report identified security threats and risks in a marine environment

Required Knowledge:

- Applicable legislation relevant to the marine environment and own work role
- Applicable WHS/OHS requirements
- Communication chain of command
- Communication modes and security equipment and systems relevant to the marine environment
- Duty of care requirements of self and others
- Enabling recognition of potential security threats including elements related to piracy and armed robbery
- Enabling recognition of weapons, dangerous substances and devices and awareness of the damage they can cause
- General procedures for emergency, evacuation and first aid response
- Handling security related information and security related communications
- International marine security policy and responsibilities of governments, organisations and individuals
- Maritime security levels and their impact on security measures and procedures aboard ship and in port facilities
- Maritime security terms and definitions including elements relating to piracy and armed robbery
- Need for and methods of maintaining security awareness and vigilance
- Reporting procedures
- Security related contingency plans
- Techniques used to circumvent security measures
- Training, drill and exercise requirements under relevant conventions, codes and IMO circulars including those relevant for anti-piracy and anti-armed robbery
- WHS/OHS requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the

demonstrate competency in this unit

Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- awareness of one's surroundings and changes to these surroundings
- attention to appropriate level of detail in reports.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- marine operations site where following vessel security procedures can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate following vessel security procedures
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Legislative requirements may include:
- Applicable crime Acts and codes of practice
 - Award and enterprise agreements
 - General duty of care responsibilities
 - Maritime industry codes of practice
 - Maritime transport Acts and regulations
- Designated personnel may include:
- Company Security Officer
 - Emergency services
 - First Aid Officer
 - Master
 - Port Security Officer
 - Ship Security Officer
 - WHS/OHS representative
- Security threats may include:
- Injury to persons
 - Persons carrying weapons
 - Persons causing a public nuisance
 - Persons demonstrating suspicious behaviour
 - Persons under the influence of intoxicating substances
 - Persons with criminal intent
 - Piracy and armed robbery
 - Terrorism
 - Theft
 - Unattended packages, goods, baggage or cargo
 - Unattended vehicles in areas not designated for parking
 - Vandalism
 - Violence or physical threats
- Security equipment may include:
- Alarms
 - Locked and secure areas
 - Mirrors
 - Surveillance equipment
- Appropriate action must include:
- Access control to the vessel
 - Monitoring restricted areas

Procedures for reporting security risks may include:

- Completing documentation such as logs and activity reports
- Completing police reports
- Contacting designated personnel
- Requesting security assistance

Communication modes may include:

- Alarms
- Call codes and signs
- Hand signals
- Megaphone
- Mobile phone
- Public address system
- Telephone
- Two-way radio
- Verbal communication

Unit Sector(s)

Not applicable.

Competency Field

Operational Quality and Safety

MARF1004A Follow work health and safety, and emergency procedures during shore-based mooring operations

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMF6007A Follow OH&S and emergency procedures during shore-based mooring operations.

Unit Descriptor

This unit involves the skills and knowledge required to interpret and follow work health and safety (WHS)/occupational health and safety (OHS) policy and procedures, and emergency procedures during mooring and untying operations.

Application of the Unit

This unit applies to people working in the maritime industry under supervision as a shore-based linesperson as part of a mooring or untying team.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|--|-----|--|
| 1 Follow safety and hazard control procedures during mooring and untying operations | 1.1 | Tests and inspections of shore <i>ropes and equipment</i> used in <i>mooring and untying operations</i> are conducted according to regulations and company procedures |
| | 1.2 | Hazards are identified and action is taken to eliminate or minimise risk to personnel, port facilities, vessel and the environment |
| | 1.3 | <i>Safety precautions</i> and <i>hazard minimisation procedures</i> and regulations are followed at all times during mooring and untying operations |
| | 1.4 | In a mooring or untying incident or emergency, action is taken to secure vessel and to maintain safety of vessel and persons involved |
| 2 Use personal protective equipment during mooring and untying operations | 2.1 | <i>Personal protective equipment</i> (PPE) required during mooring and untying operations is obtained and checked prior to commencement of operations according to company WHS/OHS policy and procedures |
| | 2.2 | PPE is correctly used as required during mooring and untying operations |
| | 2.3 | PPE is correctly stored after use according to company procedures |
| 3 Follow emergency procedures | 3.1 | Wharf and port facility emergency procedures are accessed and implemented |
| | 3.2 | Escape routes and internal and external communications and alarm systems are correctly used according to regulatory requirements and established port procedures |
| | 3.3 | Emergency communications and alarm signals and systems are used according to port emergency procedures and regulatory requirements |
| 4 Report safety incidents and emergencies during mooring and untying operations | 4.1 | Information about safety incidents or emergencies that occur during mooring or untying operations is correctly and accurately recorded according to regulations and company procedures |
| | 4.2 | Required reports on safety incidents or emergencies that occur during mooring or untying operations are prepared and referred to designated personnel according to regulations and company procedures |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Communicate effectively with other personnel when mooring and untying a vessel
- Handle rope appropriately and correctly:
 - storing and caring for ropes and lines
 - tying knots such as bowline, reef knot, overhand knot, figure of eight knot, sheet bend and clove hitch
 - applying a chain stopper to a wire rope
 - heaving on a line in collaboration with other members of a mooring team
 - applying a stopper to a synthetic fibre rope
 - applying a chain stopper to a natural cordage rope
 - attaching a line to a bollard or bitt with all lines in correct order such as up through the eye
 - flaking down a rope
 - forming a bight
- Identify and correctly use:
 - PPE
 - various types of ropes, steel wires and mooring equipment
- Interpret and follow WHS/OHS and safety management procedures for mooring and untying operations, including safety instructions and precautions
- Recognise dangers and hazards before and during mooring operations, and take appropriate action to report and rectify them
- Recognise safety-related problems that may occur during mooring operations, and take appropriate action to report and resolve them
- Record and report safety incidents and emergencies
- Work safely as a member of a mooring and untying team

Required Knowledge:

- Dangers associated with mooring duties:
 - being hit by a line being thrown down from a vessel
 - stepping inside the bight of a line
 - being struck by a parting line
 - mixing rings and wire rope
 - falling off the edge of the wharf into the water
 - back strain from carrying a line, heaving on a line or heaving on a line with one hand
 - 'snap back' in the event of a synthetic line breaking

- trip hazards such as crane lines
- Hazards and safety-related problems that may occur during mooring and untying operations, and appropriate preventative and remedial action and solutions
- Methods for safely mooring and untying ocean-going vessels
- Procedures for calculating stresses on lifting gear used in cargo handling operations
- Relevant documentation and records:
 - mooring and untying plans, procedures, checklists and instructions
 - relevant sections of maritime regulations concerning mooring and untying operations
 - rope and equipment manufacturer instructions and procedures
 - safety instructions and procedures
 - instructions of relevant maritime authorities
 - reports and records of safety incidents or emergencies
- Relevant port and vessel safety and security requirements and regulations
- Relevant WHS/OHS legislation, codes of practice, policies and procedures
- Reporting requirements for safety incidents or emergencies that occur during mooring or untying operations
- Safety instructions for using ropes and other equipment during mooring and untying operations
- Safety management procedures for mooring and untying ocean-going vessels

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- working systematically with required attention to detail and safety requirements
- promptly reporting and/or rectifying hazards, safety incidents or emergencies.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where following work health and safety, and emergency procedures during

shore-based mooring operations can be conducted

- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate following work health and safety, and emergency procedures during shore-based mooring operations
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Ropes and equipment • Radios

- must include:
- Ropes and heaving lines provided by shore
 - Shackles
 - Wires
- Mooring and untying operations may include:
- Landing a gangway
 - Preparing a berth
 - Receiving heaving line from:
 - a launch
 - a vessel
 - Returning heaving line to a vessel
 - Untying and letting go a vessel
 - Working:
 - by day or night
 - in normal and emergency situations
 - under any permissible conditions of weather
 - at various shoreside terminals and wharves
- Hazards may include:
- Crane movement
 - Faulty communications equipment
 - Inadequate lighting
 - Ship mooring lines and wires in poor condition
 - Wharf traffic
- Personnel may include:
- Mooring:
 - launch and crew
 - supervisor
 - personnel (bow)
 - personnel (stern)
 - Pilot
 - Tug crew/s
 - Vessel crew
- Safety precautions may include:
- Checking:
 - own personal fitness and medical wellbeing
 - whereabouts of edge of wharf
 - whereabouts of other members of mooring/untying team
 - Confirming availability of a personal flotation device upon arrival at mooring operation
 - Keeping work area hazard-free
 - Obtaining and using required personal protective equipment (such as safety footwear, safety helmet, suitable gloves, safety vest and reflective braces, personal collar insert for flotation device)
 - Removing rings from fingers to avoid them being caught on steel wire ropes
 - Wearing suitable clothing

- Hazard minimisation procedures may include:
- Ensuring ropes and equipment have been tested and are in good condition
 - Placing warning signage in appropriate places
 - Testing equipment prior to operation
- Personal protective equipment may include:
- Personal collar insert for flotation device
 - Reflective braces
 - Safety:
 - footwear
 - helmet
 - vest
 - Suitable gloves

Unit Sector(s)

Not applicable.

Competency Field

Operational Quality and Safety

MARF1005A Meet work health and safety requirements

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMF5407A Observe safety and emergency procedures on a coastal vessel.

Unit Descriptor

This unit involves the skills and knowledge required to follow defined work health and safety (WHS)/occupational health and safety (OHS) policies and procedures relating to the work being undertaken in order to ensure own safety and that of others on board a vessel.

Application of the Unit

This unit applies to deck and engine workers working in the maritime industry on vessels up to 80 metres. They could be working independently or as part of a vessel crew.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|--|-----|---|
| 1 Recognise safety management system requirements | 1.1 | WHS/OHS responsibilities and duties are identified and accountability processes are appreciated |
| | 1.2 | WHS/OHS policies and procedures are accessed, reviewed and clarification sought where necessary |
| | 1.3 | Implications of any changes to the safety management system (SMS) are identified and addressed |
| | 1.4 | Records are accurately completed |
| 2 Work safely | 2.1 | Established <i>safety procedures</i> are followed when conducting work |
| | 2.2 | Work for which <i>personal protective clothing and/or equipment</i> required is identified, used, maintained and stored according to workplace procedures |
| | 2.3 | Safety checks on all equipment and machinery are undertaken before operation according to workplace procedures |
| | 2.4 | <i>Hazardous chemicals</i> are identified and handled according to workplace procedures |
| | 2.5 | <i>Safe manual handling techniques</i> are used when conducting work |
| | 2.6 | <i>Worker/employee responsibilities</i> prescribed in WHS/OHS legislation are recognised and carried out |
| 3 Follow workplace procedures for hazard identification, risk assessment and risk control | 3.1 | <i>Hazards</i> in the workplace are recognised and reported to designated personnel according to workplace procedures |
| | 3.2 | Assessment of risks associated with identified hazards is made according to workplace procedures |
| | 3.3 | Workplace procedures and work instructions for controlling risks are followed |
| | 3.4 | Risks to fellow workers and other people are recognised and action is taken to eliminate or reduce them |
| 4 Participate effectively in WHS/OHS consultation processes | 4.1 | WHS/OHS issues are raised with <i>designated personnel</i> according to workplace procedures |
| | 4.2 | Contributions are made to workplace meetings, inspections and other WHS/OHS activities |
| | 4.3 | Ideas are provided to control the level of risk associated with work tasks |

- 5 Follow emergency procedures**
- 5.1 *Emergency incidents* are identified and reported
 - 5.2 Emergency procedures are followed in responding to emergency incidents
 - 5.3 Emergency equipment is used in responding to emergency incidents
 - 5.4 Appropriate personnel are notified according to workplace procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access workplace information on health and safety policies and procedures
- Apply problem solving skills to investigate and identify causes of WHS/OHS incidents
- Apply person overboard procedures for recovery
- Contribute to review and development of advice on appropriate WHS/OHS procedures
- Demonstrate safe work practices
- Identify and respond to typical emergency situations
- Identify isolation points for equipment and follow workplace procedures for lock out or tag out of equipment as required
- Identify WHS/OHS hazards related to work responsibilities and take required action to remove or control hazards
- Maintain housekeeping standards in work area
- Render assistance to others in distress
- Report WHS/OHS information according to workplace procedures
- Select, fit and use appropriate personal protective clothing and equipment
- Use consultation processes to consult others on WHS/OHS issues

Required Knowledge:

- Action to be taken:
 - in an emergency situation
 - in the event of loss of rudder
 - in the event of lost or fouled propeller
 - when vessel is completely disabled
- Application of concepts of hazard identification, risk assessment and control options
- Communication systems and consultation arrangements

- Difference between hazards (something or a source or situation with the potential to harm life or health) and risks (chance of something occurring that will result in injury or damage)
- Disposition of persons onboard to ensure satisfactory stability and trim
- Emergency and evacuation procedures
- Impact of housekeeping on safety
- Location of advice on WHS/OHS issues including documents such as procedures and safety data sheets (SDS)/material safety data sheets (MSDS)
- Obligations and duties towards all persons onboard
- Procedures and responsibilities for investigating WHS/OHS incidents and assessing risk
- Procedures for working in confined spaces
- Purpose and procedure for collecting and reporting WHS/OHS information
- Safe work procedures relating to work responsibilities
- SMS
- Steps to be taken after collision, grounding or other marine casualty and resulting hull damage
- Storage requirements for hazardous goods used in the work area
- Typical hazards related to work responsibilities
- Use, care and storage of personal protective clothing and equipment
- Use of distress signals and penalty for misuse
- WHS/OHS legislation, regulations, codes of practice and organisational procedures associated with work responsibilities

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- working as part of a team
- selecting and using the most appropriate personal protective clothing and equipment for the situation.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where observation of compliance with safety and emergency procedures on a vessel up to 80 metres can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate observing safety and emergency procedures on a vessel up to 80 metres
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in

the performance criteria, is detailed below.

Safety procedures must include:

- Instructions on how a workplace activity should be carried out, by whom and when, and may include:
 - isolation
 - permit to work
 - noise and vibration
 - emergency procedures
 - rescue procedures
 - use of safety and flotation devices
 - work in rough weather
 - use of personal protective equipment
 - manual handling
 - use and storage of hazardous substances
 - accident and incident reporting
 - electrical safety
 - vessel housekeeping
 - plant and equipment
 - health and hygiene
 - working with the elements

Personal protective clothing and equipment may include:

- Aprons
- Breathing apparatus
- Eye protectors
- Gloves
- Harnesses
- Hats
- Hearing protectors
- Helmets
- Overalls
- Personal flotation devices
- Personal locator beacons
- Safety lines
- Shoes
- Spats

Hazardous chemicals may include:

- Battery acid
- Cleaning fluids
- Fuel
- Gas
- Oils and lubricants
- Paint
- Thinners

Safe manual handling techniques may include:

- Bending
- Lifting
- Loading materials
- Moving
- Pulling
- Pushing
- Repetitious tasks
- Storing materials at heights
- Up-ending materials

Worker/employee responsibilities may include:

- Accepting responsibility for protection of health and safety of others through avoidance of personal action that will put others at risk
- Cooperating with employer/supervisor in any action taken to comply with WHS/OHS legislation
- Taking reasonable care for own health and safety

Hazards may include:

- Contact with chemicals and hazardous substances
- Contaminants
- Contact with electricity
- Contact with plant and marine life
- Dangerous organisms
- Equipment operation and maintenance
- Falls, trips and slips
- Exposure to heat, cold and water
- Hitting or being hit by stationary or moving objects
- Immersion in water without a personal flotation device (PFD)
- Ladders
- Manual handling
- Noise
- Poor housekeeping and lack of deck space
- Repetitive movements and awkward postures
- Smoking and alcohol
- Unventilated holds
- Weather and water conditions
- Working in confined spaces
- Working with inappropriate clothing
- Working with knives

Designated personnel may include:

- Master of the vessel
- Supervisors, managers and team leaders
- Workplace WHS/OHS personnel
- Other persons authorised or nominated by the workplace to perform, approve, inspect or direct specified work

Emergency incidents may include:

- Beaching with and without heavy surf
- Chemical spills
- Collisions
- Disabled vessel
- Electrocutation
- Falling or being dragged overboard
- Fire
- Flood
- Grounding
- Hull damage
- Immersion in water
- Injuries associated with dangerous organisms (such as bites, stings, poisoning)
- Injuries associated with machines, vehicles, vessels, diving
- Loss of rudder
- Lost or fouled propeller
- Rescue activities
- Rough weather and heavy seas
- Vessel capsize

Unit Sector(s)

Not applicable.

Competency Field

Operational Quality and Safety

MARF1006A Survive at sea using survival craft

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to survive at sea using survival craft.

Application of the Unit

This unit applies to deck and engine workers working in the maritime industry on vessels up to 80 metres. They could be working independently or as part of a vessel crew.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|------------------------------------|-----|---|
| 1 Prepare to abandon vessel | 1.1 | Nature of emergency is determined to minimise potential dangers and threats |
| | 1.2 | Muster and abandon vessel signals are responded to according to |

- vessel safety procedures
- 1.3 ***Survival equipment*** is organised to maximise chances of survival
 - 1.4 Emergency position indicating radio beacon (EPIRB) is operated to transmit distress signal
 - 1.5 Distress calls are made using ***radio equipment***
 - 1.6 Others are assisted to maximise their chances of survival
 - 1.7 Prevailing circumstances and emergency conditions are used as the basis for timing and sequencing individual survival actions, and potential dangers and threats to other survivors are minimised
- 2 Operate lifesaving and survival equipment**
- 2.1 Location and accessibility of lifesaving and survival equipment is established
 - 2.2 Survival craft is launched in a timely and effective manner
 - 2.3 Survival equipment is operated according to instructions and accepted survival practice
 - 2.4 Survival radio equipment is operated according to manufacturer instructions and regulatory protocols
 - 2.5 Lifejacket and other lifesaving clothing are correctly used according to instructions
- 3 Abandon vessel safely**
- 3.1 Need to abandon vessel is established according to safety management system (SMS) or plan
 - 3.2 ***Survival craft*** is launched according to instructions
 - 3.3 Survival craft is checked to ensure it is safe to board
 - 3.4 Survival craft is boarded observing safety of other survivors
 - 3.5 Survival craft is released from abandoned vessel
 - 3.6 Exposure cover is deployed on survival craft according to accepted survival practice and manufacturer instructions
- 4 Apply survival techniques**
- 4.1 Survival craft is checked for seaworthiness
 - 4.2 Sea anchors and drogues are deployed according to accepted nautical practice
 - 4.3 Occupants are checked for signs of hypothermia or other injuries and first aid is applied where necessary

- 4.4 Water and food is rationed
- 4.5 Lookout for vessels and aircraft in vicinity is maintained and distress signals are released on sighting
- 4.6 Instructions given by rescue personnel are followed to safely access *rescue craft*

Required Skills and Knowledge

This describes the essential knowledge and skills and their level required for this unit.

Required Skills:

- Apply appropriate handling strategies to manoeuvre survival craft in rough weather and sea conditions
- Board a life raft while wearing a lifejacket and assist others to board
- Collect, manage and interpret information on use of lifesaving equipment
- Determine type and extent of emergency
- Free a survival craft of obstructions
- Jump safely from a height into the water according to established survival practice
- Launch survival craft
- Operate radio equipment
- Participate in training, musters and emergency drills
- Perform calculations to ration food and water
- Read and interpret instructions for emergency procedures and for use of lifesaving and survival equipment
- Recognise and interpret muster signals
- Right an inverted life raft while wearing a lifejacket according to established survival practice
- Swim while wearing a lifejacket and float without a lifejacket according to established survival practice

Required Knowledge:

- Action to be taken in emergency situations
- Emergency muster and abandon vessel signals
- Equipment found in survival craft, its function and procedures for correct operation
- Established survival practice
- First aid techniques

- Importance of being ready for shipboard emergencies
- Location of survival equipment on vessel
- Maintenance of lifesaving appliances
- Personal protective equipment (PPE):
 - purpose
 - use
- Procedures for abandoning vessel
- Relevant maritime regulations:
 - relating to required survival equipment on a vessel
 - dealing with survival at sea following vessel abandonment
- Relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- Safety of life at sea (SOLAS) regulations
- Steps to be taken after collision, grounding or other marine casualty and resulting hull damage
- Standard safety symbols
- Survival at sea techniques
- Survival craft:
 - construction
 - outfit
 - particular characteristics of different types
- Techniques for using survival equipment
- Time required to make distress calls safely
- Threats to survival on vessel abandonment and appropriate strategies for countering these threats
- Use of distress signals and penalty for misuse

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills, the range statement and the assessment guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- donning a life jacket or immersion suit

- ensuring behaviour reflects statutory requirements pertaining to lifesaving appliances
- taking action promptly to address any problems that may arise when following vessel abandonment procedures
- completing work systematically with required attention to detail
- recognising and adapting appropriately to cultural differences in the workplace, including modes of behaviour and interactions between crew and others.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where surviving at sea using survival craft can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate surviving at sea using survival craft
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

- Survival equipment may include:
- EPIRBs
 - Flares
 - Immersion suit
 - Life jackets
 - Person overboard combination light and smoke float
 - Search and rescue transponders (SARTs)
 - Survival craft
- Radio equipment may include:
- HF
 - VHF
- Survival craft may include:
- Inflatable life raft
 - Life boat
 - Life buoy
- Rescue craft may include:
- Another vessel
 - Helicopter

Unit Sector(s)

Not applicable.

Competency Field

Operational Quality and Safety

MARF3001A Assist in an emergency response

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to assist in responding to an emergency or incident and to apply control procedures on a vessel.

Application of the Unit

This unit applies to the work of an Integrated Rating on a range of vessels.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|-----------------------|---|
| 1 Raise alarms | 1.1 <i>Emergency or incident</i> is correctly identified according to organisational procedures |
| | 1.2 <i>Distress signals</i> are activated according to manufacturer instructions |

- and organisational procedures
- 2 Act in an emergency**
- 2.1 Immediate action required is identified and taken, according to emergency procedures
 - 2.2 Safety and security procedures are complied with in all actions
 - 2.3 **Personal protective equipment** is selected and used according to requirements of the situation, work health and safety (WHS)/occupational health and safety (OHS) and emergency procedures
 - 2.4 **Emergency equipment** is selected and used appropriate to the emergency or incident
 - 2.5 Orders are acknowledged and followed
 - 2.6 Allocated duties for emergency situations are performed according to organisational procedures
 - 2.7 Communications are maintained with others to facilitate emergency response process
- 3 Assist others in distress**
- 3.1 Distress signals from others are recognised
 - 3.2 Nature of assistance required is identified
 - 3.3 Capability to safely assist or relay emergency is determined taking into account own safety and physical proximity to emergency or incident
 - 3.4 Appropriate response to emergency or incident is prepared for and implemented
 - 3.5 Communications are maintained with others to facilitate emergency response process
- 4 Monitor environment and incident**
- 4.1 Factors that may create or increase risk of injury or damage are constantly assessed and reported to the Master
 - 4.2 **Measures** taken to relieve an emergency situation are monitored to ensure continued effectiveness
 - 4.3 Changes in conditions and behaviour are identified and reported
- 5 Assist with recovery from emergency or incident**
- 5.1 Evidence relating to cause of emergency or incident is preserved and recorded as far as possible
 - 5.2 Appropriate assistance is provided according to emergency procedures

- 5.3 Emergency equipment is returned to a state of readiness as soon as is reasonably possible
- 5.4 Debriefings are attended and participated in as appropriate

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Identify, isolate and report faulty or non-operational emergency equipment and distress signals
- Read and follow emergency procedures in real or simulated emergency situations
- Read and interpret basic instructions and standard operating procedures for emergencies
- Recognise routine problems that may occur when operating emergency equipment and distress signals
- Select and use appropriate emergency equipment and distress signals

Required Knowledge:

- Applicable sections of relevant maritime regulations dealing with emergency equipment and procedures
- Common emergency actions
- Duties and responsibilities of shipboard personnel during emergencies
- Emergency duties and alarm signals
- Functions and purpose of pyrotechnic distress signals, satellite emergency position indicating radio beacons (EPIRBs) and search and rescue transponders (SARTs)
- Identification of pyrotechnic expiry dates
- Procedures for:
 - activation of maritime emergency alarms
 - emergency response on board a vessel
 - testing EPIRBs and SARTs
- Range of safety equipment
- Safety of Life at Sea (SOLAS) Convention and related regulations
- Techniques for avoiding false distress alerts and action to be taken in the event of accidental activation
- Types of emergency incidents and situations
- WHS/OHS requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- communicating clearly and concisely in an emergency or incident.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where operating emergency equipment and applying emergency procedures can be conducted or simulated
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate operating emergency equipment and applying emergency procedures in real or simulated emergency situations
- direct observation of the candidate applying relevant

WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Emergency or incident may include:

- Anchoring
- Capsize
- Contaminated fuel
- Engine breakdown or malfunction
- Fire
- Flooding
- Fouled propeller
- Fuel supply system failure
- Grounding
- Hypothermia
- Injuries/illness
- Person overboard
- Person retrieval from water
- Sinking
- Swamping

Distress signals may include:

- Dye markers
- Flags
- Hand signals
- Internal public address system
- Light signals
- Mobile phone (cautionary note: mobile phones may be limited in their effectiveness)
- Pyrotechnic distress signals
- Radio
- Reflective mirror

- Satellite emergency position indicating radio beacons (EPIRBs)
 - Search and rescue transponders (SARTs)
 - Ship's whistle
 - Sound signal including voice
 - V-sheet
- Personal protective equipment may include:
- Hand protection/gloves
 - Head protection/helmet
 - Foot protection /boots
 - Radiant heat protection/coat
- Emergency equipment may include:
- Battery systems
 - Emergency fire pump
 - Emergency generator
 - Firefighting systems
 - Life jackets
 - Lifebuoys, lines and lights
- Measures may include:
- Enhanced lookout activities
 - Fire watch
 - Measurement of water ingress
 - Monitoring distress frequencies
 - Monitoring patient recovery

Unit Sector(s)

Not applicable.

Competency Field

Operational Quality and Safety

MARF3002A Observe personal safety and social responsibility

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMF5607A Observe personal safety and social responsibilities.

Unit Descriptor

This unit involves the skills and knowledge required to contribute to the safety management system processes where there is responsibility for own work outputs.

Application of the Unit

This unit applies to people working in the maritime industry requiring a Certificate of Safety Training.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|---|--|
| 1 Plan and conduct work safely | <p>1.1 <i>Individual rights and responsibilities</i> on board a vessel are interpreted and fulfilled</p> <p>1.2 Work is planned in accordance with work health and safety (WHS)/occupational health and safety (OHS) legislation and safety management system requirements</p> <p>1.3 Work is carried out according to established performance standards</p> <p>1.4 <i>Hazards</i> are identified as part of work planning and work processes</p> <p>1.5 Identified hazards are addressed prior to starting work</p> <p>1.6 Inadequacies in control measures are reported according to the safety management system</p> <p>1.7 Incidents and injuries are reported according to organisational procedures</p> <p>1.8 WHS/OHS housekeeping is undertaken in own work area</p> |
| 2 Contribute to WHS/OHS participation processes | <p>2.1 WHS/OHS representatives and committees are supported to undertake their roles and responsibilities</p> <p>2.2 WHS/OHS issues are raised according to organisational procedures</p> <p>2.3 Contributions to WHS/OHS meetings, vessel inspections or other consultative activities are provided in a constructive manner to improve safety</p> |
| 3 Contribute to hazard identification, risk assessment and risk control activities | <p>3.1 Vessel is checked for hazards using itemised checklists according to the safety management system</p> <p>3.2 Identified hazards and inadequacies in risk controls are reported according to the safety management system</p> <p>3.3 Contributions to risk assessments are made</p> <p>3.4 Input is provided to development and implementation of control measures, with reference to the hierarchy of control</p> <p>3.5 Where relevant, procedures and precautions for entry into pump room, fuel tanks or other confined spaces on a vessel are correctly followed</p> |
| 4 Participate in controlling WHS/OHS | <p>4.1 Scale of the <i>emergency situation</i> is correctly recognised</p> <p>4.2 Prompt, accurate and clear information is given on raising alarm</p> |

emergency situations	4.3	Initial action is taken to control/confine emergency according to organisational procedures, taking account of the nature and scope of the emergency
	4.4	Emergency response procedures are implemented
5 Complete WHS/OHS records	5.1	WHS/OHS records for vessel are correctly completed
	5.2	Legal requirements for the maintenance of records of occupational injury and disease are followed

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply the hierarchy of control (the preferred order of risk control measures from most to least preferred, that is, elimination of risk, substitution, engineering controls, administrative controls and personal protective equipment)
- Communicate with crew and others as appropriate about WHS/OHS matters
- Keep records/minutes of discussions with consultation forums on WHS/OHS matters
- Identify WHS/OHS training needs of crew
- Interpret and follow information on WHS/OHS legislation, safety management system, organisational procedures, written job instructions, specifications, standard operating procedures, charts, lists, and other applicable reference documents
- Investigate incidents according to organisational procedures
- Keep records for monitoring the effectiveness of practices and procedures with respect to the safety of the vessel
- Maintain incident records according to standard workplace procedures
- Obtain results of safety audits according to organisational procedures
- Participate in consultation forums
- Report and document the processes and outcomes of WHS/OHS requirements
- Schedule meetings with the relevant consultation forums to discuss WHS/OHS matters

Required Knowledge:

- Applicable commonwealth, state or territory WHS/OHS legislation, regulations, codes of practice, standards
- Dangers of drug and alcohol abuse
- Difference between hazards (something or a source or situation with the potential to harm

life or health) and risks (chance of something occurring that will result in injury or damage)

- Fatigue management and the importance of adequate rest
- Hazard identification procedures such as vessel inspections and review of WHS/OHS data
- Hierarchy of control and its application
- Legal rights and responsibilities of management, crew and others as appropriate
- Nature of common hazards for example chemicals, bodily fluids, noise, manual handling, work postures, underfoot hazards and moving parts of machinery
- Organisation specific information including:
 - hazards of the particular work environment
 - hazard identification procedures relevant to hazards in the organisation
 - designated person for raising WHS/OHS issues
 - organisation and work procedures particularly those related to performance of own work, specific hazards and risk control, reporting of hazards, incidents and injuries and WHS/OHS issue resolution, consultation, use of personal protective equipment and emergency response
 - potential emergency situations, alarms and signals, and required response
- Personal protective equipment requirements, including use, storage and maintenance
- Principles of basic risk assessment
- Roles and responsibilities of:
 - employees, supervisors and managers in the organisation
 - safety representatives and committees
- Safety signs and their meanings, including signs for:
 - personal protective equipment
 - emergency equipment
 - dangerous goods class signs
- Sources of WHS/OHS information within in the organisation with knowledge of external sources of WHS/OHS information
- Specific hazards, such as sharps and radiation
- Standard emergency signals, alarms and required responses

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required

this unit

Knowledge and include:

- on becoming aware of an emergency, conforming to established emergency response procedures for initial and follow-up action
- accurately completing records
- attention to appropriate level of detail in recordkeeping.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- marine operations site where observation of personal safety and social responsibility can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate observing personal safety and social responsibility
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being

performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Individual rights and responsibilities may include:

- Avoiding and preventing harassment of others
- Avoiding drug and alcohol abuse on board vessel
- Implementing appropriate precautions to avoid contributing to the spread of AIDS and other communicable diseases
- Maintaining appropriate standards of hygiene and cleanliness
- Providing a good example to others as a responsible, fair, sympathetic, and equitable member of the shipboard team
- Respecting the religious and cultural habits of crew members

Hazards may include:

- Contact with chemicals and hazardous substances
- Contaminants
- Contact with electricity
- Contact with plant and marine life
- Dangerous organisms
- Equipment operation and maintenance
- Falls, trips and slips
- Exposure to heat, cold and water
- Hitting or being hit by stationary or moving objects
- Immersion in water without a personal flotation device (PFD)
- Ladders
- Manual handling
- Noise
- Poor housekeeping and lack of deck space
- Repetitive movements and awkward postures
- Smoking and alcohol
- Unventilated holds
- Weather and water conditions
- Working in confined spaces
- Working with inappropriate clothing
- Working with knives

Emergency situations may include:

- Beaching with and without heavy surf
- Chemical spills
- Collisions
- Disabled vessel
- Electrocution
- Falling or being dragged overboard
- Fire
- Flood
- Grounding
- Hull damage
- Immersion in water
- Injuries associated with dangerous organisms (such as bites, stings, poisoning)
- Injuries associated with machines, vehicles, vessels, diving
- Loss of rudder
- Lost or fouled propeller
- Rescue activities
- Rough weather and heavy seas
- Vessel capsize

WHS/OHS records may include:

- Accident reports
- Incident reports
- Injury reports
- Hazard reports

Unit Sector(s)

Not applicable.

Competency Field

Operational Quality and Safety

MARF3003A Operate emergency equipment and apply emergency procedures

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMF2307B Operate emergency equipment and apply emergency procedures.

Unit Descriptor

This unit involves the skills and knowledge required to participate in the monitoring of emergency prevention and applying of control procedures in an emergency for a vessel.

Application of the Unit

This unit applies to an Integrated Rating on a range of vessels.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Apply emergency procedures**
 - 1.1 *Emergencies* are correctly identified according to organisational procedures
 - 1.2 On becoming aware of an emergency or abnormal situation, organisational procedures for initial action are conformed with
 - 1.3 *Emergency and distress alerting systems* are activated according to manufacturer instructions and organisational procedures
 - 1.4 False distress alerts are avoided and appropriate action is taken in the event of accidental activation of a distress alert according to organisational procedures
 - 1.5 Orders are acknowledged and followed
 - 1.6 Allocated duties for emergency situations are performed according to organisational procedures
 - 1.7 Communications are maintained with others to facilitate the emergency response process
- 2 Maintain integrity of emergency and distress alerting systems**
 - 2.1 Emergency and distress alerting systems maintenance requirements are specified and managed
 - 2.2 Systems maintenance is audited for compliance
 - 2.3 Systems are assessed for useability and accessibility, and are reported according to organisational procedures
 - 2.4 Procedures are followed to correct *systems defects and deficiencies*
- 3 Report and record emergency and distress alerting systems faults**
 - 3.1 Schedule for verifying and reporting faults is developed and implemented
 - 3.2 Details and nature of faults are recorded and where possible rectified according to manufacturer instructions and organisational procedures
 - 3.3 Reports on faults are provided and contain recommendations for improvements according to organisational procedures
 - 3.4 Frequency of occurrence of faults is monitored and reported according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Identify, isolate and report faulty or non-operational emergency and distress alerting systems
- Read and follow emergency procedures in real or simulated emergency situations
- Read and interpret basic instructions and standard operating procedures for emergency and distress alerting systems
- Recognise routine problems that may occur when operating emergency and distress alerting systems
- Select and use emergency and distress alerting systems

Required Knowledge:

- Applicable sections of relevant maritime regulations dealing with emergency equipment and procedures
- Duties and responsibilities of shipboard personnel during emergencies
- Emergency duties and alarm signals
- Functions and purpose of pyrotechnic distress signals, satellite emergency position indicating radio beacons (EPIRBs) and search and rescue transponders (SARTs)
- Identification of pyrotechnic expiry dates
- Procedures for:
 - activating maritime emergency alarms
 - emergency response on board a vessel
 - testing EPIRBs and SARTs
- Safety of Life at Sea (SOLAS) Convention and related regulations
- Techniques for avoiding false distress alerts and action to be taken in the event of accidental activation
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- communicating clearly and concisely in an emergency or abnormal situation.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where operating emergency equipment and applying emergency procedures can be conducted or simulated
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate operating emergency equipment and applying emergency procedures in actual or simulated emergency situations
- direct observation of the candidate applying Relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to

the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Emergencies may include:

- Any situation leading to abandonment of a vessel
- Responding to distress alerts from other vessels

Emergency and distress alerting systems

- Internal public address system
- Pyrotechnic distress signals
- SARTs
- Satellite EPIRBs
- Ships whistle

Systems defects and deficiencies may include:

- EPIRB function test failure
- Out-of-date pyrotechnics distress signals
- SART not operating

Unit Sector(s)

Not applicable.

Competency Field

Operational Quality and Safety

MARF3004A Operate survival craft and other lifesaving appliances

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMF1907B Operate survival craft and other lifesaving appliances.

Unit Descriptor

This unit involves the skills and knowledge required to comply with accepted safety practices and standards in responding to abandon ship and survival situations.

Application of the Unit

This unit applies to crew members required to assist in the operation of survival craft and other lifesaving appliances on a range of vessels.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Launch survival craft and rescue boats**
 - 1.1 Preparations for the launch of the *survival craft or rescue boat* are made according to manufacturer instructions and organisational procedures
 - 1.2 Launch strategy is adopted appropriate to the prevailing circumstances and conditions
 - 1.3 *Launching equipment* is operated according to manufacturer instructions and organisational procedures
 - 1.4 Survival craft or rescue boat is launched smoothly according to accepted safety practices and standards
- 2 Operate survival craft and rescue boats**
 - 2.1 Pre-start checks are conducted on the engine
 - 2.2 Engine is started according to manufacturer instructions and organisational procedures
 - 2.3 Orders are given for survivors to board the survival craft
 - 2.4 Survival craft is cleared of the vessel and operated according to manufacturer instructions and organisational procedures
 - 2.5 Survival craft is manoeuvred appropriately for the prevailing circumstances and conditions
- 3 Operate lifesaving and survival equipment**
 - 3.1 Location and accessibility of all *lifesaving and survival equipment* is established
 - 3.2 Survival equipment is checked and operated according to manufacturer instructions and organisational procedures
 - 3.3 Lifesaving clothing is correctly donned and used according to manufacturer instructions and organisational procedures
 - 3.4 *Strategies* are implemented to counter threats to survival according to accepted survival practice
- 4 Recover survival craft**
 - 4.1 Persons are disembarked from the survival craft according to organisational procedures
 - 4.2 Survival craft is recovered according to manufacturer instructions and organisational procedures
 - 4.3 Survival craft and equipment are checked for signs of damage and faulty equipment
 - 4.4 Identified faulty equipment or damage is reported according to

- organisational procedures
- 5 Organise abandon vessel musters and drills**
- 5.1 Abandon vessel musters and drills are arranged according to regulatory requirements and organisational procedures
 - 5.2 Contributions are made to musters and drills
 - 5.3 Instruction is provided to others on organisational procedures and the correct use of lifesaving equipment
 - 5.4 Musters and drills are reviewed against objectives
 - 5.5 Reporting obligations are completed according to regulatory requirements and organisational procedures
 - 5.6 Risk control processes are implemented

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Conduct inspections of other survival equipment at intervals determined by the safety management system
- Conduct tests and pre-start checks of equipment at intervals determined by the safety management system
- Give correct commands for launching and boarding survival craft and clearing the ship
- Interpret and apply safety of life at sea (SOLAS) practices and regulations
- Organise abandon vessel drills
- Read and interpret instructions relevant to the safe operation of lifesaving appliances on board a vessel
- Recover survival craft and rescue boats and reset release devices
- Row and steer a survival craft and rescue boat
- Safely operate off-load and on-load release devices
- Select and use appropriate lifesaving appliances and communications equipment
- Use a compass
- Use portable radio equipment, pyrotechnics and other signalling equipment
- Use survival craft equipment including rigging devices to aid location

Required Knowledge:

- Construction and outfit of survival craft and rescue boats
- Dangers associated with the use of on-load release devices
- Emergency muster and abandon vessel signals
- IMO safety symbols
- ISM Code safety management system plans, procedures, checklists and instructions
- Maintenance procedures for survival craft and rescue boats
- Manoeuvring characteristics of survival craft and rescue boats
- Operation of survival craft and rescue boats, their launching appliances and arrangements and their equipment
- Procedures and sequences for launching, carrying out pre-start engine checks and operating survival craft and rescue boats in a variety of sea and weather conditions
- Procedures for correctly operating and using lifesaving appliances and personal safety equipment on vessels and survival craft
- Relevant sections of applicable maritime regulations
- Relevant work health and safety (WHS)/occupational health and safety (OHS) legislation
- SOLAS regulations
- Symptoms of hypothermia, its prevention and treatment
- Threats to survival on abandonment of a vessel and appropriate strategies for countering these threats
- Typical manoeuvring and engine characteristics for survival craft
- Ways of maximising detect ability and location of survival craft using radio lifesaving appliances, pyrotechnic distress signals, satellite emergency position indicating radio beacons (EPIRBs), and search and rescue transponders (SARTs)

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- acting appropriately to the prevailing circumstances and conditions in response to abandon ship and survival situations according to accepted safety practices and standards
- launching and operating various types of survival craft

Context of and specific resources for assessment

- communicating effectively with others as required when operating survival craft and ancillary survival equipment.

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where operating survival craft and other lifesaving appliances can be conducted in suitably simulated situations
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate operating survival craft and other lifesaving appliances
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Survival craft and rescue boats must include:

- Life rafts
- Lifeboats
- Rescue boats

Launching equipment must include:

- Cranes
- Davits
- Life raft launching and inflation equipment

Lifesaving and survival equipment must include:

- Immersion suits
- Life jackets
- Person overboard combination light and smoke float
- Portable radio equipment
- Pyrotechnic distress signals
- SARTs
- Satellite EPIRBs
- Thermal protective aids

Strategies must include:

- Beaching survival craft
- Deploying exposure cover on an open lifeboat
- Handling survival craft in rough weather
- Helicopter rescue from survival craft
- Maximising detect ability of survival craft
- Preventing and treating hypothermia
- Rationing food and water
- Using rescue boat to marshal life rafts
- Using rescue boat to retrieve survivors in the sea

Unit Sector(s)

Not applicable.

Competency Field

Operational Quality and Safety

MARF3005A Prevent and fight fires on board a vessel

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMF6207A Prevent, control and fight fires on board an ocean-going vessel.

Unit Descriptor

This unit involves the skills and knowledge required to prevent fires and to respond effectively to any fire emergency on board a vessel.

Application of the Unit

This unit applies to deck and engine workers working in the maritime industry requiring a Certificate of Safety Training.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 **Actively prevent fire**
 - 1.1 *Fire hazards* (pre-conditions for fire) on board a vessel are identified and rectified according to workplace procedures
 - 1.2 Onboard procedures for preventing fire are accessed and implemented
- 2 **Prepare response to fire**
 - 2.1 Location and *class of fire* is identified
 - 2.2 Alarm is raised
 - 2.3 Condition of *firefighting equipment and systems* in work area is monitored according to planned maintenance schedules
 - 2.4 Realistic drills and musters are practised to ensure pre-incident readiness of response personnel
 - 2.5 Appropriate *protective clothing and equipment* including self contained breathing apparatus (SCBA) is made ready
 - 2.6 All available means to limit the spread of fire and smoke are employed
 - 2.7 Appropriate pump/s and ancillary equipment are readied to support firefighting operations
 - 2.8 *Extinguishing media/agent* is selected according to the class/classes of fire
- 3 **Combat fire**
 - 3.1 Threats to life or health are identified within the emergency area
 - 3.2 *Activities and tactics* to combat the fire are selected so that the safety of the vessel and all on board is not compromised
 - 3.3 Fire is located and access is gained in the safest and most timely manner
 - 3.4 Fire is attacked using the extinguishing media/agent and application techniques appropriate to the class and size of fire
 - 3.5 SCBA is donned and used correctly while undertaking fire extinguishment and rescue
 - 3.6 Effectiveness of combat activities and tactics is evaluated and altered as required
 - 3.7 Communication is maintained to ensure safety and efficiency of firefighting operation

- 4 Complete post-fire activities**
- 4.1 Fire watch is maintained to prevent further outbreak
 - 4.2 Equipment is *restored* to operational condition
 - 4.3 Fire scene is preserved prior to investigation, if appropriate
 - 4.4 Information relating to the incident is provided as part of fire debriefing session

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply extinguishing media to fire
- Apply safe working practices at all times
- Assist in the setting up and use of foam making equipment
- Correctly don and use SCB while undertaking fire extinguishment and rescue in a heated smoke filled compartment
- Enter and move through a compartment filled with high expansion foam with the aid of a lifeline and without breathing apparatus
- Extinguish a fire with a fire blanket
- Log SCBA wearers correctly on a control board
- Operate charged hose-lines and nozzles
- Operate portable firefighting extinguishers
- Perform after use maintenance on SCBA

Required Knowledge:

- Action to be taken:
 - in an emergency
 - on board ship
- Alarms and signals during onboard emergencies
- Chemistry of fire, including the fire tetrahedron and its relationship to materials typically found on vessels
- Classification of fire and applicable extinguishing agents
- Correct use of all lifesaving appliances and firefighting appliances
- Different classes of fire, their characteristics and strategies and equipment needed for their extinguishment

- Elements of fire and explosion (the fire triangle)
- Extinguishing media including firefighting foams
- Fire and smoke detection and automatic alarm systems
- Firefighting tactics, techniques and procedures
- Flammable materials, fire hazards and spread of fire
- Hazards and threats to life or health during onboard firefighting operations
- Lifeline signals
- Location of firefighting appliances and emergency escape routes
- Maintenance of lifesaving appliances and firefighting appliances
- Need for constant vigilance
- Onboard Emergency Response Organisation and procedures
- Portable fire extinguishers
- Principles and methods of fire extinguishment
- Principles underlying the spread of fire
- Relevant Australian Standards
- Safe working practices
- Shipboard firefighting organisation
- Statutory requirements pertaining to lifesaving appliances and firefighting appliances
- Types and sources of ignition
- Types of fire detection, firefighting equipment and systems used on vessels, their features, principles of operation, procedures for their use and problems that can occur
- Ventilation procedures
- Vessel construction as it relates to fire prevention/protection
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- working as part of a team
- being aware of own ability and limits.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations where fighting and extinguishing fires in a simulated environment using live fire and smoke can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate fighting and extinguishing fires
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Fire hazards must cover:

- Accommodation
- Cargo areas
- Engine rooms
- Electrical distribution systems
- Fuel handling systems
- Galleys
- Lack of maintenance
- Laundry
- Poor housekeeping
- Smoking
- Stores areas

Classes of fire include:

- A Carbonaceous Solids
- B Flammable Liquids
- C Flammable Gases
- D Combustible Metals
- E Energised Electrical Equipment
- F Cooking Oils and Fats

Firefighting equipment and systems must include:

- Hoses
- Fixed fitted detection and suppression systems
- Foam applicators
- International ship-to-shore connection
- Nozzles
- Portable and semi-portable extinguishers
- Stretchers/ropes and lines

Protective clothing and equipment must include:

- Head protection/helmet
- Hand protection/gloves
- Radiant heat protection/coat
- Foot protection/ boots
- Firefighter outfit as per current Fire Safety Systems Code (as applicable)
- SCBA

Extinguishing media/agent must include:

- Extinguishing powder
- Foam
- Gaseous extinguishing agents
- Water

Firefighting activities must include:

- Boundary control
- Containing the spread of fire

- Firefighting tactics must include:
- Evacuation of casualties from heated smoke filled environments
 - Extinguishment
 - Overhaul/fire watch
 - Combination of attack
 - Cooling the fuels
 - Direct offensive (attack team)
 - Direction of attack
 - Exclusion of oxygen – smothering
 - Indirect defensive (fixed system)
 - Interrupting the chemical chain reaction
 - Removal of fuels - starvation
- Restored must include:
- Cleaning
 - Re-stowing
 - Recharging according to Australian Standards
 - Servicing

Unit Sector(s)

Not applicable.

Competency Field

Operational Quality and Safety

MARF3006A Survive at sea in the event of vessel abandonment

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to survive at sea in the event of vessel abandonment.

Application of the Unit

This unit applies to people working in the maritime industry requiring a Certificate of Safety Training.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|-------------------------------|--|
| 1 Respond to emergency | 1.1 <i>Emergency situation</i> is correctly recognised |
| | 1.2 Muster and abandon vessel signals are activated according to |

- organisational procedures
- 1.3 Prompt, accurate and clear information is given on raising alarm
 - 1.4 Instructions are provided to crew and passengers to maximise chances of survival
 - 1.5 Emergency position indicating radio beacon (EPIRB) is operated to transmit distress signal
 - 1.6 Distress calls are made using *radio equipment* on distress call frequency to communicate nature of emergency
- 2 Launch survival craft and rescue boats**
- 2.1 Preparations for the launch of the *survival craft or rescue boat* are made according to organisational procedures and manufacturer instructions
 - 2.2 Appropriate launch strategy is adopted following an assessment of the weather and sea conditions, and the nature of the emergency
 - 2.3 Launching equipment is operated according to organisational procedures and manufacturer instructions
 - 2.4 Survival craft or rescue boat is launched smoothly according to organisational procedures and manufacturer instructions
 - 2.5 Pre-start checks are conducted on the engine of the survival craft or rescue boat
 - 2.6 Survival craft or rescue boat engine is started according to organisational procedures and manufacturer instructions
- 3 Operate survival craft and rescue boats**
- 3.1 Orders are given to survivors to board the survival craft or rescue boat using appropriate means
 - 3.2 Survival craft or rescue boat is cleared of the vessel and operated according to organisational procedures and manufacturer instructions
 - 3.3 Sea anchors and drogues are used to assist in remaining within the vicinity of the abandoned vessel and to minimise the effects of adverse weather and sea conditions
 - 3.4 Exposure cover is deployed on an open lifeboat according to manufacturer instructions
- 4 Operate lifesaving and survival equipment on board survival**
- 4.1 Location and accessibility of all *lifesaving and survival equipment* is established
 - 4.2 Survival equipment is checked and operated according to manufacturer instructions

craft and rescue boats	4.3	Lifesaving equipment is correctly donned and used according to manufacturer instructions
5 Assume responsibility for survival of crew and passengers	5.1	Survivors are checked for signs of hypothermia or other injuries and first aid is applied where necessary
	5.2	Water and food is rationed
	5.3	Lookout for vessels and aircraft in the vicinity is maintained and distress signals are released on sighting
	5.4	Instructions given by rescue personnel are followed to safely access rescue craft
	5.5	Persons are disembarked from survival craft or rescue boat according to organisational procedures
	5.6	Survival craft or rescue boat is recovered and checked for signs of damage

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Board a survival craft from the ship and water while wearing a life jacket
- Determine the type and extent of the emergency
- Don a life jacket
- Don and use an immersion suit
- Free a survival craft of obstructions
- Identify hypothermia and provide appropriate treatment
- Keep afloat without a life jacket
- Launch survival craft
- Operate location devices, including radio equipment
- Operate radio equipment
- Operate survival craft equipment
- Recognise and interpret muster signals
- Right an inverted life raft
- Right an inverted life raft while wearing a life jacket
- Safely jump from a height into water
- Stream a drogue or sea-anchor

- Swim while wearing a life jacket
- Take initial actions on boarding survival craft to enhance chance of survival

Required Knowledge:

- Action to be taken in an emergency
- Characteristics of survival craft
- Emergency muster and abandon vessel signals
- Equipment found in survival craft, its function and the procedures for correct operation
- Equipment in survival craft
- First aid techniques
- Location of personal life-saving appliances
- Location of survival equipment on vessel
- Principles concerning survival including:
 - value of training and drills
 - personal protective clothing and equipment
 - need to be ready for any emergency
 - actions to be taken when called to survival craft stations
 - actions to be taken when required to abandon ship
 - actions to be taken when in the water
 - actions to be taken when aboard a survival craft
 - main dangers to survivors
- Procedures for abandoning vessel
- Relevant maritime regulations related to required survival equipment on a vessel
- Relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- Standard safety symbols
- Steps to be taken after collision, grounding or other marine casualty and resulting hull damage
- Survival at sea techniques
- Techniques for using survival equipment
- Time required to make distress calls safely
- Types of emergency situations which may occur such as collision, fire, foundering
- Types of life-saving appliances normally carried on ships
- Use of distress signals and penalty for misuse

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- identifying muster signals, and taking action that is appropriate to emergency and complies with established procedures
- timing and sequencing individual actions so they are appropriate to prevailing circumstance and conditions, and minimise potential dangers and threats to survival
- using method of boarding survival craft that is appropriate and avoids dangers to other survivors
- ensuring initial actions after leaving ship, and procedures and actions in the water minimise threats to survival.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where surviving at sea in the event of vessel abandonment can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are

appropriate to this unit:

- direct observation of the candidate surviving at sea in the event of vessel abandonment
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Emergency situations must include:

- Collision
- Fire
- Foundering

Radio equipment may include:

- EPIRB
- Global Maritime Distress and Safety System (GMDSS)
- HF
- Search and Rescue Transponders (SARTs)
- VHF

Survival craft and rescue boats may include:

- Inflatable life raft
- Life boat
- Rescue boat

Lifesaving and survival equipment may include:

- EPIRBs
- Flares
- Life jackets
- Immersion suit
- Person overboard combination light and smoke float
- SARTs

Unit Sector(s)

Not applicable.

Competency Field

Operational Quality and Safety

MARF3007A Work safely in confined spaces on a vessel

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMF5907A Work safely in enclosed spaces on a vessel.

Unit Descriptor

This unit involves the skills and knowledge required to enter and work safely in confined spaces on a vessel.

Application of the Unit

This unit applies to all maritime employees who could be required to work in, on or around confined spaces on board a vessel.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Identify confined spaces and their regulatory framework**
 - 1.1 *Characteristics of a confined space* are outlined
 - 1.2 *Confined spaces* in the workplace are identified
 - 1.3 *Regulations* and *standards* relevant to confined space operations on *vessels* are identified
 - 1.4 Relevant *codes of practice* and sources of guidance for undertaking confined space work are identified
 - 1.5 Potential *hazards* of confined spaces are identified
- 2 Assess confined space for entry**
 - 2.1 Purpose and need to enter confined space is confirmed
 - 2.2 Hazards in and around confined space and those associated with work to be performed are identified
 - 2.3 *Risk* assessment is conducted and documented according to organisational procedures
 - 2.4 *Risk control measures* are identified and documented
- 3 Obtain permission to enter confined space**
 - 3.1 Process and documentation required for authorisation to enter confined space are identified
 - 3.2 Permission to enter and work in confined space is sought from *authorised personnel* on vessel according to regulatory and organisational requirements
 - 3.3 *Permit requirements* associated with confined space entry and work to be performed are confirmed and completed
- 4 Plan and prepare for entry**
 - 4.1 Appropriate plan is prepared for completion of work activity in confined space
 - 4.2 Process is followed to ensure confined space is *ready for entry*
 - 4.3 Appropriate *personal protective clothing and equipment* is selected and used correctly
 - 4.4 *Entry equipment* is made ready and used according to manufacturer operating instructions
 - 4.5 *Precautions during entry* are identified to protect occupants
- 5 Apply emergency**
 - 5.1 *Role and responsibilities of standby person/s* are clearly defined
 - 5.2 Planned emergency procedures appropriate for circumstances are

procedures	implemented
	5.3 Personal protective equipment and <i>emergency rescue equipment</i> is selected, prepared and used
6 Conclude confined space operations	6.1 Personnel involved and equipment used are accounted for
	6.2 Equipment is cleaned, inspected and/or serviced prior to stowage
	6.3 Confined space entry is secured, isolations are removed and space is returned to normal
	6.4 Permit is withdrawn and documentation is completed according to regulatory requirements and organisational policy

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Complete necessary documentation associated with confined space entry
- Identify and implement control measures to mitigate risk
- Recognise defective equipment and take appropriate action
- Recognise hazards and risks when preparing to enter, entering and working in confined spaces
- Read and interpret regulations, codes of practice, permit requirements, instructions and procedures for entry into a confined space on a vessel
- Select, inspect and use safety and emergency equipment according to operating instructions
- Use atmospheric detection equipment and interpret the readings
- Use basic verbal and/or defined communication skills and signals when entering and working in confined spaces
- Work safely and collaboratively with others when entering and working in a confined space

Required Knowledge:

- Atmospheric testing and monitoring equipment and techniques
- Communications systems:
 - air horns
 - alarm/indicator panels

- face-to-face
- lifeline/signalling line
- two way radios
- Communication techniques used when entering and working in confined spaces on a vessel
- Criteria that defines a confined space
- Emergency entry and exit procedures
- Inherent and work related hazards associated with confined spaces
- Procedures and permit requirements for confined space entry
- Relevant legislative and/or regulatory framework that impacts on confined space entry
- Role of standby person/s
- Safe operational procedures for the use of self contained breathing apparatus (SCBA)
- Ventilation of confined spaces
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- continuously monitoring and checking conditions and hazards when working in a confined space on a vessel
- developing effective planning documents
- taking appropriate action during an emergency
- taking actions promptly to identify, report, and/or rectify hazards and emergency situations when working in a confined space.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-appropriate working or training vessel or a maritime operation where confined space entry can take place

- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate working in a confined space on an operational vessel
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Characteristics of a confined space must include:

- Those described in the Occupational Health and Safety (Maritime Industry) (National Standards) Regulation and/or Australian Standard (AS/NZS) 2865 Safe working in a confined space

Confined spaces may include:

- Ballast tanks
- Battery lockers
- Boilers
- Cargo tanks/holds
- Chain lockers
- Cofferdams
- Compressor rooms
- Double bottoms
- Duct keels
- Engine components
- Fuel tanks
- Furnaces
- Inert gas scrubber plants
- Pump rooms
- Sewage tanks
- Storage areas for fixed fire extinguishing media
- Trunking and pressure vessels
- Void spaces

Regulations, standards and codes of practice must include:

- Code of Safe Working Practice for Australian Seafarers - Section 10 Entering and working in enclosed or confined spaces
- International Safety Management (ISM) Code
- Navigation Act 2012
- Occupational Health and Safety (Maritime Industry) (National Standards) Regulations 2003

Regulations, codes of practice and standards may include:

- Australian Standard AS/NZS 2865 Safe working in a confined space
- IMO Resolution A 1050 (27) Revised Recommendations for Entering Enclosed Spaces Aboard Ships
- International Maritime Solid Bulk Cargoes Code (IMSBC Code)
- International Safety Guide for Oil Tankers and Terminals (ISGOTT)
- Liquefied Gas Handling Principles on Ships and in Terminals (SIGTTO)
- Shipboard confined /enclosed space entry procedures

Vessels may include:

- Any Australian or international commercial vessel or unit

Hazards may include:

- Cold pipes and valves (refrigeration and liquefied gases etc.)
- Dangerous goods in packaged form
- Electricity and wiring systems
- Flammable or explosive atmospheres
- Free flowing solids

- Height
 - Hot pipes (steam, fuel oil, lubricating oils etc.)
 - Manual handling
 - Moving equipment
 - Noise
 - Oxygen deficiency or enrichment
 - Physical obstructions such as transverse frames and floors
 - Poor visibility
 - Products or processes in adjacent spaces
 - Restricted access
 - Rising liquids
 - Slippery or uneven surfaces
 - Temperature extremes
 - Toxic liquids, solids, gases, vapours and dusts
 - Vibration
- Risks may include:
- Asphyxiation
 - Contamination
 - Engulfment
 - Falling
 - Fire or explosion
- Risk control measures may include:
- Atmospheric testing
 - Barricading
 - Cleaning
 - De-energising
 - Isolation
 - Lockout
 - Purging
 - Signage
 - Tag out
 - Ventilation
- Authorised personnel may include:
- Master
 - Delegated Safety Officer
 - Chief Mate
 - Chief Engineer
 - 1st Engineer
- Permit requirements may include:
- Atmospheric testing results
 - Cold work permit
 - Communications
 - Competent person who has control of the space and the authorising officer's signature
 - Date and period of validity
 - Hazards that are likely to be present

- Height permit
 - Hot work permit
 - Isolation checklist
 - Locations of the space
 - Need for respiratory protection
 - Personal protection clothing required
 - Personal protective equipment required
 - Person/s entering
 - Rescue arrangements and emergency equipment
 - Risk control measures
 - Standby person/s
- Ready for entry may include:
- Communications understood and tested
 - Control measures confirmed and implemented
 - Development of an appropriate plan to complete works in the space
 - Emergency plan confirmed as appropriate or modified and equipment in position at the ready
 - Method of safe entry and exit in place
 - Permit/s signed by the Responsible Officer and posted
 - Safe atmosphere confirmed (or relevant measures in place to ensure safe entry into an unsafe atmosphere)
 - Space is secured
 - Standby person/s identified and in position
- Personal protective clothing and equipment may include:
- Atmospheric monitoring equipment
 - Chemically resistant splash suits
 - Coveralls
 - Gloves
 - Harness and restraint equipment
 - Helmet
 - Respiratory protection (self rescue devices and SCBA)
 - Safety boots
 - Safety glasses or goggles
- Entry equipment may include:
- Anchor straps and/or anchor points
 - Atmospheric testing and monitoring equipment
 - Confined space harnesses
 - Fall arrest systems equipment
 - Intrinsically safe torches/lifting
 - Lifeline/signalling line
 - Lockout kit
 - Retractable lanyard/s
 - Rope kit/winching
 - SCBA

- Precautions during entry may include:
- Signage
 - Tripod
 - Ventilation fan and ducting
 - Atmosphere must be tested prior to entry, before re-entry and at frequent intervals
 - Atmospheric monitoring must occur during occupancy
 - If conducting prolonged work activities or in extreme temperatures, regular breaks should be taken
 - If entry to unknown or unsafe atmospheres cannot be avoided the use of suitable breathing apparatus e.g. airline or self-contained should be employed
 - Occupants must be provided with calibrated and tested multi-gas detectors
 - Standby person must maintain communications with occupants and relevant personnel
 - Ventilation must continue while the space is occupied
- Role and responsibilities of standby person/s may include:
- As defined in Regulation 4.18 Part 4 of the Occupational Health and Safety (Maritime Industry) (National Standards) Regulation
- Emergency rescue equipment may include:
- Atmospheric monitoring equipment
 - Emergency escape breathing devices
 - First aid kit
 - Harnesses
 - Helmets
 - Lighting
 - Oxygen resuscitation kit
 - Rescue ropes
 - Rope recovery kit
 - SCBA
 - Stretcher
 - Tripod

Unit Sector(s)

Not applicable.

Competency Field

Operational Quality and Safety

MARF4001A Manage firefighting and fire prevention activities on board a vessel

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMF6107A Manage marine fire fighting and prevention activities on board a vessel.

Unit Descriptor

This unit involves the skills and knowledge required to manage firefighting and fire prevention activities on board a vessel.

Application of the Unit

This unit applies to deck and engine officers who are required by Marine Order 3 to be in charge of firefighting activities on board a vessel.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|--|
| 1 Manage fire prevention activities | <ul style="list-style-type: none">1.1 <i>Hazards</i> including dangerous goods on board a vessel are identified and appropriate action is implemented as determined by industry standard documentation1.2 Legislative requirements and current industry standards relating to the maintenance and operation of <i>fire detection, firefighting equipment</i> and <i>systems</i> on board are met and complied with1.3 Inductions or other educational activities are organised to ensure awareness of causal factors of on-board fires, prevention methods and standard operating procedures when fire alarms are activated |
| 2 Plan for fire emergencies | <ul style="list-style-type: none">2.1 Vessel <i>fire control plan</i> is consulted to review and develop appropriate response to any fire2.2 <i>Contingencies</i> are anticipated, planned for and practised2.3 Evacuations are prepared for and practised according to regulatory requirements2.4 Roles/functions of command and firefighting team members, as related to fire prevention and suppression, are established and reviewed according to regulatory and organisational requirements2.5 Firefighting training exercises are developed and implemented according to regulatory and organisational requirements2.6 Training exercises are prepared, practised and debriefed according to regulatory and organisational requirements, to ensure readiness for any fire emergency |
| 3 Coordinate tactical firefighting activities in response to a fire emergency | <ul style="list-style-type: none">3.1 Gathering of full and accurate information on the nature and extent of the fire by the command team is overseen3.2 Order of priority and sequence of actions appropriate to the requirements of the incident is determined and communicated to the responding crew clearly and accurately3.3 Evacuation of personnel, if appropriate, is conducted according to regulatory requirements3.4 Search and rescue operations are conducted using established marine firefighting best practice3.5 Controlled ventilation techniques are correctly applied during fire suppression and rescue operations3.6 Treatment of injured personnel is timely and according to current best |

casualty management practice

- 3.7 Operational tactics are monitored for their effectiveness and adjusted when required to ensure best outcomes
 - 3.8 Operational tactics are monitored to ensure vessel stability and integrity is maintained
 - 3.9 All shore-side involvement in an on-board fire emergency is coordinated and monitored effectively
- 4 Manage post-fire activities**
- 4.1 Fire watch is coordinated to prevent re-ignition
 - 4.2 Fire affected area is secured prior to investigation according to regulatory and organisational requirements
 - 4.3 Equipment is *restored* to operational condition where applicable
 - 4.4 Cause of the fire is investigated and determined according to regulatory and organisational requirements
 - 4.5 Incident reports are completed according to regulatory and organisational requirements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Communicate effectively with crew and passengers during fire emergencies
- Determine the type and extent of the fire and initiate appropriate, timely, actions
- Evaluate effectiveness of firefighting activities and tactics during a fire emergency
- Initiate appropriate action and provide solutions to problems with firefighting equipment and operations during a fire emergency
- Liaise with shore-based emergency organisations during a fire emergency
- Manage fire prevention and suppression activities on a vessel
- Manage on-board firefighting training for shipboard firefighting teams
- Manage shipboard firefighting teams and their tactical activities during a fire emergency
- Manage the maintenance of firefighting equipment and systems
- Provide leadership to shipboard personnel and passengers during a fire emergency
- Recognise and interpret fire alarms and initiate appropriate response

Required Knowledge:

- Assessment of cause of incidents involving fire
- Chemistry of fire and its relationship to combustible materials typically found on vessels
- Communication and coordination during firefighting operations
- Composition and allocation of personnel to fire parties
- Control of fuel and electrical systems
- Different classes of fire and the most appropriate extinguishing agents, application equipment and methods of extinguishment for each
- Fire-detection systems: fixed fire-extinguishing systems; portable and mobile fire-extinguishing systems, including appliances, pumps and rescue, salvage, life-support, personal protective and communication equipment
- Fire precautions and hazards associated with the storage and handling of materials (paints etc.)
- Firefighting procedures at sea and in port, with particular emphasis on organisation, tactics and command
- Firefighting process hazards (dry distillation, chemical reactions, boiler uptake fires etc.)
- Firefighting involving dangerous goods
- Implications of shipboard firefighting management in port and the procedures that must be followed to comply with port and state regulations
- Importance of maintenance of fire detection and firefighting equipment on board vessels
- Life and health risks associated with fires on vessels
- Management and control of injured persons
- Maritime communication techniques applicable to the management of fire prevention and firefighting activities on board a vessel
- Methods for checking and replacing consumable materials in fire detection, fire-fighting equipment and systems on board vessels
- Preparation of contingency plans
- Principle of operation of fixed fire suppression systems
- Principles underlying the spread of fire and its extinguishment
- Problems likely to be encountered during the management of a shipboard fire and related tactics and solutions that can be applied
- Procedure for safe activation of fixed firefighting systems
- Procedures for coordination of shore-based firefighters
- Relevant regulations, codes of practice, policies and procedures relating to the maintenance of fire detection, firefighting equipment and systems on board vessels
- Requirements for on-board firefighting training
- Requirements for statutory and classification surveys
- Safety data sheets/material safety data sheets relevant to the various products and substances carried on vessels

- Strategies and tactics for control of fires in various parts of the vessel
- Strategies for rapid briefing of shore-based emergency organisations using the vessel fire control plan
- Types of fire detection, firefighting equipment and systems used on vessels, their features, principles of operation, the procedures for their use and remediating problems that can occur during use
- Typical actions of passengers in a shipboard fire
- Use of water for fire extinguishing, the effect on ship stability, precautions and corrective procedures
- Ventilation control, including smoke extraction
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and safe work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- safeguarding personal safety during fire control activities at all times
- taking actions to control fires based on a full and accurate assessment of the incident, using all available sources of information
- transmitting information promptly, accurately, completely and clearly
- ensuring order of priority, timing and sequence of actions are appropriate to the overall requirements of the incident and minimise damage and potential damage to the vessel, injuries to personnel, and impairment of the operational effectiveness of the vessel.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved site where managing teams fighting and extinguishing fires in a simulated environment using live fire and smoke can be conducted

- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing firefighting and fire prevention activities on board a vessel
- direct observation of the candidate applying relevant WHS/OHS requirements and safe work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Hazards must include:

- Contents of adjacent spaces
- Dangerous goods
- Electricity and wiring systems

- Flammable or explosive atmospheres
 - Oxygen deficiency or enrichment
 - Physical obstructions
 - Poor visibility
 - Restricted access
 - Toxic liquids, solids, gases, vapours and dusts
- Fire detection, firefighting equipment and systems may include:
- Common on board suppression systems
 - Hoses and nozzles
 - Pumps
 - Rescue equipment
 - Self contained breathing apparatus (SCBA)
 - Thermal and smoke detectors
- Fire control plan must include:
- Applications of the BC Code
 - Applications of the IMDG Code
 - Communication strategy
 - Contingency plans for fires involving hazardous materials
 - Evacuation plan
 - Handling and treatment of injured personnel
 - Hazard control strategies
 - Search and rescue operations
 - Strategies for liaison with shore-based agencies (such as environmental protection agencies, fire services, medical teams, port authorities)
 - Strategies for shipboard firefighting management in port
 - Tactical methods for fighting fires involving hazardous materials
 - Tactical plan of action
- Contingencies may include:
- Change in fire behaviour or extent
 - Equipment failure or unavailability
 - Unexpected personnel involvement
- Restored must include:
- After use, maintaining SCBA to industry standards
 - Cleaning
 - Recharging extinguishers according to Australian Standards
 - Re-stowing
 - Servicing

Unit Sector(s)

Not applicable.

Competency Field

Operational Quality and Safety

MARF5001A Control safe access to and on vessel

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMF2107B Control safe access to and on vessel.

Unit Descriptor

This unit involves the skills and knowledge required to control safe access to and on a vessel.

Application of the Unit

This unit applies to maritime workers working in the maritime industry as a Watchkeeper Deck; as a Master, Chief Mate or Watchkeeper Deck on ships of less than 500 gross tonnage (GT) in any operating area; or as Master or Chief Mate of vessels less than 3000 GT operating in near coastal waters.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|---|
| 1 Rig equipment | 1.1 Preparations for the rigging of <i>access equipment</i> are made according to manufacturer instructions and organisational procedures |
| | 1.2 Access equipment is deployed according to organisational procedures |
| | 1.3 Safety checks and precautions are carried out according to organisational procedures |
| | 1.4 Defective equipment is identified and reported, repaired or replaced according to organisational procedures |
| | 1.5 Access equipment is unrigged and stowed after use |
| 2 Monitor access of persons to and on vessel | 2.1 Persons accessing the vessel are advised and instructed on the procedures for using access equipment |
| | 2.2 Access of persons to and on vessel is supervised |
| | 2.3 Any problems with persons accessing the vessel are identified and resolved or reported |
| 3 Monitor safety of personnel working aloft and over side of vessel | 3.1 Personnel going aloft or over side are instructed on the procedures and safety precautions to be followed |
| | 3.2 <i>Equipment for going aloft or over side</i> is rigged and checked prior to operations commencing |
| | 3.3 Appropriate <i>personal protective equipment for working aloft or over side</i> is made available and instructions are provided on its use |
| | 3.4 Faulty equipment is identified, isolated and reported to enable prompt repair and/or replacement |
| | 3.5 Emergency and rescue procedures are confirmed and agreed before work commences |
| | 3.6 Operations of personnel aloft or over the side are supervised and any problems are identified and resolved or reported |
| | 3.7 Safety incidents arising in the course of work aloft or over side are reported and recorded according to statutory requirements and organisational procedures |
| 4 Monitor safety of personnel working in confined spaces | 4.1 <i>Risk assessment</i> of confined space entry is conducted and documented according to organisational and <i>regulatory requirements</i> |
| | 4.2 Permission to enter and work in a confined space is sought from <i>authorised personnel</i> according to regulatory requirements |

on a vessel

- 4.3 *Permits* are completed with conditions of validity and submitted for approval to designated personnel according to regulatory requirements
- 4.4 *Appropriate plan* is prepared for the completion of the work activity in the confined space
- 4.5 Operations of personnel working in confined spaces are supervised and any problems are identified and resolved or reported
- 4.6 Planned emergency and rescue procedures are followed in the event of an accident or other emergency
- 4.7 Evacuation of confined space is supervised and sign out is completed on entry permit

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Communicate effectively when controlling safe access to and on vessel
- Complete entry permits and other related documentation
- Conduct atmospheric assessments with oxygen meter and gas detecting equipment
- Identify and control hazards in confined spaces
- Interpret relevant legislative responsibilities in relation to working in confined spaces
- Read, interpret and apply instructions relevant to the rigging of personnel and pilot access ways on a vessel
- Recognise routine problems that may occur when controlling safe access to and on a vessel and take appropriate action
- Select and use rigging and safety equipment according to standard operating procedures and safety management systems
- Tie required knots and handle ropes
- Use emergency and safety equipment according to operating instructions
- Work safely and collaboratively with others working in a confined space
- Work safely and collaboratively with others when rigging personnel and pilot access ways to and on a vessel

Required Knowledge:

- Applicable personal protective safety equipment and procedures for its use

- Atmospheric hazards and assessment methods
- Communication techniques used when entering and working in a confined space
- Electrical safety
- Emergency entry and exit procedures
- Equipment used in confined space entry
- Hazard identification procedures
- Hazards to health and safety in confined spaces
- Maintenance and storage procedures for equipment used when working aloft or over side
- Maritime security levels and their impact on security measures and procedures on board ship and in port facilities
- Precautions to be taken:
 - when entering enclosed spaces
 - before and during repair and maintenance work
- Principle design and safety features and component parts of personnel and pilot access ways typically used on vessels
- Safety measures for hot and cold work
- Security reporting procedures
- Ship/shore safety checklist
- Relevant sections of applicable maritime regulations
- Relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- Risk management strategies for entry to confined spaces
- Role of standby personnel while a person enters and works in a confined space
- Routine problems that may occur when controlling safe access to and on a domestic vessel and appropriate action and solutions
- Safe systems of work
- Special procedures and permit requirements for particular types of work in confined spaces
- Standard operating procedures and safety precautions to be followed when working:
 - aloft or over side
 - in confined spaces
- Standard operating procedures for rigging personnel and pilot access ways
- Types of confined spaces encountered in the maritime industry
- Types of knots, bends and hitches required when rigging personnel and pilot access ways, their characteristics, applications and limitations, and methods of tying them using synthetic and fibre rope of varying construction and size
- WHS/OHS requirements for confined space entry

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- rigging personnel and pilot access ways
- managing safety of personnel aloft and over side of vessel
- supervising persons working in confined spaces.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where controlling safe access to and on vessel can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate controlling safe access to and on a vessel
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for

Holistic assessment with other units relevant to the industry

assessment

sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Access equipment may include:

- Gangways
- Gas and oxygen meters
- Pilot hoist
- Pilot ladder
- Staging

Equipment for going aloft or over side may include:

- Fall arrest devices
- Ladders
- Ropes
- Safety harness
- Staging

Personal protective equipment for working aloft or overside may include:

- Hard hats
- Immersion suit
- Life jacket
- Thermal protective aids
- Safety lines

Confined spaces may include:

- Ballast or oil tank
- Cargo hold
- Cargo tank
- Double bottom tank
- Duct keel
- Space entered through a small hatchway or access point
- Void space

Risk assessment may include:

- Atmosphere that contains potentially harmful levels of contaminants
- Atmospheric conditions such as high temperature and humidity that cause fatigue

- Corroded or otherwise damaged ladders and landings
 - Engulfment by 'fluid' cargo such as grains
 - External hazards connected to or adjacent to the space
 - Harmful non-toxic or non-explosive dusts
 - Isolation of electrical equipment
 - Operation of radar scanners
 - Oxygen deficiency or excess
 - Poor visibility and lighting
 - Restricted access and movement making escape and rescue difficult
 - Slippery conditions that might result in injury from falls
 - Toxic liquids, solids, vapours, gases and dusts
 - Work processes which may introduce flammable, volatile and/or toxic gases and vapours
- Regulatory requirements may include:
- Australian Standard AS/NZS 2865:2001 Safe working in a confined space
 - Vessel and organisation safety management system plans, procedures, checklists and instructions
- Authorised personnel may include:
- Chief engineer
 - Master
 - WHS/OHS representative
- Permits may include:
- Gas free certificate
 - Hot work permit
 - Permit to enter
- Appropriate plan may include:
- Atmospheric tests
 - Communications system
 - Emergency and rescue arrangements
 - Identification of standby person/s
 - Isolation of confined space
 - Permits
 - Personal protective equipment
 - Procedures for entering and exiting a confined space
 - Strategy for recovery of injured and unconscious person/s
 - Ventilation of space

Unit Sector(s)

Not applicable.

Competency Field

Operational Quality and Safety

MARF5002A Provide medical first aid on board a vessel

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to provide immediate first aid in the event of accident or illness on board a vessel.

Application of the Unit

This unit applies to maritime workers working in the maritime industry as a Watchkeeper Deck; as a Master, Chief Mate or Watchkeeper Deck on ships of less than 500 gross tonnage (GT) in any operating area; or as Master or Chief Mate of vessels less than 3000 GT operating in near coastal waters; or as Marine Engineer Class 2 on commercial vessels greater than 3000 kW; or as a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|---|
| 1 Prepare to respond to emergency on board | <p>1.1 Casualty condition is assessed and appropriate response is determined in order to minimise hazards and determine the need for emergency medical assistance</p> <p>1.2 Options for transporting casualty or waiting for medical assistance are evaluated in relation to environmental issues, transport availability and casualty condition</p> <p>1.3 Casualty is sheltered from elements according to environmental conditions, if required</p> |
| 2 Provide first aid on board | <p>2.1 Nature of casualty injury/condition and relevant first aid procedures are determined and explained to the casualty</p> <p>2.2 Consent is sought from the casualty prior to applying first aid</p> <p>2.3 First aid is provided to address casualty condition and according to effective first aid principles</p> <p>2.4 Casualty condition is monitored and ongoing first aid is provided as required</p> <p>2.5 Casualty is calmly reassured according to effective first aid principles</p> <p>2.6 Condition of casualty is documented over time to assist in providing ongoing first aid</p> |
| 3 Work in conjunction with medical and emergency services support | <p>3.1 Communication links are established with medical services using relevant communication equipment to ensure prompt control action is taken</p> <p>3.2 Appropriate medical assistance is sought according to the circumstances</p> <p>3.3 Medication is administered under direction from an authorised health worker as required</p> <p>3.4 Directions given by emergency services are followed to assist in the evacuation of the casualty, if required</p> |
| 4 Participate in debriefings | <p>4.1 Information is provided on the incident and the first aid assistance provided</p> <p>4.2 Clarifications are provided, where required</p> <p>4.3 Suggestions are provided to improve future operations</p> |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Accurately listen to, clarify and apply medical instructions
- Administer medication under direct instruction from an authorised health worker
- Conduct an initial casualty assessment
- Demonstrate adequate infection control procedures
- Evaluate available options for transporting or maintaining condition of casualty
- Examine casualty or patient
- Identify and prepare an area for safe evacuation
- Improvise treatment and associated resources
- Plan an appropriate first aid response in line with established first aid principles, policies and procedures
- Prepare incident reports
- Use available communication methods and equipment to access medical assistance

Required Knowledge:

- Body structure and function
- Burns, scalds and the effects of heat and cold
- Cardiac arrest, drowning and asphyxia
- First aid kit
- Fractures, dislocations and muscular injuries
- Medical care of rescued persons
- Pharmacology
- Radio medical advice
- Sterilisation
- Toxicological hazards on board including use of the Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG) or its national equivalent
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment

Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- minimising the risk of harm to self and others at all times
- promptly completing identification of probable cause, nature and extent of injuries according to current first aid practice.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where providing medical first aid on board a vessel can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate providing medical first aid on board a vessel
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required

Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Emergency may include:

- Asphyxia
- Burns and scalds and the effects of heat and cold
- Cardiac arrest
- Drowning
- Fractures, dislocations and muscular injuries
- Medical care of rescued persons

Options for transporting casualty or waiting for medical assistance may include:

- Advice given by authorised health worker
- Severity of injury
- Time required for medical assistance to arrive
- Whether movement might cause a deterioration in casualty condition
- Whether contact with medical and/or emergency services has been achieved

Documented may include:

- Administration of medications including time, date, dose, person administering
- Description of injury
- First aid management
- Fluid/oral intake/output including fluid loss via blood, vomit, faeces, urine
- Location
- Time
- Vital signs

Communication equipment may include:

- GMDSS equipment
- VHF radio

Authorised health worker may include:

- General practitioner
- Nurse practitioner
- Paramedic/ambulance officer

Unit Sector(s)

Not applicable.

Competency Field

Operational Quality and Safety

MARF5003A Respond to emergencies

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to deal with maritime emergencies and incidents.

Application of the Unit

This unit applies to maritime workers working in the maritime industry as a Watchkeeper Deck; as a Master, Chief Mate or Watchkeeper Deck on ships of less than 500 gross tonnage (GT) in any operating area; or as Master or Chief Mate of vessels less than 3000 GT operating in near coastal waters.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Raise alarms 1.1 Urgency of situation and *nature of emergency* is identified promptly

- 1.2 **Relevant alarms** are activated
- 1.3 **Distress signals** are used to indicate need for assistance, if required
- 2 **Control onboard emergency**
 - 2.1 **Initial actions** on becoming aware of emergency are undertaken according to contingency plans and are appropriate to urgency of situation and nature of emergency
 - 2.2 Onboard personnel are given information and instructions clearly and accurately
 - 2.3 Procedures are implemented to combat emergency and to protect persons on board
 - 2.4 Communications are established with **others** to facilitate emergency response process
 - 2.5 Injured persons are provided with assistance
 - 2.6 Contact is maintained with others at all times to keep them briefed on emergency response process
 - 2.7 Preparation for abandoning vessel is undertaken, if required
 - 2.8 Cessation of emergency is communicated to appropriate personnel
- 3 **Respond to a distress signal at sea**
 - 3.1 Distress signals from others are recognised immediately
 - 3.2 **Nature of assistance** required is identified
 - 3.3 Capability to safely assist or relay emergency is determined taking into account own safety and physical proximity to emergency
 - 3.4 Appropriate response to emergency is prepared for and implemented according to contingency plans and instructions in standing orders
 - 3.5 Cessation of emergency is communicated to appropriate personnel

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply first aid
- Correctly using lifesaving appliances
- If appropriate, manoeuvre vessel, according to contingency plans

- Immediately recognise a distress or emergency signal
- Implement contingency plans and instructions in standing orders when responding to a distress signal at sea
- Promptly identify type and scale of emergency

Required Knowledge:

- Common emergency actions
- Contents of the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual
- Initial action to be taken following a collision or grounding
- Initial damage assessment and control
- Precautions for protection and safety of passengers in emergency situations
- Procedures to be followed for:
 - rescuing persons from the sea
 - assisting a vessel in distress
 - responding to emergencies that arise in port
- Range of lifesaving appliances
- Types of maritime emergency incidents and situations
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	<p>The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:</p> <ul style="list-style-type: none"> • promptly identify type and scale of emergency • awareness of one's surroundings and changes to these surroundings • working as part of a team.
Context of and specific resources for assessment	<p>Performance is demonstrated consistently over time and in a suitable range of contexts.</p> <p>Resources for assessment include access to:</p>

- industry-approved marine operations site where responding to emergencies can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate responding to emergencies
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Nature of emergency may include: • Anchoring

- Assisting a vessel in distress
 - Collision
 - Contaminated fuel
 - Emergencies which arise in port
 - Engine breakdown or malfunction
 - Fire
 - Flooding
 - Grounding
 - Hypothermia
 - Incidents
 - Injuries/illness
 - Lack of fuel
 - Lost
 - Person overboard
 - Rescuing persons from sea
 - Sinking
 - Swamping
- Relevant alarms may include:
- Abandon ship signals
 - Fire and lifeboat muster alarms
 - Mayday broadcast
- Distress signals may include:
- Emergency position indicating radio beacons (EPIRB)
 - Flags
 - Hand signals
 - International Code Signal of Distress
 - Light signals
 - Pyrotechnic distress signals
 - Radio
 - Reflective mirror
 - V-sheet
- Initial actions may include:
- Damage assessment and control
 - Manoeuvring vessel
- Others may include:
- Aircraft
 - Other vessels
 - Search and rescue authorities
- Nature of assistance may include:
- Assisting a ship in distress
 - Rescuing persons from sea
 - Responding to emergencies occurring in port

Unit Sector(s)

Not applicable.

Competency Field

Operational Quality and Safety

MARF6001A Coordinate search and rescue operations

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMF107B Assist in search and rescue operations.

Unit Descriptor

This unit involves the skills and knowledge required to assist in planning and coordinating search and rescue operations at sea.

Application of the Unit

This unit applies to maritime workers working in the maritime industry as a Master Unlimited.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Activate search 1.1 Distress and emergency signals, and communications are recognised

- and rescue support plan**
- and evaluated
- 1.2 **Type of emergency**, and level and nature of assistance required is assessed and its practicability is considered
 - 1.3 Communications are established, where possible, with the parties in distress, other vessels and relevant authorities/agencies
 - 1.4 Search and rescue parameters are identified based on available **information**
 - 1.5 Search and rescue strategy is developed based on all available information and after consultation with others, in the established chain of command
 - 1.6 Required **resources** are identified according to the strategy
 - 1.7 Strategy is evaluated and reviewed as determined by the input of all information and review of available resources
 - 1.8 Organisation and command chain with other stations involved in the search and rescue is established in collaboration with search and rescue authorities
- 2 Coordinate crew in search and rescue operations**
- 2.1 Crew members are informed of the scenario and strategy
 - 2.2 Crew members are briefed on their roles and responsibilities and the way the crew will operate, and are deployed to the required stations
 - 2.3 Tasks are allocated to crew members according to their roles in the crew and level of competence
 - 2.4 Confirmation is gained from crew members of their understanding of the scenario, their role and the roles of other crew members
 - 2.5 Performance of crew members is monitored and reviewed as the scenario unfolds to determine ongoing requirements
 - 2.6 Directions are given to others involved in the search and rescue operation according to agreed plan and established chain of command
 - 2.7 Manoeuvres of vessel are made according to agreed plan and with due regard to **limits of the vessel and the environment**
 - 2.8 Feedback from crew members and others involved in the search and rescue operation is received and relayed to others according to agreed plan and established chain of command
- 3 Liaise with internal and**
- 3.1 Radio communication is established and maintained with all parties involved in the search and rescue operations

- external authorities/agencies**
- 3.2 Briefings are provided to appropriate people according to operational procedures
 - 3.3 Search and rescue progress is monitored and information is provided to internal and *external authorities/agencies*
 - 3.4 Issues are negotiated with internal and external authorities/agencies
 - 3.5 Resources are monitored and reviewed to meet changing requirements according to operational procedures
 - 3.6 Problems/potential problems with the search and rescue are identified and solutions are developed in liaison with internal and external authorities/agencies
 - 3.7 Guidance and support are provided and sought to/from internal and external authorities/agencies according to requirements
- 4 Manage communications systems**
- 4.1 Communications systems are identified as appropriate to the situation and the strategy
 - 4.2 Communications systems are selected according to agreed plan and established chain of command
 - 4.3 Communications systems are managed to provide optimum capability
- 5 Conclude search and rescue support**
- 5.1 Duration of the search and rescue operation is determined by the level of emergency
 - 5.2 Instructions from internal and external authorities/agencies about the duration of the search and rescue are complied with
 - 5.3 All information is collected and preserved
 - 5.4 Debrief is conducted with relevant people involved
 - 5.5 Items for improvement are identified and action is taken to have improvements built into support plans
- 6 Manage search and rescue records**
- 6.1 Records of the search and rescue are made in the vessel log
 - 6.2 Other documentation is completed as required by regulatory requirements
 - 6.3 *Reports* are completed and disseminated according to organisational requirements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply procedures of the International Aeronautical and Maritime Search and Rescue (IANSAR) Manual
- Establish radio communications and follow correct communication procedures at all stages of the search and rescue operations
- Identify and solve problems that may arise during search and rescue operations, report problems and issues, and take appropriate action based on available information
- Modify activities dependent on differing vessel contingencies, risk situations and environments
- Monitor and anticipate hazards and risks that may arise during search and rescue operations and take appropriate action
- Plan for coordinating search and rescue operations according to international guidelines and standards
- Take appropriate initiative for search and rescue operations
- Use relevant publications, charts, meteorological data, particulars of vessels involved, radio communication equipment and other available facilities

Required Knowledge:

- Chain of command and organisational requirements used in search and rescue operations
- IANSAR Manual
- Maritime communication techniques applicable to search and rescue operations
- Principals involved in determining the duration and scope of a search
- Responsibilities when participating in search and rescue operations
- Search and rescue techniques and procedures
- Sequence of actions to be taken after sighting or receiving a distress signal or call for assistance
- Types of distress and emergency signals, and types of response required in each case
- Types of search patterns and their application
- Typical search and rescue problems and appropriate action and solutions
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- effectively liaising with internal and external authorities/agencies
- providing high quality reports
- attention to appropriate level of detail in recordkeeping.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where coordinating search and rescue operations can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate coordinating search and rescue operations
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Type of emergency may include:

- Ditched aircraft
- Person/s in distress in sea
- Person/s in distress in survival craft
- Vessel/s in distress

Information may include:

- Agents and operators both private and commercial
- Government departments
- Members of the public
- Search and rescue authorities
- Specialist search and rescue information systems
- Vessel/aircraft owners
- Volunteer organisations

Resources may include:

- Accommodation
- Aircraft
- Australian Defence Force/Police assets
- Communications systems
- Electronic aids
- Equipment
- Facilities
- Fuel
- Instructions
- Manuals
- Maps/charts
- People
- Vessels

Limits of the vessel and the environment may include:

- Fuel range
- Limits of propulsion
- Prevailing weather
- Sea conditions
- Steering
- Vessel stability

External authorities/agencies may include:

- Aircraft
- Other vessels
- Search and rescue authorities
- Other parties involved in the rescue

Reports may include:

- Board reports and briefings
- Briefings to government
- Covering reports
- Initial advice forms
- Media releases
- Messaging systems
- Search and rescue logs

Unit Sector(s)

Not applicable.

Competency Field

Operational Quality and Safety

MARF6002A Manage provision of medical care on board a vessel

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to provide medical care to people who are sick and/or injured while they remain on board a vessel.

Application of the Unit

This unit applies to maritime workers working in the maritime industry as a Master Unlimited.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|-------------------------------------|--|
| 1 Manage vessel medical care | 1.1 Availability of adequate <i>resources</i> is monitored and maintained to support medical responses |
|-------------------------------------|--|

- 1.2 Regular inspections of stock and equipment are conducted to ensure currency and operational readiness, according to organisational requirements
 - 1.3 Equipment and resources are stored and maintained according to regulatory requirements and manufacturer/supplier instructions
 - 1.4 Risks on the vessel are reviewed and organisational policies and procedures related to the provision of medical care are validated
 - 1.5 Planning is conducted for responses to major incidents on board the vessel
- 2 Take charge of a casualty on board**
- 2.1 ***Safety of injured or ill person***, bystanders and self in an accident situation is assessed according to first aid procedures
 - 2.2 Safety requirements associated with providing medical care and vessel environmental requirements are adhered to
 - 2.3 Condition of injured or ill person is assessed according to first aid procedures
 - 2.4 Position of the injured or ill person is adjusted to optimise personal comfort for the medical condition or injury
 - 2.5 Injured or ill person is reassured and supported during the wait for medical assistance
 - 2.6 Nature of the illness/injury is explained to the injured or ill person
 - 2.7 Significance of changes in the person's condition is promptly recognised and appropriate action is taken if there are signs of deterioration in the injured or ill person
 - 2.8 Calm, confident and reassuring personal attitude is conveyed
- 3 Provide medical care**
- 3.1 ***Medical emergencies and injuries*** are identified and assessed correctly, and appropriate action is taken to prevent further injury
 - 3.2 Symptoms and appropriate treatment are identified based on the concepts of clinical examination and medical history
 - 3.3 Medical emergencies and injuries are diagnosed and managed according to accepted medical practice, and relevant national and international guides
 - 3.4 Manufacturer recommendations and accepted medical practice with regard to dosage and application of drugs and ***medication*** are complied with

- 3.5 Complete and effective methods to protect against infection and spread of diseases are used
- 3.6 Resuscitation techniques are performed following safety procedures, if required
- 3.7 Appropriate techniques for moving injured and ill persons are used
- 3.8 Resources and equipment are recovered and reprocessed, and waste is disposed of safely
- 4 Seek external assistance**
 - 4.1 Condition of the injured or ill person is documented over time to assist with ongoing management
 - 4.2 **Communication links** are established with external medical services to ensure prompt control action is taken
 - 4.3 Clinical examination procedures are completed and instructions received are complied with
 - 4.4 Assessments of the person's condition are relayed to external medical advisors
 - 4.5 Medical procedures are carried out under medical instruction using relevant communication equipment and instructions received complied with
 - 4.6 Condition of the injured or ill person is evaluated to determine transport requirements for additional medical care
 - 4.7 **Preparation for the evacuation** of the injured or ill person by emergency services is provided, if required, according to organisational procedures and welfare of the person is maximised
 - 4.8 Resources and equipment are recovered and reprocessed, and waste is disposed of safely
- 5 Manage first aid records**
 - 5.1 **Documentation** is completed in accordance with regulatory and organisational requirements
 - 5.2 First aid records are maintained in accordance with regulatory and organisational requirements
 - 5.3 Relevant documents are sent to appropriate bodies in accordance with regulatory and organisational requirements
 - 5.4 Confidentiality of records and information is maintained in accordance with privacy principles and regulatory and organisational requirements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Care of casualty involving:
 - head and spinal injuries
 - injuries of ear, nose, throat and eyes
 - external and internal bleeding
 - burns, scalds and frostbite
 - fractures, dislocations and muscular injuries
 - wounds, wound healing and infection
- Deal with a death at sea
- Dress and bandage
- Give vaccinations
- Manage acute abdominal conditions
- Provide:
 - dental care
 - gynaecological, pregnancy and childbirth support
 - medical care of rescued persons
 - minor surgical treatment
 - pain relief
- Treat:
 - alcohol and drug abuse
 - sexually transmitted diseases
 - tropical and infectious diseases
- Use disease prevention techniques including disinfection, de-infestation, de-ratting
- Use sewing and clamping techniques

Required Knowledge:

- Alcohol and drug abuse
- Care of:
 - head and spinal injuries
 - injuries of ear, nose, throat and eyes
 - external and internal bleeding
 - burns, scalds and frostbite

- fractures, dislocations and muscular injuries
- wounds, wound healing and infection
- Death at sea
- Dental care
- Disease prevention including disinfection, de-infestation, de-ratting
- Dressing and bandaging
- General principles of nursing
- Gynaecology, pregnancy and childbirth
- Hygiene
- International and national maritime medical regulations
- Management of acute abdominal conditions
- Medical care of rescued persons
- Medical care of sick seafarers involving co-operation with port health authorities or out-patient wards in port
- Medical conditions and emergencies
- Minor surgical treatment
- Nursing care
- Pain relief
- Radio medical advice
- Quarantine regulations and required advices such as pratique, notification of disease on board
- Sexually transmitted diseases
- Techniques of sewing and clamping
- Transportation of injured or ill persons including helicopter evacuation
- Tropical and infectious diseases
- Vaccinations
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required

this unit

Knowledge and include:

- seeking radio medical advice according to established practice and recommendations
- being aware of own skills, knowledge and limits.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where managing the provision of medical care on board a vessel can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing the provision of medical care on board a vessel
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Resources may include:

- Backboards
- Blood pressure cuff
- Cervical collars
- Defibrillation units
- Dressings
- Eyewash
- First aid kits
- Injections
- Oxygen resuscitation cylinders
- Pocket face masks
- Pressure bandages
- Rubber gloves
- Soft bag resuscitator
- Spacer device
- Stretchers
- Thermometers
- Thermal blankets

Safety of injured or ill person may include:

- Bodily fluids
- Environmental risks
- Equipment, machinery and substances
- First aid equipment
- Risk of further injury to the casualty
- Risks associated with the proximity of crew or passengers

Medical emergencies and injuries may include:

- Care of casualty involving:
 - head and spinal injuries
 - injuries of ear, nose, throat and eyes
 - external and internal bleeding
 - burns, scalds and frostbite
 - fractures, dislocations and muscular injuries
 - wounds, wound healing and infection
- Dealing with a death at sea
- Dressing and bandaging
- Giving vaccinations

- Managing acute abdominal conditions
 - Providing:
 - dental care
 - gynaecological, pregnancy and childbirth support
 - medical care of rescued persons
 - minor surgical treatment
 - pain relief
 - Treating:
 - sexually transmitted diseases
 - tropical and infectious diseases
 - alcohol and drug abuse
 - Using disease prevention techniques including disinfection, de-infestation, de-ratting
 - Using techniques of sewing and clamping
- Medication may include:
- Adrenaline
 - Analgesics
 - Aspirin
 - Bronchodilators
 - Oxygen
 - Pain relief/paracetamol
- Communication links may include:
- Electronic equipment
 - Email
 - Flags
 - HF/VHF radio
 - Satellite phones
 - Two-way radio
 - Use of medical codes
- Preparation for the evacuation may include:
- Communicating with helicopter, vessel or ambulance conducting the evacuation
 - Relevant first aid supplies and resources
 - Selecting relevant communication equipment
- Documentation may include:
- Casualty history forms
 - Day book
 - Disease notification to quarantine officials
 - D-Rat Certificate
 - First aid risk assessment
 - Incident/injury reports
 - Infection control records
 - Management records
 - Medical histories
 - Medication registers

- Stock records
- Workcover forms
- Workers' compensation

Unit Sector(s)

Not applicable.

Competency Field

Operational Quality and Safety

MARF6003A Manage safety and security of vessel crew and passengers

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to develop emergency and damage control plans, and to handle emergency situations to maintain the safety and security of vessel crew and passengers.

Application of the Unit

This unit applies to maritime workers working in the maritime industry as a Master Unlimited.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|---|
| 1 Develop emergency and damage control plans | <p>1.1 <i>Potential emergencies</i> and <i>damage scenarios</i> are identified</p> <p>1.2 Plans of action are developed for responding to potential emergencies and damage scenarios according to regulatory and organisational requirements</p> <p>1.3 Procedures, checklists and instructions for dealing with emergencies and damage scenarios are documented according to regulatory and organisational requirements</p> <p>1.4 Resources are organised in readiness for potential implementation of emergency and damage control plans</p> <p>1.5 <i>Information</i> on emergency and damage control plans is distributed and made available to crew</p> <p>1.6 Appropriate instruction is organised for crew about their roles and responsibilities during various emergencies and damage scenarios</p> |
| 2 Develop security risk management plans | <p>2.1 Security plan is prepared according to regulatory and organisational requirements</p> <p>2.2 Plan contains explanatory information on the importance of security and the organisation's security objectives</p> <p>2.3 Plan summarises <i>threat assessments</i> undertaken, current <i>exposure</i> and current protective security arrangements</p> <p>2.4 Plan outlines security strategies for implementation of countermeasures, monitoring and evaluation</p> <p>2.5 Appropriate instruction is organised for crew about their roles and responsibilities in the event of a security threat</p> |
| 3 Maintain the operational condition of firefighting, lifesaving and safety systems | <p>3.1 Safety management system processes and outcomes for maintaining the operational condition of <i>firefighting, lifesaving and safety systems</i> are identified</p> <p>3.2 Procedures and supporting documentation for the routine maintenance of firefighting, lifesaving and safety systems are developed</p> <p>3.3 Personnel roles and responsibilities are allocated and communicated</p> <p>3.4 Checks are conducted in accordance with safety management system requirements</p> <p>3.5 <i>Non-compliances</i> are identified and analysed</p> |

- 3.6 Appropriate responses to non-compliances are initiated according to safety management system requirements
- 3.7 Outcomes are recorded and reported according to regulatory and organisational requirements
- 4 Organise fire and abandon vessel drills**
 - 4.1 Fire and abandon vessel drills are planned and conducted according to regulatory requirements and organisational procedures
 - 4.2 Instruction is provided to others on organisational procedures and the correct use of firefighting and lifesaving equipment
 - 4.3 Musters and drills are reviewed against objectives
 - 4.4 Records are completed according to regulatory requirements and organisational procedures
- 5 Manage emergencies**
 - 5.1 **Initial actions** on becoming aware of emergency are undertaken according to contingency plans and are appropriate to the urgency of the situation and the nature of the emergency
 - 5.2 On-board personnel are given information and instructions clearly and accurately
 - 5.3 Procedures are implemented to combat emergency and to protect persons on board
 - 5.4 Communications are established with **others** to facilitate the emergency response process
 - 5.5 Injured persons are provided with assistance
 - 5.6 Contact is maintained with others at all times to keep them briefed on the emergency response process
 - 5.7 Preparation for abandoning vessel is undertaken, if required
 - 5.8 Cessation of emergency is communicated to appropriate personnel
- 6 Maintain operational safety**
 - 6.1 **Environmental factors** are continually monitored, assessed and reviewed to identify distinctive features and any change in characteristics that might indicate unusual or suspicious behaviour
 - 6.2 Personal safety checks are made on a systematic and routine basis according to organisational procedures
 - 6.3 **Resources and equipment** are organised in readiness for potential **security risk situations**
- 7 Respond to**
 - 7.1 Security risk situations are accurately identified and assessed for

- security risks** degree of risk to self, others and vessel
- 7.2 **Response** is formulated and carried out according to security risk management plan
- 7.3 Safety and security of self, others and vessel is maximised through response initiative
- 7.4 Changing circumstances are monitored and responses are adjusted as required to maintain security
- 7.5 Relevant **documentation** is completed and securely maintained with due regard to confidentiality according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply procedures for monitoring fire detection and safety systems to ensure all alarms are detected promptly and acted upon according to established emergency procedures
- Communicate using appropriate channels and communication codes and signals
- Complete documentation and reporting requirements on matters related to the development of emergency and damage control plans
- Determine response appropriate to security risk situation
- Develop emergency procedures according to established plans for emergency situations
- Identify and comply with security incident response procedures
- Identify security risk factors and conduct risk assessment
- Instruct personnel on procedures to be taken during emergency situations on board a vessel
- Interpret and apply security and safety practices and regulations
- Manage the handling of emergency situations on board a vessel
- Maintain the operational condition of lifesaving, firefighting and other safety systems
- Minimise hazards and risks to the safety of self and others
- Organise fire drills and abandon ship drills
- Prepare contingency plans for response to emergencies
- Report emergency situations on board a vessel

Required Knowledge:

- Actions to be taken to protect and safeguard all persons on board in emergencies
- Actions to limit damage and save the vessel following fire, collision or grounding
- Bomb threat and counter-terrorism procedures
- Concept of reserve buoyancy and its relevance to damage control in vessels
- Faults that can occur with fire detection, firefighting, lifesaving and safety equipment and systems and appropriate remedial action and solutions
- Functions and use of lifesaving appliances
- General principles of damage control and the manner in which the watertight integrity of the hull is maintained on a vessel
- Importance of maintenance of fire detection, firefighting, lifesaving and safety equipment and systems and the potential consequences if the equipment or systems are not operational during an emergency
- Lifesaving appliance regulations (International Convention for the Safety of Life at Sea)
- Methods and aids for fire prevention, detection and extinction
- Methods for checking and replacing consumable materials in fire detection, firefighting, lifesaving and safety equipment and systems
- Regulations related to security risk management
- Regulatory requirements for emergency response plans
- Regulatory requirements related to the maintenance of fire detection, firefighting, lifesaving and safety equipment and systems
- Relevant AMSA Marine Orders and Notices, ISPS Code, and other relevant IMO Conventions and Codes
- Safety management system plans, procedures, checklists and instructions
- Ship construction including damage control measures
- Statutory requirements pertaining to damage control in vessels
- Types of fire detection, firefighting, lifesaving and safety equipment and systems on board vessels and the procedures for their use
- Ways of controlling damage during a flooding emergency
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required

this unit

Knowledge and include:

- providing the required amount of detail in reports
- developing effective planning documents.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where managing the safety and security of vessel crew and passengers can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing the safety and security of vessel crew and passengers
- direct observation of candidate applying all relevant WHS/OHS and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Potential emergencies may include:

- Accidents
- Bomb threat
- Collision
- Fire or explosion
- Flooding
- Grounding
- Loss of main engine or power
- Loss of steering
- Person overboard
- Rescue and evacuation of injured persons
- Scenes of crime

Damage scenarios may include:

- Collision damage
- Damage caused by cargo shift
- Integrity of vessel hull

Information may include:

- Documented instructions
- Drills
- Meetings
- Notice boards
- Pamphlets
- Training sessions

Threat assessments may include:

- Determining the potential of a threat to actually cause harm
- Evaluating and discussing the likelihood of a threat being realised
- Providing information about people and events that may pose a threat to the vessel

Exposure may include:

- Measure of how open the vessel is to harm
- Potential of the vessel to attract harm

Firefighting, lifesaving and safety systems may include:

- Fire and smoke detectors and alarms
- Fire and watertight doors
- Fire hoses and extinguishers
- Fire smothering systems
- Flares and smoke floats
- Lifeboats and life rafts
- Life jackets and other flotation devices

Non-compliances may include:

- Damaged components
- Damaged equipment

- Failure to conduct drills
 - Faulty components
 - Faulty equipment
 - Lapsed expiry dates
 - Levels of consumable materials
 - Quality of consumable materials
- Initial actions may include:
- Broadcasting appropriate distress or warning signals
 - Investigating the source of fire or smoke alarms
 - Calling crew and passengers to muster stations
 - Mustering appropriate resources
- Others may include:
- Organisational personnel
 - Search and rescue authorities
 - Vessels in the vicinity
- Environmental factors may include:
- Access to assistance and resources
 - Availability of opportunities for escape
 - Degrees of illumination in affected areas
 - Presence of sources of threat
 - Time of day
 - Weather
- Resources and equipment may include:
- Access to emergency services and specialist personnel
 - Back-up personnel
 - Communication equipment
 - Firefighting equipment
 - First aid kit
 - Personal protection equipment
 - Security equipment including electronic screening equipment, video cameras and monitors, alarms and signals
- Security risk situations may include:
- Breaches of law including criminal damage, offences against people, public order, misuse of drugs and alcohol
 - Emergencies
 - Hazards including physical, chemical, electrical, psychological, biological
 - Threats including bombs, sabotage, assassination
- Responses may include:
- Abandoning the vessel
 - Checking identification
 - Defusing the situation
 - Isolating area of potential risk
 - Isolating risk
 - Issuing verbal warnings
 - Notifying relevant emergency services organisations

- Documentation may include:
- Offering assistance
 - Providing first aid
 - Requesting support and assistance
 - Restraint of person
 - Tactical withdrawal
 - Using basic defensive techniques
 - Using negotiation techniques
 - Activity logs
 - Incident reports
 - Records of conversation
 - Request for assistance forms
 - Reports

Unit Sector(s)

Not applicable.

Competency Field

Operational Quality and Safety

MARG1001A Work effectively as part of a crew on a vessel up to 80 metres

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to work effectively as a general purpose hand on a vessel up to 80 metres.

Application of the Unit

This unit applies to general purpose hand/rating working in the maritime industry on vessels up to 80 metres as part of a vessel crew.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Perform routine 1.1 *Routine work instructions and procedures* are read and interpreted

workplace duties following simple written instructions	correctly
	1.2 Appropriate lines of communication with supervisors and colleagues are identified and used
	1.3 Routine work instructions and procedures are followed in sequence
	1.4 Clarification is sought from workplace supervisor when any instruction or procedures is not understood
2 Follow simple spoken instructions	2.1 Spoken instructions are interpreted correctly
	2.2 Instructions are responded to promptly
	2.3 Clarification is sought from workplace supervisor when any instruction is not understood
3 Communicate with other crew members	3.1 Constructive feedback is encouraged and acted upon
	3.2 All crew members are treated with respect, courtesy and sensitivity
	3.3 Cultural differences are considered and appropriate language is used in all verbal and non-verbal communication
	3.4 Communication is used to develop and maintain positive relationships, mutual trust and confidence
4 Complete workplace forms	4.1 <i>Workplace forms</i> are completed clearly and concisely within designated timeframes
	4.2 Assistance is sought to complete workplace forms when necessary
5 Complete work tasks	5.1 Tasks are completed within designated timeframes according to instructions
	5.2 Effective questioning is used to seek assistance from other crew when difficulties arise in achieving allocated tasks
	5.3 <i>Factors affecting work requirements</i> are identified and appropriate action is taken
	5.4 Progress with task is communicated to supervisor as required

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Communicate effectively in the workplace relevant to own work responsibilities
- Communicate using maritime vocabulary
- Complete relevant workplace documentation
- Identify work requirements
- Plan work tasks
- Process basic workplace forms
- Relate to people from diverse backgrounds using culturally appropriate language
- Request advice, receive feedback and work with others

Required Knowledge:

- Basic spelling, grammar and punctuation to complete basic workplace forms
- Communication procedures relevant to the organisation and the individual's work responsibilities
- Standard marine communication phrases
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- being aware of own specific roles and responsibilities
- working as part of a team.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where general purpose hand/rating skills can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that

impacts on work activities

- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate working effectively as part of a crew
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Routine work instructions and procedures may include:

- Instruction manuals
- Labels
- Personnel information, notes, rosters
- Signs and symbols
- Weather information
- Work health and safety (WHS)/occupational health and

- Workplace forms may include:
- safety (OHS) policies, procedures and alerts
 - Hazard/incident/accident report forms
 - Personnel forms
 - Safety reports
 - Telephone messages
- Factors affecting work requirements may include:
- Changes to procedures
 - Competing work demands
 - Environmental factors such as weather
 - Equipment/technology breakdowns
 - Other work demands
 - Resource issues

Unit Sector(s)

Not applicable.

Competency Field

Teamwork

MARG4001A Manage a small crew

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMME1107A Contribute to effective communications and teamwork on a coastal vessel.

Unit Descriptor

This unit involves the skills and knowledge required to lead and develop small crews.

Application of the Unit

This unit applies to those working in the capacity of Master on a range of vessels up to 80 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Induct and train 1.1 Crew member is introduced to key personnel and areas on vessel

- crew**
- 1.2 Performance requirements and responsibilities of the position are explained
 - 1.3 Legislative requirements and ***organisational policies and procedures*** are explained
 - 1.4 Initial training in relevant safety management systems, equipment and work practices is arranged and conducted
 - 1.5 Training opportunities for development of the individual's job role are identified
 - 1.6 ***Relevant documentation*** is completed and submitted to appropriate personnel
- 2 Allocate crew workload**
- 2.1 Current workload of crew is assessed
 - 2.2 Workload is scheduled effectively to facilitate operational efficiency of vessel
 - 2.3 Duties, rosters and responsibilities are assessed against and matched to crew capabilities according to legislative and organisational requirements
 - 2.4 Crew are allocated a workload priority
 - 2.5 Workload of crew is continuously assessed according to agreed objectives and timelines
- 3 Monitor crew performance**
- 3.1 ***Performance expectations*** are communicated clearly to crew and individual crew members
 - 3.2 Performance of crew and individuals is systemically monitored against defined measurable performance criteria to ensure satisfactory completion of assigned workloads
 - 3.3 Performance expectations are assessed objectively against workloads and crew and individual capabilities
 - 3.4 ***Strategies*** are developed to ensure crew and individuals are actively encouraged and supported in assessing their own competence and identifying their learning needs
- 4 Address performance related issues**
- 4.1 Systems are established to ensure efforts of crew are monitored, and formal and informal feedback is provided in a constructive manner
 - 4.2 Performance above expectations is identified and reinforced through recognition and continuous feedback

- 4.3 Performance below expectations is identified and *development plan* for improved performance is negotiated, agreed on and documented according to organisational requirements
- 4.4 Action plans for improving performance are established and monitored according to organisational requirements
- 5 Address issues and problems of crew and individual crew members**
- 5.1 *Potential and current, issues and problems* arising within crew and/or individuals are identified and acted on according to organisational and legislative requirements
- 5.2 Advice, support and expertise is sought from *appropriate personnel* as required, to resolve issues and problems
- 5.3 Issues and problems that impact on individual crew members are followed through and resolved with concerned individuals
- 6 Build support and commitment within crew**
- 6.1 Organisational requirements are met through personal performance and behaviour and leadership, which serves as a positive role model for other crew members
- 6.2 Own performance is monitored and adjusted to ensure it aligns with key performance indicators and organisational goals
- 6.3 Crew members are treated in a fair and equal manner and individual differences are identified and accommodated
- 6.4 Effective communication is developed and maintained with crew and management

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Build and motivate teams
- Coach and mentor others
- Communicate and negotiate effectively
- Counsel others and provide feedback as required
- Lead others
- Manage personnel effectively
- Monitor and review activities, processes, performance and plans
- Plan and organise work and activities

- Relate to people from a range of social, cultural and ethnic backgrounds
- Resolve conflict
- Train others

Required Knowledge:

- Consultation and communication techniques and strategies
- Key result areas of crew and organisation
- Organisational policies and procedures
- Principles and techniques involved in:
 - performance management systems
 - leadership and mentoring
- Processes for monitoring team and own performance
- Relevant industry awards and enterprise agreements
- Relevant legislation especially in relation to work health and safety (WHS)/occupational health and safety (OHS), environmental issues, equal opportunity, industrial relations, unfair dismissal and anti-discrimination
- Safety management systems
- Staff counselling, grievance and disciplinary procedures

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- developing and maintaining crew performance to enhance business operations
- developing effective planning documents
- communicating effectively with others as required
- producing accurate and reliable documentation.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where managing

a small crew can be conducted

- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing a small crew
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Organisational policies and procedures may include:

- Anti-discrimination
- Complaint and grievance procedures
- Culturally appropriate entitlements

- Employment conditions
 - Equal opportunity
 - Induction and training
 - Performance measures
 - Professional development
 - Recruitment and selection
 - WHS/OHS
- Relevant documentation may include:
- Employee records
 - Job/position descriptions
 - Records of taxation and superannuation payments
 - WHS/OHS records
- Performance expectations may include:
- Documented key performance indicators (KPIs) for:
 - individuals
 - individuals and crew
 - Informal KPIs developed by Master for:
 - individuals
 - individuals and crew
- Strategies may include:
- Coaching
 - Counselling
 - Disciplinary procedures
 - Discussions and meetings to resolve performance issues
 - Making adjustments to KPIs
 - Mentoring
 - Referral to more senior management/human resources support services
 - Shadowing
 - Training
- Development plan may include:
- Capacity for inserting ongoing evaluation, review and input
 - Codes of conduct
 - Crew competencies
 - Crew roles and responsibilities
 - KPIs
 - Learning opportunities
 - Negotiated agreements with individual
 - Performance standards
 - WHS/OHS requirements
 - Work allocation
 - Work outputs and processes

Potential and current, issues and problems may include:

- Appeals against formal decisions such as assessments
- Bullying
- Discrimination and harassment
- Dispute between individuals or parties
- Grievances
- Injury rehabilitation
- Perceived or actual relating to:
 - work roles, job design and allocation of duties
 - work performance of self and others
- Prejudice or racial vilification
- Promotions
- Stress or personal problems

Appropriate personnel may include:

- Human resources manager and personnel
- Management
- Other crew members
- Other Masters in the organisation
- Union/employee representatives or groups

Unit Sector(s)

Not applicable.

Competency Field

Teamwork

MARG4002A Manage an engine room and small engineering team

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to lead and develop a small engineering team.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 1 on vessels up to 1500 kW.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Organise engine 1.1 Fuels, lubricating oil, LPG and refrigeration gas required for

- room for departure**
- 1.2 *Flammable and explosive materials* are stowed and managed according to regulatory and organisational requirements
 - 1.3 Planned maintenance tasks to be completed during proposed voyage are verified
 - 1.4 Spares and consumables required for proposed voyage are acquired
 - 1.5 Work health and safety (WHS)/occupational health and safety (OHS) hazards in engine room are identified, risks are assessed and corrective actions are taken and recorded according to organisational practices
- 2 Manage daily engine room routine**
- 2.1 *Engine room routine* is organised and duties for engineering team are defined
 - 2.2 WHS/OHS roles and responsibilities of engineering team are defined
 - 2.3 WHS/OHS procedures are communicated to engine room crew
 - 2.4 WHS/OHS issues raised are acknowledged and resolved promptly
 - 2.5 Permits for hot work, confined space entry and other high risk activities are completed according to organisational and regulatory requirements
 - 2.6 Engineering team members are allocated daily maintenance tasks according to planned maintenance system or breakdown maintenance
 - 2.7 Procedures for collecting and sorting engine room waste from cleaning and maintenance tasks are defined and communicated to engineering team
- 3 Manage engineering team**
- 3.1 Performance expectations are communicated clearly to engineering team
 - 3.2 Performance expectations are assessed objectively against workloads and engineering team capabilities to ensure satisfactory completion of assigned tasks
 - 3.3 *Potential and current issues and problems* arising within crew and/or individuals are identified and acted on according to organisational and legislative requirements
 - 3.4 Effective communication is developed and maintained with team and management
- 4 Manage**
- 4.1 Planned and breakdown maintenance activities to be conducted in

- engineering procedures in port**
- port are arranged to facilitate operational efficiency of vessel
- 4.2 Permits for hot work, confined space entry and other high risk activities are completed according to organisational and regulatory requirements
- 4.3 Sound business relationships with contractors are established and maintained to ensure effective communication and early identification of potential service delivery problems
- 4.4 Contractual disputes with contractors that arise are managed according to contractual requirements, using established mediation mechanisms
- 4.5 Removal of sludge, sewage and engine room waste is arranged
- 4.6 Procedures for removal of sludge, sewage and engine room waste are followed according to regulatory requirements and organisational procedures
- 5 Manage engineering emergencies**
- 5.1 Information is received regarding scope and severity of *emergency*
- 5.2 Information is analysed to determine appropriate response
- 5.3 WHS/OHS risks are identified and action is taken according to organisational procedures
- 5.4 Actions are taken to reduce effect of incident according to organisational procedures
- 5.5 Incident is monitored for any changes and appropriate responses are taken according to organisational procedures
- 5.6 Communications are established with support services and relevant stakeholders, where appropriate
- 5.7 Reports and debriefings are completed according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Communicate effectively with people from a range of social, cultural and ethnic backgrounds
- Counsel team members and provide feedback

- Display sound personnel management
- Lead team members
- Monitor and review activity
- Negotiate effectively
- Plan and organise activity
- Read and interpret maritime regulations, rules and instructions
- Read, interpret and apply manufacturer instructions including all WHS/OHS requirements and safety data sheets (SDS)/material safety data sheets (MSDS)
- Resolve conflict
- Write reports

Required Knowledge:

- Consultation and communication techniques and strategies
- Hazards associated with flammable/explosive materials
- Hazards of refrigeration gases including accidental release in a confined space
- Key result areas of the crew and the organisation
- Organisational policies and procedures
- Principles and techniques involved in:
 - performance management systems
 - leadership and mentoring
- Processes for monitoring crew and own performance
- Relevant legislation especially in regard to WHS/OHS, environmental issues, equal opportunity, industrial relations, unfair dismissal and anti-discrimination
- Regulations for stowing and managing flammable/explosive materials including:
 - diesel
 - petrol
 - LPG
 - refrigerant gases
 - lubricants
- Requirements for confined space entry and hot work permits
- Safety management systems
- Testing of LPG detectors

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the

performance criteria, the required skills and knowledge, the range statement and the

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- ensuring behaviour reflects relevant current legislative and regulatory requirements
- ensuring currency of relevant WHS/OHS skills and knowledge
- implementing workplace environmental and waste management procedures correctly
- providing high quality reports
- developing effective planning documents.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where managing an engineering crew can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing an engineering crew
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Flammable and explosive materials may include:

- Fuels
- LPG
- Lubricating oils
- Refrigeration gas

Engine room routine may include:

- Completing log book entries
- Monitoring of equipment in engine room
- Regular inspection of engine room
- Responding to alarms
- Watchkeeping arrangements

Performance expectations may include:

- Compliance with duty statements
- Personal appraisal reports

Potential and current issues and problems may include:

- Bullying
- Discrimination and harassment
- Disputes between individuals or parties
- Grievances
- Injury rehabilitation
- Perceived or actual issues and problems relating to:
 - work roles, job design and allocation of duties
 - work performance of self and others
- Prejudice or racial vilification
- Stress or personal problems
- Accidental release of refrigeration gas in confined space

Emergencies may include:

- Explosion
- Fire
- Flooding
- Loss of electrical supply
- Major failure of propulsion engine

Unit Sector(s)

Not applicable.

Competency Field

Teamwork

MARG4003A Supervise a crew

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to supervise a crew.

Application of the Unit

This unit applies to those working on a vessel as a Chief Integrated Rating.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|--|-----|--|
| 1 Plan and implement work schedules | 1.1 | Tasks and/or jobs are identified and prioritised according to <i>work schedule</i> |
| | 1.2 | Timelines, personnel and equipment are identified for each job and task |

- 1.3 Schedules are clearly communicated to crew or individuals
 - 1.4 Changes to schedules are implemented through reorganisation of priorities, with reasons being clearly conveyed to crew or individuals
 - 1.5 Priority of tasks is communicated to crew or individuals
 - 1.6 Tasks and/or jobs are discussed with crew or individuals and schedules are adjusted if necessary
- 2 Monitor performance of tasks**
- 2.1 Required standard is effectively communicated to crew or individuals to ensure understanding of allotted task
 - 2.2 Instruction or technical support to achieve required standard is provided as necessary
 - 2.3 Standard of performance is *monitored* to ensure achievement of outcomes
 - 2.4 Feedback on performance is discussed with crew or individuals
 - 2.5 Completion times of tasks/jobs are monitored and scheduling is adjusted as appropriate
- 3 Support development of crew or individuals**
- 3.1 Workload is discussed with crew or individuals on a regular basis
 - 3.2 Support mechanisms are explored and implemented to address issues
 - 3.3 Crew or individuals are supported to identify and resolve work-related issues
 - 3.4 Crew or individuals are supported to establish and maintain effective relationships with colleagues in line with the requirements of their work role
 - 3.5 Areas of tension or conflict in relationships are identified and steps are taken to address contributing factors and issues
 - 3.6 Mentoring, training and assessment is provided where required, to develop and enhance crew or individual skills and knowledge in line with work role requirements
 - 3.7 Trainee crew are supported in the completion of relevant training record books
- 4 Provide leadership to crew**
- 4.1 Crew is assisted to identify and work towards goals and objectives in line with *organisational values and directions*
 - 4.2 Support and encouragement is provided to crew and steps are taken to maintain or improve cooperation and cohesiveness

- 4.3 Barriers to crew effectiveness are identified and potential causes or factors contributing to these barriers are investigated
 - 4.4 **Strategies** are put in place to enhance team effectiveness by addressing identified barriers
- 5 Monitor application of WHS/OHS**
- 5.1 Implementing work health and safety (WHS)/occupational health and safety (OHS) standards is monitored to ensure safety requirements are met
 - 5.2 Strategies for prevention or correction of problems are determined from the monitoring process
 - 5.3 Recommendations for prevention or correction of problems are made in order to achieve established standards
- 6 Communicate with management, crew and individuals**
- 6.1 All information affecting work is explained logically and clearly to crew or individuals where appropriate
 - 6.2 Effective and appropriate information provision is carried out with management
 - 6.3 Concise reports are written that conform to organisational procedures
- 7 Control entry to confined spaces**
- 7.1 Requirement for **confined space** entry is identified
 - 7.2 Confined space entry permit and any **limitations** are identified according to organisational procedures
 - 7.3 Roles and responsibilities of crew members are confirmed according to organisational procedures
 - 7.4 WHS/OHS requirements are applied throughout control of the operation
 - 7.5 Entry and egress of the confined space are monitored and recorded according to work permit conditions and organisational procedures
 - 7.6 Communication and consultation with confined space entry team is maintained according to work permit conditions and organisational procedures
 - 7.7 **Documentation and reports** are completed according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access information about tasks and abilities of crew to effectively schedule tasks
- Adjust scheduling to meet contingencies
- Analyse relevant workplace data to identify hazards, assess risks, design and implement appropriate WHS/OHS control measures
- Analyse working environment to identify hazards, assess risks, design and implement appropriate WHS/OHS control measures
- Assess resources needed to maintain systematic approach to required tasks
- Calculate job times and manipulate scheduling to make the most efficient use of personnel and equipment
- Determine job priorities
- Effectively communicate ideas and information to crew
- Enhance individual performance
- Establish procedures that enable feedback from crew and encourage suggestions that might enhance performance
- Monitor performance of crew members
- Monitor performance of tasks and adjust scheduling
- Operate any equipment pertinent to the control of confined space entry
- Provide instruction to achieve the required standard

Required Knowledge:

- Appropriate emergency response procedures
- Appropriate signage, symbols, labels and barriers
- Effective team management
- Entry permit procedures
- Incident and accident investigation
- Interpersonal relations and counselling
- Human relations
- Human resource management policies
- Leadership
- Legislation, organisational policies and procedures relevant to confined spaces
- Personal communications
- Reporting procedures for WHS/OHS matters
- Risk management principles and application of appropriate measures

- Supervision of personnel
- WHS/OHS standards
- Work scheduling procedures
- Workforce development
- Workplace employment awards or agreements and work conditions

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- supporting effective team processes and work functions
- addressing legal, legislative and industrial requirements
- providing the required amount of detail in reports.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where supervising a crew can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate supervising a crew
- direct observation of candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- | | |
|---|--|
| Work schedule may include: | <ul style="list-style-type: none"> • Organisational standards relating to service delivery or outcomes specific to work role • Resources required • Specific plans for implementing identified work arrangements • Timeframe for achieving outcomes • Training plans to develop required skills and knowledge |
| Monitored may include: | <ul style="list-style-type: none"> • Discussions between crew member and supervisor • Identifying training and development needs • Mentoring training and assessment of the crew member • Reviewing and discussing factors that have affected the individual work plan • Reviewing the individual work plan |
| Organisational values and directions may include: | <ul style="list-style-type: none"> • Duty of care • First aid • Grievance management • Harassment • Person-centred approach • Service delivery standards • Specific values, standards and approaches relevant to work role • WHS/OHS |

- Strategies may include:
- Workplace behaviours
 - Review of:
 - policies and procedures
 - roster arrangements or associated work condition
 - systems, equipment or work practices
- Confined spaces may include:
- Any compartment or area with limited opening for access, no escape route, and with limited natural ventilation and the capability of accumulating a toxic, flammable or explosive atmosphere, or of being flooded such as:
 - pump rooms
 - cargo holds
 - ballast, fresh water and other tanks
- Limitations may include:
- Emergency situation requirements
 - Equipment and/or clothing, and personal protective equipment requirements
 - Maximum/minimum numbers in teams entering confined space
 - Medical constraints on personnel entering
 - Monitoring/testing requirements
 - Time limitations for working within confined space or before returning to confined space
- Documentation and reports may include:
- Entry/egress reports/logs
 - Report to WHS/OHS officer
 - Work permit completion after exit
 - Written reports required by organisation

Unit Sector(s)

Not applicable.

Competency Field

Teamwork

MARG5001A Provide leadership to crew

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMML307B Establish and maintain a harmonious workplace environment.

Unit Descriptor

This unit involves the skills and knowledge required to apply leadership and team working skills.

Application of the Unit

This unit has application for a Watchkeeper Deck and Master < 500 GT.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Allocate duties 1.1 Workload is scheduled effectively to facilitate vessel operational

efficiency

- 1.2 Duties, rosters and responsibilities are assessed against and matched to crew capabilities and according to legislative and organisational requirements
 - 1.3 Crew are allocated workload priority and *performance expectations* are communicated clearly
 - 1.4 Workload of crew is continuously assessed according to agreed objectives and timelines
 - 1.5 Performance of crew and individuals is systemically monitored against defined measurable performance criteria to ensure satisfactory completion of assigned workloads
 - 1.6 Performance above expectations is identified and reinforced through recognition and continuous feedback
 - 1.7 Performance below expectations is identified and *development plan* for improved performance is negotiated, agreed on and documented according to organisational requirements
 - 1.8 *Potential and current issues and problems* arising within the crew and/or individuals are identified and acted on according to organisational and legislative requirements
- 2 Provide learning and development activities**
- 2.1 Action plan to meet individual and group learning and development needs is prepared
 - 2.2 Individuals are supported to identify their specific learning and development needs
 - 2.3 Crew members are encouraged and supported to take advantage of *learning and development opportunities* according to their needs and organisational requirements
 - 2.4 On-the-job learning opportunities are provided according to individual needs and to the required standard
 - 2.5 Crew members are encouraged and supported in applying new skills and knowledge in the workplace
- 3 Communicate effectively with crew and stakeholders**
- 3.1 *Interpersonal skills and communication techniques* are used to facilitate open communication within crew, ensure understanding and encourage accurate exchange of information
 - 3.2 Meetings and briefings are conducted to maintain understanding and support with crew and *stakeholders*

- 3.3 ***Barriers to effective cross-cultural communication*** are identified and addressed to maintain effective relationships
 - 3.4 Positive involvement and contributions are encouraged from all crew members
 - 3.5 Communications are clear and accurate to ensure that information can be easily understood and acted upon
 - 3.6 Strategies for resolving differences are used to negotiate issues and problems
 - 3.7 Communication is used to develop and maintain positive relationships, mutual trust and confidence
- 4 Provide leadership within the crew**
- 4.1 Crew members are provided with the support, leadership and advice necessary to perform work safely and effectively
 - 4.2 Assistance is provided to crew members to accomplish ***teamwork*** and achieve ***organisational goals***
 - 4.3 Conflict situations in crew are identified and conflict resolution strategies applied
 - 4.4 ***Leadership and guidance strategies*** are varied to meet changing priorities and situations, taking into account the differing needs and skills of individuals and the requirements of the tasks
- 5 Make effective decisions**
- 5.1 Information is gathered and analysed to generate a range of options
 - 5.2 Decisions made are the most effective for the situation based on sufficient, valid and reliable information
 - 5.3 Decisions made are consistent with personal and professional values, ethics and regulatory obligations
 - 5.4 Consultative and participative decision making is used in implementing and reviewing the work of the crew and the distribution of responsibilities
 - 5.5 Needs and expectations of crew and the organisation are taken into account through decision making
 - 5.6 Decision making is undertaken according to risk management plans and within appropriate timeframes
 - 5.7 Effectiveness of decisions is evaluated to improve future decision making

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Allocate, assign and prioritise resources
- Apply:
 - decision-making techniques
 - assertiveness and leadership
- Communicate:
 - effectively on board and ashore
 - with other ships, coast stations and VTS centres
 - to perform officer duties, which may include communicating with a multilingual crew
- Ensure that communications are clear and understood
- Use and understand the IMO Standard Marine Communication Phrases (IMOSMCP)

Required Knowledge:

- Allocation, assignment and prioritisation of resources
- Assertiveness and leadership including motivation
- Communication techniques and strategies
- Decision-making techniques
- Effective communication on board and ashore
- English language to:
 - communicate with other ships, coast stations and VTS centres
 - perform officer's duties, which may include communicating with a multilingual crew
- Principles and techniques involved in:
 - performance management systems
 - assertiveness, leadership, motivation
 - teamwork
- Risk management as the process of identifying potential negative events and developing plans to mitigate or minimise the likelihood of the negative event occurring and/or the consequences, if it does occur

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- developing effective planning documents
- sharing an accurate understanding of current and predicted vessel status, operational status and external environment with necessary crew members
- demonstrating effective leadership behaviour and teamwork techniques.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- simulated situation where providing leadership to a crew, including motivation and teamwork, can be demonstrated
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate providing leadership to a crew
- direct observation of the candidate applying relevant

WHS/OHS requirements and work practices

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Performance expectations may include:

- Documented key performance indicators (KPIs) for:
 - individuals
 - individuals and crew
- Informal KPIs developed by the Master for:
 - individuals
 - individuals and crew

Development plan may include:

- Capacity for inserting ongoing evaluation, review and input
 - Codes of conduct
 - Crew competencies
 - Crew roles and responsibilities
 - KPIs
 - Learning opportunities
 - Negotiated agreement with individual
 - Performance standards
 - Work allocation
 - Work health and safety (WHS)/occupational health and safety (OHS) requirements
 - Work outputs and processes
- Potential and current issues and problems may include:
- Appeals against formal decisions such as assessments
 - Bullying
 - Discrimination and harassment
 - Dispute between individuals or parties

Learning and development opportunities may include:

- Grievances
- Injury rehabilitation
- Perceived or actual relating to work:
 - roles, job design and allocation of duties
 - performance of self and others
- Prejudice or racial vilification
- Promotions
- Stress or personal problems
- Career pathways
- Coaching
- Conference and seminar attendance
- External study
- Formal course participation
- Induction
- In-house training programs
- Job rotation
- Mentoring
- On-the-job training
- Secondment

Interpersonal skills and communication techniques may include:

- Active listening
- Constructive feedback
- Control of voice and body language
- Flexibility and willingness to negotiate
- Non-verbal communication
- Presenting options and consequences
- Paraphrasing
- Reflecting and summarising
- Speaking clearly and concisely
- Seeking feedback to check understanding
- Showing awareness of cultural and social differences
- Using language sensitively
- Using positive, confident and cooperative language

Stakeholders may include:

- Coast stations
- Master
- Other ships
- VTS centres

Barriers to effective cross-cultural communication may include:

- Assumptions
- Cultural
- First or preferred language
- Level of skill and knowledge

- Teamwork may include:
- Power imbalance
 - Racist and prejudiced attitudes
 - Socioeconomic
 - Stereotypes and generalisations
 - Structural
 - Advantages and disadvantages
 - Individual and group behaviour
 - Team building
 - Team problem solving
 - Types of groups
- Organisational goals may include:
- Client service standards
 - Environmental management
 - Organisational service standards
 - WHS/OHS
- Leadership and guidance strategies may include:
- Delegation
 - Empowerment
 - Job design
 - Motivation
 - Process theories

Unit Sector(s)

Not applicable.

Competency Field

Teamwork

MARG6001A Manage a vessel and its crew

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMML407A Manage administration of the vessel and its personnel.

Unit Descriptor

This unit involves the skills and knowledge required to use leadership and managerial skills to manage the operations of a vessel and its crew.

Application of the Unit

This unit applies to maritime workers working in the maritime industry as a Master Unlimited.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Take command**
 - 1.1 Command is exercised according to organisational authority and guidelines
 - 1.2 Command structure is established appropriate to vessel
 - 1.3 Command structure is communicated to crew and external authorities who have a regulatory interest in vessel
 - 1.4 Command *information management system* is implemented
 - 1.5 Communication mechanisms and procedures are implemented between levels of command according to organisational procedures
 - 1.6 Liaison is established and maintained to meet control and command requirements
- 2 Manage operations**
 - 2.1 Operational plan is developed in consultation with *relevant personnel*
 - 2.2 Key performance indicators (KPIs) are developed, detailed and included in operational plan
 - 2.3 *Contingency plans* are developed and implemented at appropriate stages of operational planning
 - 2.4 *Resource acquisition* is planned and managed according to organisational procedures
 - 2.5 Standard operating procedures are developed in an *appropriate format*
 - 2.6 Performance systems and processes to assess progress in achieving profit and productivity plans and targets are developed, monitored and reviewed
 - 2.7 Areas of under-performance are identified and prompt action is taken to rectify the situation
 - 2.8 Recommendations for variations to operational plans are negotiated according to organisational procedures
 - 2.9 Systems to ensure procedures and records associated with documenting performance are managed according to organisational procedures
- 3 Apply task and workload management**
 - 3.1 Workload of crew members is planned taking into account time and resource constraints
 - 3.2 Crew are assigned workload priority and *performance expectations*

- are communicated clearly
- 3.3 Workload of crew is coordinated according to agreed objectives and timelines
 - 3.4 Performance of crew and individuals is systemically monitored against defined measurable performance criteria to ensure satisfactory completion of assigned tasks and workloads
 - 3.5 **Potential and current issues and problems** arising in relation to task and workload management are identified and acted on according to organisational and legislative requirements
- 4 Support and participate in development activities**
- 4.1 Training needs of crew and individuals are identified and assessed on a regular basis according to organisational procedures
 - 4.2 Action plan to meet crew and individual training and development needs is developed, agreed and implemented
 - 4.3 On-the-job training is provided to the required organisational standard and to meet crew needs
 - 4.4 Crew members are encouraged and supported to attend training and to undertake **development opportunities**
 - 4.5 Coaching and mentoring are utilised as developmental tools
- 5 Communicate objectives and required standards**
- 5.1 Crew members are provided with up-to-date information concerning organisational objectives and standards
 - 5.2 Crew member understanding of objectives and standards is checked
 - 5.3 Organisational standards and values are modelled and promoted to crew members
- 6 Provide leadership to crew and individuals**
- 6.1 Link between function of crew and organisational goals is understood and communicated to crew
 - 6.2 Participative decision making is used to develop, implement and review work of crew and to allocate responsibilities
 - 6.3 Opportunities are given to crew and individuals to develop new and innovative work practices and strategies
 - 6.4 Delegation to crew and individuals is appropriate and relevant to crew objectives and goals according to organisational policy and procedures
 - 6.5 Allocated tasks are within the competence of crew members and supported with appropriate authority, autonomy and training

- 6.6 Procedures for emergency responses are developed and communicated to crew members
- 7 Make effective decisions**
- 7.1 *Team-building strategies* are applied to achieve strengthened crew and individual commitment to organisational vision and goals
- 7.2 Range of *consultative methods* are used to involve crew in decisions and vessel risk assessment
- 7.3 Use of problem-solving strategies and techniques to identify and generate options is promoted
- 7.4 Decisions and actions are evaluated for their effectiveness and positive outcomes
- 7.5 Decisions and actions are documented and reported according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply decision-making techniques including situation and risk assessment, identifying and generating options, selecting a course of action and evaluating outcome effectiveness
- Apply effective resource management including allocation, assignment and prioritisation of resources; effective communication onboard and ashore; decisions reflecting consideration of team experiences; assertiveness and leadership; obtaining and maintaining situational awareness
- Apply task and workload management including planning and coordination, personnel assignment, time and resource constraints, and prioritisation
- Develop, implement and oversee standard operating procedures

Required Knowledge:

- Decision-making techniques
- KPIs as measures for monitoring or evaluating the efficiency or effectiveness of a system which may be used to demonstrate accountability and to identify areas for improvements
- Organisational safety management system requirements
- Relevant international maritime conventions and recommendations, and national legislation
- Shipboard personnel management and training

- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- informing crew of expected standards of work and behaviour in a manner appropriate to the individual concerned
- assessing current competence and capabilities and operational requirements to determine training objectives and activities
- giving and receiving communication clearly and unambiguously.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where managing a vessel and its crew can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing a vessel and its crew
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- | | |
|--|---|
| Information management system may include: | <ul style="list-style-type: none"> • Data receipt • Procedures and protocols • Recording • Recording and documenting incidents • Security and authority assignment • Storage and despatch modes • Types of technology – electronic data exchange devices |
| Relevant personnel may include: | <ul style="list-style-type: none"> • Crew supervisors • Masters of other vessels • Senior crew members • Senior management • Union or employee representatives • WHS/OHS committee/s and other people with specialist responsibilities |
| Contingency plans may include: | <ul style="list-style-type: none"> • Allocating functions or tasks • Recycling and re-using materials • Risk identification, assessment and management processes • Strategies for reducing costs, wastage, stock or consumables |

- Resource acquisition may include:
- Current and projected human, physical and financial resources
 - Goods and services to be purchased and ordered
 - Stock requirements and requisitions
- Appropriate format may include:
- Details of administrative requirements prior to commencing workplace operation
 - Details in a procedural way of individual activities required to be carried out and completed
 - Location and conditions where workplace operation is to be undertaken
 - Procedural operations of tools, equipment and technology relevant to the workplace operation
 - Specific safety information and instructions for the safe conduct of the workplace operation
- Performance expectations may include:
- Documented KPIs developed by Master for:
 - individuals
 - individuals and crew
 - Informal KPIs developed by Master for:
 - individuals
 - individuals and crew
- Potential and current issues and problems may include:
- Appeals against formal decisions such as assessments
 - Bullying
 - Discrimination and harassment
 - Dispute between individuals or parties
 - Grievances
 - Injury rehabilitation
 - Perceived or actual issues relating to work:
 - roles, job design and allocation of duties
 - performance of self and others
 - Prejudice or racial vilification
 - Promotions
 - Stress or personal problems
- Development opportunities may include:
- Career pathways
 - Coaching
 - External study
 - Formal course participation
 - Induction
 - In-house training programs
 - Job rotation
 - Mentoring
 - On-the-job training
- Team-building strategies
- Clarifying ground rules and behavioural expectations

may include:

- Defining and clarifying objectives and work area plans
- Ensuring input into the review of the safety management system is encouraged
- Fostering creativity
- Offering constructive feedback
- Recognising achievements
- Strengthening communication processes

Consultative methods may include:

- Email/intranet communications, newsletters or other processes and devices that ensure all employees have the opportunity to contribute to team and individual operational plans
- Mechanisms used to provide feedback to work team in relation to outcomes of consultation
- Meetings, interviews, brainstorming sessions

Unit Sector(s)

Not applicable.

Competency Field

Teamwork

MARH2001A Plan and navigate a passage for a vessel up to 12 metres

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMH1207B Plan and navigate a short voyage within inshore limits.

Unit Descriptor

This unit involves the skills and knowledge required to conduct the passage of a vessel up to 12 metres within the 12 nautical mile (nm) limit; it includes using the range of equipment found on a vessel to plan and safely conduct the passage.

Application of the Unit

This unit applies to those working as Coxswain Grade 1 or a Coxswain Grade 2 on a range of vessels up to 12 metres within the 12 (nm) limit.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Plan passage**
 - 1.1 Appropriate *charts and publications* are accessed and checked for currency
 - 1.2 Destination is identified, and course and waypoints are plotted
 - 1.3 Estimated time of arrival (ETA) at waypoints and final destination are calculated
 - 1.4 Safe passage is plotted to comply with all navigational buoys, marks and beacons
 - 1.5 *Navigational hazards* are identified to avoid dangers to vessel
 - 1.6 Weather information is accessed to determine expected weather pattern for intended passage
 - 1.7 Proposed course is modified, if necessary, to meet expected weather conditions
 - 1.8 Fuel consumption for passage, including a reserve, is calculated
- 2 Conduct a pre-departure check**
 - 2.1 *Propulsion equipment* and *alarms* are tested for serviceability and vessel hull is checked for seaworthiness
 - 2.2 *Navigation equipment* and alarms are checked to ensure they are in proper working condition and set for the passage
 - 2.3 Navigation equipment is checked for errors and allowances are made in planning the passage
 - 2.4 Fuel is checked to ensure there is adequate fuel on board for intended passage
 - 2.5 *Safety equipment* is checked for compliance with legislation
 - 2.6 *Communications equipment* is checked to ensure it is in proper working condition
 - 2.7 *Anchoring and mooring equipment* is checked to ensure it is adequate and in good condition
 - 2.8 Vessel and equipment are secured for sea
- 3 Conduct passage**
 - 3.1 Local authorities are advised of departure and *passage plan*
 - 3.2 Vessel is steered and propulsion equipment is operated in a safe and controlled manner to complete pre-planned course

- 3.3 Pilotage techniques and navigational equipment are used to monitor vessel position and maintain vessel in safe waters at all times
 - 3.4 Errors from navigational equipment are correctly applied to maintain planned passage
 - 3.5 Navigational buoys, marks and beacons are identified and complied with
 - 3.6 Situational awareness is maintained to avoid navigational hazards and to comply with regulations for prevention of collision at sea
 - 3.7 Weather and sea conditions are monitored during passage and correct responses are made for changing conditions
- 4 Complete passage**
- 4.1 Local authority is advised of completion of passage
 - 4.2 Vessel is checked to ensure it is securely moored
 - 4.3 Propulsion equipment is checked to ensure it is safely shut down and secured
 - 4.4 Navigational equipment is switched off

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply International Regulations for the Prevention of Collision at Sea
- Apply weather information during passage planning and explain expected weather patterns
- Correctly interpret weather information received
- Explain impact of tidal variation on chart depths
- Identify and comply with all navigational buoys, marks and beacons
- Identify and respond to relevant proximity alarms
- Identify:
 - courses to steer between turning points
 - navigational hazards
 - times and heights of high and low water from local tide tables
- Obtain weather information applicable to an intended passage
- Plot the position derived from GPS and explain the dangers of reliance on the use of GPS

in coastal areas

- Plot visual bearings on a chart to derive a position
- Relate information in forecasts to conditions expected for small vessels
- Specify fuel consumption and time at turning points
- Steer a pre-planned course

Required Knowledge:

- Action to be taken on receiving adverse weather report and on encountering heavy weather
- Appreciation of manoeuvring difficulties of larger vessels
- Basic information contained in a navigation chart
- Basic meteorological terms
- Basic pilotage techniques
- Chart information (symbols and abbreviations)
- Coastal features
- Cyclonic development
- Dangers to navigation
- Electronic aids and their limitations including sourcing and applying chart corrections
- Local weather patterns including features on a synoptic weather chart
- Propulsion equipment
- Radio equipment
- Sources of weather reports and warnings
- Speed, distance and time calculations
- Types of reports available
- Use of a compass and compass errors
- Use of local tide tables
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the

demonstrate competency in this unit

Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- plotting a planned passage both electronically and on a paper chart
- awareness of one's surroundings and changes to these surroundings
- working safely at all times.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- marine operations site with an appropriate vessel up to 12 metres or an approved marine simulator to demonstrate the planning and navigation of a passage within the 12 nm limit
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate planning and navigating a passage within the 12 nm limit
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Charts and publications must include:
- Electronic charts
 - Notice to Mariners
 - Paper charts
 - Tide tables
- Navigational hazards may include:
- Restricted visibility
 - Shallow ground
 - Traffic
 - Unlit beacons
- Propulsion equipment may include:
- Inboard engine
 - Outboard engine
- Alarms may include:
- Bilge alarms
 - Depth alarms
 - Engine alarms
 - Off-course alarms
 - Radar range alarms
- Navigation equipment may include:
- Automatic Identification Systems (AIS)
 - Compass
 - Echo sounder
 - Electronic Chart Systems (ECS) and plotter
 - Paper charts
 - GPS
 - Radar
- Safety equipment must include:
- Distress flares/pyrotechnics
 - Electronic position indicating radio beacon (EPIRB)
 - Firefighting equipment
 - Life jackets
 - Life rafts and hydrostatic release systems
- Communications equipment may include:
- HF radio
 - VHF radio

Anchoring and mooring equipment may include:

- Anchor
- Mooring lines
- Sea anchors

Passage plan must include:

- Anticipated weather conditions
- Courses to steer or knowledge of navigation markers during the passage
- Depths of water throughout the passage
- ETA at destination
- Tidal information

Unit Sector(s)

Not applicable.

Competency Field

Navigation

MARH3001A Apply weather information when navigating inland waters as Master

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to predict meteorological conditions and apply them to ensure the safe navigation of a vessel. It includes interpreting and applying information obtained from observations, reports and instruments and forecasting weather for an intended inland waters passage using all available data.

Application of the Unit

This unit applies to those working in the capacity of a Master Inland Waters on any commercial vessel up to 24 metres engaged in inland waters navigation.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|--|-----|---|
| 1 Obtain weather information | 1.1 | Relevant weather forecasts are obtained from a range of <i>sources</i> and correctly interpreted |
| | 1.2 | Weather conditions are observed and correctly interpreted according to established nautical and meteorological practice |
| | 1.3 | Basic measurements of meteorological conditions are correctly made and recorded using established procedures |
| | 1.4 | Relevant meteorological charts, publications and related <i>documentation</i> are obtained, used, updated, stored and maintained |
| 2 Apply weather data to safe navigation | 2.1 | Weather condition hazards relevant to a proposed voyage are identified using relevant forecasts based on interpretation of meteorological observations, reports and measurements |
| | 2.2 | Voyage is modified as required to take into account weather and water condition hazards according to established navigational practice and operational instructions |
| 3 Maintain records of weather and oceanographic information | 3.1 | Meteorological measurements, observations, reports and forecasts are recorded and stored according to organisational procedures and regulatory requirements |
| | 3.2 | Actions taken to maintain safety of navigation and to minimise risk to safety of vessel as a result of weather and oceanographic forecasts, are documented according to organisational procedures |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Complete required records
- Read, interpret and apply weather information
- Recognise problems that may occur when interpreting and applying weather information to navigation and take appropriate action
- Select and use relevant instruments and equipment according to instructions
- Use relevant communication skills when navigating a small vessel as Master

Required Knowledge:

- Basic principles and procedures interpreting meteorological information
- Effects on navigation and vessel handling of wind, currents and bottom topography
- Maritime communication techniques
- Meteorological and oceanographic parameters:
 - atmospheric pressure
 - pressure gradient and isobar patterns
 - air temperature
 - relative humidity
 - wind strength
 - wind direction
 - visibility (in conditions of fog, mist, rain and snow)
 - cloud
- Problems in forecasting weather information to navigate a vessel and appropriate action and solutions
- Procedures for applying forecast of likely weather and water conditions to the development of a typical voyage
- Procedures to be followed during gale conditions and cyclones, including the means of securing a vessel in a cyclone mooring
- Principles of weather forecasting using information obtained from observations, reports and instruments, including:
 - vertical division of the atmosphere
 - air masses and fronts
 - cloud classifications
 - heat exchange process
 - synoptic chart analysis
 - pressure systems, cold and warm fronts
 - cyclones, storms and gales
 - tropical meteorology
 - sources of weather data
- Relevant sections of state and territory regulations, National Standard for Commercial Vessels (NSCV) and Uniform Shipping Laws (USL) Code dealing with responsibilities of a Master Inland Waters
- Sources of weather reports and methods for their interpretation

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment

Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- identifying and evaluating weather forecasting problems and determining appropriate solutions
- using weather forecasts to ensure safe navigation
- attention to detail when completing documentation
- navigating under a range of conditions - day and night, clear visibility and restricted visibility.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where applying weather information when navigating inland waters as Master can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate applying weather information when navigating inland waters as Master.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be

combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Sources may include:

- Charts
- Instruments
- Observations
- Reports
- Satellite images

Documentation may include:

- Meteorological publications
- Navigational charts of inland waterways
- Notices and instructions of relevant maritime authorities
- Operational orders
- Organisational procedures
- Relevant sections of state and territory marine regulations, NSCV and USL Code
- Vessel log
- Vessel manufacturer instructions and recommended procedures
- Weather reports, charts and satellite images

Unit Sector(s)

Not applicable.

Competency Field

Navigation

MARH3002A Manage and maintain a navigational watch on board vessels up to 80 metres

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to apply the recommended principles to be observed in managing and maintaining a navigational watch on board vessels up to 80 metres.

Application of the Unit

This unit applies to those working in the capacity of Master on a range of vessels up to 80 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|--|
| 1 Maintain watch on bridge when berthed or anchored | <p>1.1 Checks and inspections are <i>scheduled</i> to comply with organisational procedures and regulatory requirements</p> <p>1.2 Appropriate action is taken in the event of <i>irregularities or abnormal conditions</i> to maximise the safety and integrity of vessel</p> <p>1.3 Restrictions on access to vessel by non-authorized persons are followed according to organisational procedures and regulatory requirements</p> <p>1.4 Internal and external communications systems are used according to organisational procedures</p> |
| 2 Maintain watch on bridge when at sea | <p>2.1 Proper watch is maintained at all times according to organisational procedures and regulatory requirements</p> <p>2.2 <i>Lights, shapes and sound signals</i> are correctly recognised and acted upon</p> <p>2.3 Frequency and extent of monitoring traffic, vessel and environment are scheduled to conform with organisational procedures and regulatory requirements</p> <p>2.4 <i>Wheelhouse communication</i> is maintained with other crew members on matters relevant to safety and integrity of vessel</p> <p>2.5 Clear and concise wheelhouse communications are maintained and clarification is sought from or given to other crew members when watch information or instructions are not clearly understood</p> <p>2.6 <i>Internal and external communications systems</i> are used according to organisational procedures</p> <p>2.7 Log and record books are maintained according to regulatory requirements and organisational procedures</p> |
| 3 Respond to potential emergency situations | <p>3.1 <i>Watchkeeping problems</i> and <i>emergency situations</i> are promptly reported to crew according to organisational procedures</p> <p>3.2 Distress signals are recognised and acted upon</p> <p>3.3 Appropriate action is taken to handle watchkeeping problems and emergency situations according to organisational procedures and regulatory requirements</p> |
| 4 Manage crew performing | <p>4.1 Watchkeeping schedule is developed with due regard to crew qualifications, experience and organisational procedures</p> |

**watchkeeping
and lookout
duties**

- 4.2 Instructions are provided on watchkeeping and lookout requirements in relation to monitoring traffic, vessel and environment
- 4.3 Clear and concise roles and responsibilities of watchkeeping team are established
- 4.4 Effective communication is maintained with crew on matters relevant to safety and integrity of vessel
- 4.5 *Fatigue management strategies* are correctly applied in allocating watchkeeping and lookout duties

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Communicate effectively with others about watchkeeping issues, arrangements and requirements
- Identify and solve problems that may arise during watchkeeping duties
- Interpret and implement procedures relevant to the role and responsibilities of watchkeeper
- Monitor and anticipate hazards and risks that may arise during watchkeeping duties and take appropriate action
- Select and use appropriate internal and external communications equipment during watchkeeping duties

Required Knowledge:

- Application and intent of the International Ship and Port Facility Security (ISPS) Code as it applies to Australian coastal vessels and ports
- Bridge instrumentation, controls and alarms relevant to the function of watchkeeper
- Content, application and intent of the International Regulations for the Prevention of Collisions at Sea
- Fatigue management principles and techniques
- Functions and responsibilities of the wheelhouse team on board a vessel
- IALA buoyage system A
- International Aeronautical and Maritime Search and Rescue Manual (IAMSAR)
- International Code of Signals
- Maritime communication techniques on board a vessel

- Navigational hazards and implications for watchkeeping
- Procedures for the relief, maintenance and handover of a watch
- Procedures for the use of internal communications and alarm systems
- Relevant sections of state and territory marine regulations, NSCV and USL Code
- Typical watchkeeping problems and emergency situations, and appropriate actions and solutions
- Wheelhouse procedures on board a vessel
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- using bridge equipment in normal and emergency situations on vessels up to 80 metres
- ensuring currency of relevant legislative and regulatory knowledge.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- appropriate vessel or simulator to demonstrate watchkeeping procedures and use of bridge equipment in normal and emergency situations on vessels up to 80 metres
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing and maintaining a navigational watch on board vessels up to 80 metres
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Scheduled may include:

- Coverage
- Frequency
- Timing

Irregularities or abnormal conditions may include:

- Fog and restricted visibility
- Heavy weather, including cyclones

Lights, shapes and sound signals must include:

- Alternative power source for lights
- Day time shapes for a vessel
- Emergency lights
- Means of making sound signals for a vessel up to 80 metres
- Navigation lights

Wheelhouse communication may include:

- Verbal instruction relating to watchkeeping duties
- Written Master instructions

Internal and external communications systems may include:

- GMDSS equipment
- Handheld radios
- International single letter code flags
- MF and HF radios
- VHF radios

Watchkeeping problems may include:

- Dragging of anchor
- Failure of bridge equipment, steering equipment, navigational lights
- Loss of main engines or propulsion controls
- Loss of mooring lines or winches when berthing
- Machinery and bilge alarms

Emergency situations may include:

- Cargo shift
- Collision
- Fire
- Fouled hawse
- Grounding
- Injured crew or passenger
- Loss of watertight integrity
- Missing crew or passenger
- Person overboard
- Reception of a distress signal
- Retrieval of survivors from the water
- Synchronous rolling

Fatigue management strategies must include:

- Maintaining personal fitness and health and appropriate dietary habits
- Observing appropriate hours of duty in a 24 hour period
- Observing policy concerning alcohol/drug use prior to watchkeeping duties
- Recognising symptoms of fatigue

Unit Sector(s)

Not applicable.

Competency Field

Navigation

MARH3003A Plan and navigate a passage for a vessel up to 80 metres

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to plan and safely navigate a vessel up to 80 metres using a range of wheelhouse equipment and to interpret available meteorological information to inform passage planning and navigation.

Application of the Unit

This unit applies to those working in the capacity of Master on a range of vessels up to 80 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Plan passage
 - 1.1 *Navigational charts, nautical publications and related documentation* are accessed and checked for currency
 - 1.2 Documentation is used to identify *navigational hazards* relevant to proposed voyage
 - 1.3 Route for voyage is determined and critical points along proposed route of voyage are identified and plotted
 - 1.4 Potential navigational contingencies and problems along planned route are identified and appropriate strategies for dealing with them are developed and recorded
 - 1.5 *Weather* forecasts are obtained and interpreted, and weather and sea condition hazards relevant to proposed voyage are identified prior to departure
 - 1.6 Route is modified as required to take into account weather and sea condition hazards
 - 1.7 Planned route for voyage and strategies for dealing with critical situations and contingencies along route are recorded
- 2 Conduct a pre-departure check
 - 2.1 *Propulsion steering equipment and alarms* are tested for serviceability and vessel hull is checked for seaworthiness
 - 2.2 *Wheelhouse equipment* and alarms are checked to ensure they are in proper working condition and set for passage
 - 2.3 Wheelhouse equipment is checked for errors and allowances are made in planning passage
 - 2.4 Fuel is checked to ensure that there is adequate fuel, including a reserve, on board for the intended passage
 - 2.5 *Safety equipment* is checked for compliance with relevant legislation
 - 2.6 *Communications equipment* is checked to ensure it is in proper working condition
 - 2.7 *Anchoring and mooring equipment* is checked to ensure it is in proper working condition
 - 2.8 Vessel and equipment are secured for sea
 - 2.9 Latest weather information is obtained and interpreted, and proposed route is modified as required to take into account weather and sea condition hazards

- 3 Conduct passage**
- 3.1 Local authorities are advised of departure and *passage plan*
 - 3.2 *Mode of steering* is selected appropriate for prevailing weather, sea and traffic conditions, and intended manoeuvres
 - 3.3 Weather forecasts and observations of sea and weather conditions are used to determine vessel speed and direction
 - 3.4 Information from wheelhouse equipment is interpreted to identify navigational hazards and fix vessel position
 - 3.5 Alterations to vessel course or speed are made to meet prevailing circumstances and changing *conditions*
 - 3.6 Navigational manoeuvres are conducted within safe operational limits of vessel
 - 3.7 Details of passage are recorded in vessel log according to regulations
- 4 Fix vessel position**
- 4.1 *Primary position fixing method* is selected according to navigational principles and prevailing conditions
 - 4.2 Position is fixed using selected method and information derived from relevant wheelhouse equipment
 - 4.3 Position is recorded according to regulations
 - 4.4 Fixes are taken at time intervals appropriate for prevailing navigational conditions
 - 4.5 Performance checks of position fixing instruments and wheelhouse equipment are carried out according to organisational procedures and manufacturer instructions

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Complete required records relevant to planning and navigating a passage
- Determine dipping and rising distances of lights
- Estimate position using dead reckoning
- Interpret tidal stream data
- Lay off a safe course on a chart

- Observe and interpret weather and oceanographic conditions
- Read and interpret:
 - charts and other published information relevant to planning and navigating a passage
 - instrument and equipment readings relevant to planning and navigating a passage
 - weather information and oceanographic reports
- Read aneroid barometer and interpret information obtained
- Recognise and correctly respond to cross-track error resulting from effects of tide and wind
- Recognise faulty equipment and take appropriate action according to operating instructions
- Recognise problems that may be experienced when planning and navigating a passage
- Select and use relevant equipment required for planning and navigating a passage
- Use meteorological information available

Required Knowledge:

- Australian or local tide tables and sailing directions
- Basic meteorological terms
- Characteristics of various weather systems affecting Australian coast
- Charted information including that in the Title Block, Zones of Confidence Diagrams and Datums
- Compass error from transit bearings or by bearings taken from a known position
- Determining times and heights of:
 - high and low water from Australian or local tide tables for any port and the relevance of chart datum
 - tides at standard and secondary ports for any state of tide
- Differences between rhumb and great circle sailings
- Effects of current and of leeway on course and speed of vessel (without calculations) and recognising the presence of either or both factors
- Finding variation from chart
- Fixing vessel position by:
 - simultaneous bearings, transits of coastal features, and by running fix
 - radar ranges and bearings
- Information given on a chart or plan, particularly buoyage, hazards to navigation, depth and nature of bottom, lights, tides and tidal streams
- Interpreting set and drift of current from information available on chart
- Measuring distance on a chart
- Meteorological instruments and their use
- Obtaining bearings on small vessels

- Recognition of coastal features
- Relating coastal features to a chart
- Relationship between:
 - latitude and longitude
 - compass, magnetic, true and gyro courses and bearings
- Relative bearings
- Selection of suitable:
 - anchorage or shelter
 - points for bearings
- Sound signals such as:
 - appropriate signals for alteration of course to port or starboard
 - danger warnings
 - moving astern
- Sources of weather forecasts and interpretation of that information in simple terms
- Tropical revolving storms and the weather associated with such storms
- Use and limitations on use of electronic position fixing equipment found on small vessels
- Use of a deviation card without mathematical interpolation
- Using a single position line
- Using modern electronic navigational aids to determine vessel position
- Using rhumb line navigation
- Using soundings in determining position
- Using terrestrial observations to determine vessel position individually or in combination with other methods
- Weather conditions affecting Australian coast and liable to endanger vessel
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- developing effective planning documents
- producing accurate and reliable documentation.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- marine operations site or an approved marine simulator where planning and navigating a passage for a vessel up to 80 metres can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate planning and navigating a passage for a vessel up to 80 metres
- direct observation of candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Navigational charts, nautical publications and related documentation may include:

- Electronic chart display systems
- Notice to Mariners
- Paper charts
- Temporary warning notices
- Tide tables
- Weather reports and warnings

Navigational hazards may include:

- Restricted visibility
- Shallow ground
- Traffic
- Unlit beacons

Weather must include:

- Air masses and fronts
- Cloud classifications
- Cyclones, storms and gales
- Effects of weather on predicted tidal information
- Heat exchange process
- Ocean currents
- Pressure systems, cold and warm fronts
- Sea state
- Synoptic chart analysis
- Tropical meteorology
- Vertical division of atmosphere
- Weather data provided by shipboard instruments

Propulsion steering equipment and alarms may include:

- Bilge alarms
- Depth alarms
- Engine alarms
- Inboard engines, petrol and diesel
- Jet propulsion
- Off-course alarms
- Outboard engines, petrol and diesel
- Radar range alarms

Wheelhouse equipment may include:

- Alarm devices including off-course and watch alarms
- Automatic pilot
- Azimuth mirrors
- Bottom logs

- Coverage areas
 - DGPS
 - Echo sounder
 - Electronic charts
 - GPS
 - Hyperbolic systems
 - Magnetic and gyro compasses
 - Plotters
 - Radar
 - Satellite technology
- Safety equipment must include:
- Distress flares/pyrotechnics
 - Electronic position indicating radio beacon (EPIRB)
 - Firefighting equipment
 - Life jackets
 - Life rafts and hydrostatic release systems
 - Search and rescue transponder (SART)
- Communications equipment may include:
- HF radio
 - VHF radio
- Anchoring and mooring equipment may include:
- Anchor
 - Mooring lines
 - Sea anchors
- Passage plan must include:
- Anticipated weather conditions
 - Completed AUSREP reports as applicable
 - Courses to steer or knowledge of navigation markers during passage
 - Depths of water throughout passage
 - Estimated time of arrival (ETA) at destination
 - Tidal information
- Mode of steering may include:
- Automatic pilot.
 - Electric systems
 - Hydraulic systems
- Conditions may include:
- Buoyage
 - Overall passage plan requirements
 - Prevailing weather and sea conditions
 - Proximity and course of other vessels
 - Relevant navigational hazards
 - Signage
- Primary position fixing method may include:
- Radar ranges or bearings
 - Running fix

- Simultaneous bearings or transits of coastal features
- Soundings to determine position

Unit Sector(s)

Not applicable.

Competency Field

Navigation

MARH3004A Use wheelhouse equipment for safe navigation

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to maintain safe navigation of a commercial vessel through the use of radar and other equipment used for the navigation of a vessel.

Application of the Unit

This unit applies to those working in the capacity of Master on a range of vessels up to 80 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|----------------------------|---|
| 1 Set up wheelhouse | 1.1 <i>Wheelhouse navigation equipment</i> is initialised and displays are set up and maintained |
|----------------------------|---|

- navigation equipment**
- 1.2 Operational performance and accuracy of wheelhouse equipment is confirmed and appropriate action is taken when performance is out of limits
 - 1.3 *Misrepresentation of information* is detected and corrected or allowed for
- 2 Use radar to navigate safely**
- 2.1 Radar is operated according to manufacturer instructions to produce data on position of vessel, other vessels and fixed objects
 - 2.2 Radar plot is constructed on a radar plotting sheet or automatic plotting devices are initialised
 - 2.3 Systematic radar observations of vessels in the vicinity are made where there is a risk of collision
 - 2.4 Radar data is used to obtain a position fix for vessel using electronic bearing lines and variable range markers
 - 2.5 Radar bearings are corrected for vessel heading and compass error as appropriate
 - 2.6 Radar plotting data is analysed to anticipate potential collisions
 - 2.7 Analysis is used to make informed command decisions on action needed to avoid collisions
- 3 Use wheelhouse navigation equipment**
- 3.1 Wheelhouse navigation equipment is safely and efficiently used to conduct navigation of the vessel
 - 3.2 Position of vessel is monitored during voyage to ensure planned passage is followed
 - 3.3 Movement of vessels in the vicinity is monitored to ensure collision situations do not occur
 - 3.4 Wheelhouse navigation equipment is maintained according to manufacturer requirements and organisational procedures
- 4 Maintain navigational records**
- 4.1 *Navigational data* produced by wheelhouse navigation equipment that should be retained to conform with organisational procedures and regulatory requirements is identified
 - 4.2 Navigational data is stored electronically or in hard copy as required by organisational procedures and regulatory requirements
 - 4.3 Security and access requirements for data are adhered to according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Interpret radar displays and indications
- Operate marine radar systems and equipment on a vessel
- Operate other electronic navigational instruments and equipment on a vessel
- Read and interpret service manuals and instructions for radar and other electronic navigational aids
- Recognise faulty radar equipment and take appropriate action
- Recognise problems when using radar and other electronic navigational aids to maintain safe navigation and take appropriate action

Required Knowledge:

- Different types of navigational aids, including their features, key applications and operational characteristics
- Limitations and potential errors associated with each type of electronic navigational aid
- Methods for the interpretation and analysis of navigational data produced by radar and other electronic navigational instruments
- Procedures for the initialisation and operation of radar and other electronic navigational instruments
- Procedures for the use of data generated by radar and other electronic navigational instruments
- Relevant sections of state and territory regulations, National Standard for Commercial Vessels (NSCV) and Uniform Shipping Laws (USL) Code dealing with navigational equipment and the responsibilities of a Master or Deck Officer
- Techniques for the use of radar and other electronic navigational instruments
- Terminology and principles of operation of radar and other electronic navigation aids typically used on vessels
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- operating marine radar systems and equipment on an automatic radar plotting aids (ARPA) system
- attention to appropriate level of detail in recordkeeping.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where using wheelhouse equipment may be conducted
- approved radar simulator where ARPA training can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate using wheelhouse equipment
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required

Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Wheelhouse navigation equipment may include:

- AIS
- Alarm devices including off-course and watch alarms
- Automatic pilot
- Azimuth mirrors
- Bottom logs
- Coverage areas
- DGPS
- Echo sounder
- Electronic charts
- GPS
- Hyperbolic systems
- Magnetic and gyro compasses
- Plotters
- Radar
- Satellite technology

Misrepresentation of information may include

- Compass errors
- False echoes
- GPS and DGPS errors
- Incorrect setting up of electronic chart system (ECS) or electronic chart display and information system (ECDIS)
- Incorrect setting up of GPS
- Incorrect radar settings for heading marker and range marker
- Sea returns

Navigational data may include:

- Navigation safety warning
- Recording courses steered
- Weather and oceanographic reports

Unit Sector(s)

Not applicable.

Competency Field

Navigation

MARH4001A Forecast weather and oceanographic conditions

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMH707B Apply weather information when navigating a small vessel within limits of responsibility of a Master 4.

Unit Descriptor

This unit involves the skills and knowledge required to forecast weather and oceanographic conditions during a near coastal voyage and to take appropriate actions based on predictions.

Application of the Unit

This unit applies to those working in the capacity of Master on a range of vessels up to 80 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Interpret weather and oceanographic information

- 1.1 *Ocean and weather conditions* are observed and interpreted
- 1.2 Measurements of current local, meteorological and oceanographic parameters are made and recorded using appropriate *shipboard instruments*
- 1.3 Weather charts and satellite images are acquired and interpreted
- 1.4 Weather reports are obtained and interpreted

2 Use information to predict local weather and oceanographic conditions

- 2.1 Forecasts of local weather and oceanographic conditions are correctly made using available information
- 2.2 Wave height and swell forecast is made using available information
- 2.3 Effects of local topographical features on wind flow and weather conditions are estimated using available information
- 2.4 Potentially dangerous conditions are identified and *appropriate action* is taken to secure vessel

3 Maintain records of weather and oceanographic information and forecasts

- 3.1 Weather and oceanographic information and forecasts are recorded and filed according to organisational procedures
- 3.2 Action on vessel operations initiated as a result of weather and oceanographic forecasts is documented according to organisational procedures
- 3.3 Meteorological charts, publications and related documentation are updated and stored according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Observe, interpret and forecast weather and oceanographic conditions

- Read, interpret and apply weather and oceanographic information
- Recognise problems that may occur when interpreting weather and oceanographic information
- Select and use shipboard instruments to assist in forecasting weather and oceanographic conditions
- Use tide tables to calculate height of tide

Required Knowledge:

- Basic principles for making meteorological and oceanographic measurements
- Effects on navigation and vessel handling of wind, currents and bottom topography
- Heat exchange process
- Principles and procedures of weather forecasting using information obtained from observations, charts, satellite images, reports and instruments
- Procedures for filing and maintaining weather and oceanographic information
- Procedures to be followed during gale conditions and tropical revolving storms
- Sources of weather and oceanographic information, and methods for their interpretation
- Topographical effects on wind flow
- Typical problems in forecasting weather and oceanographic conditions
- Vertical division of the atmosphere
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- supporting reasons for intended action with statistical data and observations of actual conditions
- ensuring currency of relevant reference material.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where forecasting weather and oceanographic conditions may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate forecasting weather and oceanographic conditions
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. **Bold italicised wording**, if used in

the performance criteria, is detailed below.

Ocean and weather conditions must include:

- Air masses and fronts
- Cloud classifications
- Cyclones, storms and gales
- Ocean currents
- Pressure systems and cold fronts
- Sea state
- Tide prediction

Shipboard instruments may include:

- Barograph
- Barometers
- Equipment for receiving weather maps and forecasts
- Wet and dry bulb thermometers

Appropriate action may include:

- Avoiding storm centres and dangerous quadrants by adjusting course and speed
- Ensuring all vessel equipment is properly secured
- Taking action to avoid extreme adverse weather conditions

Unit Sector(s)

Not applicable.

Competency Field

Navigation

MARH5001A Apply command navigation procedures on vessels limited by tonnage or near coastal operations

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMH1707A Apply command navigation procedures on vessels limited by tonnage or near coastal operations.

Unit Descriptor

This unit involves the skills and knowledge required to manage safe navigational watchkeeping on a commercial ocean-going vessel in compliance with Australian and international regulations and guidelines, protection of the marine environment and the safety of vessel and persons on board.

Application of the Unit

This unit applies to people who work in the maritime industry as Master or Chief Mate on a vessel of up to 500 gross tonnage (GT) or as a Watchkeeper on a vessel up to 3000 GT or as Master or Chief Mate on vessels up to 3000 GT operating in near coastal waters.

The unit is consistent with the relevant sections of STCW 95 and Marine Orders under the Australian Navigation Act 2012.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance

unit of competency. is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|--|------|--|
| 1 Establish safe watchkeeping procedures on vessels, potentially with limited qualified personnel | 1.1 | Set of Master standing orders is developed to supplement vessel safety management system (SMS) noting number of watchkeeping personnel |
| | 1.2 | Accepted <i>principles</i> , vessel safety management procedures and Master standing orders are conformed with in conduct, handover and relief of watch |
| | 1.3 | Appropriate bridge team is established according to vessel SMS and bridge personnel are confirmed as fit for duty |
| | 1.4 | Duties are assigned to members of bridge team and their performance of those duties is monitored |
| | 1.5 | Members of bridge team are correctly briefed on their duties |
| | 1.6 | Action is taken to ensure vessel is navigated safely using appropriate position fixing techniques to check location the vessel and to maintain movement of vessel within planned limitations |
| | 1.7 | Action is taken to ensure progress of vessel with respect to passage plan is analysed and vessel navigation is managed appropriately to maintain a required estimated time of arrival at a point in the plan |
| | 1.8 | Accepted principles and procedures are conformed with in relation to frequency and extent of monitoring of traffic, vessel and environment |
| | 1.9 | <i>Responsibility for safety of navigation</i> is defined according to vessel SMS |
| | 1.10 | Safe navigational practice is achieved by implementing accepted bridge resource management principles and procedures |
| | 1.11 | Action is taken to ensure <i>fatigue management strategies</i> are correctly applied by bridge management team |
| 2 Respond to potential collision and emergency | 2.1 | Leadership of bridge team is taken when called to bridge in response to navigational situation |
| | 2.2 | Circumstances when assistance is required when Master is performing watchkeeping duties are identified |

- situations**
- 2.3 Potential collision situations are analysed and appropriate action is taken to avoid collision in ample time and in compliance with international collision regulations, resulting in a safe passing distance and following practices of good seamanship
 - 2.4 SMS procedures and compliance with standard watchkeeping principles are correctly implemented when taking over bridge watch from officer of the watch
 - 2.5 Appropriate action is taken to initiate search and rescue procedures on receipt of a distress signal
 - 2.6 Appropriate advice is given to watchkeepers and correct actions are implemented regarding a response to navigational or operational *emergency situations*
- 3 Maintain watchkeeping records**
- 3.1 Relevant information is documented in required records
 - 3.2 Action is taken to ensure deck log book and other required records are maintained in an appropriate manner
 - 3.3 Required records are filed and stored according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assess:
 - circumstances requiring Master to call for assistance from a second qualified watchkeeper
 - necessary action when called to bridge by officer of watch
- Brief officers of watch on passage plan and their watchkeeping duties
- Communicate effectively with other personnel when managing safe navigational watchkeeping activities
- Comply with mandatory rules, regulations and IMO Conventions and Codes, including relevant sections of AMSA Marine Orders and ensure codes, guidelines and standards recommended by IMO, classification societies and maritime industry organisations are taken into account
- Conduct emergency procedures
- Determine:
 - actions to take with respect to executing passage plan

- most important watchkeeping task at any given time
- Exchange information with pilot about pilotage plan and conduct of bridge team
- Perform pilotage duties, where permitted
- Provide leadership to bridge team
- Recognise situations warranting alterations to bridge team, including situations where vessel is under pilotage
- Solve problems that may arise when managing bridge team
- Use available technology when managing navigational watchkeeping activities

Required Knowledge:

- Applicable legislation, regulations and codes of practice
- Bridge watch handover procedures
- Causes of groundings, collisions and casualties when on board vessel
- Documentation and records, including:
 - operational orders
 - Master standing and night orders
 - established passage plan
 - navigational charts
 - relevant maritime regulations as they relate to watchkeeping functions and operations during a coastal voyage
 - vessel log
 - company SMS
 - instructions of relevant maritime authorities
- Range of factors that can affect watchkeeping functions on vessels under 500 GT and their implications, including:
 - maintaining proper lookout by all available means at all times
 - need to adhere to established passage plan
 - never leaving the bridge unattended
 - weather and sea conditions, visibility and whether there is daylight or darkness
 - proximity of navigational hazards
 - use and operational condition of navigational aids
 - operational status of bridge instrumentation, controls and alarms
 - provision on bridge of unmanned machinery space (UMS) controls, alarms and indicators
 - unusual demands on navigational watch arising from operational conditions
 - traffic density and other activities occurring in area in which vessel is navigating
 - size of vessel and field of vision available from conning position
 - attention necessary when navigating in or near traffic separation schemes or other routing measures

- rudder and propeller control and vessel manoeuvring characteristics
- Fatigue management principles and techniques
- Navigational aids including:
 - compass and azimuth mirror
 - electronic navigation systems
 - radar
 - electronic charts
- Navigational hazards during voyage and implications for watchkeeping
- Precautions necessary when navigating in or near traffic separation schemes or other routing measures
- Principles for maintaining a safe navigational watch on vessels with potentially limited qualified personnel
- Principles of bridge team management
- Regulations for preventing collisions at sea (Colregs)
- Relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- ensuring established passage plan is correctly carried out
- taking prompt action to report and/or rectify watchkeeping incidents according to established procedures
- completing work systematically with required attention to detail
- recognising and adapting appropriately to cultural differences in the workplace, including modes of behaviour, and interactions and communication with others
- managing watchkeeping arrangements while underway, when berthed or moored, when slipped or in dry dock, during routine or unplanned events.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where applying command navigation procedures on vessels limited by tonnage or near coastal operations can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate applying command navigation procedures on vessels limited by tonnage or near coastal operations
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised wording, if used in***

the performance criteria, is detailed below.

- Principles may include:
- Ensuring proper watch is maintained at all times, including correct response to avoiding collision and maintaining safe navigation of vessel passage
 - Making appropriate assistance available to be summoned to bridge if required by change in vessel situation
 - Taking all necessary precautions to avoid pollution of marine environment
- Responsibility for safety of navigation must include:
- Periods under pilotage
 - Periods when Master is on bridge
- Fatigue management strategies may include:
- Arranging assistance for watchkeepers when symptoms of fatigue are identified
 - Ensuring avoidance of excessive consumption of alcohol prior to watchkeeping duties
 - Following appropriate dietary habits
 - Maintaining personal fitness and health
 - Planning appropriate actions when un-fatigued personnel are not available
 - Recognising symptoms of fatigue
- Emergency situations may include:
- Cargo shift
 - Distress signal
 - Dragging anchor
 - Entry into confined spaces
 - Failure of bridge equipment, steering equipment, navigational lights
 - Fire
 - Fog and restricted visibility
 - Fouled hawse
 - Heavy weather
 - Intoxicated persons on board vessel
 - Loss of:
 - main engines
 - mooring lines or winches when berthing
 - watertight integrity
 - Person overboard
 - Personnel working aloft or overside
 - Possible collision
 - Retrieval of survivors from water
 - Stranding
 - Sudden list or loll
 - Synchronous rolling

Unit Sector(s)

Not applicable.

Competency Field

Navigation

MARH5002A Plan and conduct a passage

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to plan and conduct a passage and to determine position on a vessel using a range of bridge equipment, and to evaluate meteorological information to inform passage planning.

Application of the Unit

This unit has application for a Watchkeeper Deck and Master < 500 GT.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|-----------------------|--|
| 1 Plan passage | 1.1 <i>Navigational charts, nautical publications and related documentation</i> are selected for the area of navigation and corrected according to the latest information available |
|-----------------------|--|

- 1.2 Information from charts and publications is interpreted and applied to accurately identify potential *navigational hazards* relevant to the proposed voyage
 - 1.3 State of the tide at specified locations is determined and findings are applied to the passage plan
 - 1.4 Route for voyage is determined and critical points along the proposed route of voyage are identified and plotted
 - 1.5 Accurate calculations and measurements of navigational information are made
 - 1.6 Meteorological information is obtained and interpreted, and weather and sea condition hazards relevant to the proposed voyage are identified prior to departure
 - 1.7 Route is modified as required to take into account weather and sea condition hazards
 - 1.8 Planned route for voyage is recorded according to organisational and regulatory requirements
- 2 Conduct passage**
- 2.1 *Mode of steering* is selected appropriate for the prevailing weather, sea and traffic conditions and intended manoeuvres
 - 2.2 Measurements and observations of sea and weather conditions are used to determine vessel speed and direction
 - 2.3 Information from bridge equipment is interpreted to identify navigational hazards and fix vessel position
 - 2.4 Alterations to vessel course or speed are made to meet prevailing circumstances and changing *conditions*
 - 2.5 Navigational manoeuvres are conducted within safe operational limits of vessel
 - 2.6 Details of passage are recorded in vessel log according to regulations
 - 2.7 Variations to planned route are documented prior to archiving on completion of the voyage
- 3 Fix vessel position**
- 3.1 *Primary position fixing method* is selected according to prevailing circumstances and conditions
 - 3.2 Position is fixed using selected method and information derived from relevant wheelhouse equipment

- 3.3 Position is determined within limits of acceptable instrument/system errors
 - 3.4 Position is recorded on a navigational chart according to regulatory requirements
 - 3.5 Fixes are taken at time intervals appropriate for prevailing navigational conditions
 - 3.6 Reliability of information obtained from primary method of position fixing is checked at appropriate intervals
 - 3.7 Performance checks of position fixing instruments and wheelhouse equipment are carried out according to organisational procedures and manufacturer instructions
- 4 Determine appropriate action to take with respect to plotted position**
- 4.1 Assessment of the set, drift and leeway being experienced by the vessel is made
 - 4.2 Course is adjusted to maintain or resume planned route where the position indicates a deviation has occurred
 - 4.3 Dead reckoning (DR) and/or estimated position (EP) is projected along planned route according to the course made good between previously observed positions
- 5 Analyse navigational system performance**
- 5.1 Theoretical performance of navigational system is determined
 - 5.2 Measurement equipment is selected, and checks and tests are conducted
 - 5.3 Data is analysed and theoretical performance is checked with actual performance
 - 5.4 Significance of variation between theoretical and actual performance is determined
 - 5.5 Appropriate action is taken to bring performance to acceptable instrument/system errors

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Accurately measure and observe weather conditions

- Accurately prepare calculations and measurements of navigational information
- Adjust steering controls for optimum performance
- Calculate courses using plane, mercator and great circle sailing methods
- Change over from manual to automatic control and vice versa
- Check reliability of information obtained from primary method of position fixing at appropriate intervals
- Correctly interpret and apply meteorological information
- Determine errors in magnetic and gyro compasses, and correctly apply to courses and bearings
- Determine errors of magnetic and gyro compasses using celestial and terrestrial means, and to allow for such errors
- Determine vessel position by use of:
 - landmarks
 - aids to navigation including lighthouses, beacons and buoys
 - rising and dipping distances of lights and the use of horizontal angles
 - dead reckoning, taking into account winds, tides, currents and estimated speed
 - electronic navigational aids
- Determine vessel position within the limits of acceptable instrument/system errors
- Estimate position using dead reckoning
- Interpret nautical charts and publications
- Maintain charts and publications by applying up-to-date corrections to both paper and electronic charts and publications
- Operate echo-sounders and apply the information correctly
- Read the aneroid barometer and interpret the information obtained
- Select mode of steering most suitable for prevailing weather, sea and traffic conditions and intended manoeuvres
- Select most appropriate primary method of fixing vessel position for the prevailing circumstances and conditions
- Use and interpret information obtained from shipborne meteorological instruments
- Use celestial bodies to determine vessel position
- Use chart catalogues, charts, nautical publications, radio navigation warnings, sextant, azimuth mirror, electronic navigation equipment, echo-sounding equipment, compass
- Use nautical charts and publications
- Use meteorological information available

Required Knowledge:

- Basic meteorological terms
- Characteristics of the various weather systems, reporting procedures and recording systems
- Charted information including that in the Title Block, Zones of Confidence Diagrams and

Datums

- Compass error from transit bearings or by bearings taken from a known position
- Determining the times and heights of high and low water from Australian or local tide tables for any port and the relevance of chart datum
- Effects of current and of leeway on the course and speed of the vessel (without calculations)
- Finding the variation from the chart
- Fixing vessel position by:
 - simultaneous bearings, transits of coastal features, and by running fix
 - radar ranges and bearings
- Information given on a chart or plan
- Interpreting the set and drift of the current from information available on the chart
- Measuring distance on a chart
- Meteorological instruments and their use
- Nautical charts and publications
- Plane, Mercator and great circle sailing concepts
- Principles of magnetic and gyro compasses
- Recognising the presence of either or both factors
- Relating coastal features to a chart
- Relationship between compass, magnetic, true and gyro courses and bearings
- Relative bearings
- Selection of suitable points for bearings
- Sources of weather forecasts and the interpretation of that information
- Steering control systems
- Steering control systems operating procedures
- Tropical revolving storms and weather associated with such storms
- Use and limitations on the use of electronic position fixing equipment found on small vessels
- Use of a deviation card without mathematical interpolation
- Using a single position line to assist in clearing dangers
- Using modern electronic navigational aids to determine vessel position
- Using soundings in determining position
- Using terrestrial observations to determine vessel position individually or in combination with other methods
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- producing accurate and reliable information
- ensuring currency of relevant legislative and regulatory knowledge.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where planning and conducting a passage may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate planning and conducting a passage
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for

Holistic assessment with other units relevant to the industry

assessment

sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Navigational charts, nautical publications and related documentation may include:

- Electronic chart display systems
- Nautical Almanac
- Nautical tables
- Notices to Mariners
- Paper charts
- Radio navigational warnings
- Sailing directions
- Temporary warning notices
- Tide tables
- Vessel routing information
- Weather reports and warnings

Navigational hazards may include:

- Restricted visibility
- Shallow ground
- Traffic
- Unlit beacons

Mode of steering may include:

- Automatic pilot
- Electric systems
- Hydraulic systems

Conditions may include:

- Buoyage
- Overall passage plan requirements
- Prevailing weather and sea conditions
- Proximity and course of other vessels
- Relevant navigational hazards
- Signage

Primary position fixing method may include:

- Celestial observations
- Radar ranges or bearings
- Radio navigation aids
- Running fix
- Simultaneous bearings or transits of coastal features
- Soundings to determine position
- Terrestrial observations

Unit Sector(s)

Not applicable.

Competency Field

Navigation

MARH5003A Use an electronic chart display and information system to navigate safely

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to maintain safe navigation of a commercial vessel greater than 500 gross tonnage using an electronic chart display and information system (ECDIS).

Application of the Unit

This unit has application for a Watchkeeper Deck, Master < 500 GT and Master (Unlimited).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Set up an ECDIS 1.1 *ECDIS* is initialised and programmed with own vessel data

- 1.2 Operational performance and accuracy of ECDIS is confirmed
- 1.3 *Settings* and values are adjusted to suit conditions for passage planning and navigation
- 1.4 Means of providing *additional information* is correctly interfaced with ECDIS
- 2 **Use an ECDIS for passage planning and navigation**
 - 2.1 ECDIS is used to assist in passage planning and the conduct of navigation
 - 2.2 *Information* on ECDIS is monitored to ensure safe navigation
 - 2.3 Information obtained from ECDIS is interpreted and analysed taking into account limitations of equipment, all connected sensors and prevailing circumstances and conditions
 - 2.4 Position of vessel is confirmed by alternative means
 - 2.5 Safety of navigation is maintained through adjustments made to vessel course and speed
 - 2.6 *System and position alarms* are responded to, to maintain safety of navigation
 - 2.7 *Situational awareness* is maintained while using ECDIS
- 3 **Maintain data**
 - 3.1 *Data* produced by ECDIS that should be retained to conform with organisational procedures and regulatory requirements is identified
 - 3.2 Data is stored electronically or in hard copy as required by organisational procedures and regulatory requirements
 - 3.3 Security and access requirements for data are adhered to in accordance with organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Adjust settings and values to suit present conditions
- Conduct tests for malfunctions including functional self testing and interpret the test results
- Confirm vessel position by alternative means

- Maintain situational awareness while using ECDIS
- Operate ECDIS when interfaced with AIS and interpret AIS data
- Operate, interpret and analyse information:
 - when radar and ARPA is connected to ECDIS
 - obtained from ECDIS
- Operate, interpret and analyse information
- Plan a passage on a display using ECDIS
- Safely monitor and adjust information
- Set-up initial display and maintain display
- Use functions that are integrated with other navigation systems in various installations
- Use settings efficiently to ensure conformance to operational procedures

Required Knowledge:

- Correcting and updating charts by manual, semi automatic and automatic systems
- Dangers of over-reliance
- Differences between vector and raster charts
- Differences between ECDIS, ECS and RCDS
- Functions of ECDIS required by performance standards in force
- Principles, capability and limitations of ECDIS operations
- Requirements for voyage recording
- Significance of chart alarms and indicator warnings
- Use of ECDIS in emergency situations
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- ensuring integrity of back-up systems
- ensuring integrity of data.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where using an ECDIS may be conducted
- approved ECDIS simulator where training can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate using an ECDIS
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- ECDIS must include:
- Adequate and up-to-date back-up paper charts
 - Adequate and up-to-date electronic charts
 - Back-up systems
 - Electronic position fixing system
 - Gyro and log
 - Raster charts
 - Uninterruptable power supply
 - Vector electronic chart systems
- Settings may include:
- Alarm parameters for anti-grounding
 - Back-up arrangements
 - Chart update status
 - Completeness of chart data
 - Proximity to contacts and special areas
- Additional information must include:
- AIS input
 - Radar/ARPA input
- Information may include:
- Chart data displayed
 - Contacts
 - Mode and orientation
 - Own position
 - Radar overlay functions
 - Radar tracking
 - Route monitoring
 - Sea area display
 - User-created information layers
- System and position alarms must include:
- Approach to waypoint, critical point, navigation danger and other ships
 - Chart alarms
 - Depth and contour alarms
 - Mode losses
 - Primary failure
- Situational awareness may include:
- Chart data and scale selection
 - Contact detection and management
 - Integrity of sensors
 - Safe water and proximity of hazards
 - Set and drift
 - Suitability of route

Data may include:

- ENC source, date and edition
- Chart correction information
- Vessel voyage details

Unit Sector(s)

Not applicable.

Competency Field

Navigation

MARH5004A Use bridge equipment to determine vessel position

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to maintain safe navigation of a vessel through the use of radar and other bridge equipment to determine vessel position.

Application of the Unit

This unit has application for a Watchkeeper Deck, Master < 500 GT and Master (Unlimited).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|----------------------------------|---|
| 1 Set up bridge equipment | 1.1 <i>Bridge equipment</i> is initialised and displays are set up and maintained |
| | 1.2 Operational performance and accuracy of bridge equipment is |

- confirmed and appropriate action is taken when performance is out of limits
- 1.3 Any false echoes and *misrepresentations* are detected, identified and rejected
- 2 Use radar to safely navigate**
- 2.1 Radar is operated according to manufacturer instructions to produce data on position of vessel, other vessels and fixed objects
- 2.2 Radar plot is constructed on radar plotting sheet and automatic plotting devices are initialised
- 2.3 Systematic radar observations of vessels in the vicinity are made and risk of collision is determined
- 2.4 Radar data is used to obtain a position fix for vessel using electronic bearing lines and variable range markers
- 2.5 Radar bearings are corrected for vessel heading and compass error as appropriate
- 2.6 Adjustments are made to vessel course and speed to maintain safety of navigation
- 2.7 Manoeuvring signals are made at appropriate time according to regulations
- 3 Use bridge equipment to safely navigate**
- 3.1 Bridge equipment is safely and efficiently used to conduct navigation of vessel
- 3.2 Position of vessel is monitored during voyage to ensure planned passage is followed
- 3.3 Movements of vessels in the vicinity are monitored to ensure collision situations do not occur
- 3.4 Adjustments are made to vessel course and speed to maintain safety of navigation
- 3.5 Manoeuvring signals are made at appropriate time according to regulations
- 3.6 Bridge equipment is maintained according to manufacturer requirements and organisational procedures
- 4 Maintain navigational records**
- 4.1 *Navigational data* produced by bridge equipment that should be retained to conform with organisational procedures and regulatory requirements is identified
- 4.2 Navigational data is stored electronically or in hard copy as required

by organisational procedures and regulatory requirements

- 4.3 Security and access requirements for data are adhered to according to organisational procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Clearly and concisely communicate at all times in a seamanlike manner
- Correctly interpret and analyse information obtained from radar and automatic radar plotting aids (ARPA) taking into account the limitations of equipment and prevailing circumstances and conditions
- Correctly interpret information received from other bridge equipment and apply appropriate corrections
- Determine latitude by meridian altitude
- Make adjustments to vessel course and speed to maintain safety of navigation
- Make decisions to amend course or speed in a timely manner according to accepted navigation practice
- Make manoeuvring signals at the appropriate time according to International Regulations for Preventing Collisions at Sea 1972 as amended
- Plan and conduct celestial observations using a sextant and plot a position
- Take action to avoid close encounter or collision according to International Regulations for Preventing Collisions at Sea 1972 as amended

Required Knowledge:

- ARPA system performance and accuracy, tracking capabilities, limitations and processing delays
- Course and speed of other vessels
- Critical echoes, exclusion areas and trial manoeuvres
- Detecting course and speed changes of other vessels
- Detection of misrepresentation of information, false echoes, sea and rain clutter etc., racons and search and rescue transponders (SARTs)
- Effect of changes in own vessel course and speed or both
- Factors affecting performance and accuracy of radar and other navigational equipment
- Fundamentals of radar and ARPA
- Ground and sea stabilisation and their effects on ARPA data

- Identification of critical echoes
- International Regulations for Preventing Collisions at Sea 1972 as amended
- Meeting overtaking vessels
- Methods of position fixing using celestial observations with a sextant
- Methods of target acquisition and their limitations
- Parallel indexing
- Plotting techniques and relative- and true-motion concepts
- Principal types of ARPA, their display characteristics, performance standards and the consequences of over reliance on ARPA
- Range and bearing by radar
- Sea and ground stabilisation and their effect on ARPA data
- Setting up and maintaining displays on radar
- Time, distance and bearing of closest point of approach of a closing vessel
- True and relative vectors, graphic representation of target information and danger areas
- Use of operational warnings and system tests
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- attention to appropriate level of detail in recordkeeping
- ensuring currency of relevant legislative and regulatory knowledge.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where using bridge equipment may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that

impacts on work activities

- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate using bridge equipment
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Bridge equipment may include:

- ARPA
- Automatic identification systems
- Automatic pilot
- Azimuth mirrors and other bearing measurement devices
- Bridge alarm systems
- Chronometer

- Electronic chart display and information system (ECDIS)
- Echo sounder
- Differential satellite navigation systems
- Doppler and electro-magnetic speed logs
- Integrated navigation systems
- Loran C navigation systems
- Magnetic and gyro compasses including rate of turn gyro
- Navigation light systems
- Radar
- Satellite navigation systems
- Sextant
- Signalling devices
- Voyage data recorders

Misrepresentations may include:

- Compass errors
- False echoes
- Incorrect radar settings for heading marker and range marker
- Incorrect setting up of electronic chart system (ECS) or ECDIS
- Incorrect setting up of satellite navigation systems
- Satellite and differential satellite navigation system errors
- Sea and rain clutter returns

Navigational data may include:

- Navigation safety warning
- Recording of courses steered
- Weather and oceanographic reports

Unit Sector(s)

Not applicable.

Competency Field

Navigation

MARH6001A Forecast weather and oceanographic conditions to plan a safe passage

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMH907B Forecast weather and oceanographic conditions.

Unit Descriptor

This unit involves the skills and knowledge required to forecast weather and oceanographic conditions to plan a safe passage.

Application of the Unit

This unit applies to maritime workers working in the maritime industry as a Master Unlimited.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|--|-----|---|
| 1 Forecast area weather | 1.1 | Synoptic chart is interpreted |
| | 1.2 | Information received by weather fax is interpreted |
| | 1.3 | Weather reports are obtained and interpreted |
| | 1.4 | Observations of weather and cloud formations are made and interpreted |
| | 1.5 | Statistical data and observations are used to predict likely <i>weather conditions</i> for a determined period |
| 2 Use information to predict oceanographic conditions | 2.1 | Information on ocean current systems is interpreted |
| | 2.2 | Nautical publications on tides and currents are used to calculate tidal conditions |
| | 2.3 | Wave height and swell forecast is made using available information |
| | 2.4 | Potentially <i>dangerous oceanographic conditions</i> are identified and <i>appropriate action</i> is taken to maintain safety of navigation and to minimise risk to safety of vessel |
| 3 Maintain records of weather and oceanographic information and forecasts | 3.1 | Statistical data and observations are recorded and filed according to organisational procedures |
| | 3.2 | Actions taken to maintain safety of navigation and to minimise risk to safety of vessel as a result of weather and oceanographic forecasts, are documented according to organisational procedures |
| | 3.3 | Meteorological and nautical publications are updated and stored according to organisational procedures |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Calculate tidal conditions
- Observe, interpret and forecast weather and oceanographic conditions
- Read, interpret and apply weather and oceanographic information
- Select and use shipboard instruments to assist in forecasting weather and oceanographic conditions

- Use appropriate nautical publications on tides and currents
- Use tide tables to calculate height of tide

Required Knowledge:

- Air masses and fronts
- Basic principles for making meteorological and oceanographic measurements
- Characteristics of various weather systems including tropical revolving storms, and avoidance of storm centres and the dangerous quadrants
- Cloud classifications
- Cyclones, storms and gales
- Effects on navigation and vessel handling of wind, currents and bottom topography
- Heat exchange process
- Ocean currents
- Principles and procedures of weather forecasting using information obtained from observations, charts, satellite images, reports and instruments
- Pressure systems and cold fronts
- Procedures for filing and maintaining weather and oceanographic information
- Procedures to be followed during gale conditions and tropical revolving storms
- Sea state
- Sources of weather and oceanographic information, and methods for their interpretation
- Synoptic chart analysis
- Tide prediction
- Tropical revolving storms
- Typical problems in forecasting weather and oceanographic conditions
- Use of tide tables
- Vertical division of the atmosphere
- Weather data provided by shipboard instruments
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- supporting reasons for intended action with statistical data and observations of actual conditions
- ensuring currency of relevant reference material.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where forecasting weather and oceanographic conditions to plan a safe passage may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate forecasting weather and oceanographic conditions to plan a safe passage
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Weather conditions must include:

- Air masses and fronts
- Cloud classifications
- Cyclones, storms and gales
- Heat exchange process
- Ocean currents
- Pressure systems and cold fronts
- Sea state
- Synoptic chart analysis
- Tide prediction
- Tropical revolving storms
- Use of tide tables
- Vertical division of the atmosphere
- Weather data provided by shipboard instruments

Dangerous oceanographic conditions may include:

- Excessively high sea state and swells
- Ice formations
- Tornados, tropical revolving storms, hurricanes and gales

Appropriate action may include:

- Avoiding storm centres and dangerous quadrants by adjusting course and speed
- Ensuring all crew and passengers are informed
- Ensuring all vessel equipment is properly secured
- Securing cargo and stores
- Taking action to avoid extreme adverse weather conditions

Unit Sector(s)

Not applicable.

Competency Field

Navigation

MARH6002A Manage the navigation of a vessel 500 gross tonnage or more

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to manage the planning of a voyage and the navigation of a vessel of 500 gross tonnage or more.

Application of the Unit

This unit applies to maritime workers working in the maritime industry as a Master Unlimited.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 **Oversee** 1.1 Requirements of passage are established

- development of passage plan**
- 1.2 Reasons for planned route are supported by facts and statistical data obtained from relevant *sources and publications*
 - 1.3 Positions, courses, distances and time calculations are checked for correctness within accepted accuracy standards for navigational equipment
 - 1.4 All potential navigational hazards are accurately identified
- 2 Develop and implement watchkeeping arrangements and procedures**
- 2.1 *Watchkeeping arrangements* and procedures are developed according to principles bridge resource management, and organisational and regulatory requirements
 - 2.2 Principles of resource management are appropriately applied in establishing watchkeeping arrangements and procedures and in developing an effective bridge working system
 - 2.3 Communication strategies are developed to link watchkeeping procedures with all aspects of vessel operations
 - 2.4 Fatigue management strategies are developed according to organisational and regulatory requirements
 - 2.5 Corrective action procedures are developed and monitored
 - 2.6 Procedures for reporting, recording and responding to emergencies and non-compliance are established
- 3 Monitor bridge team in implementing passage plan**
- 3.1 Work schedule for bridge team is detailed according to bridge resource management principles
 - 3.2 Risk control measures are evaluated against passage plan
 - 3.3 Navigation requirements are communicated to bridge team
 - 3.4 Individuals are fully briefed and responsibilities coordinated
 - 3.5 Navigation tasks are carried out according to passage plan
 - 3.6 Ongoing checks and *position determination* are conducted according to organisational procedures
 - 3.7 *Non-routine problems* related to navigation of vessel are solved
 - 3.8 Navigational data is signed off according to organisational procedures
 - 3.9 Work schedule for bridge team is detailed according to bridge resource management principles
- 4 Interpret and**
- 4.1 Data from radar plotting sheet is interpreted and analysed to

- evaluate information from electronic navigational system** anticipate potential collisions
- 4.2 Data produced by other electronic navigational aids is interpreted and used to assist navigational command decisions, taking into account known limitations and errors associated with each type of aid
- 4.3 Information obtained through a single vessel or multiple vessel analysis of radar plots or other electronic navigational data is used to make command decisions on action needed to avoid collisions
- 4.4 Radar data is used to obtain position fix for vessel using electronic bearing lines and variable range markers
- 5 Navigate in complex situations**
- 5.1 Measurements and observations of sea and weather conditions are used to determine vessel speed and direction in *complex situations*
- 5.2 Information from bridge equipment is interpreted to identify navigational hazards and to fix vessel position
- 5.3 Alterations to vessel course or speed are made to meet prevailing circumstances and changing conditions
- 5.4 Navigational manoeuvres are conducted within safe operational limits of vessel
- 5.5 Details of passage are recorded in vessel log according to regulations
- 5.6 Variations to planned route are documented prior to archiving on completion of voyage
- 6 Manage emergencies**
- 6.1 Bridge team is taken charge of when called to bridge in response to an *emergency*
- 6.2 Safety management system procedures are implemented when taking over bridge watch from officer of the watch
- 6.3 Appropriate action is taken to initiate search and rescue procedures on receipt of distress signal
- 6.4 Advice is provided to watchkeeper regarding response to emergency situations
- 7 Maintain navigational equipment**
- 7.1 Navigational charts, nautical publications and related documentation are stored and maintained according to organisational procedures
- 7.2 Inventory of navigational charts, nautical publications and related documentation is established and kept according to organisational procedures
- 7.3 Navigational charts, nautical publications and related documentation

are ordered and updated from relevant sources to ensure available data needed for voyage planning is current

7.4 Performance checks and tests of navigation position fixing instruments and systems are carried out according to organisational procedures and manufacturer instructions

8 Prepare reports and documentation relevant to passage

8.1 Passage information is recorded and reported in required format, style, structure and timeframe

8.2 All information is recorded and reported according to legislative requirements

8.3 Technology is used to store and retrieve information

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Accurately identify all potential navigational hazards
- Choose the most appropriate primary method for fixing vessel position given the prevailing circumstances and conditions
- Conduct performance checks of navigation position fixing instruments and systems
- Correctly calculate positions, courses, distances and time within accepted accuracy standards for navigational equipment
- Determine and allow for errors of magnetic and gyro-compass
- Determine position in all conditions by celestial observations, terrestrial observations and using modern navigational aids within accepted accuracy levels
- Enumerate the equipment, charts and nautical publications required for the voyage and appropriate to the safe conduct of the voyage
- Establish and maintain watchkeeping arrangements in compliance with international regulations and guidelines so as to ensure the safety of navigation, protection of the marine environment and the safety of the vessel and persons on board
- Properly assess accuracy of fix
- Recognise faulty equipment and readings, and take appropriate action
- Recognise problems that may be experienced when planning and navigating a passage, and take appropriate action
- Report according to General Principles for Ship Reporting Systems and vessel traffic service (VTS) procedures
- Support reasons for planned route using facts and statistical data obtained from relevant sources and publications

- Undertake routeing according to the General Provisions on Ships' Routeing
- Use chart catalogues, charts, nautical publications and vessel particulars to plan and navigate a passage

Required Knowledge:

- AMSA Watchkeeping Standards Booklet (including the Manila Amendments)
- Content, application and intent of bridge resource management principles to be observed in keeping a navigational watch
- Content, application and intent of the International Regulations for Preventing Collisions at Sea, 1972, as amended
- General Principles for Ship Reporting Systems
- General Provisions on Ships' Routeing
- Method and frequency of checks for errors of magnetic and gyro-compasses to ensure accuracy of information
- Methods for fixing position of a vessel
- Modern electronic navigational aids, their operating principles, limitations, sources of error, detection of misrepresentation of information and methods of correction to obtain accurate position fixing
- Operation and care of the main types of gyro-compass
- Principles of magnetic and gyro-compasses
- Problems experienced when fixing vessel position and appropriate action and solutions
- Procedures for filing and maintaining navigational charts, nautical publications and related documentation in serviceable condition
- Procedures for swinging a vessel to determine deviation
- Relevant AMSA Marine Orders
- Requirements for effective passage planning including contingency planning
- Systems under control of the master gyro
- Voyage planning and navigation for all conditions by acceptable methods of plotting ocean tracks
- VTS procedures
- Vessel reporting systems and their use in planning and conducting a voyage
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the

performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- planning and navigating a voyage for all conditions including restricted waters, meteorological conditions, ice, restricted visibility, traffic separation schemes, VTS areas and areas of extensive tidal effects
- ensuring currency of relevant legislative and regulatory knowledge
- ensuring currency of relevant reference material.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where managing the navigation of a vessel of 500 gross tonnage or more may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing the navigation of a vessel of 500 gross tonnage
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Sources and publications may include:

- AMSA Marine Orders
- Annual and weekly Notices to Mariners
- Nautical almanac
- Navigational chart availability
- Radio signals, light lists, sailing directions, tide tables and chart catalogues
- Safety management system procedures
- Ship reporting systems and requirements
- Ship's routing information

Watchkeeping arrangements must include:

- Clear instruction to watchkeeping officers in the Standing Orders from the Master
- Establishing a proper lookout separate from the helmsman
- Fatigue management strategies
- Hours of work schedule established to ensure correct rest periods are maintained
- Watch hand over procedures

Position determination may include:

- Azimuth mirrors
- Chronometer
- Doppler and electronic logs
- Echo sounders
- ECS and ECDIS systems
- Integrated navigation systems
- Magnetic and gyro compasses and repeaters
- Paper navigational charts
- Radar and other electronic navigation devices

- Non-routine problems may include:
- Sextant
 - Equipment failure
 - Lack of appropriate resources
 - Potential collision and emergency situations
 - Weather conditions precluding the establishment of vessel position
- Complex situations must include:
- Adverse weather
 - Areas of extensive tidal effects
 - Ice
 - Restricted visibility
 - Restricted waters
 - Traffic separation schemes
 - VTS areas
 - When summonsed to the bridge by the duty officer
- Emergencies may include:
- Engine failure
 - Failure of navigational equipment
 - Potential close quarter situations

Unit Sector(s)

Not applicable.

Competency Field

Navigation

MARI2001A Comply with regulations to ensure safe operation of a vessel up to 12 metres

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to apply current commonwealth, state and territory Acts, legislation, codes of practice and other publications pertaining to the safe operation of a vessel up to 12 metres.

Application of the Unit

This unit applies to Coxswain Grade 1 and Coxswain Grade 2 working in the maritime industry on vessels up to 12 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Determine relevant rules and regulations impacting on work practices	1.1	International Regulations for Preventing Collisions at Sea are appreciated
	1.2	Responsibilities as the person in charge of a vessel are identified
	1.3	Relevant commonwealth, state, territory and local legislation governing the vessel and the passage are comprehended
2 Comply with industry and professional codes of practice	2.1	Relevant industry and professional codes of practice are sourced
	2.2	Commitment to comply with industry and professional codes of practice is demonstrated through own behaviour
3 Apply legislative and regulatory requirements to the operation of the vessel	3.1	<i>Regulatory requirements relating to operational aspects of the vessel</i> are recognised and appropriate procedures are developed
	3.2	Situations where rules must be applied in order to avoid collisions are recognised
	3.3	Safety requirements are implemented in accordance with legislative and regulatory requirements
	3.4	Compliance with all relevant rules and legislation is demonstrated while operating the vessel
4 Identify changes in laws and regulations and their implications for vessel operation	4.1	Changed legislation and regulations are accessed
	4.2	Changes in regulatory requirements are identified and applied
	4.3	Operational procedures are reviewed to reflect changes in legislation and regulations
5 Maintain statutory records	5.1	Copies of relevant <i>records</i> are maintained
	5.2	Evidence of current authorisation, training and relevant licences are maintained according to legislative and regulatory requirements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply regulations pertaining to the safe operation of a vessel
- Apply safety management plan standards and emergency operating procedures

- Conduct inductions for crew where applicable
- Identify the duties and responsibilities of the Master
- Obtain information from commonwealth, state and territory Acts, legislation, codes of practices and other publications relating to the safe navigation of a vessel

Required Knowledge:

- Assisting in distress
- Certificates on board a vessel
- Certificates to be carried on board
- Contents of marine notices, annual notices to mariners
- Distress signals
- Duties and responsibilities
- International Association of Lighthouse Authorities (IALA) Buoyage System A
- International Regulations for Preventing Collisions at Sea
- Large commercial traffic
- Lifesaving and firefighting appliances
- Lights, shapes and sounds
- Log book or vessel record book
- Marine pollution prevention
- National Standard for Commercial Vessels (NSCV) Part C Section 7
- Operational areas and classifications of vessels
- State and territory marine legislation
- Work health and safety (WHS)/occupational health and safety (OHS) legislation

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- ensuring behaviour reflects relevant current legislative and regulatory requirements
- ensuring currency of relevant legislative and regulatory knowledge

Context of and specific resources for assessment

- attention to appropriate level of detail in recordkeeping.

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where complying with regulations to ensure safe operation of vessels can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate applying current commonwealth, state, territory Acts, legislation, codes of practice and other publications relevant to the safe operation of a vessel.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Regulatory requirements relating to operational aspects of the vessel may include:

- Assisting in distress
- Certificates on board a vessel
- Distress signals
- Duties and responsibilities of the Master
- IALA Buoyage System
- International Regulations for Preventing Collisions at Sea
- Lifesaving and firefighting appliances
- Lights, shapes and sounds
- Log book or vessel record book
- Marine pollution prevention
- Marine Safety (Domestic Commercial Vessel) National Law, Regulations, Marine Orders and NSCV
- Operational areas and classifications of vessels
- Safety management systems or plans
- WHS/OHS legislation
- Applicable log books
- Environmental control
- Survey certificates

Records may include:

Unit Sector(s)

Not applicable.

Competency Field

Regulations and Port Operations

MARI3001A Observe regulations to ensure safe operation of a vessel up to 80 metres

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to apply current commonwealth, state and territory Acts, legislation, codes of practice and other publications pertaining to the safe operation of a vessel up to 80 metres.

Application of the Unit

This unit applies to a Master working in the maritime industry on vessels up to 80 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Interpret
 - 1.1 *Regulatory requirements for vessel operations and maintenance* are

relevant maritime rules and regulations impacting on vessel operations and personal responsibilities	followed
	1.2 Duties and responsibilities as the person in charge of a vessel are recognised
	1.3 Relevant commonwealth, state and territory or local legislation governing the vessel and the passage are identified
	1.4 Organisational procedures relating to the vessel's safety management system are identified
	1.5 Copies of relevant rules and regulations are stored in an accessible location on the vessel according to regulations
2 Ensure continuous validity of vessel certification	2.1 Certification expiry dates for the vessel, renewal requirements, periodic inspections or extensions are checked to ensure continuous validity
	2.2 Survey items and equipment are tested, checked and maintained according to certificate conditions
	2.3 Arrangements for renewals and surveys are completed in a timely manner and comply with issuing authority requirements
	2.4 Vessel's documents are completed and any effects of damage and alterations or additions to the vessel or operations are specified according to certification requirements and authority procedures
	2.5 Certificates and documentation are stored in a location on the vessel according to regulations
3 Apply legislative and regulatory requirements to vessel operations and maintenance	3.1 Regulatory requirements relating to operations and maintenance of the vessel are interpreted and applied as required
	3.2 Vessel procedures for monitoring operations and maintenance are implemented
	3.3 Training and instruction, including induction training, on procedures is instigated to ensure crew comply with regulations
	3.4 Failure to comply with procedures is identified and dealt with according to organisational procedures
	3.5 Tasks are monitored to ensure compliance with regulatory requirements
	3.6 Problems that may lead to potential non-compliance are promptly identified and rectified or reported according to organisational procedures

- 3.7 Compliance with all relevant legislative and regulatory requirements is demonstrated while operating the vessel
- 4 Maintain statutory records of compliance**
- 4.1 Regulatory requirements related to *records and reports* are interpreted
- 4.2 Records and reports are completed to comply with applicable regulations
- 4.3 Records and reports are distributed to the required maritime authority at appropriate times and places
- 4.4 Copies of records and reports are maintained according to regulatory requirements
- 4.5 Evidence of current authorisation, training and relevant licences are maintained according to legal and regulatory requirements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Identify and act according to the duties and responsibilities of the Master
- Identify and solve problems to do with the implementation of regulations relating to the operations, security and maintenance of a vessel up to 80 metres
- Interpret and apply regulations related to the operations, security and maintenance of a vessel up to 80 metres
- Maintain statutory records of compliance including log books
- Obtain information from commonwealth, state and territory Acts, legislation, codes of practice and other publications relating to the operations, security and maintenance of a vessel up to 80 metres
- Provide training, inductions and briefings to crew and passengers

Required Knowledge:

- Action that must be taken for non-compliance with applicable maritime regulations
- Applicable state and territory maritime regulations relating to the operation of vessels up to 80 metres
- Certificates to be carried on board
- Collision regulations relevant to a domestic Australian vessel up to 80 metres

- Content of publications and Marine Notices about:
 - navigational warnings (including firing practices)
 - precautions concerning submarine cables and pipelines
 - search and rescue
- Commonwealth legislation concerning safety of life at sea
- Commonwealth and state legislation reflecting the provisions of international conventions for the prevention of pollution from ships
- Importance of maintaining a log book or vessel record book
- Information relating to safe navigation in coastal waters
- International Association of Lighthouse Authorities (IALA) Buoyage System A
- Laws relating to lifesaving appliances; fire appliances; distress, urgency and safety signals
- Legal certification requirements for a vessel less than 80 metres
- Procedures for monitoring compliance with relevant maritime regulations
- Responsibilities for the prevention of pollution of the marine environment
- State and territory Acts, regulations, notices, determinations or other legislation about the operation of trading vessels for which the certificate will be valid
- Relevant aspects of a safety management system (ISM Code)
- Relevant work health and safety (WHS)/occupational health and safety (OHS) legislation
- Requirements for records and reports that must be made under applicable maritime regulations
- Risk management principles and application
- Uniform Shipping Laws (USL) Code, in particular Section 15, Emergency Procedures and Safety of Navigation and National Standard for Commercial Vessels (NSCV) Part C, Section 7

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- recognising navigation marks in the IALA Buoyage System
- providing the required amount of detail in reports
- attention to appropriate level of detail in recordkeeping.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where compliance with regulations to ensure safe operation of vessels up to 80 metres can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate applying current commonwealth, state and territory Acts, legislation, codes of practice and other publications relevant to the safe operation of a vessel up to 80 metres.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Regulatory requirements for vessel operations and maintenance must include:

- Assisting in distress
- Certificates on board a vessel
- Distress signals
- Duties and responsibilities of the Master
- IALA Buoyage System
- International Regulations for Preventing Collisions at Sea
- Lifesaving and firefighting appliances
- Lights, shapes and sounds
- Log book or vessel record book
- Marine pollution prevention
- Operational areas and classifications of vessels
- Radio log book and regulations
- WHS/OHS legislation
- Applicable log books
- Environmental control log books
- Survey certificates

Records and reports may include:

Unit Sector(s)

Not applicable.

Competency Field

Regulations and Port Operations

MARJ2001A Follow environmental work practices

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to be aware of environmental issues and to apply organisational policies and procedures to minimise environmental threats.

Application of the Unit

This unit applies to deck and engine workers working in the maritime industry on vessels up to 80 metres. They could be working independently or as part of a vessel crew.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|----------------------------------|--|
| 1 Implement environmental | 1.1 <i>Workplace practices and work instructions</i> relating to potential environmental impacts are implemented |
|----------------------------------|--|

- work practices**
- 1.2 **Relevant legislation, codes of practice and national standards** that impact on environmental work practices are recognised and followed
 - 1.3 Environmental **protection measures** are implemented
 - 1.4 Containment procedures are applied according to workplace procedures where appropriate
 - 1.5 Approved waste management procedures and practices are implemented
 - 1.6 Signs or symptoms of a **potential environmental threat** are recognised and reported to appropriate personnel/authorities
- 2 Contribute to improved environmental work practices**
- 2.1 Information is gathered and **suggestions** are made to appropriate personnel for improvements to work practices
 - 2.2 Environmental issues and their relationship to work practices are discussed with colleagues and appropriate personnel
 - 2.3 Contributions to the review of environmental work practices and policies are made within limits of own responsibility
- 3 Maintain environmental records**
- 3.1 Environmental records are accurately prepared according to workplace procedures
 - 3.2 Environmental records are stored securely

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Make suggestions for improved environmental work practices
- Prepare and keep environmental records
- Recognise procedures and follow instructions for environmental work practices
- Report environmental hazards and risks

Required Knowledge:

- Environmental and resource hazards and risks associated with the maritime industry
- Environmental laws, regulations and standards relevant to work in the maritime industry
- Procedures and processes that support environmentally sustainable principles

- Procedures for reporting environmental hazards and risks
- Relevant environmental sustainability principles
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- timely reporting of environmental hazards and risks
- attention to appropriate level of detail in reports and records
- awareness of limits of own personal responsibility.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where following environmental work practices may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess

practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate following environmental work practices
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Workplace practices and work instructions must include:

- Avoiding or minimising environmental risks
- Documented policies and procedures
- Emergency procedures
- Environmental data recording and reporting procedures
- Environmental hazard and risk identification
- Environmental management system
- Environmental monitoring
- Hazard and incident reporting and recording procedures
- Improving environmental performance
- Signs and labels
- Waste minimisation and segregation
- Work plans

Relevant legislation, codes of practice and national standards may include:

- Commonwealth, state and territory legislation
- International Convention for the Prevention of Pollution from Ships (MARPOL)
- Local government by-laws and regulations
- Third party standards such as the ISO1400 series and those of the Marine Stewardship Council

Protection measures may include:

- Controlling emissions of gas and smoke
- Managing waste
- Observing restricted fishing areas
- Preventing cargo spillage
- Preventing fuel and oil spillage
- Proper use of refrigerant gases
- Using appropriate signage

Potential environmental threats may include:

- Anchoring
- Garbage
- Harm to marine life
- Noise
- Poorly maintained equipment and machinery
- Sewage
- Waste and debris for example from oil and fuel containers

Suggestions may include:

- Improving energy efficiency
- Increasing the use of renewable, recyclable, re-usable and recoverable resources
- Maximising opportunities such as the use of solar or alternative forms of energy
- Preventing and minimising risks
- Reducing emissions of greenhouse gas

Unit Sector(s)

Not applicable.

Competency Field

Environment

MARJ3001A Monitor environmental management on a vessel

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to monitor the implementation of environmental management policies and procedures on a vessel up to 80 metres to ensure compliance with marine regulations and environmental considerations.

Application of the Unit

This unit applies to those working in the capacity of Master on a range of vessels up to 80 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|----------------------------------|-----|---|
| 1 Ensure crew are able to | 1.1 | Information on <i>environmental management policies and procedures</i> is accessible and communicated to crew |
|----------------------------------|-----|---|

- implement environmental work practices**
- 1.2 Information about identified *environmental hazards* and outcomes of risk assessments and risk control procedures are accessible and communicated to crew
 - 1.3 Crew are informed of environmental hazards and risk control measures relating to their work responsibilities
 - 1.4 Mentoring and coaching are provided to support individuals/crew to implement procedures to support environmental management
 - 1.5 Ensure *relevant principles* are implemented to meet environmental obligations and regulatory requirements
 - 1.6 Crew is consulted and environmental issues relevant to their work role are identified and promptly resolved or referred to appropriate personnel
- 2 Monitor observance of environmental management procedures**
- 2.1 Procedures for environmental management on the vessel are clearly defined and followed
 - 2.2 Deviations from environmental management procedures are identified and addressed
 - 2.3 Personal behaviour is monitored to ensure it is consistent with environmental management procedures
 - 2.4 *Housekeeping standards* on the vessel are maintained
 - 2.5 Breaches of environmental protection requirements are documented according to organisational procedures and regulatory requirements
- 3 Implement emergency procedures to respond to hazardous events**
- 3.1 Procedures for dealing with *hazardous events* are promptly implemented as required
 - 3.2 Hazardous events are investigated to identify cause
 - 3.3 *Control measures* to prevent recurrence and to minimise risks of hazardous events to the marine environment are implemented
 - 3.4 Emergency is reported in accordance with organisational procedures and regulatory requirements
- 4 Maintain and improve vessel environmental management**
- 4.1 Risk assessments are conducted and appropriate control measures are identified and implemented according to organisational procedures
 - 4.2 Appropriate records and log book entries are made to assist the review of managing environmental protection measures
 - 4.3 Potential hazards are identified, assessed and removed or reported

according to organisational procedures

- 4.4 Recommendations arising from risk assessments are implemented within level of responsibility
- 4.5 Inadequacies in control measures are identified and reported according to organisational procedures
- 4.6 Opportunities for improving environmental performance are identified and raised with appropriate personnel

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Communicate information about environmental management and related procedures to crew
- Ensure that appropriate and timely action is taken in response to emergencies
- Ensure environmental records and documentation are accurate, complete and timely, according to organisational and regulatory requirements
- Ensure that housekeeping standards are maintained
- Model work policies and procedures to support environmental management in own work
- Monitor responsible resource utilisation on the vessel, consistent with organisational policies
- Participate in consultation processes to improve environmental management in the organisation
- Participate in investigations of non-compliance and risk assessment processes
- Provide access to and maintain current environmental management information for the crew
- Respond to environmental hazard identification and hazardous incidents in an appropriate and timely manner
- Review practice and procedures to implement recommendations arising from risk assessments
- Support others to follow environmental management procedures

Required Knowledge:

- Documentation system and procedures
- Effects on marine environment of various possible pollution incidents
- Environmental hazards and control methods associated with work activities on a vessel
- Legal responsibilities as determined by relevant legislation, codes of practice, policies and procedures to protect the marine environment
- Operational characteristics of emission control equipment used on various types and sizes of

vessels

- Operational requirements of water, bilge, waste, pollution and recycling management processes used on various types and sizes of vessels
- Pollution control problems and related measures to protect the marine environment
- Principles of environmental management
- Principles of risk management
- Requirements for fishing, anchoring and other activities in environmentally sensitive areas
- Requirements under Australian and/or international legislation and conventions for reporting incidents related to breaches of the statutory codes and measures for the protection of the marine environment
- Responsibilities of self and employer to manage environmental issues
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- maintaining compliance with legislation for protection of the marine environment
- implementing preventative and remedial anti pollution procedures according to organisational and regulatory requirements
- identifying typical pollution control problems and taking appropriate action
- awareness of responsibilities for preventing pollution of the marine environment.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where monitoring environmental management on a vessel may be assessed
- tools, equipment and personal protective equipment

- currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate monitoring environmental management on a vessel
- direct observation of candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. **Bold italicised wording**, if used in the performance criteria, is detailed below.

Environmental management policies and procedures must include:

- **Ballast water control**
- **Bilge pumping**
- **Disposal of garbage**
- **Disposal of waste oil**

- Environmental hazards may include:
- Loss of cargo
 - Loss of vessel
 - Refuelling
 - Sewage control
 - Stowage and management of explosive and flammable material
 - Transfer of fuel
 - Anchoring
 - Harm to marine life
 - Noise
 - Oil pollution
 - Polluting emissions of gas and smoke
 - Spillages of cargo
 - Spillages of fuel
 - Waste pollution
- Relevant principles may include:
- Ballast water management
 - Preventing oil pollution
 - Sewage discharge
 - Stowage and management of explosive and flammable materials
 - Waste collection, treatment, recycling or disposal
- Housekeeping standards may include:
- Pollution control and equipment.
 - Waste minimisation and control
- Hazardous events may include:
- Anchoring in a prohibited sensitive area
 - Garbage discharge
 - Polluting emissions of gas and smoke
 - Poorly maintained equipment and machinery resulting in pollution
 - Sewage discharge
 - Spillages of cargo
 - Waste and debris spillage from oil and fuel containers
- Control measures may include:
- Cofferdams around fuel vents and manifolds
 - Oil spill absorbent material
 - Oil spill containment equipment
 - Oily water separators, if fitted
 - Sound operational procedures

Unit Sector(s)

Not applicable.

Competency Field

Environment

MARJ5001A Ensure compliance with environmental management legislation

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to coordinate environmental activities on a vessel to ensure compliance with relevant legislation, regulations, permits and/or licences.

Application of the Unit

This unit has application for a Watchkeeper Deck and Master < 500 GT.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--------------------------------|--|
| 1 Confirm environmental | 1.1 <i>Legislative and regulatory requirements, and approvals</i> that apply to the vessel are interpreted |
|--------------------------------|--|

- management responsibilities**
- 1.2 Own scope of authority/responsibility for achieving specific environmental outcomes for the vessel and the roles of other key personnel are clarified
 - 1.3 Resources available to implement environmental management policies for the vessel are identified
- 2 Develop a positive environmental reputation**
- 2.1 *Stakeholders*, their relationship to the vessel and perceived attitudes about the vessel are identified
 - 2.2 Appropriate strategies are used to foster the trust and confidence of stakeholders
 - 2.3 Requests for information are responded to in the appropriate format and a timely manner
 - 2.4 Difficult situations are identified and solutions are negotiated using a collaborative approach
 - 2.5 Regular feedback is obtained and used to enhance positive relations
- 3 Provide environmental management information and training**
- 3.1 Environmental management plans and recent incident reports are used to identify training needs of crew members
 - 3.2 *Information and training* is developed and provided to ensure all crew members understand their environmental obligations/responsibilities
 - 3.3 Crew member understanding of environmental obligations/responsibilities for work areas and activities is confirmed
 - 3.4 Effectiveness of the information and training is monitored and additional information/training is provided as required
- 4 Assess environmental impacts and risks**
- 4.1 Activities are reviewed to identify implications for environmental management
 - 4.2 *Potential risks and incidents* that may cause harm to the environment are identified
 - 4.3 Inspections and in situ measurements are conducted to quantify risks and impacts
 - 4.4 Assessment of risks and impacts is reported according to organisational procedures
- 5 Ensure environmental**
- 5.1 *Environmental monitoring instruments* are checked to ensure they are fully functioning

- | | | |
|---|-----|---|
| monitoring and management plans are implemented | 5.2 | Specified environmental monitoring and inspections are conducted to check performance against environmental management requirements |
| | 5.3 | Additional monitoring/inspections are conducted after atypical events or requests from authorities to assess whether environmental management plan is operating |
| | 5.4 | Results for monitoring/inspections are analysed to identify significant trends, non-conformance and/or incidents |
| 6 Respond to environmental non-conformance and incidents | 6.1 | Unusual situations, unexpected risks/hazards and potential/actual environmental incidents are recognised |
| | 6.2 | Organisational procedures for responding to environmental non-compliance and incidents are implemented to ensure prompt control and remediation |
| | 6.3 | Causes of non-compliance and incidents are investigated according to organisational procedures |
| | 6.4 | Findings are analysed to identify opportunities to improve work practices, environmental controls, crew training and/or management procedures |
| | 6.5 | Corrective/preventative actions are implemented to prevent recurrence of non-compliance and incidents, and to reduce risks |
| | 6.6 | Reports are completed according to organisational procedures |
| 7 Keep the Master informed about environmental performance | 7.1 | Regular reports about environmental performance are provided |
| | 7.2 | Opportunities and recommendations for improvements are reported |
| | 7.3 | Master's advice is sought when challenges are beyond own scope of technical competence or when input from environmental specialist may be required |
| 8 Maintain environmental records | 8.1 | Required records are prepared and maintained according to regulatory and organisational requirements |
| | 8.2 | Records are stored to enable easy access and review by authorised personnel according to regulatory and organisational requirements |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access, interpret and apply regulatory requirements
- Apply procedures for monitoring vessel operations and ensuring compliance with MARPOL requirements are fully observed
- Clearly explain environmental management concepts, principles and procedures to others
- Maintain accurate environmental records
- Maintain actions to ensure a positive environmental reputation
- Monitor the implementation of environmental management plans, policy and procedures, and specified work methods
- Regularly inspect vessel for environmental risks and impacts
- Respond to complaints and requests for information from authorities and authorised personnel

Required Knowledge:

- Ant-pollution procedures and all associated equipment
- Environmental legislative/regulatory requirements and responsibilities relevant to the vessel
- Environmental protection/management terminology, concepts and principles
- Importance of proactive measures to protect the marine environment
- Organisational environmental management plans, procedures, control measures and management actions for vessel
- Organisational procedures for:
 - identifying and assessing environmental risks and impacts
 - managing stakeholder relations
 - responding to complaints and other environmental incidents
 - record management and reporting
- Precautions to be taken to prevent pollution of the marine environment
- Vessel characteristics and environmental issues, risks and impacts
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment The evidence required to demonstrate competence in this unit

and evidence required to demonstrate competency in this unit

must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- ensuring currency of relevant WHS/OHS skills and knowledge
- ensuring currency of relevant legislative and regulatory knowledge
- attention to appropriate level of detail in recordkeeping.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where ensuring compliance with environmental management legislation may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate ensuring compliance with environmental management legislation
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Legislative and regulatory requirements, and approvals may include:

- Australian and international standards
- Commonwealth legislation and regulations
- Marine Orders
- MARPOL and IMO circulars
- State/territory legislation and regulations

Stakeholders may include:

- Cargo owners
- Government officials
- Port authorities

Information and training may include:

- Due diligence and duty to notify
- Environmental management actions and checklists, methods/procedures for specific activities
- Incident management and reporting
- Introduction to vessel, environmental considerations and sources of environmental information
- Legislative requirements
- Licensing/compliance requirements
- Organisational environmental management policy

Potential risks and incidents may include:

- Ballast water discharge
- Disposal of waste material including sewage and garbage
- Over-side maintenance work
- Spill or release of hazardous chemicals/materials

Environmental monitoring instruments may include:

- Emission control equipment
- Fuel management systems
- Oily water separators
- Waste storage monitoring equipment

Reports may include:

- Hazard near miss report form
- Monthly environmental report
- Non-conformance report form
- Regulatory agency reports
- Vessel incident investigation report

Records may include:

- Waste disposal log books
- Weekly environmental report
- Contractor and supplier information
- Correspondence
- Digital photographs
- Environmental monitoring data
- Records of training
- Records of monitoring equipment purchase, calibration, inspection, maintenance and service
- Records of environmental non-conformance, incidents or significant impacts
- Records required by permit, approval or licence conditions

Unit Sector(s)

Not applicable.

Competency Field

Environment

MARJ5002A Inspect and report defects and damage to vessel

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to inspect and report defects and damage to vessels.

Application of the Unit

This unit has application for a Watchkeeper Deck and Master < 500 GT.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 **Plan inspections**
 - 1.1 *Elements of the vessel structure* critical to the safety of the vessel are identified
 - 1.2 Location of *defects and damage* caused by *vessel operations and the*

- environment* are ascertained
- 1.3 *Parts of the vessel* to be inspected for defects and damage are identified
 - 1.4 Inspections are scheduled to ensure all parts are covered within a given time
 - 1.5 Damage control plan is developed to ensure the seaworthiness of the vessel
- 2 Check condition of vessel in normal and emergency situations**
- 2.1 Organisational procedures for *coverage* and frequency of tests and inspections on the vessel are complied with
 - 2.2 Watertight integrity is checked and appropriate action is taken to prepare for prevailing and forecast weather and sea conditions
 - 2.3 Degree to which vessel is secured is appropriate to prevailing and forecast conditions
 - 2.4 Defects and damage are reliably detected and appropriate action is taken to rectify the situation
 - 2.5 Irregularities beyond own ability to rectify are recognised in time to enable remedial action to be taken
- 3 Prepare reports**
- 3.1 *Reports* are completed and maintained as required according to regulatory and organisational requirements
 - 3.2 Relevant reports are sent to appropriate bodies and copies are filed according to regulatory and organisational requirements
 - 3.3 Documents are stored according to regulatory and organisational requirements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Adhere to procedures to distinguish between normal and defective or damaged parts of vessel
- Develop damage control plans
- Identify those elements of the vessel structure that are critical to vessel safety
- Inspect and report defects and damage to cargo spaces, hatch covers and ballast tanks

- Interpret and follow procedures for the coordination of planned maintenance processes
- Prepare appropriate reports on inspection and maintenance outcomes

Required Knowledge:

- Causes of corrosion to cargo spaces and ballast tanks, and how corrosion can be identified and prevented
- Construction, layout and subdivision of a vessel, including freeboard and bulkhead deck, watertight compartments, weather tight compartments, the bulkhead of the vessel and collision bulkhead
- Corrosion control measures
- Damage control measures that may be required to maintain the integrity of a hull in a range of typical emergency situations
- How to ensure reliable detection of defects and damages
- Parts of the vessel to be inspected each time in order to cover all parts within a given period
- Planned maintenance systems for vessel and associated maintenance inspection procedures
- Principal features of vessel structure
- Principal stresses that act on vessel structure
- Principles and procedures to ensure watertight integrity of vessel hull in both normal and emergency situations
- Procedures for checking and inspecting vessel seaworthiness
- Properties and application of materials used to construct vessels
- Purpose of the enhanced survey program
- Typical vessel construction features and stress characteristics
- Where to look for damage and defects most commonly encountered due to loading and unloading operations, corrosion, severe weather conditions
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required

this unit

Knowledge and include:

- developing effective planning documents
- being aware of own ability and limits to rectify irregularities and faults.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where inspecting and reporting defects and damage to a vessel may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate inspecting and reporting defects and damage to a vessel
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- | | |
|--|--|
| Elements of the vessel structure may include: | <ul style="list-style-type: none">• Ballast tanks• Bulkheads• Cargo holds• Cargo tanks• Frames• Fresh water tanks |
| Defects and damage may include: | <ul style="list-style-type: none">• Cargo operation damage• Damage to structures through heavy weather• Damage caused by corrosion• Defects to ballast water tank vents |
| Vessel operations and the environment may include: | <ul style="list-style-type: none">• Loading and unloading operations• Severe weather conditions |
| Parts of the vessel may include: | <ul style="list-style-type: none">• Cargo holds• Deck structures• Hatch covers• Machinery spaces• Ventilators and fire closing devices |
| Coverage may include: | <ul style="list-style-type: none">• Areas requiring inspection under the planned maintenance schedule and survey requirements |
| Reports may include: | <ul style="list-style-type: none">• Defects and damage reports to management• Inspection records• Maintenance reports• Survey reports |

Unit Sector(s)

Not applicable.

Competency Field

Environment

MARJ6001A Manage compliance with environmental management legislation

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMU107B Monitor compliance with legislative requirements and measures to ensure protection of the environment.

Unit Descriptor

This unit involves the skills and knowledge required to establish and implement an environmental management plan to ensure compliance with regulations and procedures for the protection of the marine environment as an integral part of vessel operations.

Application of the Unit

This unit applies to maritime workers working in the maritime industry as a Master Unlimited.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|--|
| 1 Develop vessel environmental management plan framework | <p>1.1 Relevant legislation and compliance documentation for the implementation and maintenance of the marine environment is accessed and interpreted</p> <p>1.2 Appropriate measures to prevent pollution of the marine environment are developed and documented in consultation with relevant personnel according to organisational policies and procedures</p> <p>1.3 Structures for the application of the environmental management plan are developed and documented in consultation with relevant personnel according to organisational policies and procedures</p> <p>1.4 Responsibilities for applying the environmental management plan are defined and documented in job descriptions and duty statements</p> <p>1.5 Strategies are established to encourage all crew members to meet high standards of environmental performance</p> |
| 2 Develop processes to support vessel environmental management plan | <p>2.1 Existing and potential environmental hazards and risks are identified from vessel inspection and record system</p> <p>2.2 Organisational criteria for assessing and treating risks are clarified</p> <p>2.3 Detailed procedures and practices for the application of the environmental management plan are developed and documented to minimise environmental impacts</p> |
| 3 Prepare and implement vessel environmental management plan | <p>3.1 Introduction of the environmental management plan is scheduled and documented</p> <p>3.2 Resources to support the introduction of the environmental management plan are made available</p> <p>3.3 Information on the environmental management plan is provided in a readily accessible form to all crew members</p> <p>3.4 Training is provided on the environmental management plan procedures and practices</p> <p>3.5 Support and encouragement is provided to those responsible for the implementation of the environmental management plan</p> |
| 4 Monitor environmental management processes | <p>4.1 Compliance with regulatory requirements and the environmental management plan is monitored</p> <p>4.2 Appropriate action is taken where non-compliance is identified</p> <p>4.3 Breaches of regulations and associated action taken are reported</p> |

according to regulatory and organisational requirements

- 4.4 Currency and validity of certificates and other documents required are checked and appropriate plans for their renewal and extension are developed and implemented

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply legislative and organisational requirements and procedures
- Develop procedures for monitoring operations that comply with legislative requirements
- Identify fully and promptly, potential non-compliance
- Interpret technical information, rules, procedures and regulations
- Plan for the renewal and extension of certificates to ensure continued validity of surveyed items and equipment

Required Knowledge:

- Environmental:
 - hazard identification processes
 - risk assessment processes
 - risk treatment processes
 - management reporting and recording procedures
 - management system documentation methods
- Hazards (sources of potential harm or situations with the potential to cause loss)
- International maritime law embodied in international agreements and conventions
- Methods and aids to prevent pollution of the marine environment by ships
- Relevant marine environmental issues
- Responsibilities under the International Convention for the Prevention of Pollution from Ships, as amended
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the

performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- ensuring currency of relevant legislative and regulatory knowledge
- developing effective planning documents.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where managing compliance with environmental management legislation may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing compliance with environmental management legislation
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be

combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Relevant legislation may include:

- Commonwealth, state and territory legislation
- International Convention for the Prevention of Pollution from Ships, as amended (MARPOL)
- International maritime law embodied in international agreements and conventions
- Third party standards such as the ISO1400 series and those of the Marine Stewardship Council

Compliance documentation may include:

- Australian standards
- Avoiding or minimising environmental risks
- Codes of practices
- Documented policies and procedures
- Emergency procedures
- Environmental:
 - data recording and reporting procedures
 - hazard and risk identification
 - management system
 - monitoring
- Hazard and incident reporting and recording procedures
- Improving environmental performance
- Legislative, organisational and vessel requirements and procedures
- Manufacturer guidelines and specifications
- Signs and labels
- Waste minimisation and segregation
- Work plans

Relevant personnel may include:

- Crew members
- Regulatory authorities
- Senior management
- Subject matter experts

Risks may include:

- Lack of proper waste, pollution and recycling processes
- Polluting emissions of gas and smoke
- Spillages of cargo
- Spillages of fuel and oil
- Spread and carriage of marine pests in ballast water

Procedures and practices may include:

- Allocation of responsibilities
- Certificate requirements
- Documentation and reporting requirements
- Emergency procedures
- Safe operating procedures
- Sampling, testing and inspection requirements
- Standard operating procedures
- Work instructions

Resources may include:

- Emission control equipment
- Finance
- People
- Pumps and valves
- Waste storage and recycling equipment
- Water management equipment, including cooling and ballast water and bilge systems

Unit Sector(s)

Not applicable.

Competency Field

Environment

MARK2001A Handle a vessel up to 12 metres

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to manoeuvre a vessel up to 12 metres in length. This includes the ability to berth, moor, anchor and manoeuvre a vessel during emergencies.

Application of the Unit

This unit applies to people working as Coxswain Grade 1 and Coxswain Grade 2 on a range of vessels up to 12 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|----------------------------------|-----|--|
| 1 Handle vessel in normal | 1.1 | <i>Features of vessel</i> that relate to its handling characteristics are recognised |
|----------------------------------|-----|--|

- conditions**
- 1.2 Details of *manoeuvres* are communicated to relevant personnel clearly and concisely using standard maritime vocabulary
 - 1.3 Situational awareness is maintained to ensure safety of manoeuvres
 - 1.4 Manoeuvres are completed to meet passage requirements
 - 1.5 *Propulsion equipment* is used and monitored to assist in completing manoeuvres safely
 - 1.6 Safe operating limits of propulsion and steering equipment are not exceeded
- 2 Handle vessel in adverse weather conditions**
- 2.1 Nature of *adverse weather conditions* is identified and the potential impact on the manoeuvrability of the vessel is determined
 - 2.2 *Appropriate action* is taken to ensure the safety of the vessel
 - 2.3 Propulsion equipment is used and monitored to assist in completing manoeuvres safely
 - 2.4 Safe operating limits of propulsion and steering equipment are not exceeded
 - 2.5 Situational awareness is maintained at all times to review actions and ensure the safety of the vessel
- 3 Handle vessel in emergencies**
- 3.1 *Nature of emergency* is established and required action is determined
 - 3.2 Risks to the vessel and the safety of persons on board are assessed and safety of required action is confirmed
 - 3.3 Details of action are communicated to relevant personnel clearly and concisely using standard maritime vocabulary
 - 3.4 Appropriate manoeuvres are made during the emergency to maintain the safety of the vessel and those on board, and any other vessels or persons involved
 - 3.5 Propulsion equipment is used and monitored to assist in completing manoeuvres safely
 - 3.6 Safe operating limits of propulsion and steering equipment are not exceeded
- 4 Tow and be towed**
- 4.1 *Preparations for towing* are made safely according to established nautical practice
 - 4.2 *Correct towing procedures* and precautions are applied when towing and being towed

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Anchor a vessel
- Handle a disabled or partially disabled vessel
- Manoeuvre a vessel crossing a bar
- Manoeuvre a vessel in:
 - bad weather
 - heavy swell and surf
 - vicinity of large vessels
- Manoeuvre a vessel through:
 - berthing and leaving a berth in various wind and tidal conditions
 - berthing in a pen
 - coming to and leaving a mooring
 - person overboard
 - steering astern through an 's' configuration
 - towing and being towed in varying weather conditions
 - turn short around
 - turning a vessel across the tide across the wind
- Manoeuvre to beach and refloat the vessel
- Maintain situational awareness
- Use appropriate communication

Required Knowledge:

- Avoidance of tropical revolving storm activity
- Effects of:
 - displacement and planing hulls
 - outboard and inboard propulsion units
 - rudders and propellers
- Features of a vessel that relate to its handling characteristics
- Manoeuvring characteristics of small power-driven vessels (heavily laden and lightly laden)
- Maritime publications and procedures relating to emergency response
- Procedures for towing and being towed

- Stability of a small vessel and stability terms
- Techniques for crossing a coastal bar with and against the sea
- Trim and displacement
- Use of a sea anchor
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- communicating effectively
- knowledge about how to handle small vessels in strong tidal streams, bad weather, heavy swell and surf, crossing a bar, and use of a sea anchor
- knowledge about towing arrangements for towage at sea and in sheltered waters
- knowledge about berthing and unberthing in various wind and tidal conditions.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- appropriate vessel up to 12 metres to demonstrate manoeuvring a vessel in normal and emergency situations
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures,

regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate handling a vessel up to 12 metres
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Features of vessel must include:

- Displacement and planing hulls
- Outboard and inboard propulsion units
- Rudders and propellers
- Stability
- Trim and displacement

Manoeuvres must include:

- Astern movements
- Berthing and leaving a berth
- Berthing in a pen
- Coming to and leaving mooring
- Retrieval of person overboard
- Turning a vessel across tide and wind
- Turning short around

Propulsion equipment must include:

- Inboard engine
- Outboard engine

- Adverse weather conditions must include:
- Fog and restricted visibility
 - Tropical revolving storm activity in the area
 - Wind and sea conditions that may affect the safety of the vessel
- Appropriate action must include:
- Altering course to minimise the effect of wind and sea
 - Deploying a sea anchor to keep vessel head to sea
 - Heading to wind and sea to ride out the adverse weather
 - Reduction of speed
 - Seeking shelter
- Nature of emergency must include:
- Beaching
 - Collision
 - Disabled or partially disabled vessel
 - Grounding
 - Person overboard
- Preparations for towing must include:
- Communication with towed vessel
 - Means of transferring towing line to the towed vessel
 - Preparation of towing lines appropriate for the tow
- Correct towing procedures must include:
- If the tow is manned, means of communication must be available
 - Methods of securing the tow line must be capable of being slipped
 - Towing lines and associated equipment must be of sufficient strength to ensure the tow can be safely conducted

Unit Sector(s)

Not applicable.

Competency Field

Manoeuvring Vessels

MARK3001A Manoeuvre a vessel up to 24 metres within near coastal waters

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMC807B Manoeuvre a vessel within the limits of responsibility of a Master 5.

Unit Descriptor

This unit involves the skills and knowledge required to manoeuvre a vessel of up to 24 metres in length within near coastal waters.

Application of the Unit

This unit applies to people working in maritime industry in the capacity of Master on a range of vessels up to 24 metres within near coastal waters. The limit of near coastal waters is the Exclusive Economic Zone (EEZ), which in Australia is 200 nautical miles.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|---|---|
| 1 Manoeuvre vessel in normal conditions | <ul style="list-style-type: none">1.1 <i>Features of vessel</i> that relate to its handling characteristics are recognised1.2 Details of <i>manoeuvres</i> are communicated to relevant personnel clearly and concisely using standard maritime vocabulary1.3 <i>Situational awareness</i> is maintained to ensure safe manoeuvres1.4 Manoeuvres are completed to meet passage requirements1.5 <i>Propulsion equipment</i> is used and monitored to assist in completing manoeuvres safely1.6 Appropriate alterations to vessel heading are made in response to operational environment1.7 Safe operating limits of propulsion and steering equipment are not exceeded |
| 2 Manoeuvre vessel in adverse weather conditions | <ul style="list-style-type: none">2.1 Nature of <i>adverse weather conditions</i> is identified and the potential impact on the manoeuvrability of the vessel is determined2.2 <i>Appropriate action</i> is taken to ensure the safety of vessel2.3 Propulsion equipment is used and monitored to assist in completing actions safely2.4 Heading is maintained within acceptable limits2.5 Appropriate allowance is made for effects of deadweight, draft, trim, speed and underwater keel clearances during turning circles and stopping distance2.6 Safe operating limits of propulsion and steering equipment are not exceeded2.7 Situational awareness is maintained at all times to review actions and ensure safety of vessel |
| 3 Manoeuvre vessel in emergencies | <ul style="list-style-type: none">3.1 <i>Nature of the emergency</i> is established and required action is determined3.2 Risks to the vessel and the safety of persons on board are assessed and safety of required action is confirmed3.3 Details of action are communicated to relevant personnel clearly and concisely using standard maritime vocabulary |

- 3.4 Appropriate manoeuvres are made during the emergency to maintain the safety of the vessel and those on board, and any other vessels or persons involved
 - 3.5 Propulsion equipment is used and monitored to assist in completing actions safely
 - 3.6 Safe operating limits of propulsion and steering equipment are not exceeded
- 4 Tow and be towed**
- 4.1 *Preparations for towing* are safely made according to established nautical practice
 - 4.2 *Correct towing procedures* and precautions are applied when towing and being towed

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Anchor
- Handle a disabled or partially disabled vessel
- Issue helm and engine orders
- Manoeuvre a vessel through:
 - berthing and leaving a berth in various wind and tidal conditions
 - berthing in a pen
 - coming to and leaving a mooring
 - person overboard
 - towing and being towed
 - turn short around
 - turning a vessel across the tide across the wind
- Manoeuvre a vessel to approach an anchorage
- Maintain situational awareness
- Manoeuvre to assist vessels in distress
- Use a sea anchor

Required Knowledge:

- Effects of displacement and planing hulls

- Effects of inboard propulsion units
- Effects of rudders and propellers
- Effects of interaction with passing or moored vessels
- Features of a vessel that relate to its handling characteristics
- Lessening drift and use of oil
- Launching boats or life rafts
- Manoeuvring characteristics of a vessel:
 - in heavy weather
 - in heavy swell and surf
 - crossing a bar
 - in a narrow channel or shallow water
- Manoeuvring a vessel astern
- Manoeuvring characteristics to beach and refloat the vessel
- Manoeuvring characteristics to assist a vessel or aircraft in search and rescue
- Means of keeping a vessel out of a trough
- Precautions in manoeuvring or launching boats or life rafts in bad weather
- Procedures for towing and being towed
- Techniques for crossing a coastal bar with and against the sea
- Trim and displacement
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- determining required action for a range of emergency situations
- knowledge of factors that could adversely affect vessel safety during operations.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- appropriate vessel up to 24 metres to demonstrate manoeuvring a vessel in normal and emergency situations
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate manoeuvring a vessel up to 24 metres in normal and emergency situations
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Features of vessel may include:	<ul style="list-style-type: none">• Displacement and planing hulls• Propulsion units• Rudders and propellers
Manoeuvres must include:	<ul style="list-style-type: none">• Astern movements• Berthing and leaving a berth• Berthing in a pen• Coming to and leaving mooring• Positioning vessel for helicopter evacuation• Positioning vessel to safely launch boats or life rafts in bad weather• Retrieval of person overboard• Turning a vessel across tide and wind• Turning short around• Williamson turn
Situational awareness may include:	<ul style="list-style-type: none">• Other vessels in the vicinity of the manoeuvre• Own vessel position in relation to shallow water and other obstructions• Weather conditions that may affect the manoeuvre
Propulsion equipment may include:	<ul style="list-style-type: none">• Inboard engine• Inboard/outboard engine• Jet propulsion engine• Outboard engine
Adverse weather conditions may include:	<ul style="list-style-type: none">• Fog and restricted visibility• Wind and sea conditions that may affect the safety of the vessel
Appropriate action may include:	<ul style="list-style-type: none">• Altering course to minimise the effect of wind and sea• Deploying a sea anchor to keep vessel head to sea• Heading to wind and sea to ride out the adverse weather• Reducing speed• Seeking shelter
Nature of the emergency may include:	<ul style="list-style-type: none">• Beaching• Collision• Damage to the vessel• Disabled or partially disabled vessel• Fire• Grounding• Injury or death• Loss of steering gear• Person overboard
Preparations for towing may include:	<ul style="list-style-type: none">• Crew briefings that include the task at hand and risks to persons on both vessels• Ensuring appropriate lights and shapes for the tow are

Correct towing procedures may include:

- available and in working order
- Ensuring means of communication between the two vessels is available
- Ensuring tow ropes are in good condition and of adequate strength for the proposed tow
- Making appropriate reports to authorities
- Preparing messenger ropes for passing tow lines
- Ensuring tow line is of sufficient length to minimise shockloading on tow-line
- Making tow fast to the towing vessel to ensure steerage can be maintained
- Making provision for rapid slipping of the tow in emergency situations

Unit Sector(s)

Not applicable.

Competency Field

Manoeuvring Vessels

MARK3002A Steer a vessel under direction of the Master

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMC1007C Steer a domestic vessel under the direction of the master or officer in charge of the watch.

Unit Descriptor

This unit involves the skills and knowledge required to steer a vessel under the direction of the Master, complying with helm orders.

Application of the Unit

This unit applies to an Integrated Rating.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Steer a steady 1.1 *Features of vessel* that relate to its handling characteristics are

- course within acceptable limits in normal conditions** recognised
- 1.2 *Navigational equipment* is used to steer a steady course
 - 1.3 Situational awareness is maintained to ensure safety of vessel
 - 1.4 *Propulsion equipment* is used and monitored to assist in steering a steady course within acceptable limits having regard to the area of navigation and prevailing state of sea
 - 1.5 Safe operating limits of propulsion and steering equipment are not exceeded
 - 1.6 Automatic pilot and hand steering are used to steer a steady course and course is altered smoothly and in a controlled way
 - 1.7 Helm orders are followed and effective communication is maintained with the Master on matters relevant to the safety and integrity of the vessel
- 2 Steer a vessel in adverse weather conditions**
- 2.1 Nature of *adverse weather conditions* is identified and potential impact on the manoeuvrability of the vessel is determined and confirmed with the Master
 - 2.2 Propulsion equipment is used and monitored to assist in steering a steady course within acceptable limits having regard to the area of navigation and prevailing state of sea
 - 2.3 Safe operating limits of propulsion and steering equipment are not exceeded
 - 2.4 Situational awareness is maintained at all times to review actions and ensure the safety of the vessel
 - 2.5 Automatic pilot and hand steering are used to steer a steady course and course is altered smoothly and in a controlled way
 - 2.6 Helm orders are followed and effective communication is maintained with the Master on matters relevant to the safety and integrity of the vessel
- 3 Steer a vessel in emergencies**
- 3.1 *Nature of the emergency* is established and required action is determined and confirmed with the Master
 - 3.2 Helm orders are followed and effective communication is maintained with the Master on matters relevant to the safety and integrity of the vessel
 - 3.3 Vessel is steered during the emergency to maintain the safety of the vessel and those on board and any other vessels or persons involved

- in the emergency
- 3.4 Propulsion equipment is used under the direction of the Master and is monitored to assist in completing steering safely
- 3.5 Safe operating limits of propulsion and steering equipment are not exceeded
- 4 Steer a vessel while towing and be towed**
- 4.1 Correct towing procedures and precautions are applied when towing and being towed in relation to helm orders
- 4.2 Helm orders are followed and effective communication is maintained with the Master on matters relevant to the safety and integrity of the vessel

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Change over from automatic pilot to hand steering and vice versa
- Maintain situational awareness
- Steer a vessel:
 - in bad weather
 - in heavy swell and surf
 - through coming to and leaving a mooring
 - through towing and being towed
 - in the vicinity of large vessels

Required Knowledge:

- Effects of:
 - displacement and planing hulls
 - outboard and inboard propulsion units
 - rudders and propellers
 - trim and displacement on the steering characteristics of a vessel
- Features of a vessel that relate to its handling characteristics
- Helm orders
- Steering characteristics
- Use of magnetic and gyro-compasses

- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- awareness of one's surroundings and changes to these surroundings
- ensuring behaviour reflects relevant current legislative and regulatory requirements.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- appropriate vessel to demonstrate steering a vessel in normal conditions, heavy weather and emergency situations
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are

appropriate to this unit:

- direct observation of the candidate steering a vessel under direction of the Master
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- | | |
|---|---|
| Features of vessel may include: | <ul style="list-style-type: none"> • Displacement and planing hulls • Outboard and inboard propulsion units • Rudders and propellers |
| Navigational equipment may include: | <ul style="list-style-type: none"> • Auto pilot • Gyro and magnetic compass • Manual steering arrangements • Off course alarms |
| Propulsion equipment may include: | <ul style="list-style-type: none"> • Inboard engine • Outboard engine |
| Adverse weather conditions may include: | <ul style="list-style-type: none"> • Fog and restricted visibility • Wind and sea conditions that may affect the safety of the vessel |
| Nature of the emergency may include: | <ul style="list-style-type: none"> • Beaching • Collision • Disabled or partially disabled vessel • Grounding • Person overboard |

Unit Sector(s)

Not applicable.

Competency Field

Manoeuvring Vessels

MARK4001A Manoeuvre a vessel up to 80 metres

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMC507B Manoeuvre a vessel within limits of responsibility of a Master 4.

Unit Descriptor

This unit involves the skills and knowledge required to manoeuvre a vessel up to 80 metres.

Application of the Unit

This unit applies to people working in the maritime industry in the capacity of Master on a range of vessels up to 80 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Manoeuvre 1.1 *Features of vessel* that relate to its handling characteristics are

- | | |
|---|---|
| vessel in normal conditions | <p>recognised</p> <p>1.2 Adequate resources are organised prior to and during operations</p> <p>1.3 Details of manoeuvres are communicated to relevant personnel clearly and concisely using standard maritime vocabulary</p> <p>1.4 Situational awareness is maintained to ensure safe manoeuvres</p> <p>1.5 <i>Manoeuvres</i> are completed in relevant conditions of tide and wind to meet passage requirements</p> <p>1.6 <i>Propulsion equipment</i> is used and monitored to assist in completing manoeuvres safely</p> <p>1.7 Appropriate alterations to vessel heading and power are made in response to operational environment</p> <p>1.8 Safe operating limits of propulsion and steering systems are not exceeded</p> |
| 2 Manoeuvre vessel in adverse weather conditions | <p>2.1 Nature of <i>adverse weather conditions</i> is identified and implications for vessel operations are evaluated</p> <p>2.2 Preparations are made and required precautions are taken to minimise risk and damage to vessel, personnel and time loss on passage</p> <p>2.3 Manoeuvres are adjusted to allow for weather and sea conditions, and to keep vessel in safe water</p> <p>2.4 Propulsion equipment is used and monitored to assist in completing actions safely</p> <p>2.5 Heading is maintained within acceptable limits</p> <p>2.6 Appropriate allowance is made for effects of deadweight, draft, trim, speed and underwater keel clearances during turning circles and stopping distance</p> <p>2.7 Safe operating limits of propulsion and steering equipment are not exceeded</p> <p>2.8 Situational awareness is maintained at all times to review actions and ensure safety of vessel</p> |
| 3 Manoeuvre vessel in emergencies | <p>3.1 <i>Nature of emergency</i> is established and required action is determined</p> <p>3.2 Risks to vessel and safety of persons on board is assessed and safety of required action is confirmed</p> |

- 3.3 Details of action are communicated to relevant personnel clearly and concisely using standard maritime vocabulary
 - 3.4 Appropriate manoeuvres are made during emergency to maintain safety of vessel and those on board, and any other vessels or persons involved
 - 3.5 Propulsion equipment is used and monitored to assist in completing actions safely
 - 3.6 Safe operating limits of propulsion and steering equipment are not exceeded
 - 3.7 Special handling techniques are correctly applied during launching of boats or life rafts and rescues of persons overboard
- 4 Tow and be towed**
- 4.1 *Preparations for towing* are safely made according to established nautical practice
 - 4.2 *Correct towing procedures* and precautions are applied when towing and being towed

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Anchor a vessel
- Handle a disabled or partially disabled vessel
- Issue helm and engine orders
- Manoeuvre a vessel in:
 - bad weather
 - in heavy swell and surf
 - crossing a bar
 - following and quartering seas
- Manoeuvre a vessel through:
 - berthing and leaving a berth and anchor work in various wind and tidal conditions
 - berthing and unberthing
 - coming to and leaving a mooring
 - person overboard
 - steering astern through an 's' configuration
 - towing and being towed

- turn short around
- turning a vessel across the tide across the wind
- Manoeuvre a vessel to embark or disembark a pilot
- Manoeuvre in shallow water
- Maintain situational awareness

Required Knowledge:

- Effects of displacement and planing hulls
- Effects of inboard propulsion units
- Effects of rudders and propellers
- Features of a vessel that relate to its handling characteristics
- Interaction with passing vessels , banks and shallow water
- Launching boats or life rafts
- Lessening drift and use of oil
- Manoeuvres assisting a vessel or aircraft in distress
- Manoeuvres to beach and refloat the vessel
- Manoeuvring characteristics
- Means of keeping a vessel out of a trough
- Methods of taking on board survivors from lifeboats and life rafts
- Precautions in manoeuvring or launching boats or life rafts in bad weather
- Procedures for towing and being towed
- Requirements for entering, departing and crossing a Traffic Separation Area
- Techniques for crossing a coastal bar with and against the sea
- Trim and displacement
- Use of a sea anchor
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required

this unit

Knowledge and include:

- manoeuvring a vessel in normal and emergency situations
- determining required action for a range of emergency situations
- knowledge of factors that could adversely affect vessel safety during operations.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- appropriate vessel up to 80 metres to demonstrate manoeuvring a vessel in normal and emergency situations
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate manoeuvring a vessel up to 80 metres
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being

performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Features of vessel may include:

- Displacement and planing hulls
- Propulsion units
- Rudders and propellers

Manoeuvres must include:

- Astern movements
- Berthing and leaving a berth
- Berthing in a pen
- Coming to and leaving mooring
- Positioning vessel to safely launch boats or life rafts in bad weather
- Retrieval of person overboard
- Turning short around
- Turning vessel across tide and wind

Propulsion equipment may include:

- Inboard engine
- Outboard engine
- Inboard/outboard engine
- Jet propulsion engine

Adverse weather conditions may include:

- Fog and restricted visibility
- Wind and sea conditions that may affect safety of vessel

Nature of emergencies may include:

- Beaching
- Collision
- Damage to vessel
- Disabled or partially disabled vessel
- Fire
- Grounding
- Loss of steering gear
- Person overboard

Preparations for towing may include:

- Ensuring appropriate lights and shapes for the tow are available and in working order
- Ensuring means of communication between the two vessels is available
- Ensuring tow ropes are in good condition and of adequate strength for proposed tow
- Making appropriate reports are to authorities

Correct towing procedures may include:

- Preparing messenger ropes for passing tow lines
- Ensuring tow line is of sufficient length
- Making provision for rapid slipping of tow in emergency situations
- Making tow fast to towing vessel to ensure steerage is maintained

Unit Sector(s)

Not applicable.

Competency Field

Manoeuvring Vessels

MARK5001A Perform basic vessel manoeuvres

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to perform basic manoeuvres on a vessel in normal operating conditions and in emergencies under the direction of the Master.

Application of the Unit

This unit applies to maritime workers working in the maritime industry as a Watchkeeper Deck; as a Master, Chief Mate or Watchkeeper Deck on ships of less than 500 gross tonnage (GT) in any operating area; or as Master or Chief Mate of vessels less than 3000 GT operating in near coastal waters.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Manoeuvre 1.1 Vessel heading is maintained within acceptable limits to meet the

- vessel in normal operations** requirements of the *operating situation*
- 1.2 Alterations of heading and power are smooth and controlled
 - 1.3 *Suitable mode of steering* is selected for the manoeuvre to meet the requirements of the operating situation
 - 1.4 Constant rate of turn techniques are used to achieve constant radius turns during manoeuvres
 - 1.5 Safe operating limits of vessel propulsion, steering and power systems are not exceeded in normal manoeuvres
 - 1.6 *Orders* of the Master are followed to assist in *anchoring and berthing operations*
- 2 Make adjustments to vessel course and speed to maintain safe navigation**
- 2.1 Effects of *operational environment* on vessel performance are evaluated at regular intervals
 - 2.2 Implications of the changed operational environment on vessel handling are assessed
 - 2.3 Appropriate *alterations* to vessel heading and power are made in response to the assessment of the operational environment
- 3 Manoeuvre vessel during adverse weather**
- 3.1 Impending *adverse weather conditions* are identified and implications for vessel operations are evaluated
 - 3.2 *Preparations* are made to minimise risk and damage to vessel and personnel
 - 3.3 Communications are made with engine room to ensure main engines are readied for manoeuvring
 - 3.4 Master is advised of developments in sea and weather conditions
 - 3.5 Vessel heading and power is maintained in response to adverse weather and sea conditions
- 4 Manoeuvre vessel in emergencies under Master's instructions**
- 4.1 *Nature of emergency* is established and initial action is taken
 - 4.2 Risk to the vessel and the safety of persons on board is assessed and Master is informed
 - 4.3 Appropriate manoeuvres under Master's instructions are made during the emergency to maintain the safety of the vessel
 - 4.4 Propulsion equipment is used and monitored to assist in completing actions safely

- 4.5 Safe operating limits of propulsion and steering equipment are not exceeded

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Handle a disabled or partially disabled vessel
- Implement anchoring and berthing procedures
- Issue helm and engine orders
- Maintain situational awareness
- Manoeuvre a vessel:
 - in bad weather
 - in heavy swell
 - through coming to and leaving a mooring
- Manoeuvre for the rescue of person overboard
- Manoeuvre in shallow water
- Recognise emergency situations

Required Knowledge:

- Effects of deadweight, draught, trim, speed and under-keel clearance on turning circles and stopping distances
- Effects of wind and current on vessel handling
- Effects on vessel handling of wind, currents and bottom topography
- Features of a vessel that relate to its handling characteristics
- Manoeuvring and engine characteristics for various vessels more than 500 gross tonnage
- Manoeuvring problems for vessels more than 500 gross tonnage and appropriate action and solutions
- Manoeuvring procedures in and near traffic separation schemes and vessel traffic service areas
- Methods for controlling vessel speed and direction
- Procedures for the rescue of person overboard
- Procedures for turning a vessel in various situations
- Proper procedures for anchoring and mooring
- Safe operating limits of propulsion and power systems, and steering equipment

- Squat, shallow-water and similar effects on vessel handling
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- following all orders carefully
- awareness of one's surroundings and changes to these surroundings.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where performing basic manoeuvres on an appropriate vessel or simulator may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are

appropriate to this unit:

- direct observation of the candidate performing basic manoeuvres on an appropriate vessel or simulator
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Operating situation must include:

- Headreach
- Requirements of the manoeuvre
- Safe water
- Stopping distances
- Tide
- Weather

Suitable mode of steering must include:

- Automatic pilot
- Emergency steering
- Manual steering

Orders may include:

- Communication with tugs and pilot vessel
- Communications with Vessel Traffic Services
- Engine
- Helm
- Internal communication with engine room and berthing stations

Anchoring and berthing operations may include:

- Manoeuvring in:
 - shallow waters
 - estuaries
 - rivers
 - restricted waters

Operational environment may include:

- Heavy traffic areas
- Ice
- Marine park areas
- Shallow and restricted waters
- Traffic separation zones

Alterations must include:

- Adjustment of speed to assist collision avoidance
- Allowance for current and wind
- Appropriate speed in reduced visibility
- Speed adjustment for heavy weather conditions

Adverse weather conditions may include:

- Fog and restricted visibility
- Wind and sea conditions that may impact on the safety of the vessel

Preparations may include:

- Advice to Master
- Allocation of extra lookouts
- Reduction in speed
- Resources to engage manual steering

Nature of emergency may include:

- Beaching
- Collision
- Damage to the vessel
- Disabled or partially disabled vessel
- Fire
- Grounding
- Loss of steering gear
- Person overboard

Unit Sector(s)

Not applicable.

Competency Field

Manoeuvring Vessels

MARK6001A Manoeuvre a vessel 500 gross tonnage or more

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to issue orders to manoeuvre and handle a vessel in all conditions based on the proper assessment of vessel manoeuvring and engine characteristics.

Application of the Unit

This unit applies to people working in the maritime industry as a Master Unlimited.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|---|-----|--|
| 1 Provide commands to bridge and | 1.1 | <i>Situational awareness</i> is maintained to determine progress of vessel |
| | 1.2 | Situation is assessed to determine <i>manoeuvres</i> required |

engine room to effect manoeuvres	1.3	Appropriate <i>orders</i> are issued to ensure vessel is manoeuvred safely in all conditions
2 Order adjustments to vessel course and speed to maintain safe navigation	2.1	Effects of the <i>operational environment</i> on vessel performance are evaluated at regular intervals
	2.2	Implications of the changed operational environment on vessel handling are assessed
	2.3	Appropriate <i>alterations</i> are made and orders are issued in response to assessment of the operational environment
3 Command vessel during emergencies	3.1	<i>Nature of emergency</i> is established and initial action is taken
	3.2	Risks to the vessel and the safety of persons on board are assessed
	3.3	Appropriate manoeuvres are made to maintain vessel safety
4 Work with pilot to ensure safe passage to berth or anchorage	4.1	Vessel is manoeuvred to ensure safe embarkation of pilot
	4.2	Pilot is provided access to <i>vessel resources</i>
	4.3	Pilot is provided with information on <i>vessel handling characteristics</i>
	4.4	Proposed berthing/anchoring plan is discussed with pilot
	4.5	Pilot activities are monitored to ensure safe operation of vessel according to agreed berthing/anchoring plan

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply constant-rate-of-turn techniques
- Berth and unberth under various conditions of wind, tide and current with and without tugs
- Clear fouled anchors
- Determine the manoeuvring and propulsion characteristics of common types of vessels, with special references to stopping distances and turning circles at various draughts and speeds
- Drag anchor
- Handle vessels in rivers, estuaries and restricted waters having due regard to the effects of current, wind and restricted water on helm response

- Issue helm and engine orders
- Manage and handle vessels in heavy weather including assisting a vessel or aircraft in distress, towing operations, keeping unmanageable vessel out of trough of the sea, lessening drift and using oil
- Manoeuvre in shallow water including the reduction in under-keel clearance caused by squat, rolling and pitching
- Use remote controls of propulsion plant and auxiliary machinery
- Use propulsion and manoeuvring systems

Required Knowledge:

- Anchoring with one or two anchors in limited anchorages and factors involved in determining the length of anchor cable to be used
- Choice of anchorage
- Clearing fouled anchors
- Effects of current, wind and restricted water on helm response
- Entering a dry-dock under normal conditions and with hull damage
- Features of a vessel that relate to its handling characteristics
- Importance of navigating at reduced speed to avoid damage caused by own vessel bow wave and stern wave
- Interaction between passing vessel and own vessel and nearby banks
- Manoeuvres when approaching pilot stations and embarking and disembarking pilots, with due regard to weather, tide, headreach and stopping distances
- Manoeuvres when towing or under tow
- Manoeuvring and propulsion characteristics of common types of vessels
- Means of keeping an unmanageable vessel out of trough of the sea, lessening drift and use of oil
- Methods of taking on board survivors from rescue boats or survival craft
- Practical measures to be taken when navigating in or near ice or in conditions of ice accumulated on board
- Precautions in manoeuvring to launch rescue boats or survival craft in bad weather
- Procedures for entering and leaving traffic separation zones
- Reduction in under-keel clearance caused by squat, rolling and pitching
- Use of, and manoeuvring in or near, traffic operation schemes and in vessel traffic service (VTS) areas
- Use of propulsion and manoeuvring systems
- Vessel and tug interaction
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- basing all decisions concerning berthing and anchoring on a proper assessment of vessel manoeuvring and engine characteristics and the forces to be expected while berthed alongside or lying at anchor
- while under way, making a full assessment of possible effects of shallow and restricted waters, ice, banks, tidal conditions, passing vessels and own vessel bow and stern wave so that the vessel can be safely manoeuvred under various conditions of loading and weather.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where manoeuvring a vessel of 500 gross tonnage or more may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate manoeuvring a vessel of 500 gross tonnage or more
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Situational awareness must include:
- Berthing and unberthing with tugs
 - Choice of anchorage
 - Dry-docking
 - Effects of current, wind and restricted waters on helm response
 - Headreach
 - In or near ice or ice accumulation on board
 - Interaction between passing vessels and between own vessel and nearby banks
 - Launching life boats or survival craft
 - Load conditions
 - Own vessel bow wave and stern wave
 - Pilot boarding grounds
 - Requirements of the manoeuvre
 - Rivers, estuaries and restricted waters
 - Safe water
 - Shallow water
 - Stopping distances and turning circles
 - Taking on board survivors from life boats or survival craft
 - Tide

Manoeuvres must include:

- Traffic operation schemes
- Vessel and tug interaction
- Vessel traffic service (VTS) areas
- Weather conditions
- Application of constant-rate-of-turn techniques
- Berthing and unberthing under various conditions of wind, tide and current with and without tugs
- Choice of anchorage: anchoring with one or two anchors in limited anchorages and factors involved in determining the length of anchor cable to be used
- Determining the manoeuvring and propulsion characteristics of common types of vessels, with special references to stopping distances and turning circles at various draughts and speeds
- Dragging anchor, clearing fouled anchors
- Dry-docking, both with and without damage
- Handling vessel in rivers, estuaries and restricted waters with due regard to the effects of current, wind and restricted water on helm response
- Importance of navigating at reduced speed to avoid damage caused by own vessel bow wave and stern wave
- Interaction between passing vessel and own vessel and nearby banks
- Managing and handling vessels in heavy weather including assisting a vessel or aircraft in distress; towing operations; means of keeping unmanageable vessel out of trough of the sea, lessening drift and use of oil
- Manoeuvres when approaching pilot stations and embarking and disembarking pilots with due regard to weather, tide, headreach and stopping distances
- Manoeuvring in shallow water including the reduction in under-keel clearance caused by squat, rolling and pitching
- Methods of taking on board survivors from rescue boats and survival craft
- Practical measures to be taken when navigating in or near ice or in conditions of ice accumulated on board
- Precautions in manoeuvring to launch rescue boats or survival craft in bad weather
- Turning a vessel on a reciprocal track to rescue a person overboard
- Using, and manoeuvring in or near, traffic operation schemes and in VTS areas
- Using propulsion and manoeuvring systems
- Vessel and tug interaction
- Communications with shore
- Embarking or disembarking a pilot

Orders may include:

- Operational environment may include:
- Engine
 - Helm
 - Preparation for being towed or towing another vessel
 - Preparation for taking tugs lines
 - Running mooring lines
 - Banks
 - Conditions of loading
 - Ice
 - Marine park areas
 - Own vessel bow and stern wave
 - Passing vessels
 - Shallow and restricted waters
 - Tidal conditions
 - Traffic separation zones
 - Weather
- Alterations may include:
- Alterations of course
 - Reduction in speed
- Nature of emergency may include:
- Beaching
 - Cargo shift
 - Collision
 - Damage to the vessel
 - Disabled or partially disabled vessel
 - Fire
 - Grounding
 - Loss of steering gear including rudder
 - Person overboard
- Vessel resources may include:
- Bow and stern thrusters
 - Communications equipment
 - Engine control systems
 - Helm and rate of turn indicators
 - Personnel
 - Propulsion systems
- Vessel handling characteristics may include:
- Effects of single or twin screw
 - Effects when moving astern
 - Rate of turn
 - Stopping ability
 - Use of controllable pitch propeller

Unit Sector(s)

Not applicable.

Competency Field

Manoeuvring Vessels

MARL4001A Carry out engineering calculations

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to carry out calculations related to fuel consumption, fuel storage and engine performance that conform to accepted engineering tolerances.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 1 on vessels up to 1500 kW.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|---|------------|--|
| 1 Calculate fuel consumption and | 1.1 | Information required for <i>calculations related to fuel consumption and storage</i> is obtained from relevant sources |
|---|------------|--|

- storage**
- 1.2 Calculations are completed to accepted working tolerances
 - 1.3 Results of calculations are verified
 - 1.4 Results of calculations are applied to managing fuel as required
- 2 Complete calculations related to engine performance**
- 2.1 Information required for *calculations related to engine performance* is obtained from relevant sources
 - 2.2 Calculations are performed to accepted working tolerances
 - 2.3 Results of calculations are verified
 - 2.4 Results of calculations are applied to managing engine performance as required

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Calculate:
 - area and circumference of a circle
 - consumption of fuel and lubricating oil for a particular voyage, using quantity in litres and mass in tonnes and specified regular shaped tanks
 - distances covered
 - hourly fuel consumption
 - mechanical advantage, load, effort moments
 - pumping capacities for tank filling and emptying
 - remaining steaming times
 - requirements for replenishing lubricating oil in oil tank
 - specific fuel consumption, power, speed and range
 - stress, strain and safe working load
 - tank capacities and pumping capacities for tank filling and emptying
 - theoretical steaming times
 - velocity ratio and efficiency of simple machines
 - volume and capacity of regular shaped tanks
- Convert:
 - fractions to decimals
 - units to multiples of base units
- Use calibration tables to measure quantities in tanks

- Use relative density/specific gravity to convert quantity in litres and volume

Required Knowledge:

- Area and circumference of a circle
- Calibration tables
- Common SI units such as kilogram, tonne, Newton, Newton metre, Pascal, joule, watt and metre
- Relationship between theoretical vessel speed, propeller pitch and RPM
- Terminology of:
 - simple levers
 - material technology
- Volumes of regular shaped tanks
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- accurately calculating voyage fuel requirements
- performing accurate and reliable calculations.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where carrying out engineering calculations can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the

workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate carrying out engineering calculations
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Calculations related to fuel consumption and storage must include:

- Calculations involving:
 - specific fuel consumption
 - volume and capacity of regular shaped tanks
 - pumping capacities for tank filling and emptying
 - consumption of fuel and lubricating oil
 - hourly fuel consumption
- Hourly fuel consumption
- Requirements for replenishing lubricating oil in oil tank

Calculations related to engine performance must include:

- Using calibration tables to measure quantities in tanks
- Using relative density/specific gravity to convert quantity in litres and volume to mass
- Calculations involving:
 - theoretical steaming times
 - distances covered
 - specific power, speed and range
 - theoretical steaming times
 - mechanical advantage, load, effort moments
 - stress, strain and safe working load
- Remaining steaming times

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL5001A Apply basic principles of marine electrotechnology

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to explain basic marine electrotechnology principles and to perform basic electrical calculations.

Application of the Unit

This unit applies to the work of Marine Engineering Watchkeepers on commercial vessels greater than 750 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Watchkeeper issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|-------------------------------|--|
| 1 Explain how material | 1.1 Terms and symbols used in the formula for resistivity are used correctly |
|-------------------------------|--|

- properties affect resistance of electrical conductors**
- 1.2 How resistance varies with changes in conductor length and cross sectional area is outlined
 - 1.3 How resistance varies with temperature is outlined
 - 1.4 Calculations are performed that illustrate how material properties affect resistance of electrical conductors
- 2 Apply Ohm's Law to electrical circuits**
- 2.1 Main sources of EMF are identified
 - 2.2 Terms and symbols used in Ohm's Law are used correctly
 - 2.3 Calculations are performed using Ohm's Law to solve problems involving internal, external and variable resistances in both series and parallel circuits
 - 2.4 Calculations are performed to determine power required and /or energy expended by electrical devices
 - 2.5 Circuits for a wheatstone bridge and a slide wire bridge are sketched and their application on a ship is outlined
 - 2.6 Calculations are performed dealing with resistances, currents and voltage drops in bridge circuits under null or balanced conditions
- 3 Apply principles of electrolytic action to electrical cells**
- 3.1 How the theory of electrolytic disassociation when applied to common electrolytic solutions and electrode materials explains the generation of EMF from chemical sources, is outlined
 - 3.2 Primary cells are distinguished from secondary cells
 - 3.3 Calculations are performed to solve problems involving currents, voltage drops and terminal potential difference of cells connected to form batteries in series and in parallel
 - 3.4 How capacity of a battery is measured is explained
 - 3.5 Construction of typical batteries used in marine environments is outlined
- 4 Apply principles of electromagnetism to EMF generation**
- 4.1 Form and properties of the magnetic fields surrounding single conductor and multi-turn solenoid coils when carrying an electrical current are compared and contrasted
 - 4.2 Terms and symbols used in Faraday's and Lenz's laws of electromagnetic induction are used correctly
 - 4.3 Calculations are performed using Faraday's and Lenz's laws of electromagnetic induction to solve problems related to

- electromagnetism and EMF generation
- 4.4 Fleming's Right Hand Rule is outlined
- 5 Explain operation of direct current rotating machinery**
- 5.1 Construction and methods of maintaining and repairing typical direct current (DC) machines are illustrated
- 5.2 Principle wiring arrangements used with DC machines are outlined
- 5.3 Action of the commutator in DC generators is outlined
- 5.4 Significance of Back EMF (E_b) in the operation of DC motors is outlined
- 5.5 Mathematical formula are applied to show relationships between *operational parameters of DC motors*
- 5.6 Calculations are performed to solve simple problems relating to power output and efficiency in DC motors
- 6 Explain operation of AC rotating machinery**
- 6.1 How three-phase AC may be developed out of simple single phase AC is explained
- 6.2 Difference between Star and Delta connections is outlined
- 6.3 How a three-phase supply can generate a rotating magnetic field is explained
- 6.4 Construction of an AC synchronous generator is outlined
- 6.5 Construction of an AC induction motor is outlined
- 6.6 Calculations are performed to show how driving torque is produced in an induction motor
- 7 Explain parallel operation and load sharing of generator**
- 7.1 Load/voltage curves of AC and DC generators are compared
- 7.2 Main requirements for satisfactory power sharing between both AC and DC generators are outlined
- 7.3 Sequences that occur when load changes on two DC generators working in parallel without an equaliser connection are outlined
- 7.4 Effect of varying power factors on the load/voltage curve of an AC generator is outlined

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain basic principles of marine electrotechnology
- Identify and apply relevant mathematical formulas and techniques to solve basic problems related to marine electrotechnology
- Identify and interpret numerical and graphical information, and perform mathematical calculations such as resistance of electrical conductors, power output and efficiency in DC motors, and driving torque in induction motors
- Identify, collate and process information required to perform basic calculations related to marine electrotechnology
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret written information needed to perform basic electrical calculations
- Use calculators to perform mathematical calculations

Required Knowledge:

- AC:
 - rotating machinery
 - principles
- Basic electrical circuits
- Batteries
- DC:
 - rotating machinery
 - motors
- Difference between AC and DC
- Electrical:
 - current
 - power
 - safety
 - units of measurement
- Electromagnetic:
 - induction
 - force
- Ohm's Law
- Parallel circuits

- Principles of:
 - electromagnetism
 - electrolytic action
- Resistance
- Series circuits
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- performing accurate and reliable calculations
- solving problems using appropriate laws and principles.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where basic principles of marine electrotechnology can be applied
- electrical diagrams, specifications and other information required for performing basic electrical calculations
- technical reference library with current publications on basic marine electrotechnology
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures,

regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate applying basic principles of marine electrotechnology
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Operational parameters of DC motors may include:

- current
- flux density
- torque
- voltage

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL5002A Apply basic principles of marine engineering thermodynamics

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to apply basic principles of marine engineering thermodynamics to perform calculations and to explain the operation of marine machinery, including engines, compressors, steam plants, refrigeration and air-conditioning units.

Application of the Unit

This unit applies to the work of Marine Engineering Watchkeepers on commercial vessels greater than 750 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Watchkeeper issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Explain common thermodynamic principles**
 - 1.1 Desired System International (SI) units applicable to thermodynamic calculations are developed
 - 1.2 Basic properties of fluids are outlined
 - 1.3 Gauge pressure is distinguished from absolute pressure
 - 1.4 Temperature is defined and temperature scales are outlined
 - 1.5 Calculations are performed by applying formulae for work, power and efficiency
- 2 Calculate properties of gas during expansion and compression**
 - 2.1 Calculations are performed by applying Boyle's, Charles's and combined gas law
 - 2.2 Gas equation is derived and applied to gas process calculations
 - 2.3 Specific heat of gases and the relationship between C_p , C_v , R and Γ is defined
 - 2.4 Heat transfer is calculated for constant pressure and constant volume processes
 - 2.5 Isothermal, adiabatic and polytropic processes are outlined and properties of gases after expansion and compression including the effects of turbocharging are calculated
 - 2.6 Work required to compress gases is illustrated and calculated
- 3 Explain methods of heat transfer**
 - 3.1 Different forms of heat transfer and their application to marine systems are explained
 - 3.2 Heat transfer through flat layers is calculated
 - 3.3 Purpose of insulation is explained
- 4 Explain enthalpy and apply to mixture calculations**
 - 4.1 Heat energy is defined
 - 4.2 Fundamental formula for heat energy transfer is developed
 - 4.3 Specific heat and its application are identified
 - 4.4 Enthalpy and change of phase are outlined
 - 4.5 Heat mixture problems involving water equivalent, ice, water and steam are solved
 - 4.6 Specific heat of materials are calculated

- 4.7 Latent heat and dryness fraction are identified
- 4.8 Steam tables are used to find values of enthalpy for water, saturated and superheated steam and dryness fraction
- 4.9 Temperature/enthalpy diagram is constructed from steam table data
- 5 Explain steam plants and calculate thermal efficiency**
 - 5.1 Basic steam plant cycles are sketched and function of each component is outlined
 - 5.2 Steam cycles on a temperature/enthalpy diagram are illustrated
 - 5.3 Effects of superheating and under cooling are clarified
 - 5.4 Calculations are performed for heat supplied, rejected, work and thermal efficiency of a steam plant
 - 5.5 Methods of improving cycle efficiency are outlined
- 6 Explain operation of internal combustion engine cycles**
 - 6.1 Operating principles of two stroke and four stroke internal combustion engines are outlined
 - 6.2 Differentiation is made, by use of a pressure/volume diagram, between Otto, Diesel and Dual combustion cycles
 - 6.3 Mean effective pressure is calculated from an indicator diagram
 - 6.4 Indicated power formula is developed and related calculations are solved
 - 6.5 Specific fuel consumption is defined and calculated
 - 6.6 Ideal cycle and air standard efficiency is defined
- 7 Explain operating cycle of reciprocating air compressors**
 - 7.1 Pressure/volume diagram is used to describe operating cycle of single stage reciprocating air compressors
 - 7.2 Mass of air delivered by single stage reciprocating air compressors is calculated
 - 7.3 Clearance volume and its effect on volumetric efficiency is outlined, and volumetric efficiency is calculated
 - 7.4 Work per cycle for isothermal and polytropic processes is calculated
- 8 Explain operating cycle of refrigeration and air conditioning**
 - 8.1 Principle of refrigeration is outlined
 - 8.2 Temperature/enthalpy and pressure/enthalpy diagrams are compared
 - 8.3 Refrigerants used in refrigeration and air conditioning machines are

plant	identified
	8.4 Refrigeration effect and plant capacity are defined
	8.5 Refrigeration tables are used to calculate refrigeration effect and condition of vapour after expansion
	8.6 Operating cycle of self-contained and centralised air conditioning systems are outlined and compared
	8.7 Relative humidity is defined and key features of a psychrometric chart are outlined
9 Apply linear, superficial and volumetric expansion equations to calculate expansion of liquids and metals	9.1 Expansion processes for metals is defined
	9.2 Coefficient of linear expansion is outlined
	9.3 Linear expansion is applied to calculate machinery clearances and to shrink fit allowances
	9.4 Superficial and volumetric expansion of solids is calculated
	9.5 Apparent expansion of liquids in tanks is calculated

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain basic principles of marine engineering thermodynamics
- Identify and apply relevant mathematical formulas and techniques to solve basic problems related to marine engineering thermodynamics
- Identify and interpret numerical and graphical information, and perform basic mathematical calculations related to marine engineering thermodynamics, such as gas expansion and contraction, heat transfer, thermal efficiency, and the expansion of liquids and solids
- Identify, collate and process information required to perform basic calculations related to marine engineering thermodynamics
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret written information needed to perform basic calculations related to marine engineering thermodynamics
- Use calculators to perform mathematical calculations

Required Knowledge:

- Enthalpy
- Expansion processes for metals (conduction, convection, radiation)
- Forms of heat transfer (conduction, convection, radiation)
- Gas laws
- Internal combustion engine cycles
- Methods of heat transfer
- Operating cycle of reciprocating air compressors
- Operating principles of two stroke and four stroke internal combustion engines
- Principles of refrigeration
- Properties of fluids (density, mass, pressure, specific volume, temperature)
- SI units
- Steam plants
- Thermodynamic principles
- Thermal efficiency calculations
- Work health and safety (WHS)/occupational health and safety OHS requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- performing accurate and reliable calculations
- solving problems using appropriate laws and principles.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where basic principles of marine engineering thermodynamics can be applied

- diagrams, specifications and other information required for performing basic calculations related to marine engineering thermodynamics
- technical reference library with current publications on basic marine thermodynamics
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate applying basic principles of marine engineering thermodynamics
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

Not applicable.

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL5003A Apply basic principles of marine mechanics

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to apply the basic principles of marine mechanics and to perform associated calculations needed to operate and maintain marine machinery.

Application of the Unit

This unit applies to the work of Marine Engineering Watchkeepers on commercial vessels greater than 750 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Watchkeeper issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Use vector 1.1 Meaning of force as a vector, moment of a force, resultant and

- diagrams to calculate the resultant and equilibrant of up to four coplanar forces**
- equilibrant are explained
 - 1.2 Forces using the triangle and polygon of forces are determined
 - 1.3 Moments and couples applied to beams and levers are explained
 - 1.4 Centroid of an area is calculated
 - 1.5 Centre of gravity of regular geometrical shapes is calculated
 - 1.6 Resultant and equilibrant of a system of concurrent coplanar-planer forces are calculated
- 2 Solve problems involving friction**
- 2.1 Nature of friction and the laws of dry sliding friction are explained
 - 2.2 Influence of lubrication on bearings and plain surfaces is outlined
 - 2.3 Coefficient of friction is derived
 - 2.4 Laws of friction are applied to movement in a horizontal plane and the force to overcome friction on horizontal surfaces
 - 2.5 Effect of lubricating two surfaces in contact with each other is outlined
- 3 Apply laws of motion**
- 3.1 Laws of motion are explained
 - 3.2 Velocity/time and acceleration/displacement graphs are sketched and adapted to derive the standard velocity formula for both linear and angular motion
 - 3.3 Formula and/or graphs are applied to solve problems of linear and angular velocity
 - 3.4 Linear motion is converted to angular motion and revolutions to radians
- 4 Solve problems in dynamics related to marine machinery**
- 4.1 Relationship between torque, work, energy and power in marine engines and compressors is explained
 - 4.2 Conservation of energy theorem is used to calculate energy and power during linear and angular motion
 - 4.3 Meaning of momentum is explained
 - 4.4 Calculations are performed associated with the collision of rigid bodies
 - 4.5 Centrifugal force is distinguished from centripetal force

	4.6	Centrifugal and centripetal force in relation to marine machinery is calculated
5 Determine efficiency of lifting and geared marine machinery	5.1	Velocity ratio, mechanical advantage and efficiency of <i>simple machines</i> is calculated
	5.2	Calculations are performed to solve problems related to the operation of simple machines
6 Calculate stress and strain due to axial loads	6.1	Normal stress is distinguished from strain
	6.2	Hooke's Law for stress and strain is explained
	6.3	Meaning of elastic limit, ultimate tensile strength, yield stress, limit of proportionality and factor of safety is explained
	6.4	Normal stress and strain caused by axial loads is calculated
7 Determine shear stress and strain in coupling bolts and simple bolted connections	7.1	Shear stress in simple bolted connections is determined
	7.2	Torque theory is applied to calculate shear stress in coupling bolts
8 Determine stresses in thin walled pressure vessels	8.1	Factor of safety and joint efficiency factor for pressure vessels is calculated
	8.2	Hoop and longitudinal stress in thin walled pressure vessels is calculated

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain basic principles of marine mechanics
- Identify and apply relevant mathematical formulas and techniques to solve basic problems related to marine mechanics
- Identify and interpret numerical and graphical information, and perform mathematical calculations to determine resultant and equilibrant of coplanar forces, linear and angular velocity, and hoop and longitudinal stress in thin walled pressure vessels

- Identify, collate and process information required to perform basic calculations related to marine mechanics
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret written information needed to perform basic calculations in marine mechanics
- Use calculators to perform mathematical calculations

Required Knowledge:

- Centre of gravity
- Conservation of energy theorem
- Factor of safety
- Force
- Joint efficiency factor
- Laws of motion
- Momentum
- Nature and laws of friction
- Pressure vessels
- Stress and strain
- Thin cylinder theory
- Types and uses of simple machines
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

- The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:
 - performing accurate and reliable calculations
 - solving problems using appropriate laws and principles.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where basic principles of marine mechanics can be applied
- diagrams, specifications and other information required for performing basic calculations related to marine mechanics
- technical reference library with current publications on basic marine mechanics
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate applying basic principles of marine mechanics
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Simple machines may include:

- Hydraulic jack
- Pulley blocks
- Reduction gears
- Screw jack
- Single and double purchase crab winches
- Warwick screw
- Wheel and axle
- Worm driven chain blocks

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL5004A Apply basic principles of naval architecture

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to perform basic calculations related to the seaworthiness of commercial vessels, including those dealing with watertight integrity and vessel stability.

Application of the Unit

This unit applies to the work of Marine Engineering Watchkeepers on commercial vessels greater than 750 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Watchkeeper issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Calculate 1.1 Basic principle structural members of ship and proper names of

- shipboard areas and volumes** various parts are detailed
- 1.2 Simpson's Rules are applied to calculate *shipboard areas*
- 1.3 Simpson's Rules are applied to calculate *shipboard volumes*
- 2 Calculate vessel displacement** 2.1 Tonnes per centimetre (TPC) values and Simpson's Rules are applied to calculate vessel displacement
- 2.2 Calculations are performed using TPC values and Simpson's Rules to solve *problems related to vessel displacement*
- 3 Calculate ship dimensions** 3.1 Ship form dimensions are calculated using *coefficients for areas*
- 3.2 Ship form *coefficients for underwater volumes* are calculated
- 3.3 Influence of common hull modifications on hull form coefficients is explained
- 3.4 Calculations are performed to solve problems of ship form coefficients following change to vessel length resulting from mid body insertion or removal
- 4 Explain position of centre of gravity of vessel in relation to its keel and midships** 4.1 *Centre of gravity* calculations for a vessel are performed
- 4.2 How centre of gravity changes with redistribution, addition and/or removal of *mass* is explained
- 4.3 How addition, removal or transfer of mass may cause overturning moments is identified
- 4.4 Problems are solved involving addition, removal and vertical movement of mass by performing centre of gravity calculations for typical vessel loaded conditions
- 4.5 Calculations are performed using results from inclining experiments to obtain initial stability characteristics
- 5 Explain effects of water density and flooding of mid-length compartment on vessel draft** 5.1 Relationship between changes in underwater volume and changes in water density is outlined
- 5.2 Fresh water allowance of a vessel is determined
- 5.3 Change in mean draft for vessel movement between waters of different densities is calculated
- 5.4 Volume lost-volume gained relationship for flooded compartments is explained
- 5.5 Calculations are performed to solve problems of mid-length

		compartment flooding in simple box-shaped hull forms
	5.6	Fundamental actions to be taken in the event of partial loss of intact buoyancy are identified
6 Perform calculations related to propellers and vessel speed	6.1	Relationship between propellers and vessel speed is explained
	6.2	Problems related to vessel speed and propellers are solved by calculating theoretical, apparent and true speeds, apparent and true slips, wake speed and Taylor wake fraction
	6.3	Impact of fouling on vessel hull and propeller is outlined
7 Calculate voyage and daily fuel consumptions	7.1	Fuel consumption is determined by applying admiralty coefficient for fuel consumption taking account of ship speed, shaft power and displacement
	7.2	Calculations are performed to solve problems of vessel fuel consumption taking account of ship speed, shaft power and displacement
	7.3	Impact of fouling on vessel fuel consumption is explained
8 Calculate pressures and loads on surfaces due to hydrostatics	8.1	Standard formula for hydrostatic pressure is defined
	8.2	Hydrostatic load on vertical and horizontal surfaces is calculated
	8.3	Method of calculating loads on typical tank structures for different <i>filling rates</i> is explained

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain basic principles of naval architecture
- Identify and apply relevant mathematical formulas and techniques to solve basic problems related to speed, fuel consumption and stability of commercial vessels
- Identify and interpret numerical and graphical information, and perform mathematical calculations related to shipboard areas and volumes, vessel displacement, ship dimensions, centre of gravity, vessel speed, fuel consumption and hydrostatic pressure
- Identify, collate and process information required to perform calculations related to speed, fuel consumption and stability of commercial vessels

- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret written information needed to perform calculations related to the seaworthiness of commercial vessels
- Use calculators to perform mathematical calculations

Required Knowledge:

- Basic structural members of a ship and the proper names of the various parts
- Buoyancy
- Centre of gravity:
 - KG, VCG and LCG
 - calculations
- Density correction formula
- Fuel consumption calculations
- Hydrostatic pressure
- Principle of displacement
- Ship:
 - stability
 - stability calculations
 - measurements
 - displacement
- Shipboard:
 - areas
 - volumes
- Simpson's Rules
- TPC immersion
- Trim and stress tables, diagrams and stress calculating equipment
- Vessel speed calculations
- Watertight integrity
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- performing accurate and reliable calculations
- solving problems using appropriate laws and principles.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where basic principles of naval architecture can be applied
- vessel diagrams and specifications and other information required for mathematical calculations related to shipboard areas and volumes, vessel displacement, ship dimensions, centre of gravity, vessel speed, fuel consumption and hydrostatic pressure
- technical reference library with current publications on basic naval architecture
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate applying where basic principles of naval architecture
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for

Holistic assessment with other units relevant to the industry

assessment

sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Shipboard areas may include:

- Bulkheads
- Elemental areas
- Water planes

Shipboard volumes may include:

- Transverse sectional areas
- Water plane areas

Problems related to vessel displacement may include:

- Addition of mass
- Removal of mass

Coefficients for areas may include:

- Midships (CM)
- Waterplane (CW)

Coefficients for underwater volumes may include:

- Block (Cb)
- Prismatic (Cp)

Centre of gravity may include:

- Centre of gravity [KG]
- Longitudinal centre of gravity [LCG]
- Vertical centre of gravity [VCG]

Mass may include:

- Ballast
- Cargo
- Fuel
- Passengers

Filling rates may include:

- Accidental flooding
- Tank testing

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL5005A Demonstrate basic knowledge of marine auxiliary boilers

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the knowledge required to operate and maintain marine auxiliary boilers on a commercial vessel.

Application of the Unit

This unit applies to the work of Marine Engineering Watchkeepers on commercial vessels greater than 750 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Watchkeeper issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|---|-----|--|
| 1 Distinguish between different types of auxiliary boilers | 1.1 | Design and use of water tube and fire tube auxiliary boilers are compared and contrasted |
| | 1.2 | Movement of water and gas in an operating boiler is sketched |
| | 1.3 | How variations to operating pressure and saturation temperature in an auxiliary boiler can be used to get wet, dry or superheated steam is explained |
| 2 Recognise different functions of steam and different components of steam systems | 2.1 | Key features of steam and other heating systems are compared and contrasted |
| | 2.2 | Steam side requirements of an auxiliary steam turbo alternator are compared and contrasted with other steam-powered machinery |
| | 2.3 | Typical steam and condensate system is outlined |
| 3 Explain fuel oil system of auxiliary boilers | 3.1 | Combustion process is explained and factors that affect combustion in a boiler are outlined |
| | 3.2 | Differentiation is made between different burner types |
| | 3.3 | Operation of a complete fuel oil system for an auxiliary boiler including the functions of components for automatic combustion control is outlined |
| 4 Explain procedure for operating fired and unfired boilers | 4.1 | Locations of all <i>mountings and fittings on auxiliary boilers</i> are identified and their functions are outlined |
| | 4.2 | Purpose of all alarms and shut downs incorporated in auxiliary boilers is clarified |
| | 4.3 | Types and operation of safety valves are outlined |
| | 4.4 | Procedure for lighting off a boiler from cold is clarified |
| | 4.5 | Procedure for laying up for short and long periods including full blow down and shut down procedures is clarified |
| | 4.6 | Procedure for isolating an auxiliary boiler after shut down is clarified |
| 5 Explain procedure for sampling and testing boiler water | 5.1 | Effects of poor water treatment practices on safety and boiler function are identified |
| | 5.2 | Correct procedure for taking boiler and feed water sample and possible errors that might occur are clarified |
| | 5.3 | Common water tests carried out are outlined and typical results are |

- stated
- 5.4 Chemicals used for treatment of boiler water are named and acceptable range of chemical reserves found in boiler waters are confirmed
- 6 Explain procedure for maintaining water level in the boiler**
- 6.1 Method of testing and changing a gauge glass is outlined
- 6.2 Effects of blockages in water, steam and drain cocks on levels in gauge glass are outlined
- 6.3 Procedure for when a gauge glass apparently shows no water is clarified
- 7 Explain common hazards and defects and relevant prevention/control procedures**
- 7.1 *Hazards and defects* associated with auxiliary boilers are identified
- 7.2 How water hammer can be prevented in auxiliary boilers is outlined
- 7.3 Symptoms, causes, effects and actions to be taken in the event of oil contamination of boiler water are determined
- 7.4 Difference between and measures taken to avoid, fire and water side explosions, are clarified
- 7.5 Causes, mechanism, prevention and control of economiser fires are detailed

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access information related to marine auxiliary boilers
- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain basic operation of marine auxiliary boilers
- Identify and apply relevant solutions for addressing problems associated with marine auxiliary boilers
- Identify and interpret diagnostic information and perform mathematical calculations related to operating, maintaining and repairing marine auxiliary boilers
- Identify methods, procedures and materials needed for operating, maintaining and repairing marine auxiliary boilers
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret manuals, technical specifications, safety data sheets/material safety

data sheets and manufacturer guides related to operating, maintaining and repairing marine auxiliary boilers

Required Knowledge:

- Basic principles of operation of boilers and steam systems
- Combustion in boilers and related safety procedures, including importance of purging a boiler and other safety precautions taken when firing a boiler
- Common boiler defects and repair procedures
- Fuel oil system for an auxiliary boiler
- Fittings mounted on boilers
- Hazards associated with running boiler plant
- Operating principles relating to steam generation in fired and unfired boilers
- Principles of boiler operation in normal and emergency situations
- Procedures for maintaining water level in boilers
- Purpose of alarms and shut downs in marine boilers
- Treatment, sampling and testing of boiler water
- Types of auxiliary boilers and typical operating pressures and temperatures
- Typical feed systems for marine boilers
- Work health and safety (WHS)/occupational health and safety (OHS) legislation, policies and procedures

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- providing accurate and reliable information
- providing appropriate level of detail in responses.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where basic knowledge of marine auxiliary boilers can be

demonstrated

- diagrams, specifications and other information required for performing basic calculations related to marine auxiliary boilers
- technical reference library with current publications on basic marine auxiliary boilers
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating basic knowledge of marine auxiliary boilers
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work

environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Mountings and fittings on auxiliary boilers may include:

- Air release cock
- Auxiliary steam stop valve
- Blow down valve
- Feed check or control valve
- Main steam stop valve
- Pressure gauge connection
- Safety valves
- Sampling connection
- Scum valve
- Water level gauge
- Whistle stop valve

Hazards and defects may include:

- Chemical hazards
- Enclosed space
- Illumination of work area
- Machine guarding
- Manual handling
- Materials
- Rubbish and combustible
- Steam and fuel leaks
- Thermal hazards
- Trips

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL5006A Demonstrate basic knowledge of marine auxiliary machinery and equipment

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to operate and maintain auxiliary machinery and associated systems on board a commercial vessel.

Application of the Unit

This unit applies to the work of Marine Engineering Watchkeepers on commercial vessels greater than 750 kW forms part of the requirements for the Certificate of Competency Marine Engineer Watchkeeper issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Outline layout of engine room and functions of auxiliary machinery in engine room**
 - 1.1 Layout of a typical engine room is outlined
 - 1.2 *Types and functions of auxiliary machinery* found in an engine room are explained
 - 1.3 Location, function and operation of all safety devices found on main and auxiliary machinery and within engine room, including shut downs and engine room escape routes is outlined
 - 1.4 Common operating pressures and temperatures of fluids within engine room are identified and how to respond to abnormal parameters is clarified

- 2 Explain duties and responsibilities of a watchkeeper engineer during a watch**
 - 2.1 Duties and responsibilities of a watchkeeper engineer with respect to safety of personnel and vessel, during and taking over the watch are clarified
 - 2.2 Importance of ensuring all events related to machinery are recorded in the log is explained
 - 2.3 Duties and responsibilities of a watchkeeper engineer in prevention and extinction of fire in machinery spaces are clarified
 - 2.4 Duties and responsibilities of a watchkeeper engineer in relation to prevention of flooding and avoidance of pollution are clarified
 - 2.5 Routine duties and responsibilities of a watchkeeper engineer with respect to safe operation of propulsion and auxiliary machinery are clarified
 - 2.6 Duties and responsibilities of a watchkeeper engineer on a unmanned machinery space (UMS) vessel are clarified
 - 2.7 Procedure for familiarising oneself on joining a new vessel is clarified

- 3 Recognise key features, applications and treatment of fuels, lubricants and chemicals**
 - 3.1 Types, properties, applications and treatments of various fuels used on board vessels are outlined

- used on board vessels
 - 3.2 Procedures to be followed before and during fuel bunkering are clarified
 - 3.3 Types, properties, applications and treatments of various lubricants used on board vessels are outlined
 - 3.4 Uses and safe handling methods for various *types of chemicals* used on board vessels are outlined
 - 3.5 Fuel system layout including fuel treatment method is detailed
 - 3.6 Working principle, construction and safe operation of purifiers and clarifiers is explained
- 4 Explain operation and maintenance of typical pumping systems used on board vessels
 - 4.1 Basic working principles, components and properties of different *types of pumps* are outlined
 - 4.2 *Types of heat exchanges*, their basic working principles and applications are outlined
 - 4.3 Correct operation and maintenance of pumps and heat exchangers is detailed
 - 4.4 *Key features of bilge, cargo and ballast pumping systems* are outlined
 - 4.5 Types, operating principles and requirements for oily-water separators or similar equipment are outlined
 - 4.6 Other approved methods of disposing of oily water are identified
 - 4.7 Procedure for completing oil record book is clarified
- 5 Explain operation and maintenance of marine air compressors
 - 5.1 Types, characteristics, components and applications of various *compressors* used on board vessels are compared and contrasted
 - 5.2 Correct pre-operational checks, starting procedure, safe operation and basic maintenance required for air compressors are detailed

- 5.3 Potential safety hazards associated with compressed air are identified
 - 5.4 Locations of all mountings, safety devices, alarms and shut downs on compressors, air receivers and compressed air systems are identified and their functions are outlined
 - 5.5 Different requirements and production methods for control air, method of production and special requirements for a breathing apparatus compressor are clarified
- 6 Explain different types, safe operation and testing of steering gear commonly used on board vessels**
- 6.1 Essential statutory regulations covering operation of steering gear are established
 - 6.2 Operation of different *types of steering gear* used on board vessels is clarified
 - 6.3 Working principle of variable delivery pumps used in *steering gear* is explained
 - 6.4 Location of all alarms and safety devices associated with steering gear is identify and their functions are outlined
 - 6.5 Process for testing steering gear and monitoring its performance is explained
- 7 Explain operation of an evaporator**
- 7.1 Why 'fresh water' may have to be produced from seawater is explained
 - 7.2 Function, construction and operation of evaporators is explained
 - 7.3 Correct starting procedure, safe operation and basic maintenance required for an evaporator is clarified
 - 7.4 Process for testing the evaporator and monitoring performance is explained
 - 7.5 Treatment of distillate for domestic purposes is outlined
 - 7.6 Quality necessary if water being produced by a distiller is to be used for human consumption is outlined

- 8 Explain basic operation of marine refrigeration systems**
- 8.1 Properties of an ideal refrigerant are listed
 - 8.2 Refrigerants commonly used on board are listed and reason for their use is clarified
 - 8.3 Basic construction and operation of a marine refrigeration system is explained
 - 8.4 Preparation, operation, fault detection and necessary actions to prevent damage in marine refrigeration systems is confirmed
 - 8.5 Personal safety and environmental hazards associated with CFCs and ozone depleting substances are identified
- 9 Explain basic operation of marine air-conditioning and ventilation systems**
- 9.1 Basic construction and operation of marine air-conditioning and ventilation systems in routine and emergency situations is explained
 - 9.2 Preparation, operation, fault detection and necessary actions to prevent damage in marine air-conditioning and ventilation systems is confirmed
- 10 Explain basic operation of marine gas turbines**
- 10.1 Basic flow of air and gas through a simple cycle marine gas turbine is outlined
 - 10.2 Materials and construction of compressor, combustion system and turbine in a single and two-shaft design turbine are detailed
 - 10.3 Basic controls required for the control and protection of the plant are outlined
 - 10.4 *Accessories* necessary for safe operation are listed
- 11 Explain types, safe operation and maintenance of deck machinery**
- 11.1 Types, basic construction and operation of *deck machinery* are outlined
 - 11.2 Preparation, operation, fault detection and necessary actions to prevent damage in deck machinery is confirmed

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access information and sketch diagrams to interpret and explain testing requirements related to the operation of marine auxiliary machines
- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain basic principles of marine auxiliary machines
- Identify and interpret numerical and graphical information related to starting up and shutting down marine auxiliary machines on commercial vessels
- Identify and suggest ways of rectifying faults and malfunctions in marine auxiliary machines on commercial vessels
- Identify methods, procedures and materials needed for operating, maintaining and repairing marine auxiliary machines on commercial vessels
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret written information related to the operation, performance and maintenance of marine auxiliary machines, including machinery specifications, machinery design drawings, machine drawings, operational manuals, specifications and electrical and control circuit diagrams

Required Knowledge:

- Fuels and basic principles of fuel systems
- Nature and causes of typical start up and shut down malfunctions of main and auxiliary machinery and associated systems, and available methods for their detection and rectification
- Operational characteristics and performance specifications for different types of auxiliary machinery and associated systems usually found on a commercial vessel, including pumps, air compressors, steering gears, heat exchangers and evaporators
- Principles and procedures of machinery lubrication
- Procedures for carrying out start up and shut down of main and auxiliary machinery and associated systems to ensure compliance with company and survey requirements and regulations
- Purpose and content of safety data sheets/material safety data sheets
- Safety, environmental and hazard control precautions and procedures relevant to start up and shut down of marine auxiliary machinery and associated systems
- Types of auxiliary machinery and components
- Work health and safety (WHS)/occupational health and safety (OHS) legislation and policies

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- providing accurate and reliable information
- providing appropriate level of detail in responses.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where basic knowledge of marine auxiliary machinery and systems can be demonstrated
- technical reference library with current publications on auxiliary machinery
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating basic knowledge of marine auxiliary machinery and systems
- direct observation of the candidate applying relevant

WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Types of auxiliary machinery may include:

- Boiler
- Compressors
- Diesel generator
- Evaporators
- Pumps
- Refrigerating installation
- Separators

Functions of auxiliary machines may include:

- Applying main power of engines for propulsion and manoeuvring
- Keeping ship dry and trimmed
- Mooring ship and handling cargo
- Providing for safety
- Supplying domestic needs such as fresh water
- Supplying needs of main engines and boilers
- Supplying ship with electric power and lighting

Types of chemicals may include:

- Cleaning fluids
- Fuel additives
- Solvents

Types of pumps may include:

- Axial flow
- Centrifugal
- Gear
- Reciprocating
- Screw
- Vane

Types of heat exchanges may include:

- Plate
- Shell and tube

Features of bilge, cargo and ballast pumping systems may include:

- Safety fittings
- Sensing devices
- Types of valves

Compressors may include:

- Breathing apparatus compressor
- Lubricated reciprocating air compressors
- Non-lubricated reciprocating air compressors
- Oil free air compressors
- Rotary screw compressors

Types of steering gear may include:

- Electrical
- Ram
- Rotary vane
- Oscillating steering

Steering gear may include:

- Hunting gear
- Telemotor

Accessories may include:

- Accessory gear
- Lube oil coolers
- Lube oil drive
- Lube oil filter
- Starting device

Deck machinery may include:

- Accommodation ladders
- Anchor winch
- Cranes
- Davits
- Mooring winch

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL5007A Demonstrate basic knowledge of marine control systems and automation

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the knowledge of marine automation and process control required engineers to operate control systems on board a commercial vessel.

Application of the Unit

This unit applies to Marine Engineering Watchkeepers on commercial vessels greater than 750 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Watchkeeper issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Outline basic actions and functions of automation equipment in marine contexts**
 - 1.1 Basic concept of an automatic control system is explained using a simple block diagram, correct Australian Standard symbols and layout
 - 1.2 *Components* and operation of automatic control systems are outlined
 - 1.3 Relative advantages and disadvantages of different *mediums* used in shipboard automatic control systems are explained
- 2 Explain action of nozzle flapper mechanism in pneumatic instruments**
 - 2.1 Principle of operation of nozzle/flapper as a pneumatic control system component is outlined
 - 2.2 Modifications required to make the simple nozzle/flapper mechanism suitable for use in process control systems are explained
- 3 Explain operating principles and application of sensing and transmitting elements**
 - 3.1 Different methods of measuring level in an unpressurised tank and in a closed pressurised vessel are sketched and outlined
 - 3.2 Applications at sea, advantages and disadvantages and temperature ranges covered of filled system thermometers are outlined
 - 3.3 Operating principles of resistance temperature detector and thermocouple are outlined
 - 3.4 Different methods for measuring flow on board ships that are suited to remote indication and automatic control are identified
 - 3.5 Different methods for measuring pressure on board a ship that are suited to remote indication and automatic control are identified
- 4 Explain function of controller element and associated hand/auto changeover station in an analogue**
 - 4.1 Difference between ‘off-on’ control action and fully modulating proportional control action is explained

- control loop**
 - 4.2 'Offset' and how it may be removed is explained
 - 4.3 Basic principles of operation of a simple pneumatic controller are outlined
 - 4.4 Action and function of hand/auto change over station in an automatic control loop is explained, using suitable schematic diagrams
- 5 Explain basic operating principles of electronic circuits and components**
 - 5.1 Components are identified and electronic circuit diagrams are interpreted
 - 5.2 Correct methods of testing electronic components are detailed
 - 5.3 Basic operation of operational amplifiers is outlined
- 6 Explain use of solid state diodes and transistors to control monitoring and alarm systems**
 - 6.1 Basic concept of logic and operation of logic gates is outlined
 - 6.2 Operation of input/output devices and their application to sequential control systems are explained
- 7 Explain 'fail safe' philosophy and its implications for design and operation of main types of actuators available for operating final correcting elements**
 - 7.1 Purpose and function of a typical valve actuator and positioned is confirmed
 - 7.2 Constructional differences between typical 'air-to-open' and 'air-to-close' actuators are confirmed
 - 7.3 Why 'fail safe' may mean valves could either close, open, or remain where they are, upon failure of their associated automatic (or servo remote) operating system is clarified
 - 7.4 Pneumatic piston actuator/positioner assembly used to move final correcting elements pneumatically is outlined
 - 7.5 Operating principles of electrical actuators are outlined
 - 7.6 Operation of a hydraulic steering gear actuator is compared and contrasted with valve actuator and positioner assemblies

- 8 Specify requirements for a pneumatic control system air supply**
- 8.1 Standard specifications for cleanliness, moisture and oil content of a typical control air system are outlined
 - 8.2 Importance of ensuring that standards for cleanliness, moisture and oil content are maintained throughout operation of control air system is explained
 - 8.3 Typical system that is able to supply compressed air that meets required standards for cleanliness, moisture and oil content is outlined
- 9 Explain mechanisms for control of physical parameters in a ship's machinery space**
- 9.1 Typical control loops associated with centralised cooling systems that serve the cooling water system are sketched
 - 9.2 Function of typical loops required for control of temperature, pressure and viscosity of fuel supplies to main and auxiliary engines are outlined and sketched
 - 9.3 Typical pressure and temperature control loops associated with main and auxiliary engine lubricating oil services are sketched
 - 9.4 Function of components of typical control loops for the automatic control of boilers are outlined and sketched
 - 9.5 Location and reasons for alarms associated with remote and/or automatic machinery operation to be separate from control function are explained
 - 9.6 Tests and procedures required to meet unmanned machinery space (UMS) requirements are specified and different types of associated alarm and monitoring systems are evaluated
 - 9.7 Power output and control of a main propulsion diesel engine (slow speed two-stroke) and an electrical generator prime mover (high or medium speed four-stroke) are compared and contrasted
- 10 Explain schematically total bridge**
- 10.1 Engine manufacturer schematic diagram is

control of a commercial vessel

interpreted and how Total Bridge control may be achieved to manoeuvre and control the engine is explained

- 10.2 Safety interlocks in sequence of operation depicted in schematic diagram are identified and why they are required is explained
- 10.3 Location of engine control positions, apart from the bridge, is identified from schematic diagram
- 10.4 Why bridge control is preferred option for manoeuvring main engine in modern commercial vessels is explained

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access information and sketch diagrams to interpret and explain testing requirements related to control systems on commercial vessels
- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain basic principles of marine automation and process control
- Identify and interpret numerical and graphical information, including schematic diagrams, relevant to control systems on commercial vessels
- Identify and suggest ways of rectifying faults and malfunctions in control systems on commercial vessels
- Identify methods, procedures and materials needed to operate and maintain control systems on commercial vessels
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret written information related to the operation of control systems on commercial vessels

Required Knowledge:

- Australian Standards for drawing symbols/layouts for schematic diagrams
- Characteristics and functions of temperature, pressure and viscosity of fuel
- Concept of 'fail safe' philosophy

- Concepts of UMS, and automated monitoring and control of machinery
- Control and monitoring of ship machinery
- Control loops
- Instrument process and control terms
- Mechanical and electrical sensors
- Pneumatic and electrical instrumentation transmitters
- Principles of:
 - process control
 - basic pneumatic systems and action of pneumatic instruments
 - basic electronic circuits
- Safety devices, alarms and monitoring systems
- Sensing and transmitting elements
- Tests and procedures required to meet UMS requirements
- Total bridge control
- Work health and safety (WHS)/occupational health and safety (OHS) legislation, policies and procedures

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- providing accurate and reliable information
- providing appropriate level of detail in responses.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where basic knowledge of marine control systems and automation can be demonstrated
- technical reference library with current publications on automation and process control
- tools, equipment and personal protective equipment currently used in industry

- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating basic knowledge of marine control systems and automation
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Components may include:

- Actuators
- Responders
- Sensors

Mediums may include:

- Compressed air
- Electric currents

- Electric voltages
- Hydraulic fluids

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL5008A Demonstrate basic knowledge of marine diesel engines and systems

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the knowledge required to operate and maintain marine diesel engines and systems on a commercial vessel.

Application of the Unit

This unit applies to the work of Marine Engineering Watchkeepers on commercial vessels greater than 750 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Watchkeeper issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|---|-----|---|
| 1 Outline stages of combustion in two-stroke and four-stroke cycle diesel engines | 1.1 | Two-stroke and four-stroke cycle diesel engines are compared and contrasted |
| | 1.2 | Methods and <i>diagnostic information</i> used in determining engine combustion characteristics are specified |
| | 1.3 | Diagnostic information is used to identify and interpret <i>common combustion faults</i> and to produce typical diagrams for analysing faults |
| 2 Explain means of pressure-charging diesel engines | 2.1 | Pressure-charging principles and their influence on engine design and waste heat recovery are explained |
| | 2.2 | Different <i>methods of pressure-charging diesel engines</i> are clarified |
| | 2.3 | Emergency isolation procedures used when pressure-charging diesel engines are clarified |
| 3 Explain operation of diesel engine governors | 3.1 | Governing principles, common governor types and related controls are outlined |
| | 3.2 | Different requirements for governing diesel engines for propulsion and power generation are explained |
| | 3.3 | Problems of mismatched engine sizes/prime mover types when sharing common loads are outlined |
| 4 Explain properties of materials used in construction of engine components | 4.1 | Properties of materials used in construction of engine components are specified |
| | 4.2 | Dynamic stresses and loads, materials and service limitations of engine components are outlined |
| | 4.3 | Construction and operating cycle forces of <i>diesel engine components</i> are outlined |
| | 4.4 | Relationship between critical speed, use of detuners/dampers and materials in engine components is clarified |
| 5 Explain safe working practices associated with diesel engines during maintenance, repair and | 5.1 | Safe practices for isolating propulsion and power generation diesel engines prior to work commencement are confirmed |
| | 5.2 | Safety protective clothing to be used during all aspects of diesel maintenance is identified |
| | 5.3 | <i>Hazards</i> associated with working on diesel engines and systems including working in enclosed spaces are identified |

- | | | |
|--|-----|---|
| operation | 5.4 | Correct procedures for using hydraulic tools and high-pressure fuel injection test equipment are clarified |
| | 5.5 | Purpose, operation and maintenance of safety interlocks and protective cut-outs of engine manoeuvring systems is determined |
| 6 Explain procedures for preventing and responding to crankcase and airline explosions, and scavenge and uptake fires | 6.1 | <i>Causes</i> , symptoms and means of preventing and extinguishing uptake and economiser fires are outlined |
| | 6.2 | Risks of continued service with an isolated waste heat unit are assessed |
| | 6.3 | Causes, symptoms, methods of extinguishing and prevention of scavenge fires are evaluated |
| | 6.4 | Causes and hazards associated with starting airline explosions are identified |
| | 6.5 | Protective devices fitted to air starting systems to minimise risk of explosion, and routine inspection and maintenance required are detailed |
| | 6.6 | Causes and ways of preventing crankcase explosions in both diesel and dual-fuel engines are outlined |
| | 6.7 | Procedure to be taken in the event of an early warning of a hazardous crankcase atmosphere and required procedure to be followed after engine has stopped are clarified |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access diagnostic information related to marine diesel engines and systems
- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain basic operation of marine diesel engines and systems, and
- Identify and apply relevant solutions for addressing problems associated with marine diesel engines and systems
- Identify and interpret diagnostic information, and perform mathematical calculations related to operating, maintaining and repairing marine diesel engines and systems
- Identify methods, procedures and materials needed for operating, maintaining and repairing marine diesel engines and systems

- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret manuals, technical specifications, safety data sheets/material safety data sheets and manufacturer guides related to operating, maintaining and repairing marine diesel engines and systems

Required Knowledge:

- Basic principles of diesel engine operation
- Components of diesel engines
- Crankcase and air-line explosions, scavenge and uptake fires
- Diesel engine:
 - lubrication systems
 - propulsion and power generation
- Diesel engine
- Manoeuvring systems of diesel engines
- Pressure-charging diesel engines, including common service faults, actions to rectify faults, emergency operation and isolation procedures
- Properties and characteristics of fires
- Safe working practices associated with diesel engines during operation, maintenance, and repair
- Starting methods of diesel engines
- Work health and safety (WHS)/occupational health and safety (OHS) legislation, policies and procedures

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- providing accurate and reliable information
- providing appropriate level of detail in responses.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where basic knowledge of marine diesel engines and systems can be demonstrated
- diagrams, specifications and other information required for performing basic calculations related to marine diesel engines and systems
- technical reference library with current publications on basic marine diesel engines and systems
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating basic knowledge of marine diesel engines and systems
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Diagnostic information may include:
- Engine efficiency
 - Fuel consumption
 - Temperature
- Common combustion faults may include:
- Engine cylinder fuel supply
 - Lack of total combustion
- Methods of pressure-charging diesel engines may include:
- Exhaust gas turbo charging
 - Positive displacement engine-driven blowers
 - Under-piston assistance
- Diesel engine components may include:
- Bedplates
 - Camshafts
 - Crankshafts
 - Cross-heads
 - Cylinder heads
 - Exhaust valves
 - Frames
 - Fuel injectors
 - Fuel pumps
 - Liners
 - Pistons
 - Tie-rods for two- or four-stroke engines
 - Turbochargers
 - Valves and rocket gear
- Hazards may include:
- Acids
 - Chemicals
 - Defective or bypassed machinery protective devices
 - Defective or inappropriately adjusted exhaust systems
 - Enclosed spaces
 - Flammable liquids under pressure
 - Hydrocarbons
 - Lifting heavy components both unaided and with lifting gear
 - Leaking oil and fuel
- Causes may include:
- Airlock in feed water system
 - Cleanliness of economiser tubes

- Failure of economiser feed pump
- Loss of feed-water supply

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL5009A Demonstrate basic knowledge of marine electrical systems

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to operate alternators, generators and control systems to supply shipboard electrical power on board a commercial vessel.

Application of the Unit

This unit applies to the work of Marine Engineering Watchkeepers on commercial vessels greater than 750 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Watchkeeper issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|---|-----|--|
| 1 Explain hazards and isolation procedures associated with live electrical components | 1.1 | Effects of electricity on the human body are outlined |
| | 1.2 | Procedure to be taken in the event of a person suffering an electric shock is clarified |
| | 1.3 | Correct procedure for isolating an electrical circuit is clarified |
| | 1.4 | <i>Electrical hazards</i> in a vessel at sea or port are identified |
| 2 Explain basic operation of and hazards associated with marine high voltage installations | 2.1 | Functional and operational requirements for a marine high voltage system are detailed |
| | 2.2 | Safety procedures required when working in high voltage environments are outlined |
| | 2.3 | Procedure for assisting suitably qualified personnel to carry out maintenance and repair of high voltage switchgear of various types is outlined |
| 3 Explain principles of power generation and transmission in AC and DC circuits | 3.1 | Excitation methods used to produce alternating current (AC) and direct current (DC) voltages are outlined |
| | 3.2 | Basic voltage control of generated AC voltages is outlined |
| 4 Outline key features of basic electrical diagrams used on vessels | 4.1 | Types of diagrams used to depict electrical systems on ships are outlined |
| | 4.2 | Electrical symbols used in basic electrical diagrams are identified |
| | 4.3 | Electrical devices used in basic electrical circuits are clarified |
| 5 Use common electrical measuring and testing instruments | 5.1 | Different types of multimeters are used appropriately |
| | 5.2 | Functions of insulation and 'tong' testers are explained |
| | 5.3 | Safety requirements when using test equipment are applied |
| 6 Rectify basic electrical faults | 6.1 | Fault situation is determined by appropriate questioning of client or operator |
| | 6.2 | Safe working practices are demonstrated when carrying out fault-finding work |
| | 6.3 | Basic common faults of equipment and techniques used to find faults are outlined |

- | | | |
|---|-----|--|
| | 6.4 | Knowledge of various types of basic common faults of circuits and techniques is used to find faults |
| | 6.5 | Basic common faults in electrical equipment are identified and rectified |
| 7 Outline basic components and layout of a marine electrical switchboard | 7.1 | Layout of a typical three wire insulated electrical system is sketched |
| | 7.2 | Interconnections between main switchboard, emergency switchboard and shore supply are explained |
| | 7.3 | Procedure for changing over to emergency switchboard for testing or during loss of mains power is outlined |
| | 7.4 | Safety features on a typical marine switchboard are identified |
| 8 Explain operation of shipboard alternators | 8.1 | Types and construction methods of alternators used on a marine vessel are outlined |
| | 8.2 | Principles of operation of a marine type alternator are outlined |
| | 8.3 | Relationship is shown between voltage and speed in regulation of alternator |
| | 8.4 | Operational characteristics of a marine alternator are outlined |
| | 8.5 | Excitation and automatic voltage regulation systems used with marine alternators are clarified |
| 9 Explain procedures for paralleling of alternators | 9.1 | Process of measuring voltage, frequency and phase angle is outlined |
| | 9.2 | Automatic and manual procedures for synchronising and paralleling marine alternators, including machines of different capacities are clarified |
| | 9.3 | How two machines can be adjusted to share kVAR and kW loads is confirmed |
| | 9.4 | Process of removing an alternator from the bus is outlined |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assess own work outcomes and maintain knowledge of current codes, standards,

regulations and industry practices

- Explain basic principles of alternators, generators and control systems, and
- Identify and interpret numerical and graphical information in electrical diagrams and specifications for a commercial vessel
- Identify and suggest ways of rectifying electrical hazards and emergency situations on a vessel
- Identify methods, procedures and materials needed for operating, maintaining and repairing basic marine electrical systems
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret written information related to electrical circuitry and components on commercial vessels
- Use electrical measuring and testing instruments

Required Knowledge:

- AC/DC voltage
- Alternators – construction, characteristics, synchronised operation
- Electrical:
 - safe working practices
 - measuring and testing instruments
 - symbols, basic electrical diagrams/circuits
- Marine electrical systems – switchboards, instrumentation, earthing
- Phase angle, power factor and current flow
- Procedures for dealing with hazards and emergencies
- Resistance, inductance and capacitance
- Switchboards and protection – purpose, testing and maintenance, equipment removal
- Work health and safety (WHS)/occupational health and safety (OHS) legislation and policies

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required

this unit

Knowledge and include:

- providing accurate and reliable information
- providing appropriate level of detail in responses.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where basic knowledge of marine electrical systems can be demonstrated
- technical reference library with current publications on marine electrical systems
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating basic knowledge of marine electrical systems
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being

performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Electrical hazards may include:
- Electric shock
 - Electrical fire
 - Moving and rotating electrical equipment
 - Non-compliance with safe working procedures
 - Over-speed of electrical machinery
 - Poor housekeeping procedures
 - Using equipment beyond safe working limits

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL5010A Demonstrate basic knowledge of marine steam turbines and main boilers

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the knowledge required to operate and maintain main steam propulsion plant and associated control systems on a commercial vessel.

Application of the Unit

This unit applies to the work of Marine Engineering Watchkeepers on commercial vessels greater than 750 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Watchkeeper issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|---|--|
| 1 Interpret an energy balance diagram for a shipboard steam plant | <p>1.1 Ideal theoretical thermodynamic cycle for the operation of a steam plant is outlined</p> <p>1.2 Why actual expansion of steam through a turbine differs from ideal cycle is explained</p> <p>1.3 Typical heat losses around a steam plant are identified</p> <p>1.4 Effect of air preheating, feed heating and economisation upon energy balance of steam plant's thermodynamic cycle are explained</p> <p>1.5 Typical heat (and/or mass) balance diagram for a ship's steam plant is interpreted</p> |
| 2 Explain construction and operation of marine high-pressure water boilers | <p>2.1 Advantages of water tube boiler over fire tube boiler for shipboard applications are outlined</p> <p>2.2 Construction and operation of a 'D' type membrane furnace boiler with superheater, economiser and air pre-heater is explained</p> <p>2.3 External fittings required by Classification Society Rules on any large boiler are identified</p> <p>2.4 Internal fittings of a boiler's main steam drum are identified</p> <p>2.5 How automation is applied to boiler control is clarified</p> <p>2.6 Start up, operation and shut down of a main propulsion steam boiler is outlined</p> |
| 3 Explain construction and operation of a main propulsion steam plant | <p>3.1 How common forms of blading and rotor construction are manufactured is clarified</p> <p>3.2 How casings of common <i>marine steam turbines</i> are fitted out is clarified</p> <p>3.3 Principles of thermodynamics are applied to explain expansion of steam in a typical marine turbine</p> <p>3.4 Importance of start up and <i>warming-through procedures</i> for a steam turbine set is conveyed</p> <p>3.5 Checks required during routine turbine operation are explained</p> <p>3.6 <i>Safety devices</i> for a steam turbine set are identified and normal emergency shut-down procedures are identified</p> <p>3.7 Operation of turbines under normal and emergency conditions is</p> |

- outlined
- 4 Explain auxiliary machinery required to support operation of main propulsion steam turbines and boilers**
- 4.1 Construction and operation of different types of *auxiliary machinery* needed to support main propulsion steam turbines and boilers is outlined
- 4.2 Construction and operation of steam and electric motor prime movers required for driving auxiliary machinery are outlined
- 5 Explain configuration and operating principles of different steam distribution systems used in steam-powered vessels**
- 5.1 Configuration and operating principles of different *steam distribution systems* is outlined
- 5.2 Typical pressure reducing and pressure control valves suitable for steam service are outlined and illustrated
- 6 Explain operation principles of close feed systems used by boiler/turbine sets**
- 6.1 Difference between an open and a closed feed system is clarified
- 6.2 Closed feed system is outlined
- 6.3 Pressure feed heaters are outlined
- 6.4 Chemical injection equipment suitable for use on any ship's main feed system is explained
- 7 Explain feed and boiler water treatment**
- 7.1 Recommended limits of characteristics for boiler water and recommended intervals at which tests are undertaken are clarified
- 7.2 Reasons for treating boiler water are outlined
- 7.3 Different types of hardness in water, their consequences if left untreated, and ways of minimising their effect are explained
- 7.4 How corrosion within a boiler is minimised by treating boiler water is explained
- 7.5 Causes and ways of avoiding carry-over and caustic embrittlement are explained
- 7.6 Safety requirements for handling feedwater and boiler water treatment chemicals are explained
- 8 Explain**
- 8.1 Why reduction gearing is required between steam turbines and

transmission of power from the steam turbine main engine to the propeller		propeller is clarified
	8.2	Generation of tooth form is outlined
	8.3	Double helical gearing and difference between single and double reduction gearing are explained
	8.4	Applications of epicyclic gearing are explained
	8.5	Function of flexible couplings in a turbine/gearing set is clarified
	8.6	Components of a driveline from main wheel connection, aft, to propeller are listed
	8.7	Methods and mechanisms for lubricating a driveline are detailed
9 Explain procedures for preventing and responding to fires and explosions specific to steam propulsion plant	9.1	Causes, symptoms and means of preventing and extinguishing <i>fires</i> associated with steam propulsion plant are detailed
	9.2	Protective devices associated with boilers to minimise risk of fires, explosions and water shortages are identified
	9.3	Routine inspection and maintenance requirements to prevent fires, explosions and water shortages are outlined

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access diagnostic information related to marine steam turbines
- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain basic operation of marine steam turbines, and
- Identify and apply relevant solutions to problems that can occur when operating steam propulsion plant and associated systems on a steam vessel
- Identify and interpret diagnostic information, and perform mathematical calculations related to operating, repairing and maintaining marine steam turbines
- Identify methods, procedures and materials needed for operating, maintaining and repairing marine steam turbines
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret manuals, technical specifications, safety data sheets/material safety data sheets and manufacturer guides related to operating, maintaining and repairing marine steam turbines

Required Knowledge:

- Basic principles of operation of main steam propulsion and auxiliary systems on a steam vessel, including:
 - methods of turbine control, including safety devices
 - symptoms, causes, effects, and actions to be taken with defects of auxiliary steam turbines
 - construction and operation of main and auxiliary steam turbines
 - procedures for emergency operation of a steam turbine
- Established engineering practice and procedures for operating shipboard steam propulsion plant and associated systems in warm-through, manoeuvring, start up, normal running, emergency and shut down situations
- Fundamental principles of steam propulsion systems and boilers
- Hazards and problems that can occur when operating steam propulsion plant and associated systems, and appropriate preventative and remedial action
- Methods of lubricating the principal components of a marine steam propulsion turbine and its associated gearing, and evaluating common faults, including common lubrication faults, symptoms, causes, and actions to be taken with such faults
- Operational characteristics and performance specifications for different types of steam propulsion plant and associated systems on a steam vessel of unlimited propulsion power
- Procedures for reading, interpretation of readings, and indications of the performance of steam propulsion plant and associated systems
- Typical operating precautions for steam propulsion plant and associated systems to ensure operational performance is in compliance with bridge orders, technical specifications, survey requirements and established safety and anti-pollution rules and regulations
- Types, properties, tests, applications and treatment of fuels, lubricants, and solvents/chemicals used on board a steam vessel, including a basic understanding of the working principles, construction, maintenance and safe operation of centrifuges, filters, and other treatment devices
- Units of measurement
- Work health and safety (WHS)/occupational health and safety (OHS) legislation and policies

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment The evidence required to demonstrate competence in this unit

and evidence required to demonstrate competency in this unit

must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- providing accurate and reliable information
- providing appropriate level of detail in responses.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where basic knowledge of marine steam turbines and main boilers can be demonstrated
- diagrams, specifications and other information required for performing basic calculations related to marine steam turbines
- technical reference library with current publications on basic marine steam turbines
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating basic knowledge of marine steam turbines and main boilers
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be

combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Marine steam turbines may include:
- Impulse
 - Reaction
- Warming-through procedures may include:
- Ensuring air vent is open
 - Minimising thermal shock
 - Warming up according to manufacturer instructions
 - Shutting down
- Safety devices may include:
- Axial movement
 - Gland temperature
 - Lube oil pressure
 - Lube oil temperature
 - Remote stops
 - Vacuum condenser pressure
 - Vibration
- Auxiliary machinery may include:
- Lube oil supply pump and system
 - Main boiler forced draught fan
 - Main condensate extraction pump and air ejector
 - Main condenser
 - Main cooling water circulating pump
 - Main fuel oil supply pump and system
 - Main feed pump
- Steam distribution systems may include:
- Auxiliary exhaust steam range
 - Auxiliary superheated steam range
 - Bled steam systems
 - Superheated main steam range
- Fires may include:
- Blow back
 - Economiser
 - Explosions

- Low water level
- Uptake

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL5011A Demonstrate basic knowledge of ships and ship routines

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to maintain a safe engineering watch on a commercial vessel.

Application of the Unit

This unit applies to the work of Marine Engineering Watchkeepers on commercial vessels greater than 750 kW forms part of the requirements for the Certificate of Competency Marine Engineer Watchkeeper issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|---|-----|--|
| 1 Outline key features of different types of commercial ships | 1.1 | Annotated sketch of profile and midship section of a range of <i>ship types</i> is constructed |
| | 1.2 | Terms used to quote size of a ship are used appropriately |
| | 1.3 | Plate materials and joining methods used in ship construction are detailed |
| | 1.4 | Basic principles of watertight integrity are identified and applied |
| | 1.5 | <i>Shipping terms</i> are applied to describe characteristics of commercial vessels |
| 2 Explain dangers associated with entry into engine room spaces | 2.1 | How atmosphere in engine room spaces may be hazardous is detailed |
| | 2.2 | Procedures for obtaining permission to enter engine room spaces are outlined |
| | 2.3 | Administrative procedures applying to work in engine room after normal hours are outlined |
| 3 Explain need for standards and other monitoring requirements for ships | 3.1 | International standards relating to construction, equipment and conditions of commercial vessels are outlined |
| | 3.2 | National legislation and IMO conventions concerning safety of life at sea, security and protection of marine environment are outlined |
| | 3.3 | Requirements of ISM Code and safety management system are outlined |
| | 3.4 | Qualifications and experience requirements for <i>key personnel</i> on a ship are outlined |
| | 3.5 | Personal and ship certificates, and other documents required to be carried on board ship by international conventions, how they are obtained, how they may be verified and period of their legal validity are identified |
| | 3.6 | Roles and functions of key national and international <i>shipping authorities and organisations</i> are outlined |
| | 3.7 | Purpose of surveys and dry-docking of ships are explained |
| 4 Explain responsibilities of personnel on | 4.1 | Roles and responsibilities of personnel on board ship are clarified |
| | 4.2 | Organisational structure, lines of responsibility and communication on board ship are outlined |

- board ship**
- 4.3 International maritime conventions, recommendations and national legislation concerning shipboard personnel and training are clarified
 - 4.4 Daily work and shipboard routines relating to engineering watchkeeping are outlined
 - 4.5 ***Personal and social responsibilities*** of personnel on board ship are confirmed
- 5 Explain engineering watchkeeping procedures**
- 5.1 Established marine engineering practice and regulatory requirements for conduct, handover and relief of an engineering watch are outlined
 - 5.2 Operational procedures and requirements for main propulsion, auxiliary systems and associated controls are outlined
 - 5.3 Operational procedures and requirements for monitoring the performance of main propulsion, auxiliary systems and associated controls are outlined
 - 5.4 Procedures for identifying, rectifying and reporting problems associated with performance of main propulsion, auxiliary systems and associated controls are outlined
 - 5.5 Basic operation, monitoring and maintenance of shafting installations and propeller systems is detailed
 - 5.6 ***Engine room resource management principles*** and procedures required for a safe engineering watch are outlined
 - 5.7 Safety precautions to be observed during a watch and immediate action to be taken in the event of fire or accident are clarified
 - 5.8 Requirements for recording activities and incidents that occur during keeping an engineering watch are detailed
 - 5.9 Fatigue management strategies for engine room management team are identified
 - 5.10 ***Personal task and workload management techniques*** appropriate for an engineering watchkeeper are outlined
- 6 Outline procedures and responses to malfunctions and emergency**
- 6.1 ***Potential malfunctions and emergencies*** relating to main propulsion and auxiliary systems are identified
 - 6.2 Correct response and required action relating to potential malfunctions and emergencies in main propulsion and auxiliary systems are detailed

situations

- 6.3 Regulatory requirements and reporting requirements for incidents and emergency situations outside watchkeeper limits of responsibility are confirmed

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access information required to undertake watchkeeping duties in routine and emergency situations
- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Identify and determine appropriate ways of responding to malfunctions and emergency situations in daily watchkeeping operations
- Identify, interpret and process numerical and graphical information required to undertake watchkeeping duties in routine and emergency situations
- Identify methods and procedures needed to implement watchkeeping duties on commercial vessels
- Read and interpret written instructions, procedures and information relevant to watchkeeping duties

Required Knowledge:

- Bridge instrumentation, controls and alarms
- Bridge resource management systems
- Causes of groundings, collisions and casualties
- Composition of bridge/engine room management team
- Enclosed spaces
- Engineering watchkeeping procedures and practices
- Fatigue management principles and techniques
- Functions of unmanned machinery space (UMS) controls, alarms and indicators
- Hierarchy and organisational structure of shipboard personnel
- Key international and Australian standards relating to shipping
- Key shipping authorities and organisations
- Maritime communication techniques
- Navigational hazards and implications for watchkeeping
- Personal and social responsibilities on board ship

- Procedures for dealing with malfunctions and emergencies
- Rudder and propeller control and vessel manoeuvring characteristics
- Sections of IMO STCW Convention and Codes and AMSA Marine Orders dealing with watchkeeping principles, arrangements, procedures, roles and responsibilities
- Signs of fatigue
- Types of ships and key features of ships
- Watch handover procedures
- Work health and safety (WHS)/occupational health and safety (OHS) legislation and policies

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- providing accurate and reliable information
- providing appropriate level of detail in responses.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where basic knowledge of ships and ship routines can be demonstrated
- technical reference library with current publications on commercial shipping
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures,

regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating basic knowledge of ships and ship routines
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Ship types may include:

- Bulk carrier
- Container
- General dry cargo
- Passenger
- Ro-ro
- Tanker

Shipping terms may include:

- Hogging
- Panting
- Pounding
- Racking
- Sagging

Key personnel may include:

- Crew
- Master
- Officers

Shipping organisations and authorities may include:

- Australian Maritime Safety Authority
- Classification societies
- International Maritime Organisation
- National Maritime Safety Committee
- State and territory marine authorities

Personal and social responsibilities may include:

- Alcohol and drug abuse
- Discipline
- Finance
- Health and fitness
- Hygiene
- Relationships
- Safety

Engine room resource management principles may include:

- Allocation, assignment and prioritisation of resources
- Assertiveness and leadership
- Considering team experience
- Effective communication
- Obtaining and maintaining situational awareness

Personal task and workload management techniques may include:

- Coordination
- Managing resource constraints
- Managing time constraints
- Personnel assignment
- Planning

Potential malfunctions and emergencies may include:

- Accidents
- Breakdowns
- Collisions
- Explosion fire
- Flooding
- Groundings

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL5012A Perform basic marine engineering calculations

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to perform basic marine engineering calculations required for the operation of marine machinery and equipment.

Application of the Unit

This unit applies to Marine Engineering Watchkeepers on commercial vessels greater than 750 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Watchkeeper issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|-----------------------------|---|
| 1 Apply mathematical | 1.1 Proportions, variation, percentages and averages are calculated, and method of unity is applied |
|-----------------------------|---|

- | | | |
|---|---|--|
| formulae to solve marine engineering problems | 1.2 | Problems involving the manipulation of indices are solved |
| | 1.3 | Written descriptions of actual or hypothetical marine engineering problems are expressed in mathematical terms |
| | 1.4 | Algebraic formulae and equations are manipulated to change subjects, as and when required |
| | 1.5 | Index problems are converted to logarithmic problems, and vice versa, according to the Law of Logarithms |
| | 1.6 | Calculator is used to resolve marine engineering problems |
| | 2 Calculate areas, volumes and masses of regular and irregular figures | 2.1 |
| 2.2 | | Problems relating to surface areas and volumes of circular figures are solved |
| 2.3 | | Centres of gravity and centroids of area are found for both line figures and areas |
| 2.4 | | Concept of density is applied to calculate masses |
| 3 Apply trigonometry to solve problems relating to angular measurement and the resolution of vectors | 3.1 | Basic trigonometric ratios of sine, cosine and tangent, together with their reciprocals are explained with respect to the sides of a right-angled triangle |
| | 3.2 | Pythagoras' Theorem is proved |
| | 3.3 | Problems associated with single angle trigonometric identities including those derived from the application of Pythagoras' Theorem to the basic sin, cos and tan identities are solved |
| | 3.4 | Derivation of multiple, double and half angle trigonometric identities are shown and used to simplify complicated trigonometric expressions and identities |
| | 3.5 | Sine Rule and Cosine Rule for solution of triangles are proved and applied |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain basic mathematical concepts and techniques relevant to marine engineering, and
- Identify and determine appropriate mathematical techniques and formula to solve marine engineering problems
- Identify the methods and procedures needed to select mathematical techniques and formula to solve marine engineering problems
- Impart knowledge and ideas through verbal, written and visual means
- Perform calculations relevant to marine engineering, including volumes and masses of regular and irregular areas
- Read and interpret written information on marine engineering problems and express this information in mathematical terms
- Use a calculator to resolve marine engineering problems

Required Knowledge:

- Centre of gravity (KG, VCG, LCG)
- Centroids of area
- Formulae for areas, volumes and masses of regular and irregular shapes
- Indices
- Law of Logarithms
- Proportions, variation, percentages, averages and method of unity
- Pythagoras' Theorem

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- performing accurate and reliable calculations
- solving problems using appropriate laws and principles.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where performing basic marine engineering calculations may be conducted
- technical reference library with current publications on marine engineering calculations
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate performing basic marine engineering calculations
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

Not applicable.

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6001A Apply intermediate principles of marine electrotechnology

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to explain intermediate marine electrotechnology principles and perform intermediate electrical calculations.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Apply concepts of resistivity, resistance and capacitance to series and parallel AC and DC circuits**
 - 1.1 Calculations are performed to solve problems related to resistance, voltage drop, current and power in series and parallel circuits
 - 1.2 Calculations are performed to solve problems related to temperature coefficient of resistance and change of resistance of a conductor with a change of temperature
 - 1.3 Basic relationships that give total equivalent capacitance for capacitors arranged in series and parallel combinations are derived
 - 1.4 Relationships that give total equivalent capacitance to solve numeric problems involving alternating current (AC) and direct current (DC) circuits are applied
- 2 Explain how principles of electrolytic action apply to electrical cells and batteries**
 - 2.1 Kirchhoff's circuit laws are explained
 - 2.2 Calculations to solve problems involving currents, voltage drop and terminal potential difference for cells connected to form batteries in series and in parallel are performed
 - 2.3 Calculations to solve secondary cell charging and discharging problems are performed
 - 2.4 Calculations to solve problems related to the efficiency of cells are performed
- 3 Analyse a magnetic circuit**
 - 3.1 *Key parameters of magnetic circuits* are identified
 - 3.2 Formula for calculating the amount of flux generated by a multi turn solenoid coil carrying a current to give the B/H relationship is applied
 - 3.3 Significance of the varying slopes in the B/H curves for a solenoid coil with air, cast iron, cast steel and mild steel cores is explained
 - 3.4 How a magnetic circuit may be created by using a toroidal core within the solenoid coil is shown
 - 3.5 Calculations to solve problems relating to magnetic circuits using different materials in different parts of their cores, including air gaps, are performed

- 3.6 Effect on flux density of applying an alternating magnetising force to an iron core is shown diagrammatically
- 4 Interpret electromagnetic consequences of a conductor moving relative to a magnetic field**
- 4.1 Faraday's and Lenz's Laws are applied to solve problems relating to the electromagnetic induction of EMF and current
- 4.2 Generation of EMF is illustrated by a simple, single loop conductor rotating in a uniform magnetic field and how this EMF may be tapped to an external circuit as either AC or DC is explained
- 4.3 How alternating electrical quantities may be represented by rotating phasors is illustrated and explained
- 4.4 Relationships between instantaneous, maximum, average and RMS values of sinusoidally alternating electrical quantities is derived
- 4.5 Mathematical problems are solved by applying relationships between instantaneous, maximum, average and RMS values of sinusoidally alternating electrical quantities
- 5 Analyse circuits that incorporate combinations of resistive, inductive, and capacitive elements**
- 5.1 Time constant for different *circuit combinations* subjected to DC EMF's is defined
- 5.2 Calculations are performed to solve problems involving time constants in DC circuits with changing rates of current in resistive/inductive elements and changing voltages through resistive/capacitive circuit elements
- 5.3 Differentiation is made between inductive reactance, capacitive reactance and impedance as applied to AC circuits
- 5.4 Effects of inductive and capacitive reactance upon phasor relationships between applied AC voltage and current are shown
- 5.5 Concept of total impedance is applied to solution of problems involving single phase AC quantities in the presence of both resistive/inductive and resistive/capacitive circuit elements, arranged in either series or parallel

- 5.6 Power factor is defined and concepts of real and reactive power usage are applied to solution of problems involving RL and RC elements
- 6 Analyse operation of polyphase AC circuits**
- 6.1 How three phase AC may be developed out of simple single phase AC is explained
- 6.2 Voltage and current relationships between line and phase in both Star and Delta 3 phase connections are derived
- 6.3 Standard Star to Delta and Delta to Star conversion relationships for current and voltage are derived
- 6.4 Numeric problems involving both balanced and unbalanced circuit loads are solved
- 6.5 Relationships between kW, kVA and kVAR for 3 phase AC circuits is derived
- 6.6 Calculations are performed using the relationship between kW, kVA and kVAR to solve problems in 3 phase AC circuits
- 7 Describe basic operating principles of shipboard DC machinery**
- 7.1 Schematic circuits are prepared for separately excited, series, shunt and compound connected generators and motors to illustrate wiring arrangements used with DC machines
- 7.2 EMF equation for a DC generator to solve shipboard problems is applied
- 7.3 Torque equation for a DC motor to solve shipboard problems is applied
- 7.4 Expression linking back EMF parameters for a DC motor is derived and used to solve shipboard problems
- 7.5 Various *losses* that can occur in DC motors and generators are calculated
- 8 Perform calculations related to operation of AC generators**
- 8.1 Construction features of the AC synchronous generator are explained
- 8.2 EMF equation for an AC generator is derived, taking into account distribution and pitch factors
- 8.3 Expression for the magnitude and speed of the rotating flux generated by a three-phase supply is

- derived
- 8.4 Voltage regulation for synchronous generator is defined
- 8.5 Effect of power factor on load characteristic of an AC generator is illustrated
- 9 Perform calculations related to operation of three-phase AC induction motors**
- 9.1 Construction features of the AC induction motor are explained
- 9.2 Expression for slip of an induction motor rotor is derived and applied to frequency of its rotor EMF and current
- 9.3 Expression for magnitude of rotor EMF and current is derived, taking into account distribution and pitch factors
- 9.4 Relationships between rotor torque, rotor losses and slip indicating factors that affect torque are outlined
- 9.5 Significance of torque/slip curves for an induction motor is explained
- 9.6 Relationship between starting torque and applied voltage is established and consequences of this upon starting methods are outlined
- 10 Explain operating principles of basic electrical instrumentation**
- 10.1 Schematic circuit diagrams are prepared that illustrate the main features and applications of moving coil and moving iron voltmeters and ammeters
- 10.2 Schematic circuit diagrams are prepared that illustrate the main features and applications of air and iron cored dynamometer type wattmeters
- 10.3 Dangers associated with current and voltage transformers on high current and voltage systems are identified

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain intermediate principles of marine electrotechnology
- Explain Faraday's and Lenz's Laws of Electromagnetic Induction
- Identify and apply relevant mathematical formula and techniques to solve problems related to marine electrotechnology
- Identify and interpret numerical and graphical information, and perform mathematical calculations such as the relationship between starting torque and applied voltage in three phase AC induction motors
- Identify, collate and process information required to perform calculations related to marine electrotechnology
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret written information needed to perform intermediate electrical calculations
- Use calculators to perform mathematical calculations

Required Knowledge:

- AC induction motors
- AC principles
- Batteries
- Circuit diagrams
- DC motors
- Difference between AC and DC
- Electrical:
 - current
 - power
 - units of measurement
- Electromagnetic:
 - force
 - induction
- Intermediate electrical circuits
- Kirchhoff's circuit laws
- Magnetic circuits
- National and international maritime regulations, IMO Conventions and Codes applicable to the operation of electrical and electronic control equipment on vessels of typically unlimited propulsion power
- Ohm's Law
- Polyphase AC circuits

- Principles of:
 - electrical safety
 - electrolytic action
 - electromagnetism
- Parallel circuits
- Principles and procedures for electrical and electronic measurement
- Series circuits
- Shipboard DC machinery
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- making accurate and reliable calculations
- solving problems using appropriate laws and principles.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where intermediate principles of marine electrotechnology can be applied
- electrical diagrams, specifications and other information required for performing intermediate electrical calculations
- technical reference library with current publications on intermediate marine electrotechnology
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the

workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate applying intermediate principles of marine electrotechnology
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Key parameters of magnetic circuit may include:
- Current
 - Flux
 - Flux density
 - Magnetising force
 - Magneto motive force
- Circuit combinations may include:
- Resistive/capacitive
 - Resistive/inductive
- Losses may include:
- Copper losses
 - Iron losses or magnetic losses
 - Mechanical losses

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6002A Apply intermediate principles of marine engineering thermodynamics

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to apply intermediate principles of marine engineering thermodynamics to perform calculations and explain the operation of marine machinery, including engines, compressors, steam plants, refrigeration and air-conditioning units.

Application of the Unit

This unit applies to the work of a Marine Engineers Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|---|
| 1 Calculate heat mixtures involving water equivalent, change of phase, and feed heating | <ul style="list-style-type: none">1.1 Key terms associated with heat transmission are explained1.2 Heat transfer is calculated between liquids and solids using water equivalent1.3 Flow is differentiated from non-flow heating and cooling processes1.4 Effects of superheating and sub-cooling on steam plant efficiency are outlined1.5 Mass balance throughout a steam plant cycle is constructed and effects of pressure and temperature on cycle efficiency are analysed |
| 2 Determine fluid properties of steam | <ul style="list-style-type: none">2.1 Relationship between saturated and superheated steam, including dryness fraction, is explained2.2 Regions on a temperature/enthalpy diagram are constructed and identified2.3 Steam tables are used to determine fluid properties2.4 Changes of enthalpy throughout a system are identified2.5 Operating principles and application in steam plants of throttling, separating and combined throttling, and separating calorimeters are explained2.6 Calorimeters are applied to determine dryness fraction of steam |
| 3 Calculate boiler efficiency and boiler water density | <ul style="list-style-type: none">3.1 Efficiency of saturated and superheated steam boilers is calculated3.2 Where loss of efficiency occurs is shown3.3 Concept of parts per million for density of boiler water is explained3.4 Changes in boiler water density due to contaminated feed are calculated3.5 How acceptable dissolved solids and water levels may be maintained in a boiler is shown |

- 4 Determine steam turbine velocity**
 - 4.1 Principles and differences between pressure and velocity changes in reaction and impulse steam turbines are explained
 - 4.2 Velocity diagrams to calculate steam velocity at exit of nozzles and blades are applied
 - 4.3 Graphical and mathematical methods to determine blade angle, steam velocity, thrust, power, and efficiency of single stage impulse and reaction steam turbines are applied

- 5 Calculate calorific value and the air fuel ratio for solid and liquid fuels**
 - 5.1 Elements and compounds present in fuel and the products of combustion are evaluated
 - 5.2 Air/fuel ratio, gravimetric and volumetric analysis are explained
 - 5.3 Chemical equations for combustion elements and compounds are developed and elements of combustion are analysed
 - 5.4 Bomb calorimeter is used to find calorific value of a fuel
 - 5.5 Formula to calculate calorific value of a fuel from mass analysis of fuel is applied
 - 5.6 Air required for combustion is calculated

- 6 Calculate thermal expansion**
 - 6.1 Coefficient of linear expansion and its significance to different materials is explained
 - 6.2 Clearances and shrunk fit allowances are calculated
 - 6.3 Stresses generated with restricted expansion are calculated
 - 6.4 Volumetric expansion of solid and liquids, and allowance required for fluid expansion in tanks and systems is calculated

- 7 Apply gas law equations**
 - 7.1 Compression and pressure ratio is explained and related to combined gas law equation
 - 7.2 Combined gas law equation is applied to constant volume and constant pressure processes
 - 7.3 Specific gas constant of a gas or mixture of gases is

calculated

- 7.4 Differentiation is made between specific heat of gases, ratio of specific heats, work and change in internal energy
- 7.5 Changes in internal energy associated with specific heat of gases, ratio of specific heats and work are calculated
- 8 Calculate gas conditions, work and thermal efficiency of internal combustion engines**
 - 8.1 Processes associated with expansion and compression of gases are explained
 - 8.2 Gas conditions and index of compression at end of each process are determined
 - 8.3 Work formula is derived for each process and derived formula is applied to calculate work and power per cycle
 - 8.4 Air standard cycle is applied to determine amount of fuel consumed and work produced by an internal combustion engine
 - 8.5 Differentiation is made between air standard efficiency and thermal efficiency
 - 8.6 Thermal efficiency of engine cycles is calculated
- 9 Perform calculations related to refrigeration and air conditioning cycles**
 - 9.1 Pressure/enthalpy diagram is applied to describe the refrigeration cycle
 - 9.2 Importance of superheating and under-cooling in determining stability and well-functioning of refrigeration systems is explained
 - 9.3 Properties and hazards of refrigerants used in refrigeration and air conditioning systems are identified
 - 9.4 Refrigeration tables are applied to calculate refrigeration effect, cooling load and coefficient of performance
 - 9.5 Basic air conditioning cycles are explained
 - 9.6 Wet and dry bulb temperatures are explained
 - 9.7 Humidity conditions are determined using psychrometric charts

10 Solve heat transfer problems involving flat plates and thin cylinders

- 10.1 Different *forms of heat transfer* are identified
- 10.2 Heat flow through composite flat plates using thermal conductivity is calculated
- 10.3 Interface temperatures of composite flat layers are calculated
- 10.4 Radial conduction of heat through a thin cylinder is calculated

11 Solve problems related to single and multi stage air compression

- 11.1 Pressure–volume diagram is applied to describe operating cycle of reciprocating compressors
- 11.2 Work done by constant pressure, isothermal processes and polytropic processes in reciprocating compressors is calculated
- 11.3 Effect of clearance volume on efficiency of reciprocating compressors is explained
- 11.4 Volumetric efficiency and free air discharge in reciprocating compressors is calculated
- 11.5 Volume, mass flow and temperature are calculated at completion of each process in reciprocating compressors
- 11.6 How inter-cooling and after-cooling affects overall efficiency of reciprocating compressors is explained
- 11.7 Quantity of cooling water required by reciprocating compressors is calculated

12 Perform calculations related to engine power and heat balances

- 12.1 Indicator and timing diagrams for internal combustion engines are plotted
- 12.2 Formula is applied to solve problems related to indicated power of internal combustion engines
- 12.3 Formula is applied to solve problems related to brake power of internal combustion engines
- 12.4 Morse test is applied to determine the indicated power of internal combustion engines
- 12.5 Tabular and graphical heat balance diagrams are applied to calculate mechanical, thermal and overall efficiencies of internal combustion engines

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain basic principles of marine engineering thermodynamics
- Identify and apply relevant mathematical formulas and techniques to solve basic problems related to marine engineering thermodynamics
- Identify and interpret numerical and graphical information, and perform basic mathematical calculations related to marine engineering thermodynamics, such as gas expansion and contraction, heat transfer, and thermal efficiency
- Identify, collate and process information required to perform basic calculations related to marine engineering thermodynamics
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret written information needed to perform basic calculations related to marine engineering thermodynamics
- Use calculators to perform mathematical calculations

Required Knowledge:

- Air compressor:
 - components
 - faults and hazards
 - first law of thermodynamics
 - operating cycle of reciprocating air compressors
 - performance characteristics
 - property diagrams
 - types
 - uses
 - working principles of reciprocating compressors
- Enthalpy
- Expansion and compression of gases
- Gas laws
- Internal combustion engines:
 - second law of thermodynamics
 - heat engine cycles

- operating principles of two stroke and four stroke internal combustion engines
- performance characteristics
- improvements
- Principles of:
 - heat transfer
 - refrigeration
- Refrigeration and air conditioning cycles
- Steam plants
- System International (SI) units
- Thermal efficiency calculations
- Thermodynamic principles
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- making accurate and reliable calculations
- solving problems using appropriate laws and principles.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where intermediate principles of marine engineering thermodynamics can be applied
- diagrams, specifications and other information required for performing intermediate calculations related to marine engineering thermodynamics
- technical reference library with current publications on intermediate marine thermodynamics
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that

impacts on work activities

- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate applying intermediate principles of marine engineering thermodynamics
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. **Bold italicised wording**, if used in the performance criteria, is detailed below.

Key terms may include:

- Enthalpy of fusion
- Evaporation
- Sensible heat
- Transfer of heat energy

Processes may include:

- Adiabatic
- Isothermal

Fluid properties include:

- Polytropic
- Density
- Dryness fraction
- Enthalpy of water
- Pressure
- Saturated steam
- Specific volume
- Superheated steam
- Temperature
- Conduction
- Convection
- Radiation

Forms of heat transfer may include:

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6003A Apply intermediate principles of marine mechanics

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to apply intermediate principles of marine mechanics and to perform associated calculations needed to operate and maintain marine machinery.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|---|
| 1 Apply principle of moments to | 1.1 Equilibrium of solids is explained |
|--|---|

- determine forces in supports, connections, bearings and support systems**
- 1.2 Polygon of forces is applied to determine an unknown force
 - 1.3 Principle of moments is applied to solve moments of any quantity
 - 1.4 Resultant of a system of co-planer forces is calculated
 - 1.5 Twisting moment due to engine crank mechanisms is calculated
 - 1.6 Moments of areas and solids are calculated
- 2 Perform friction calculations**
- 2.1 Laws of friction are applied to solve problems involving friction in inclined planes
 - 2.2 Coefficient of friction is converted to angle of repose
 - 2.3 Friction theory is applied to solve problems involving screw threads
 - 2.4 Brake torque is analysed and problems are solved relating to work lost on brake shoes and brake discs
- 3 Solve motion problems**
- 3.1 Linear velocity/time and acceleration/time graphs are applied to derive standard linear formula
 - 3.2 Problems of linear and angular motion involving uniform acceleration and deceleration are solved
 - 3.3 Marine engineering problems involving free falling bodies are solved
- 4 Solve problems using principle of momentum**
- 4.1 Relationship between momentum and impulse is explained
 - 4.2 Conservation of energy theory is applied to problems involving collision of perfectly elastic bodies
- 5 Solve problems using principles of dynamics**
- 5.1 Centripetal force is distinguished from centrifugal force

- 5.2 Relationship between centripetal and centrifugal force and mass, angular velocity and radius is clarified
- 5.3 Problems are solved involving centripetal and centrifugal forces
- 5.4 Centripetal acceleration is distinguished from centrifugal force
- 5.5 Out-of-balance forces on co-planer systems are calculated
- 5.6 Bearing reactions in rotating shafts are determined
- 5.7 Radius of gyration and moment of inertia when applied to rotating bodies is explained
- 5.8 Centrifugal forces in ***governors*** are calculated
- 5.9 Principles of dynamics are applied to solve problems involving rotating bodies, accelerating shafts, motors and flywheels
- 6 Calculate stresses and strains on components due to axial loading and restricted thermal expansion**
 - 6.1 Reduction in area and percentage elongation of tensile test specimens is calculated
 - 6.2 Stresses in composite bodies of dissimilar dimensions and dissimilar materials are calculated
 - 6.3 Problems involving thermal stress on components due to temperature change with free and restricted expansion are solved
- 7 Apply thin cylinder theory to determine stresses in pressure vessels**
 - 7.1 Stress on thin-shelled pressure vessels due to internal pressure is calculated
 - 7.2 Formula for calculating stress on thin-shelled pressure vessels to incorporate ***special conditions*** is modified
- 8 Apply torsion theory to calculate shear stress**
 - 8.1 Torsion equation is applied to solve problems involving solid and hollow shafts
 - 8.2 Power transmitted in shafts and coupling bolts is calculated

- 8.3 Torsion equation is applied to calculate stress and deflection in a close-coiled helical spring
- 8.4 Power transmitted by shafts and couplings is calculated
- 9 Solve problems involving fluids**
- 9.1 Variation of fluid pressure with depth is calculated
- 9.2 Bernoulli's Theorem is used to solve problems of velocity, pressure and head in pipes and ducted systems
- 9.3 Archimedes' Principle is used to solve problems related to floating vessels using real and apparent weight
- 10 Apply beam theory to solve problems**
- 10.1 Reactions of a loaded beam are calculated
- 10.2 Shear force and bending moment diagrams are constructed for simply supported and cantilever beams
- 10.3 Shear force and bending moment diagrams for beams with concentrated and uniformly distributed loads are calculated
- 10.4 Beam equation is applied to derive stresses in beams loaded with concentrated and uniformly distributed loads
- 10.5 Beam equation is applied to calculate bending stresses

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain basic principles of marine mechanics
- Identify and apply relevant mathematical formulas and techniques to solve basic problems related to marine mechanics

- Identify and interpret numerical and graphical information, and perform mathematical calculations to solve problems related to fluids and stresses
- Identify, collate and process information required to perform basic calculations related to marine mechanics
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret written information needed to perform basic calculations in marine mechanics
- Use calculators to perform mathematical calculations

Required Knowledge:

- Beam theory
- Conservation of energy theorem
- Factor of safety
- Fluids
- Forces:
 - balanced and unbalanced forces
 - centre of gravity
 - conditions for equilibrium
 - coplanar
 - definitions of matter, mass, weight, force, density and relative density
 - forces
 - moments of couples
 - parallelogram and triangle of forces
 - pressure
 - scalar and vector quantities
 - vector representation of forces
- Joint efficiency factor
- Laws of:
 - friction
 - motion
- Momentum
- Motion:
 - action and reaction
 - force, velocity and acceleration
 - linear and angular motion
 - momentum
 - Newton's laws of motion
- Pressure vessels

- Principle of moments
- Principles of dynamics
- Relationship between torque and power
- Stress and strain:
 - direct stress and strain
 - Hooke's law
 - load extension graphs
 - modulus of elasticity
 - shear stress and strain
- Thin cylinder theory
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- making accurate and reliable calculations
- solving problems using appropriate laws and principles.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where intermediate principles of marine mechanics can be applied
- diagrams, specifications and other information required for performing calculations related to marine mechanics
- technical reference library with current publications on marine mechanics
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other

- simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate applying intermediate principles of marine mechanics
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Governors may include:

- Porter
- Watt

Special conditions may include:

- Joint efficiencies
- Safety factors

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6004A Apply intermediate principles of naval architecture

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to perform intermediate calculations related to the seaworthiness of commercial vessels, including those dealing with vessel stability, fuel consumption, power and symmetrical flooding.

Application of the Unit

This unit applies to the work of a Marine Engineers Class 2 and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Calculate 1.1 Simpson's Rules are applied to find typical and non-conforming

shipboard areas, volumes and displacement		<i>shipboard areas</i>
	1.2	Simpson's Rules are applied to calculate water plane areas or transverse sectional areas to determine underwater volumes
	1.3	Simpson's Rules are applied to immersed tonnes per centimetre values to determine displacement
	1.4	Tonnes per centimetre is applied to determine change in mean draught due to addition or removal of mass
2 Calculate coefficients of form and changes in draught associated with fluid density	2.1	Application of <i>coefficients of form</i> are identified and explained
	2.2	Problems are solved involving coefficients of form
	2.3	Impact of hull modification on hull form coefficients is explained
	2.4	Problems of coefficients of form are solved following change in length by mid body insertion/removal
	2.5	Relationship between underwater volume/draught and fluid density is explained
	2.6	Application of freeboard markings for Load Line Rules is explained
	2.7	Density correction formula is defined
	2.8	Change in mean draught due to change in density is calculated
3 Solve stability problems	3.1	Effects of adding, removing and transferring mass on board or from a vessel are explained
	3.2	Calculations are performed to solve problems involving suspended masses
	3.3	Positive, neutral and negative stability are distinguish from each other
	3.4	How centre of gravity is calculated for redistribution, addition and/or removal of masses is explained, including the use of derricks
	3.5	Problems are solved involving vertical and horizontal movement of masses to calculate KG and GM for typical vessel loaded conditions, together with true shift in vessel centre of gravity between specified conditions and small angle transverse stability
	3.6	Vessel righting moment and GZ are explained
	3.7	Calculations are performed to solve problems of small angle transverse stability

- 3.8 Purpose of an Inclining Experiment is explained
- 3.9 Formula for determining initial stability characteristics is applied
- 3.10 Calculations are performed to solve problems using Inclining Experiments
- 4 Calculate loss of transverse stability due to fluid free surface**
 - 4.1 Principles of liquid free surface are explained
 - 4.2 Principles of metacentric height are explained
 - 4.3 Centre of gravity solid is distinguished from centre of gravity fluid
 - 4.4 Application of the second moment of area using parallel axis theorem to obtain free surface moment of inertia and use of density correction between vessel and free surface fluids is explained
 - 4.5 Calculations are performed to solve problems of liquid free surface for simple compartments, including correction for free surface on metacentric height [GM] and fluid mass on centre of gravity [KG]
- 5 Calculate centroids and solve problems of hydrostatics**
 - 5.1 Importance of area and volume centroids and methods of determining KG, LCF, LCB and bulkhead area centroids is explained
 - 5.2 Calculations are performed to solve problems related to area and volume centroids
 - 5.3 Methods of calculating pressures and loads on typical tank structures for different filling rates, accidental flooding or tank testing are explained
 - 5.4 Use of flat panel stiffeners and shear force reactions applicable to vertical bulkheads is explained
 - 5.5 Calculations are performed to solve problems in hydrostatics relating to pressure and loads on ship structures, including bulkheads, stiffeners and shear forces
- 6 Solve problems involving propellers and powering**
 - 6.1 Factors that influence the *speed of advance* are explained
 - 6.2 Calculations are performed to solve problems of single screw vessels
 - 6.3 Relationships between propulsive coefficient, quasi propulsive coefficient and *related powers* together with typical values of losses for transmission, hull and propeller are explained
 - 6.4 Components of *hull resistance* are explained

- 6.5 Calculations are performed to show impact of resistance augmentation and thrust deduction factors on powering of full size vessels
- 6.6 Causes, effects and methods of reducing cavitation are explained
- 7 Calculate voyage and daily fuel consumptions**
- 7.1 Admiralty coefficient for fuel consumption is stated taking account of values for ship speed, shaft power and displacement
- 7.2 Vessel fuel consumption is calculated using admiralty coefficient
- 7.3 Calculations are performed to show relationship between fuel consumption and displacement
- 7.4 Calculations are performed to show relationship between daily fuel consumption and speed
- 7.5 Calculations are performed to show relationship between voyage consumption, speed and distance travelled
- 7.6 Voyage and daily fuel consumption are calculated taking into account propulsion, domestic loads and fuel reserve requirements
- 8 Solve problems related to symmetrical flooding**
- 8.1 Volume lost-volume gained relationship for flooded compartments is explained
- 8.2 Modified volume lost by compartment subdivision is explained using a horizontal flat
- 8.3 Modified volume lost by compartment permeability is explained, including consideration of cargo stowage factor and relative density details
- 8.4 Problems of symmetrical flooding of simple box-shaped and standard hull forms involving flooding above and below horizontal subdivisions and different permeabilities are solved

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain intermediate principles of naval architecture

- Identify and apply relevant mathematical formulas and techniques to solve problems related to speed, fuel consumption and stability of commercial vessels
- Identify and interpret numerical and graphical information, and perform mathematical calculations related to shipboard areas and volumes, vessel displacement, ship dimensions, centre of gravity, vessel speed and fuel consumption
- Identify, collate and process information required to perform calculations related to speed, fuel consumption and stability of commercial vessels
- Impart knowledge and ideas through oral, written and visual means
- Read and interpret written information needed to perform calculations related to the seaworthiness of commercial vessels
- Use calculators in performing mathematical calculations

Required Knowledge:

- Admiralty and fuel coefficients
- Buoyancy
- Centre of gravity:
 - KG, VCG and LCG
 - calculations
- Density correction formula
- Displacement
- Draught alterations
- Fuel consumption calculations
- Hydrostatic pressure
- Metacentre
- Principle of displacement
- Propellers and powering
- Ship:
 - displacement
 - measurements
 - stability
 - stability calculations
- Shipboard areas
- Shipboard volumes
- Simpson's Rules
- Structural members of a ship and the proper names of various parts
- Symmetrical flooding
- Tonnes per centimetre immersion (TPC)
- Traverse stability

- Trim and stress tables, diagrams and stress calculating equipment
- Vessel speed calculations
- Watertight integrity
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- making accurate and reliable calculations
- solving problems using appropriate laws and principles.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where intermediate principles of naval architecture can be applied
- vessel diagrams and specifications and other information required for mathematical calculations related to shipboard areas and volumes, vessel displacement, centre of gravity, vessel speed, fuel consumption, vessel stability, power and symmetrical flooding
- technical reference library with current publications on naval architecture
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate applying intermediate principles of naval architecture
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Shipboard areas may include:

- Bulkheads
- Elemental areas
- Water planes

Coefficients of form may include:

- Block coefficient
- Midship section area coefficient
- Prismatic coefficient
- Waterplane area coefficient

Centre of gravity refers to:

- Centre of gravity (KG)
- Longitudal centre of gravity (LCG)
- Vertical centre of gravity (VCG)

Speed of advance includes:

- Apparent and true slips
- Taylor Wake Fraction
- Theoretical, apparent and true speeds

- Related powers includes:
- Wake speed
 - Delivered
 - Effective
 - Indicated
 - Shaft
 - Thrust
- Hull resistance includes:
- Frictional
 - Residuary
 - Total

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6005A Apply advanced principles of marine electrotechnology

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to explain advanced marine electrotechnology principles and to perform advanced electrical calculations.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|--|-----|---|
| 1 Analyse circuits incorporating resistance, inductance and capacitive elements | 1.1 | Mathematical problems involving RL and RC combinations in direct current (DC) circuits are solved |
| | 1.2 | Mathematical problems involving resistive, inductive and capacitive reactance and overall circuit impedance in alternating current (AC) circuits are solved |
| | 1.3 | Why large power factors are desirable in AC circuits is explained |
| | 1.4 | Mathematical problems related to power factor correction mechanisms are solved |
| | 1.5 | Conditions for resonance in series and parallel RLC circuit combinations are analysed |
| | 1.6 | Mathematical problems involving resonance in series and parallel RLC circuit combinations are solved |
| | 1.7 | Differing consequences of resonance to both RLC series and RLC parallel circuit are illustrated |
| 2 Apply complex number theory to analyse AC circuit performance | 2.1 | J operator is explained |
| | 2.2 | Rectangular notation of j operator is related to comparable trigonometric and polar notations |
| | 2.3 | J operator is used in the addition and subtraction of phasors, applying the most appropriate notation to the solution of phasor problems involving current, voltage and impedance |
| | 2.4 | Conductance, admittance and susceptance are distinguished from each other in terms of resistance, impedance and the j operator |
| | 2.5 | Problems involving RL and C elements in different circuit combinations using j operator theory are solved |
| | 2.6 | Power in AC circuit applications using j operator theory is calculated |
| 3 Analyse operating principles of electrical instrumentation | 3.1 | Mathematical calculations are performed to demonstrate how moving coil and moving iron instruments may have their ranges changed |
| | 3.2 | Mathematical calculations are performed to demonstrate how dynamometer type wattmeters may have their measuring ranges extended |
| | 3.3 | Construction, operating principles and functions of <i>electrical meters</i> are outlined |

- 3.4 Principal methods and instruments used in resistance measurement are detailed
- 3.5 Resistance measurements are conducted and verified using appropriate electrical instrumentation
- 4 Analyse operating principles of DC generators**
 - 4.1 EMF equation is applied to solve problems related to DC generators
 - 4.2 Losses that may occur in DC generators are analysed
 - 4.3 Appropriate parametric relationships for DC generator losses, together with expressions for output power and efficiency are derived and associated numerical problems are solved
 - 4.4 Basic principles of DC armature winding techniques are explained
 - 4.5 Generator armature reaction is explained
 - 4.6 Expression for armature EMF is derived and applied to solve problems related to DC generators
 - 4.7 Commutator arcing and how this might be minimised or eliminated is explained
 - 4.8 Open circuit and load characteristic curves for separately excited, shunt, and compound wound DC generators are derived
- 5 Analyse operating principles of DC motors**
 - 5.1 DC torque equation is applied to solve problems related to DC motors
 - 5.2 Losses that may occur in DC motors are analysed
 - 5.3 Appropriate parametric relationships for DC motor losses, together with expressions for output power and efficiency are derived and associated numerical problems are solved
 - 5.4 Speed equation for a DC motor is derived and corresponding characteristics for different winding configurations are sketched
 - 5.5 Speed equation and characteristics of different DC motor configurations are applied to explain how DC motor speed may be controlled
 - 5.6 Reasons for armature reaction and methods of compensating for its effects are identified
 - 5.7 Why DC motors need variable starting resistors are explained
- 6 Compare operation of**
 - 6.1 Marine applications of synchronous motors and generators are identified

- synchronous motors and generators**
- 6.2 Mathematical expression for the magnitude and rotational speed of the magnetic field produced by a three-phase supply is derived
 - 6.3 Operating principle of synchronous motors is explained
 - 6.4 Operation of synchronous motors and generators are compared and contrasted
 - 6.5 Problems using phasor diagrams and mathematical expressions involving the effects of loads and excitation on synchronous motors are solved
 - 6.6 Advantages and disadvantages of AC synchronous motors and generators are analysed
- 7 Analyse operation of single and three-phase transformers**
- 7.1 Basic transformation ratio and EMF equation for an ideal transformer is derived
 - 7.2 No load and on load phasor diagrams for an ideal transformer are constructed, with negligible voltage drop through its windings
 - 7.3 Causes of actual transformer losses are explained and relationships associated with the transformer equivalent circuit are derived
 - 7.4 Open circuit and short circuit tests are applied to calculate transformer efficiency and voltage regulation
 - 7.5 *Problems* related to the operation of auto-transformers are solved
- 8 Analyse requirements for parallel operation of AC and DC generators**
- 8.1 Conditions required for shunt, series and compound wound DC generators to operate in parallel are identified
 - 8.2 Numerical problems related to parallel operation of shunt, series and compound wound DC generators are solved
 - 8.3 Conditions required for AC generators to operate in parallel are identified
 - 8.4 Numerical problems related to parallel operation of AC generators are solved

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain advanced principles of marine electrotechnology
- Identify and apply relevant mathematical formulas and techniques to solve complex problems related to marine electrotechnology
- Identify and interpret numerical and graphical information, and perform mathematical calculations to perform tasks such as using phasor diagrams and mathematical expressions to explain the effects of loads and excitation on synchronous motors
- Identify, collate and process information required to perform complex calculations related to marine electrotechnology
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret written information needed to perform complex electrical calculations
- Use calculators to perform complex mathematical calculations

Required Knowledge:

- AC principles
- Circuits:
 - resistance
 - inductance
 - capacitance
- Complex number theory
- DC generators
- DC motors
- Difference between AC and DC
- Electrical:
 - circuits
 - current
 - power
 - safety
 - units of measurement
- Electromagnetic:
 - force
 - induction
- Electrical meters:
 - energy meters
 - frequency meters
 - induction disc watt meters
 - power factor meters

- Ohm's Law
- Operating principles of:
 - DC generators
 - DC motors
 - electrical instrumentation
- Parallel circuits
- Parallel operation of AC and DC generators
- Power factor
- Power factor correction mechanisms
- Resistance
- Single and three-phase transformers
- Synchronous motors and generators
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- making accurate and reliable calculations
- solving problems using appropriate laws and principles.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where advanced principles of marine electrotechnology can be applied
- electrical diagrams, specifications and other information required for performing advanced electrical calculations
- technical reference library with current publications on marine electrotechnology
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities

- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate applying advanced principles of marine electrotechnology
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Electrical meters may include:

- Energy meters
- Frequency meters
- Induction disc watt meters
- Power factor meters

Problems may include:

- Tapping point
- Turns
- Voltages

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6006A Apply advanced principles of marine engineering thermodynamics

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to apply advanced principles of marine engineering thermodynamics to perform calculations and explain the operation of marine machinery, including internal combustion and gas turbine engines, air compressors, steam condensers and refrigeration units.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|---|
| 1 Calculate heat energy with and without phase change | <p>1.1 Enthalpy is applied to heat mixture calculations with or without phase change</p> <p>1.2 Enthalpy is applied to calculate resultant conditions of hot wells involving multiple returns</p> <p>1.3 Steam conditions in a system when using throttling devices and separators are calculated</p> <p>1.4 Entropy is distinguished from enthalpy</p> <p>1.5 Entropy values are determined from standard tables</p> |
| 2 Analyse change of phase and state diagrams | <p>2.1 <i>Tables and/or diagrams</i> are use to find enthalpy and entropy values for liquid, part liquid-part vapour and vapour states</p> <p>2.2 Carnot cycle is outlined</p> <p>2.3 Rankine cycle is outlined</p> <p>2.4 Isentropic efficiency is explained</p> <p>2.5 Problems are solved involving the efficiency of steam turbines operating in the Rankine cycle</p> |
| 3 Apply Dalton’s law of partial pressures to steam condensers | <p>3.1 Dalton’s Law is applied to calculate air and condensate extraction from condensers</p> <p>3.2 Problems are solved involving cooling water mass flow and cooling water pump work</p> |
| 4 Apply chemical equations for complete and incomplete combustion | <p>4.1 Atomic and molecular weights and kilogram-mol are explained</p> <p>4.2 Calorific value of a fuel is calculated by chemical formula</p> <p>4.3 Mass of air required for stoichiometric combustion is calculated by gravimetric and volumetric analysis</p> <p>4.4 Air fuel ratio is determined when supplied with composition of fuel and exhaust gas analysis</p> |
| 5 Apply gas laws to analyse internal combustion engine | <p>5.1 Universal gas constant form AVOGADRO S hypothesis is determined</p> |

efficiencies

- 5.2 Heat transfer is calculated for constant volume and constant pressure processes
- 5.3 First law of thermodynamics is applied to *thermodynamic processes* in a closed system
- 5.4 Second law of thermodynamics is applied to find thermal efficiency of Carnot cycle
- 5.5 Mathematical formula is applied to solve problems related to ideal constant volume air standard cycle

- 5.6 Mathematical formula is applied to solve problems related to diesel and dual cycles

6 Calculate performance of internal combustion and gas turbine engines

- 6.1 P/V and out of phase engine indicator diagrams are analysed
- 6.2 Work, power, mean effective pressure and thermal efficiency of internal combustion engine cycles is calculated
- 6.3 Heat transfer to jacket cooling systems is calculated
- 6.4 Open and closed systems for gas turbines are outlined
- 6.5 Temperature/entropy diagrams are applied to illustrate gas turbine cycles
- 6.6 Power, isentropic efficiencies, thermal efficiency, work and fuel consumption for gas turbine cycles is calculated
- 6.7 Methods to increase efficiency of gas turbines are specified
- 6.8 Reheaters and intercoolers and how they improve efficiency is explained

7 Analyse air compressor performance

- 7.1 Compressor types are classified
- 7.2 Volumetric efficiency at free air conditions is explained
- 7.3 Work is calculated for isothermal and adiabatic compression, and effect of clearance for

reciprocating compressor

7.4 Pressure ratio for compressor types is analysed

7.5 Problems are solved relating to multi-staging and intercooling

7.6 Heat transfer to air or cooling water from an air compressor is calculated

7.7 Formula to calculate work and efficiency of centrifugal compressors is derived

8 Analyse vapour compression refrigeration cycles

8.1 Design parameters for a vapour compression cycle are explained

8.2 Pressure/enthalpy diagram is prepared for a refrigeration cycle

8.3 Heat rejected, work done and coefficient of performance (COP) for a basic cycle is calculated

8.4 Effect of sub cooling and superheating is shown on a temperature/entropy diagram

8.5 COP is calculated with evaporators operating at two different pressures

9 Apply psychrometric principles to solve air conditioning problems

9.1 Comfort conditions for air conditioning systems are defined

9.2 Key *parameters* used in defining air condition are illustrated on a psychrometric chart

9.3 Cooling loads are calculated

9.4 Problems associated with air delivering and distribution methods are analysed

9.5 *Methods* of controlling noise and vibration in air conditioning systems are analysed

10 Analyse different methods of heat transfer

10.1 Heat flow through composite divisions is calculated

10.2 Insulation dimensions and interface temperatures are determined

10.3 Problems relating to radiated energy are solved by applying Stefan-Boltzmann Law

10.4 Problems in heat exchangers are solved by applying log mean temperature difference

10.5 Relative efficiency of contra-flow heat exchange is determined

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain advanced principles of marine engineering thermodynamics
- Identify and apply relevant mathematical formulas and techniques to solve advanced problems related to marine engineering thermodynamics
- Identify and interpret numerical and graphical information, and perform advanced mathematical calculations related to marine engineering thermodynamics, such as calculation of power, isentropic efficiencies, thermal efficiency, work and fuel consumption for gas turbine cycles
- Identify, collate and process information required to perform advanced calculations related to marine engineering thermodynamics
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret written information needed to perform complex calculations related to marine engineering thermodynamics
- Use calculators to perform complex mathematical calculations

Required Knowledge:

- Atomic and molecular weights and the kilogram-mol
- Daltons Law of partial pressures
- Enthalpy
- Gas laws
- Gas turbines
- Heat transfer:
 - methods
 - principles
- Internal combustion engine cycles
- Laws of Thermodynamics

- Noise and vibration control:
 - fundamentals of sound
 - noise and vibration problems
 - methods of control
- Operating cycle of reciprocating air compressors
- Operating principles of two-stroke and four-stroke internal combustion engines
- Principles of refrigeration
- Rankine cycle
- System International (SI) units
- Thermal efficiency calculations
- Thermodynamic principles
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- making accurate and reliable calculations
- solving problems using appropriate laws and principles.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where advanced principles of marine engineering thermodynamics can be applied
- diagrams, specifications and other information required for performing advanced calculations related to marine engineering thermodynamics
- technical reference library with current publications on marine thermodynamics
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that

impacts on work activities

- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate applying advanced principles of marine engineering thermodynamics
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. **Bold italicised wording**, if used in the performance criteria, is detailed below.

Tables and/or diagrams may include:

- Pressure–enthalpy
- Pressure–specific volume
- Specific enthalpy–specific entropy
- Temperature–pressure
- Temperature–specific enthalpy
- Temperature–specific entropy

- Thermodynamic processes may include:
- Adiabatic
 - Isobaric
 - Isochoric
 - Isothermal
 - Polytropic
- Parameters may include:
- Adiabatic saturation or constant enthalpy
 - Humidifying or dehumidifying and
 - Latent heat
 - Sensible heat
- Methods may include:
- Duct attenuators
 - Duct lining
 - Lined duct splitters
 - Lined plenums
 - Natural attenuation
 - Sound absorbing materials/placement
 - Vibration isolators
 - White noise

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6007A Apply advanced principles of marine mechanics

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to apply advanced principles of marine mechanics and to perform associated calculations needed to operate and maintain marine machinery.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|--|
| 1 Apply principle of statics to determine forces in structures, connections, support systems, and trusses in two and three dimensions | <p>1.1 Bow's notation is applied to solve problems related to trusses</p> <p>1.2 Individual loads are computed using method of sections</p> <p>1.3 Forces in three-dimensional structures are calculated</p> |
| 2 Calculate friction torque in plate and cone clutches | <p>2.1 Laws of friction are applied to develop formulae, using uniform wear, to find the torque in a plate and cone clutch</p> <p>2.2 Laws of friction are applied to develop formulae, using uniform pressure, to find the torque in plate and cone clutches</p> <p>2.3 Power to overcome friction in plate and cone clutches using uniform wear and uniform pressure formulae is computed</p> |
| 3 Calculate displacement, velocity and acceleration in cams, engine mechanisms and gear systems | <p>3.1 Velocity and acceleration diagrams are applied to illustrate relative velocity and acceleration</p> <p>3.2 Output of epicyclic gears is calculated by applying relative velocity and acceleration theory</p> <p>3.3 Inertia loads are calculated using piston velocity and acceleration equations</p> |
| 4 Analyse forces and couples to balance reciprocating machinery | <p>4.1 How primary force balance is obtained is graphically illustrated</p> <p>4.2 Relationship between complete balance and dynamic balance is explained</p> <p>4.3 Reciprocating piston acceleration formula is applied to differentiate between primary and secondary forces</p> <p>4.4 Complete balance for a multicylinder reciprocating engine or machine is illustrated graphically using vector diagrams and computed analytically</p> |

- 5 Apply simple harmonic motion principles to solve problems in free and forced vibration**
- 5.1 Differences in the terms amplitude, frequency and period are explained
 - 5.2 Simple harmonic motion (SHM) equations are derived from the scotch yoke mechanism
 - 5.3 Equations for displacement, velocity, acceleration and frequency in SHM are developed
 - 5.4 Displacement, velocity, acceleration and frequency in SHM in a vibrating spring-mass system are determined
 - 5.5 Spring constant (k) for springs in series and parallel is calculated
 - 5.6 Forced vibration caused by an out-of-balance rotating mass is analysed to derive an expression for amplitude of forced vibration
 - 5.7 *Dangers* of resonance are explained
 - 5.8 Transmissibility factor to calculate frequency and spring rate are applied
- 6 Calculate hoop stresses in rotating rings and stresses in compound bars**
- 6.1 How rotational stress is generated by centrifugal force is explained
 - 6.2 Formula for hoop stress in a rotating ring is applied to calculate hoop stress and/or limiting speed of rotation
 - 6.3 Stresses in compound bars subject to axial loads and/or temperature change are determined
- 7 Apply strain energy and resilience theory to determine stresses caused by impact or suddenly applied loads**
- 7.1 Equation is derived to calculate strain energy in a deformed material
 - 7.2 Stress in a material due to impact or dynamic loads is determined using energy equation
 - 7.3 Equation to calculate stress caused by suddenly applied loads is derived

- 8 Calculate beam deflection**
- 8.1 Macaulay's method is applied to calculate beam deflection
 - 8.2 Deflection of cantilever and simply supported beams is calculated using standard deflection formulae for *different loads*
- 9 Apply Euler's formula to find buckling load of a column**
- 9.1 Effective length of a column with various end restraints is determined
 - 9.2 Slenderness ratio is applied to determine the strength of columns
 - 9.3 Relationship between slenderness ratio and buckling is explained
 - 9.4 How buckling load for a slender column is applied (including a factor of safety) is explained
- 10 Calculate stresses**
- 10.1 How to combine stress formula and calculate stress with combined loading is explained
 - 10.2 Superposition is used to describe stress due to combined axial and bending stress
 - 10.3 Mohr's Circle is employed to illustrate normal and shear stress
 - 10.4 Principal stress formulae are applied to explain how maximum combined normal and shear stress can be obtained
 - 10.5 Principal stress equation is applied to calculate maximum combined shear and normal stress
- 11 Apply thick shell formulae**
- 11.1 Tangential stress distribution caused by internal and external pressure is analysed
 - 11.2 Lamé's theorem is applied to describe stress in thick cylinders due to internal and external pressure
- 12 Apply continuity equation to determine changes in fluid velocity**
- 12.1 Conservation of energy theory is applied to calculate pressure, head and velocity of fluids flowing through orifices

- 12.2 Volumetric and mass flow through a venturi meter is calculated
- 12.3 Forces exerted by flowing fluids either free (jet) or contained are determined, including coefficients of velocity, contraction of area and discharge
- 13 Determine changes in fluid flows through pipe systems and centrifugal pumps**
- 13.1 Difference between steady and unsteady flow is clarified
- 13.2 Viscosity of fluids is analysed and difference between dynamic and kinematic viscosity is explained
- 13.3 Significance of Reynolds number in fluid mechanics is explained
- 13.4 Importance of critical Reynolds number is explained
- 13.5 Flow losses in pipes and fittings are calculated
- 13.6 Changes of velocity of liquids in a centrifugal pump are analysed and entry and exit vane angles are determined

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain advanced principles of marine mechanics
- Identify and apply relevant mathematical formulas and techniques to solve advanced problems related to marine mechanics
- Identify and interpret numerical and graphical information, and perform complex mathematical calculations such as determining hoop stresses in rotating rings and stresses in compound bars
- Identify, collate and process information required to perform complex calculations related to marine mechanics
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret written information needed to perform complex calculations in marine

mechanics

- Use calculators to perform complex mathematical calculations

Required Knowledge:

- Angular and linear motion
- Centre of gravity
- Conservation of energy theorem
- Factor of safety
- Force
- Inertia force
- Joint efficiency factor
- Laws of motion
- Momentum
- Nature and laws of friction
- Polygon of forces
- Pressure vessels
- Reactions
- Simple harmonic motion
- Stress and strain
- Thin cylinder theory
- Turning moment
- Vector diagrams
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- making accurate and reliable calculations
- solving problems using appropriate laws and principles.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where advanced principles of marine mechanics can be applied
- diagrams, specifications and other information required for performing advance calculations related to marine mechanics
- technical reference library with current publications on advanced marine mechanics
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate applying advanced principles of marine mechanics
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- | | |
|------------------------------|--|
| Dangers may include: | <ul style="list-style-type: none">• Catastrophic failure due to physical limitations of machines being exceeded as determined by their susceptibility and resistance to vibrations• Violent swaying motions |
| Different loads may include: | <ul style="list-style-type: none">• Concentrated• Distributed• Combined |

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6008A Apply advanced principles of naval architecture

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to perform complex calculations related to the seaworthiness of commercial vessels, including those dealing with vessel stability, trim, fuel consumption, buoyancy, vessel strength and vibration.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Apply Simpson's First and Second Rules to calculate areas, volumes and displacement of ship shapes using TPC values**
 - 1.1 Simpson's (Mid-Ordinate) First Rule and Second Rule, with typical applications, using half and full ordinates is explained
 - 1.2 Areas of water planes, bulkheads and elemental areas are calculated
 - 1.3 Problems of immersed hull volume, appendage volumes and non-standard tank volumes are solved
 - 1.4 Archimedes Principles of buoyancy are explained
 - 1.5 TPC with application of Simpson's Rules to find displacement is explained
 - 1.6 Change in draught with mass addition and removal using TPC to give parallel sinkage or rise is explained
 - 1.7 Problems of vessel displacement given water plane areas or TPC values are solved
 - 1.8 TPC curves and displacement curves for given values are constructed
- 2 Apply ship form coefficients**
 - 2.1 *Ship form coefficients* and their uses are defined
 - 2.2 Coefficients are calculated given underwater form particulars
 - 2.3 Problems of ship form coefficients following change in length and draught are solved
- 3 Calculate changes in draft due to fluid density**
 - 3.1 Load line freeboard measurement and markings required for change in fluid density are explained
 - 3.2 Formula for change in mean draft due to change in density is derived
 - 3.3 Change in draft between fluids of two densities are calculated
 - 3.4 Formula to derive fresh water allowance is applied

- 3.5 Changes in mean draft due to changes in density and loading are calculated
- 4 Solve stability problems**
 - 4.1 Calculations are performed to solve problems associated with adding, removing and transferring masses on ships
 - 4.2 Centre of gravity of a suspended mass is explained
 - 4.3 Calculations are performed to solve problems associated with suspended masses
 - 4.4 How KG and LCG can be obtained from stability information is explained
 - 4.5 Creation of overturning moments by mass addition, removal or transfer transversely, including cargo shift or loss is explained
 - 4.6 Calculations are performed to solve problems of small angle transverse stability
 - 4.7 Purpose of inclining experiments, weighing tests and roll period tests to determine stability characteristics are explained
 - 4.8 Calculations are performed to solve problems associated with inclining experiments and roll period tests
- 5 Calculate loss of transverse stability due to fluid free surface**
 - 5.1 Principles of free surface loss of GM are explained
 - 5.2 KG solid is differentiated from KG fluid
 - 5.3 Second moment of area is applied to obtain free surface moment of inertia and is related to stability criteria for standard conditions
 - 5.4 Problems of liquid free surface for simple and complex geometry compartments including variation in filling rates are solved
 - 5.5 Wall-sided formula and factors that lead to negative GM creating an angle of loll are explained
 - 5.6 Problems involving correction of loll angle are

- solved
- 6 Calculate large angle transverse static and dynamical stability**
- 6.1 How GZ and KN righting levers are obtained from cross curves of stability is explained
 - 6.2 KN values are converted to GZ
 - 6.3 Dynamical stability is explained
 - 6.4 IMO requirements for intact and damaged stability cases as well as different vessel types, using typical values from stability files are applied
 - 6.5 Problems of large angle transverse stability, including changes due to redistribution of mass on board are solved and results against IMO requirements are evaluated
 - 6.6 Graphical solutions to large angle transverse stability problems identifying *key points* are prepared
- 7 Solve problems of hydrostatics**
- 7.1 Importance of area and volume centroids is explained
 - 7.2 Methods of determining KB, LCB, LCF and bulkhead area centroids are explained
 - 7.3 Calculations are performed to determine centroids of shipboard areas and volumes
 - 7.4 Impact of hydrostatic pressure and load on vertical and horizontal surfaces is explained
 - 7.5 Methods of calculating pressure, load, shear force and bending moment diagrams for typical tank structures are applied
 - 7.6 Problems are solved in hydrostatics relating to pressure and loads on ship structures, including graphical solution of shear force diagrams of rectangular bulkheads and their elemental stiffeners
 - 7.7 Effective weld area of bulkhead attachment is calculated
- 8 Perform trim and draft calculations**
- 8.1 Meaning of trim and how trim occurs is explained

- 8.2 Standard trimming moments resulting from mass addition, removal, transfer, flooding or combinations of these factors are explained
 - 8.3 Change of trim is calculated using $MCT1cm$, GML and BML
 - 8.4 Problems of applied trimming moments to determine final vessel draughts are solved
 - 8.5 True mean draft is differentiated from apparent mean draft by applying correction for layer
 - 8.6 Calculations are performed to solve problems associated with true mean draft
 - 8.7 Problems of combined trim and transverse stability from typical fluid transfer in both a longitudinal and transverse direction are solved
- 9 Calculate voyage and daily fuel consumption**
- 9.1 Problems of fuel consumption are solved using the admiralty coefficient for various speed indexes
 - 9.2 Optimum vessel speed for combined propulsive and auxiliary fuel consumptions is determined
 - 9.3 Calculations are performed to show relationships between fuel consumption and displacement
 - 9.4 Calculations are performed to show relationships between daily fuel consumption and speed
 - 9.5 Calculations are performed to show relationships between voyage consumption, speed and distance travelled
- 10 Apply principles of loading to ship structures to determine strength characteristics**
- 10.1 Distribution of concentrated and point masses, buoyancy, load, shear force and bending moments are explained using simple loaded beam principles
 - 10.2 Calculations and diagrams are used to solve problems involving loaded conditions of simple box-shaped vessels, identifying location and value of maximum shear force and bending moments
 - 10.3 Empirical formula is applied to solve problems

involving bending and direct stress in beams

11 Apply empirical formula to solve vibration problems

11.1 *Causes* and *adverse effects* of ship vibration are explained

11.2 Natural hull vibration is explained

11.3 Schlick formula is applied to determine natural frequency of ship hull vibrations

11.4 Ways of preventing or reducing local vibration are identified

12 Solve buoyancy problems

12.1 Calculations are performed to solve problems of lost buoyancy and sinkage into homogeneous mud due to tide fall with insufficient under keel clearance

12.2 Calculations are performed to solve problems of simple box-shaped and standard hull forms involving change in trim due to flooding end compartments

13 Perform rudder calculations

13.1 Types of rudders in use on ships are outlined

13.2 Reasons for using balanced rudders are identified

13.3 Application of force acting normal to a rudder surface (F_n), its components and the influence of Propeller Race Effect is explained

13.4 Rudder Centre of Effort for ahead and astern conditions is obtained to determine torque on rudder stock for conventional rudders or equivalent twisting moment (ETM) for spade rudders

13.5 Calculations are performed involving simple and complex rudder shapes to calculate speed limitations ahead and astern for stated safety factor and material properties

13.6 Calculations are performed involving simple and complex rudder shapes to determine rudder stock and coupling bolt diameters

14 Perform rudder calculations

14.1 Frictional resistance to motion of a vessel given the empirical formulae for frictional coefficient

‘f’ of the form is determined

14.2 Froudes Laws of Comparison is explained

14.3 Meaning of the term ‘corresponding speed’ is explained

14.4 Law of comparison is applied to determine residuary resistance of a ship if residuary resistance of a scale model of vessel is known or can be determined

14.5 Differentiation is made between effective power (naked), P_{SEP} effective power and ship correlation factor

14.6 Effective power requirements of a full sized ship given total resistance to motion measured on a scale model of vessel towed at corresponding speed is calculated

14.7 Problems of resistance and powering for full size vessels and models are solved

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain advanced principles of naval architecture
- Identify and apply relevant mathematical formulas and techniques to solve complex problems related to speed, fuel consumption and stability of commercial vessels
- Identify and interpret numerical and graphical information, and perform mathematical calculations related to shipboard areas and volumes, vessel displacement, ship dimensions, centre of gravity, vessel speed, fuel consumption and hydrostatic pressure
- Identify, collate and process information required to perform calculations related to speed, fuel consumption and stability of commercial vessels
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret written information needed to perform calculations related to seaworthiness of commercial vessels
- Use calculators to perform complex mathematical calculations

Required Knowledge:

- Buoyancy
- Centre of gravity – KG, VCG and LCG
- Centre of gravity calculations
- Density correction formula
- Dynamical stability
- Fuel consumption calculations
- Hydrostatic pressure
- Principle of displacement
- Principle structural members of a ship and the proper names of the various parts
- Rudders
- Ship:
 - displacement
 - measurements
 - resistance
 - stability
 - stability calculations
- Shipboard:
 - areas
 - volumes
- Ship form coefficients
- Simpson's Rules
- Stability problems
- Tonnes per centimetre immersion (TPC)
- Trim and stress tables, diagrams and stress calculating equipment
- Vessel speed calculations
- Vibration
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- making accurate and reliable calculations
- solving problems using appropriate laws and principles.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where advanced principles of naval architecture can be applied
- vessel diagrams and specifications and other information required for mathematical calculations related to shipboard areas and volumes, vessel displacement, ship dimensions, centre of gravity, vessel speed, fuel consumption and hydrostatic pressure
- technical reference library with current publications on naval architecture
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate applying advanced principles of naval architecture
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for

Holistic assessment with other units relevant to the industry

assessment

sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Ship form coefficients may include:
- Block coefficient
 - Midship section area coefficient
 - Prismatic coefficient
 - Waterplane area coefficient
- Key points may include:
- Maximum GZ value and angle of occurrence
 - Points of vanishing stability
 - Range of positive stability
- Causes may include:
- Action of the sea
 - Fluctuating forces on propeller
 - Operation of deck machinery
 - Out-of-balance forces in main or auxiliary machinery
 - Propeller-hull interaction
- Adverse effects may include:
- Discomfort to passengers and crew
 - Failure of equipment
 - Structural failure

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6009A Demonstrate basic knowledge of ship construction

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to explain the basic principles of ship construction.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Outline size, shape and structural components of

1.1 Correct *terms to describe size and shape of vessels* are used

- vessels**
- 1.2 Correct terms to describe structural components of vessels are used
 - 1.3 Correct *terms to describe size or cargo carrying capacity of vessels* are used
 - 1.4 Online and other sources of information on size, shape and structural components of vessels are accessed
- 2 Explain static and dynamic forces and moments exerted on hull of a vessel**
- 2.1 Correct *terms to describe effects of forces exerted on hull* are used
 - 2.2 Various forces acting on the vessel are analysed
 - 2.3 Stresses on various components of the hull are compared as a result of these forces
 - 2.4 Typical weight, load, shear force curves and bending moment diagram are sketched
- 3 Explain how vessel structure is designed to resist distortion**
- 3.1 Scantlings are defined
 - 3.2 Classification society rules for determining scantling sizes are identified
 - 3.3 Main strength members of vessel hull are identified
 - 3.4 Importance of maintaining integrity of principal strength members is explained
- 4 Identify materials used in hull construction**
- 4.1 Types of materials used in hull construction are identified
 - 4.2 Properties of high tensile steel are defined
 - 4.3 Types of steel used in hull construction are identified
 - 4.4 Use of forged, rolled and cast components in hull construction is explained
- 5 Explain methods of joining shipbuilding materials**
- 5.1 Different methods and applications of welding used in shipbuilding and repair are outlined
 - 5.2 How materials are joined so that the strength of components is not impaired is confirmed
 - 5.3 Different methods used to connect aluminium to

- steel are outlined
- 6 Explain bottom structure, forepeak and afterpeak of vessels**
- 6.1 Differentiation is made between different types of keel construction
 - 6.2 Advantages and disadvantage of duct keel in relation to ship strength are explained
 - 6.3 How safe access to the duct keel is obtained, is outlined
 - 6.4 Longitudinally framed double bottom construction is distinguished from a transversely framed double bottom construction
 - 6.5 Differentiation is made between bracket floors and plate floors
 - 6.6 Structural requirements for supporting different types of main engines are outlined
 - 6.7 Classification society rules for construction of forepeak and afterpeak sections are explained
- 7 Explain deck and frame construction**
- 7.1 Longitudinal, transverse and combined framing are compared and contrasted in relation to ship strength
 - 7.2 Position, purpose and construction of a deep frame are explained
 - 7.3 Transition methods from one frame type to another are outlined
 - 7.4 How the strength of frames is maintained when connecting to deck beams and other strength members is explained
 - 7.5 How stress raisers are reduced around hatchways, door *openings*, forecastle, bridge structure, watertight doors and gastight doors is explained
 - 7.6 Bilge keels structure with particular reference to fitment to hull is outlined and purpose for this type of fitting is explained
 - 7.7 Classification requirements and restrictions of sheer strake, keel strake and garboard strake are examined

- 7.8 Requirements for use of suction and discharge valves and fittings in the shell above and below the waterline are outlined
- 7.9 Strength members required for deck machinery are outlined
- 8 Explain construction of watertight bulkheads**
- 8.1 Purpose of bulkheads is stated
- 8.2 Minimum number of bulkheads and their locations are determined
- 8.3 Bulkhead is sketched showing construction and attachment to hull
- 8.4 Purpose, construction and location of collision bulkheads is outlined
- 8.5 Test procedures for bulkheads are clarified
- 8.6 How strength is maintained in openings is explained
- 8.7 Requirements for penetration of collision bulkhead are stated
- 8.8 Situations in which non-watertight bulkheads are fitted are identified
- 9 Explain bow and stern forces**
- 9.1 Differentiation is made between panting and pounding forces
- 9.2 How forepeak sections are strengthened to resist panting and pounding forces is explained
- 9.3 Anchor and cable arrangements in forepeak tank are explained
- 9.4 Strength members in afterpeak sections are outlined
- 9.5 Different rudder support arrangements are clarified
- 10 Outline vessel ventilation systems**
- 10.1 Different types of ventilation systems are clarified
- 10.2 Why ventilator cowls are required is explained
- 11 Explain damage criteria**
- 11.1 How unsymmetrical flooding is minimised is explained

- 11.2 Damage control measures are outlined
- 11.3 How damage criteria are applied is explained
- 12 Explain use of stabilisers to reduce effect of rolling**
 - 12.1 Use of stabilisers is explained
 - 12.2 Bilge keels and fin type stabilisers are compared and contrasted
 - 12.3 How stabilisers are attached to the hull is explained
 - 12.4 Hull stiffening requirements for fin and bilge keel types is explained
- 13 Explain weather tight and watertight integrity**
 - 13.1 Weather tight integrity is distinguished from watertight integrity
 - 13.2 How the position of load line is determined is explained
 - 13.3 Design criteria imposed by Conditions of Assignment of Loadlines is explained
 - 13.4 How watertight integrity of weather deck is maintained and tested is explained
 - 13.5 Different types of tank air vents and their closing devices are compared and contrasted
- 14 Outline processes involved in painting a vessel**
 - 14.1 *Surface preparation* required prior to painting steel is outlined
 - 14.2 Hazards and safety measures to be taken during surface preparations are identified
 - 14.3 Properties of paints required for different *areas* of vessels are specified
 - 14.4 Procedures required for successful application of paints are clarified
 - 14.5 Precautions required when handling and applying paint are examined
 - 14.6 Action of self-polishing and non-polishing anti fouling paints is compared
 - 14.7 Reasons for using cathodic protection systems are clarified

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access online information on ship construction
- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain basic concepts of ship construction
- Identify and determine appropriate ways of responding to problems associated with ship construction
- Identify relevant methods and procedures such as procedures for painting commercial vessels
- Identify, interpret and process numerical and graphical information related to ship construction
- Impart part knowledge and ideas through verbal, written and visual means
- Read and interpret technical guides, manuals and information relevant to ship construction

Required Knowledge:

- Bottom structure and the forepeak and afterpeak of vessels
- Bow and stern forces
- Construction of watertight bulkheads
- Damage criteria
- Deck and frame construction
- Materials used in the construction of ship hull
- Methods of joining shipbuilding materials
- Processes involved in painting a vessel
- Stabilisers to reduce the effect of rolling
- Static and dynamic forces and moments exerted on hull of vessel
- Terms used to describe size, shape and structural components of vessels
- Types of ships and key features of ships
- Vessel ventilation systems
- Watertight integrity
- Weather tight integrity
- Work health and safety (WHS)/occupational health and safety (OHS) legislation and policies

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- providing accurate and reliable information
- providing appropriate level of detail in responses.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where basic knowledge of ship construction can be demonstrated
- technical reference library with current publications on commercial shipping
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating basic knowledge of ship construction
- direct observation of the candidate applying relevant

WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Terms to describe size and shape of vessels may include:

- Breadth
- Camber
- Draught
- Flare
- Length
- Rake
- Rise of floor
- Sheer

Terms to describe size or cargo carrying capacity of vessels may include:

- Deadweight
- Gross register tonnage
- Gross tonnage
- Net register tonnage
- Net tonnage

Terms to describe effects of forces exerted on hull may include:

- Hogging
- Racking
- Sagging
- Still water bending moment

Openings may include:

- Cables
- Piping
- Trunking
- Watertight door

Surface preparation may include:

- Degreasing
- Sand blasting
- Shot blasting

Areas may include:

- Ultra high pressure water jetting
- Wet blasting
- Ballast tanks
- Cargo tanks
- Freshwater tanks
- Superstructures
- Underwater areas
- Weatherdecks

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6010A Demonstrate basic knowledge of ship operation and maintenance

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to ensure that vessels comply with regulatory and survey requirements as well as maintenance and repair procedures associated with satisfying maintenance of Class.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Identify regulatory environment for shipping operations**
 - 1.1 Function of the International Maritime Organisation (IMO) is outlined, how recommendations are adopted through maritime legislation is explained and areas of exemption for local and international shipping are identified
 - 1.2 *International maritime law* embodied in international agreements and conventions is identified
 - 1.3 Application of the International Labour Organization (ILO) Convention to dockyard and shipboard practices is explained
 - 1.4 Flag State responsibilities are explained
 - 1.5 Purpose of the Navigation Act, Marine Notices, Marine Orders, Port State Control and other methods of implementing international agreements and conventions is clarified
 - 1.6 Purpose of insurance underwriters and Protection and Indemnity (P & I) Clubs is clarified
 - 1.7 Function of Classification Societies and their involvement with Flag States with Memorandum of Agreement is outlined
 - 1.8 ISM Code is applied to ship operation and maintenance
 - 1.9 Requirement for crew training for emergency response, administration, operation and maintenance to STCW requirements is explained
- 2 Prepare for surveys**
 - 2.1 *Areas covered by classification surveys* are identified
 - 2.2 Reasons for class withdrawal are clarified and condition of class are explained
 - 2.3 Continuous, alternative and special surveys, terms of survey and survey frequency are outlined

- 2.4 Differentiation is made between planned maintenance and condition monitoring for machinery
 - 2.5 Safe practices for preparing compartments for survey, including pressure testing are identified
 - 2.6 Tail shaft surveys are outlined and planned
 - 2.7 Pressure vessels and boiler surveys outlined and planned
 - 2.8 Machinery and hull layup methods are specified
- 3 Explain survey requirements**
- 3.1 Statutory survey requirements for convention and non-convention vessels are identified
 - 3.2 Documentation and records essential for compliance with statutory surveys, legislation and measures are identified to ensure protection of the marine environment and safety of life at sea
 - 3.3 Load line measurements and freeboard assignment are explained
 - 3.4 Conditions of freeboard assignment, tests, common faults and repairs are identified
 - 3.5 Maintenance and repair responsibilities are identified to satisfy safety construction surveys
 - 3.6 Common defects, tests and preparations are identified to satisfy safety equipment surveys
 - 3.7 MARPOL survey requirements, including precautions to be taken to prevent pollution of the marine environment are clarified and how compliance with MARPOL is fully observed is explained
 - 3.8 Survey requirements for safety radio, tanker certificates of fitness, passenger ship and safety certificate are clarified
 - 3.9 Port State Control is explained
 - 3.10 Substandard ship and factors causing ship

- detention are identified
- 4 Assess influences on vessel stability**
- 4.1 Basic theories and factors affecting trim and stability as well as measures necessary to preserve trim and stability are explained
 - 4.2 IMO recommendations concerning ship stability are identified
 - 4.3 Influences causing change of centre of gravity are explained and action to be taken in the event of partial loss of intact buoyancy, free surface and Angle of Loll is specified
 - 4.4 Consequences of cargo movement, including bulk and deck cargo is outlined
 - 4.5 Stability documentation required for different ship types to satisfy survival of life at sea (SOLAS) is identified
 - 4.6 Intact and damage stability criteria are explained
 - 4.7 Damage control procedures and assessment following collision or grounding are specified to ensure watertight integrity of a ship is according to accepted practice
 - 4.8 Stability requirements for routine dry-docking are identified
- 5 Outline procedures for maintenance and repairs of hull, pumping systems, propellers, machinery and other items satisfying maintenance of Class**
- 5.1 Properties and repair techniques are identified for ordinary and high tensile hull grades of steel including underwater repair work
 - 5.2 Means of *minimising and controlling both internal and external hull corrosion* are identified
 - 5.3 Repair techniques for various propeller materials are outlined
 - 5.4 Drainage arrangements and connections to *other systems of spaces outside the engine room* are explained
 - 5.5 Ballast main connections to fore and after peak tanks are outlined and procedure for filling and

- emptying tanks is clarified
- 5.6 Means of testing performance of *shipboard pumping systems* is identified
 - 5.7 Common faults and ways of assessing condition of shipboard pumping systems are determined
 - 5.8 Machinery condition monitoring and planned maintenance systems are identified
 - 5.9 Hull life extension surveys and enhanced survey requirements for tankers and bulkships are outlined
- 6 Explain function of IMDG Code**
- 6.1 IMDG Code is applied to prepare action plans for emergency situations
 - 6.2 Common hazards of shipboard enclosed spaces are identified and suitable strategies, including compartment re-entry, following extinction of fire, are planned
 - 6.3 Methods of testing enclosed space atmospheres are identified and limits of exposure to common hazards confirmed
 - 6.4 Requirements of ordering and taking bunkers as well as discharging to shore side reception facilities, are specified
- 7 Outline dry-dock and in-water bottom survey responsibilities of engineering staff**
- 7.1 Procedures for planning and implementing dry-docking and in-water bottom surveys are clarified
 - 7.2 Responsibilities for engineering personnel associated with planning and implementing dry-docking and in-water bottom surveys are detailed
 - 7.3 Dry-dock and in-water hull cleaning methods are compared and contrasted
 - 7.4 Dry-dock refloating criteria and responsibilities of engineering staff are outlined
 - 7.5 Preservation and maintenance requirements for extended layup of vessel, and inspection and

- tests required on reactivation are outlined
- 8 Outline maintenance, repair and safe working practices associated with lifting and life saving equipment**
- 8.1 Safe working practices applicable to cranes, chain blocks, items of loose gear and other lifting equipment are identified
- 8.2 Safety and protective devices used in conjunction with lifting gear are identified
- 8.3 Means of testing and adjusting lifting gear are confirmed
- 8.4 Legislative and regulatory requirements for inspection, storage and maintenance of lifting gear are outlined
- 8.5 Purposes and procedures involved in annual and quadrennial surveys of cargo gear are clarified
- 8.6 Procedures for SWL and proof load tests, including lifeboat launching gear are clarified
- 8.7 Safe working practices applicable to rigging and lifting *heavy items* during maintenance and repair are identified
- 8.8 Installation, operation, maintenance of lifesaving appliances and launching equipment is outlined
- 8.9 Safety and protective devices associated with lifesaving appliances and launching equipment are confirmed
- 9 Outline operation of an inert gas system for a tanker**
- 9.1 Construction, operation and maintenance of individual components of inert gas system (IGS) are explained
- 9.2 Mandatory controls, alarms and cut-outs are identified
- 10 Apply leadership and management skills**
- 10.1 Shipboard personnel management and training requirements are explained in relation to engineering operations
- 10.2 Procedures for managing personal and crew workload in relation to marine engineering functions are clarified

- 10.3 Effectiveness of resource management in relation to engineering functions is assessed
- 10.4 Decision-making techniques appropriate to engineering functions are explained
- 10.5 Processes for developing, implementing and maintaining standard operating procedures relevant to marine engineering functions are explained

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access information required to undertake duties in routine and emergency situations
- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain concepts of ship operation and maintenance
- Identify and determine appropriate ways of responding to malfunctions and emergency situations in daily operations
- Identify methods and procedures needed to implement dry-docking and other duties on commercial vessels
- Identify, interpret and process numerical and graphical information required to undertake duties in routine and emergency situations
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret written instructions, procedures and information relevant to duties of a Marine Engineer Class 2

Required Knowledge:

- Centre of gravity
- Classification societies
- Dry-dock and in-water bottom surveys
- Enclosed spaces
- Flag State responsibilities
- IMDG code
- Inert gas system for tankers
- Key international and Australian standards relating to shipping

- Key shipping authorities and organisations
- Leadership and management techniques
- Maintenance and repairs of lifting and life saving equipment
- Maintenance and repairs of hull, pumping systems, propellers, machinery and other items satisfying maintenance of class
- Maintenance, repair and safe working practices associated with lifting and life saving equipment
- Maritime communication techniques
- Port State Control
- Regulatory environment for shipping operations
- SOLAS
- Survey requirements
- Types of ships and key features of ships
- Vessel stability
- Work health and safety (WHS)/occupational health and safety (OHS) legislation and policies

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- ensuring currency of relevant legislative and regulatory knowledge
- providing appropriate level of detail in responses.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where basic knowledge of ship operation and maintenance can be demonstrated
- technical reference library with current publications on ship operation and maintenance
- tools, equipment and personal protective equipment

- currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating basic knowledge of ship operation and maintenance
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. **Italicised** wording, if used in the performance criteria, is detailed below.

- International maritime law may include:
- ASM Code
 - Certificates and other documents to be carried on board ships by international conventions
 - International Convention for the Prevention of

Pollution from Ships

- International Convention for the Safety of Life at Sea 1974
- International Convention on Load Lines 1966
- International Health Regulations
- international instruments affecting safety of ships, passengers, crew or cargo
- STCW

Areas covered by classification surveys may include:

- Automation
- Boilers/pressure vessels
- Cargo gear
- Hull
- Machinery
- Specific notations
- Tail shaft

Minimising and controlling both internal and external hull corrosion may include:

- Cathodic protection
- Coating systems
- Surface preparation techniques

Other systems of spaces outside the engine room may include:

- Holds
- Pump rooms
- Spaces forward of the collision bulkhead

Shipboard pumping systems may include:

- Ballast systems
- Bilge systems

Heavy items may include:

- Hatches
- Stern doors
- Other large movable structures

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6011A Demonstrate intermediate knowledge of marine auxiliary boilers

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to operate and maintain marine auxiliary boilers on a commercial vessel. This includes analysing the responsibilities of an Engineer Class 2 in relation to auxiliary boiler and steam plant of a vessel, design of marine auxiliary boilers, operation of thermal fluid heating plants, layout of marine stem systems and components, and procedures for inspecting marine auxiliary boilers and associated plant.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|--|-----|---|
| 1 Outline responsibilities of an Engineer Class 2 in relation to auxiliary boiler and steam plant of a vessel | 1.1 | Commonwealth, state/territory and local legislation and regulations that relate to <i>marine boilers and steam plant</i> in terms of safety, repairs and pollution, including implementation, is identified |
| | 1.2 | Safe operating practices for all steam plant are examined and standing orders as to their operation are prepared or modified |
| | 1.3 | Procedure for establishing engine room staff who are fully conversant with safe practices for boiler operation is outlined |
| 2 Evaluate design and construction of marine auxiliary boilers | 2.1 | Typical boiler types illustrating cross section, attachments and location of all fittings, mountings, scantlings and method of achieving circulation are examined |
| | 2.2 | Material requirements for boiler components are identified |
| | 2.3 | Construction of different types of boilers is analysed |
| | 2.4 | Different gauge glass types are compared |
| 3 Evaluate design and operation of thermal fluid heating plants | 3.1 | Typical thermal fluid heating plant is explained and advantages and limitations of the system are identified |
| | 3.2 | Locations and functions of all fittings and safety devices in a typical thermal fluid system are explained |
| | 3.3 | Properties of thermal fluid, effects of contamination and methods of testing fluid are analysed |
| | 3.4 | Thermal fluid heating is compared to conventional steam plant |
| 4 Evaluate layout and design of marine steam systems and components | 4.1 | Typical steam system layout showing location of all components on feed and heating side is detailed |
| | 4.2 | Material requirements for steam system components are identified |
| | 4.3 | Reasons for operating plant and systems at nominated temperatures and pressures, and effects of departing from these parameters are explained |
| | 4.4 | Symptoms of faults in steam traps, hot wells, de-aerators, condensers, evaporators and requirements for contamination prevention between systems, are analysed |
| 5 Outline procedure for inspecting marine auxiliary | 5.1 | Procedure for shutting down, isolating and opening up a boiler for inspection or during an emergency is clarified |
| | 5.2 | Possible defects that may occur in a boiler, fire and water side, their |

- boilers and associated plant** location and effects are analysed
- 5.3 Repair procedures commonly employed for damaged boilers are examined and limitations of such repairs are explained
- 5.4 Procedures for leak detecting in boilers and steam equipment are clarified and remedial actions are explained
- 5.5 Mechanism of economiser fires are analysed
- 5.6 Procedure for detecting economiser fires, actions for controlling after occurrence and preventative measures are clarified
- 6 Differentiate between safety valves types**
- 6.1 Common types of boiler safety valves are analysed and sketched, and how they are classified in terms of valve lift is explained
- 6.2 Materials used in safety valves are identified and operational problems that can occur are analysed
- 6.3 Procedure for setting valve lift pressure is established and precautions necessary when testing valve on fired and non-fired boilers are examined
- 6.4 Defects that may be found when dismantling a safety valve for survey are analysed
- 7 Evaluate problems associated with feed and boiler water**
- 7.1 Causes of scaling and corrosion of water side of a boiler and how these can be minimised are analysed
- 7.2 Acceptable operational range and effects of contamination on boiler chemical reserves are identified
- 7.3 Reliability of boiler water test results are analysed in relation to sampling procedure, testing equipment and shelving of test chemicals
- 7.4 Different tests carried out on boiler water are explained and implications of out-of-range results are interpreted
- 7.5 Use of different chemicals to treat and condition boiler water is assessed
- 7.6 Procedure to be adopted when boiler is severely contaminated from different sources is outlined
- 8 Evaluate marine fuel systems**
- 8.1 Boiler fuel system, its components and maintenance procedure are detailed
- 8.2 Combustion process, its monitoring system and requirements for good combustion are analysed

- 8.3 Different types of burners are compared and contrasted and how atomisation is achieved is explained
- 8.4 Operation of a burner management system that incorporates pressure and level control is explained
- 8.5 Protection devices, alarms and shut downs, found on firing system are identified and their method of operation is analysed

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access information related to marine auxiliary boilers
- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain intermediate operation of marine auxiliary boilers
- Identify and apply relevant solutions for addressing problems associated with marine auxiliary boilers
- Identify and interpret diagnostic information, and perform mathematical calculations related to operating, maintaining and repairing marine auxiliary boilers
- Identify methods, procedures and materials needed for operating, maintaining and repairing marine auxiliary boilers
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret manuals, technical specifications, safety data sheets/material safety data sheets and manufacturer guides related to operating, maintaining and repairing marine auxiliary boilers

Required Knowledge:

- Basic principles of operation of boilers and steam systems
- Combustion in boilers and related safety procedures, including importance of purging a boiler and other safety precautions taken when firing a boiler
- Common boiler defects and repair procedures
- Fittings mounted on boilers
- Fuel oil system for an auxiliary boiler
- Hazards associated with running boiler plant
- Marine boiler inspection procedures
- Operating principles relating to steam generation in fired and unfired boilers

- Principles of boiler operation in normal and emergency situations
- Procedures for maintaining water level in boilers
- Purpose of alarms and shut downs in marine boilers
- Safety valves
- Treatment, sampling and testing of feed and boiler water
- Types of auxiliary boilers, and typical operating pressures and temperatures
- Typical feed systems for marine boilers
- Work health and safety (WHS)/occupational health and safety (OHS) legislation, policies and procedures

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- providing accurate and reliable information
- providing appropriate level of detail in responses.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where intermediate knowledge of marine auxiliary boilers can be demonstrated
- diagrams, specifications and other information related to marine auxiliary boilers
- technical reference library with current publications on basic marine auxiliary boilers
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating intermediate knowledge of marine auxiliary boilers
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Marine boilers and steam plant may include:

- Condensers
- Economiser
- Feed pumps
- Fired
- High-pressure
- Low pressure
- Medium pressure
- Steam – steam generators
- Unfired

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6012A Demonstrate intermediate knowledge of marine auxiliary machinery and systems

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to operate and maintain auxiliary machinery and associated systems on board a commercial vessel.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|--|-----|---|
| 1 Determine responsibilities of an Engineer Class 2 in relation to auxiliary machinery of a vessel | 1.1 | Commonwealth, state/territory and local legislation and regulations, which relate to <i>auxiliary machines and systems</i> in terms of safety, repairs and pollution, including implementation, is identified |
| | 1.2 | Safe operating practices for all steam plant are examined and standing orders as to their operation are prepared or modified |
| | 1.3 | Procedures for establishing engine room staff who are fully conversant with safe practices for operation and maintenance of auxiliary machines and systems are outlined |
| 2 Assess material properties and their application to engine room situations | 2.1 | Properties of materials and how these can be determined by simple tests are explained |
| | 2.2 | Common methods for non-destructive <i>testing</i> (NDT) and their application to auxiliary machinery and components are outlined |
| | 2.3 | Common non-metallic materials used in the marine industry are assessed and their properties, applications and restrictions on usage are explained |
| | 2.4 | Common metallic materials used in marine industry, their applications, failure mechanisms and methods to limit or reduce failures are assessed |
| 3 Outline procedure for sampling and carrying out onboard and laboratory tests on fuel and lubricants | 3.1 | Importance and implications of continual monitoring of quality of fuel oils and lubricants in efficient operation of machinery are explained |
| | 3.2 | Procedures for onboard testing for fuels and lubricants are clarified |
| | 3.3 | Laboratory tests that may be conducted on fuels and lubricants and how results can be interpreted and utilised as part of a maintenance program are detailed |
| 4 Explain pre-treatment of residual fuel and servicing of | 4.1 | Operation of centrifugal separators is outlined and factors that affect optimum separation are |

contaminated fuel and lubricants		analysed
	4.2	Procedures for dealing with contamination of oils by water, fuel or solid debris including recognition of dangerous levels and possible consequences, are clarified
	4.3	Symptoms, causes, effects and methods of treatment of oils that have become infected by bacteria are identified
	4.4	Function and operation for onboard fuel blender and alternative fuel treatments are explained
5 Assess operational problems with pumps and pumping systems handling sea water	5.1	Procedure for evaluating pump or pumping system, including heat exchangers and methods of locating cause of problems that affect output and performance, is clarified
	5.2	Operation of a self-priming system used on bilge, ballast or cargo pumping arrangements is explained
	5.3	Different types of distillation plants used on ships are compared and contrasted taking into account operation, performance, problems and applications
	5.4	Main reasons for corrosion in sea water systems and regions most affected are explained
	5.5	Operation of <i>corrosion prevention systems</i> fitted to pumping systems is assessed
6 Apply fault-finding procedures for air compressors and compressed air systems	6.1	Effects of <i>common faults</i> on operation of single and multi stage compressors are interpreted
	6.2	Reasons for and effects of high levels of oil or water in compressed air are explained
	6.3	Effects of operating air compressors on synthetic lubricating oils are explained with regards to carbon formation and water contamination of the oil
	6.4	Procedures for inspecting and maintaining air

- receivers and associated fittings are clarified
- 7 Outline construction, installation and operation of steering gears, stabilisers and bow thrusters**
- 7.1 Construction, installation and operation of hydraulic steering gear is explained
- 7.2 Construction and operation of stabilisers is explained
- 7.3 Construction and operation of bow thrusters is explained
- 7.4 Normal alarms and safety devices fitted to steering gears for all classes of vessel are identified
- 7.5 Auto and manual changeover procedures are analysed in the event of faults occurring in a steering gear
- 7.6 Oil changing and air purging procedures for a steering gear are clarified
- 7.7 Fault finding procedures for steering gear are clarified
- 7.8 Procedures for change over to alternative systems of power or control of steering gear are clarified
- 8 Assess common faults in refrigeration and air conditioning systems**
- 8.1 Symptoms, effects and remedial action for common faults in refrigeration and air conditioning systems are assessed
- 8.2 Pumping down, leak test, gas charge and oil charge procedures are clarified
- 8.3 Functions and operation of all *components of refrigeration and air conditioning plant* are analysed
- 8.4 Correct procedures for recovery of refrigerants from refrigeration systems are implemented
- 9 Outline pollution prevention regulations and operation of equipment used to handle oily bilge, sewage and other waste substances**
- 9.1 International Convention for the Prevention of Pollution from Ships (MARPOL) regulations are identified and their implications for marine engineers and ship operators are explained
- 9.2 Operation of modern oily water separators, oil content monitors and how they comply with

-
- MARPOL regulations are explained
- 9.3 Operation of typical sewage plants and regulations controlling their usage are explained
- 9.4 Operation of incinerators, material that may legally be burned and monitoring devices is explained
- 10 Explain basic operation of marine gas turbines**
- 10.1 Basic flow of air and gas through a simple cycle marine gas turbine is outlined
- 10.2 Materials and construction of compressor, combustion system and turbine in a single and two-shaft design turbine are outlined
- 10.3 Basic controls required for control and protection of plant are outlined
- 10.4 *Accessories* necessary for safe operation are identified
- 11 Explain shafting arrangement of vessel**
- 11.1 Different shafting arrangements found on vessels from main engine to propeller are outlined
- 11.2 Performance of different couplings and coupling bolts is assessed
- 11.3 *Arrangement of a stern tube* is completed
- 11.4 Procedure to mount and unmount propeller on tail shaft is clarified
- 11.5 Different shaft bearings, couplings, sealing and lubrication arrangements of transmission system are identified
- 12 Explain types, operation, and maintenance requirements of steam turbine machinery found in larger vessels**
- 12.1 Types of steam turbines, their location, and typical operating conditions of temperature and pressure are explained
- 12.2 Common operational problems associated with steam turbine plants, symptoms and effects of

these problems and possible remedies are outlined

12.3 Process of warming-through and shutting down turbine plant is explained

12.4 Maintenance requirements for achieving optimum performance of an auxiliary steam turbine plant are outlined

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access information and sketch diagrams to interpret and explain testing requirements related to operating marine auxiliary machines
- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain principles of marine auxiliary machines
- Identify and interpret numerical and graphical information related to starting up and shutting down marine auxiliary machines on commercial vessels
- Identify and suggest ways of rectifying faults and malfunctions in marine auxiliary machines on commercial vessels
- Identify methods, procedures and materials needed for operating, maintaining and repairing marine auxiliary machines on commercial vessels
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret written information related to the operation, performance and maintenance of marine auxiliary machines, including machinery specifications, machinery design drawings, machine drawings, operational manuals, specifications, and electrical and control circuit diagrams

Required Knowledge:

- Corrosion causes and prevention
- Fuels and basic principles of fuel systems
- MARPOL
- Nature and causes of typical start up and shut down malfunctions of main and auxiliary machinery, and associated systems and available methods for their detection and rectification
- Non-destructive testing procedures and standards
- Operational characteristics and performance specifications for the different types of auxiliary

machinery and associated systems usually found on a commercial vessel, including pumps, air compressors, steering gears, heat exchangers and evaporators

- Pollution prevention regulations
- Principles and procedures of machinery lubrication
- Procedures for carrying out the start up and shut down of main and auxiliary machinery and associated systems to ensure compliance with company and survey requirements and regulations
- Properties of metallic and non-metallic materials
- Purpose and content of safety data sheets/material safety data sheets
- Responsibilities of an Engineer Class 2 in relation to auxiliary machinery of a vessel
- Safety, environmental and hazard control precautions and procedures relevant to start up and shut down of marine auxiliary machinery and associated systems
- Types of auxiliary machinery and components
- Work health and safety (WHS)/occupational health and safety (OHS) legislation and policies

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- providing accurate and reliable information
- providing appropriate level of detail in responses.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where intermediate knowledge of marine auxiliary machinery and systems can be demonstrated
- technical reference library with current publications on marine auxiliary machinery and systems
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments

- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating intermediate knowledge of marine auxiliary machinery and systems
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Auxiliary machines and systems may include:

- Boiler
- Cargo handling equipment
- Compressors
- Deck machinery
- Diesel generator
- Evaporators
- Pumps
- Refrigerating installation

Testing may include:

- Separators
- Density
- Fuel in lubricating oil
- Pour point
- Viscosity
- Water contamination

Corrosion prevention systems may include:

- Anodes
- Chemical injection
- Impressed current
- Marine growth inhibiting systems
- Special coatings

Common faults may include:

- Coolers
- Filters
- Rings
- Valves

Components of refrigeration and air conditioning plant may include:

- All fittings
- Safety devices

Accessories may include:

- Accessory gear
- Lube oil:
 - coolers
 - pump
 - filter
- Starting device

Arrangement of a stern tube may include:

- Lubrication circuit
- Shaft sealing
- Tail shaft bearing

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6013A Demonstrate intermediate knowledge of marine control systems and automation

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMB4207A Test, detect faults and maintain and restore electronic control equipment to operating condition on vessels over 750 kW propulsion power.

Unit Descriptor

This unit involves the skills and knowledge required to operate control systems on board a commercial vessel.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|---|
| 1 Analyse open and closed loop systems | 1.1 Open loop systems are distinguished from closed loop systems |
| | 1.2 Closed loop manual, time based automatic open loop and feed forward open loop are explained |
| 2 Explain principles and operation of pneumatic control element and systems | 2.1 Operation of a nozzle flapper and pneumatic amplifier unit is analysed and applied to transmitters, basic controllers and valve positioners |
| | 2.2 Control air supply system is defined |
| | 2.3 Principle of operation of direct and reverse acting pneumatic relays and application is clarified |
| | 2.4 Application of computing relays is analysed |
| 3 Compare temperature transmitters | 3.1 Pneumatic temperature transmitter is defined |
| | 3.2 Effect of changes in ambient temperature on thermocouples and RTDs is explained |
| | 3.3 Testing procedures and methods of simulation for both RTDs and thermocouples are explained |
| | 3.4 Characteristics and application of thermistors are outlined |
| 4 Analyse application of differential pressure transmitters | 4.1 Application of differential pressure transmitters on board ships is confirmed |
| | 4.2 Arrangements of differential pressure transmitters for measurement of liquid levels in both closed and open tanks are explained |
| | 4.3 Mechanics for viscosity measurement using a differential pressure transmitter are analysed |
| | 4.4 Principle of using a differential pressure transmitter for flow measurement and the need for a square root extractor is explained |
| | 4.5 Use of a differential pressure transmitter for flow measurement is compared and contrasted |

- with other types of *meters*
- 5 Explain engine room monitoring systems**
- 5.1 Application of different speed sensing systems is analysed
 - 5.2 Operating principles of torque monitoring systems applied to propeller shafting are explained
 - 5.3 Arrangements of shaft power and indicated power monitoring are compared
 - 5.4 Horizontal and vertical float level systems are compared with other tank level monitoring system in common use
 - 5.5 Operating principle of oil-water interface sensor is explained
 - 5.6 Methods of bearing temperature monitoring applied to diesel engine rotating parts are outlined
 - 5.7 Machinery space monitoring and alarm system from a central control room are outlined
- 6 Explain procedure for transmitter calibration**
- 6.1 Procedure for transmitter calibration for both pneumatic and electronic transmitters is applied
 - 6.2 Test equipment is used for transmitter calibration
 - 6.3 Relationship between process variables and output signals is demonstrated in a graph
 - 6.4 Effects of transmitter dead band are defined
- 7 Explain operation of pneumatic 3-term controller and controller adjustment procedures**
- 7.1 Common controller actions and applications are outlined
 - 7.2 Operating principle of pneumatic 3-term controllers is outlined
 - 7.3 Procedure for adjusting 3-term pneumatic controllers is applied and effects if incorrectly adjustment are explained
 - 7.4 Typical controller settings for a PID controller are detailed

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- 7.5 Integrated hand/auto station and 3-term controller are outlined and bumpless transfer is demonstrated
- 8 Explain actuators and control valves**
- 8.1 Arrangements to provide fail safe requirements are outlined
- 8.2 Control valve and actuator are explained
- 8.3 Different *types of actuators* are identified
- 8.4 Operating principle of pneumatic valve positioners is explained
- 9 Analyse operation of hydraulic governors**
- 9.1 Operating principle of proportional action hydraulic governors is explained
- 9.2 Importance of spring stiffness in relation to response is clarified
- 9.3 Purpose of an isochronous governor is outlined
- 9.4 Principle of operation of an isochronous hydraulic governor is outlined
- 9.5 Governor droop and its requirements for stable load sharing and engine stability is explained
- 10 Interpret electronic systems circuit diagrams**
- 10.1 Electrical symbols commonly used in electronic circuits and sub-circuits are defined
- 10.2 Printed and colour codes used in electronic circuits are defined
- 10.3 Operation and maintenance manuals commonly used in the fault finding electronic circuits are used correctly
- 11 Explain basic operation of programmable logic controllers**
- 11.1 Principles and operation of integrated circuit gates are explained
- 11.2 Operational function of input/output devices connected to a digital programmable logic controller is detailed
- 11.3 Methods of operation of flip flops, adders, counters, multiplexers and decoders are outlined

- 11.4 Methods employed when changing set point values in a digital programmable logic controller are outlined
- 12 Explain typical machinery space control loops and unmanned machinery spaces requirements**
- 12.1 Fuel oil heating, LO cooling and JW cooling loop showing cascade and split range systems are outlined
- 12.2 Fuel oil viscosity control loop is outlined
- 12.3 Common methods of boiler water control and simple combustion control with burner management for an auxiliary boiler are outlined
- 12.4 Requirements and system arrangements for bridge control of main propulsion machinery including change over from local to bridge are explained
- 12.5 Common pressure control loops found in a ship's engine room are identified
- 12.6 Unmanned machinery spaces (UMS) requirements are outlined
- 12.7 Troubleshooting procedures associated with control systems are outlined
- 12.8 Procedures for software version control are outlined

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access information and sketch diagrams to interpret and explain testing requirements related to control systems on commercial vessels
- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain principles of marine automation and process control
- Identify and interpret numerical and graphical information, including schematic diagrams, relevant to control systems on commercial vessels

- Identify and suggest ways of rectifying faults and malfunctions in control systems on commercial vessels
- Identify methods, procedures and materials needed to operate and maintain control systems on commercial vessels
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret written information related to operate control systems on commercial vessels

Required Knowledge:

- Actuators and control valves
- Australian standards for drawing symbols/layouts for schematic diagrams
- Bridge control systems
- Concepts of UMS and automated monitoring and control of machinery
- Control and monitoring of ship machinery
- Differential pressure transmitters
- Electronic systems circuit diagrams
- Engine room monitoring systems
- Machinery space control loops and UMS requirements
- Mechanical and electrical sensors
- Open and closed loop systems
- Operation of hydraulic governors
- Operation of pneumatic 3-term controller and controller adjustment procedures
- Operation of programmable logic controllers
- Pneumatic and electrical instrumentation transmitters
- Principles and operation of pneumatic control element and systems
- Principles of basic pneumatic systems and action of pneumatic instruments
- Principles of process control
- Temperature transmitters
- Tests and procedures required to meet UMS requirements
- Total bridge control
- Transmitter calibration
- Work health and safety (WHS)/occupational health and safety (OHS) legislation, policies and procedures

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- providing accurate and reliable information
- providing appropriate level of detail in responses.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where intermediate knowledge of marine control systems and automation can be demonstrated
- technical reference library with current publications on automation and process control
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating intermediate knowledge of marine control systems and automation
- direct observation of the candidate applying relevant

WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Meters may include:

- Area meter
- Rotometer
- Target meter

Types of actuators may include:

- Electric
- Hydraulic
- Pneumatic

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6014A Demonstrate intermediate knowledge of marine diesel engines and systems

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to operate and maintain marine diesel engines and systems on a commercial vessel. This includes evaluating diesel fuel systems, methods of diesel engine cooling, diesel engine lubrication requirements, propulsion methods and faults using combustion diagnostic equipment.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Evaluate diesel fuel systems**
 - 1.1 Why atomisation and penetration of fuel and air turbulence are essential to optimum combustion is explained
 - 1.2 Typical injection pressures and viscosities for different grades of fuel are stated
 - 1.3 Design modifications of pumps, camshafts and injectors for fuel types are outlined
 - 1.4 Difference between constant and variable injection fuel pump timing, showing materials, principal parts, method of operation and adjustments of common pump types is explained
 - 1.5 Injection requirements for slow speed and high speed diesel engines are compared, including pilot injection and pre-combustion chambers
 - 1.6 Common service faults, symptoms and causes of diesel fuel injection problems are identified, specifying appropriate adjustments, including methods of fuel pump timing
 - 1.7 Work health and safety (WHS)/occupational health and safety (OHS) requirements for handling and testing fuel injection systems are explained
 - 1.8 Normal operating pressures and temperatures for fuel valve cooling arrangements, and uni-fuel and dual-fuel systems, including both high/medium viscosity fuel types are explained
- 2 Evaluate different methods of diesel engine cooling**
 - 2.1 Importance of maintaining diesel engine thermal efficiency and evaluate thermal loads on engine components is outlined
 - 2.2 Cooling media selection is justified, and advantages and disadvantages of different diesel cooling methods are outlined
 - 2.3 Appropriate action to be taken with common faults in cooling systems is explained and different cooling water treatments are compared
 - 2.4 How cooling systems are commissioned, stored during idle periods and restored after contamination is confirmed
 - 2.5 Methods of load-dependent cooling of diesel alternators on heavy fuels are evaluated
 - 2.6 Normal operation temperatures, pressures, and methods of cooling medium and slow speed diesel engine pistons, exhaust valves, cylinders, turbochargers and cylinder heads are identified

- 3 Evaluate diesel engine lubrication requirements**
- 3.1 Principles of engine lubrication are outlined
 - 3.2 Lubricant types, physical and chemical properties and applications are assessed
 - 3.3 Sources of diesel lubricant contamination and deterioration are identified
 - 3.4 Ways of testing for diesel lubricant contamination and deterioration, interpreting test results and identifying appropriate action to be taken are outlined
 - 3.5 Distribution of lubricating oil to guides, top-end, bottom-end and main bearings of diesel engines, showing direction of flow, typical clearances and stating normal operating temperatures and pressure is explained
 - 3.6 Principles of bearing lubrication are outlined
 - 3.7 Materials used in bearing construction are identified
 - 3.8 Bearing faults are evaluated and remedies to prevent them from occurring are determined
- 4 Compare different propulsion, manoeuvring and starting methods**
- 4.1 Starting procedures of diesel engines for power generation, propulsion, and emergency use are clarified
 - 4.2 Starting and manoeuvring requirements/sequences for direct-coupled reversible and geared propulsion diesels, including CPP applications are explained
 - 4.3 Common faults are analysed and appropriate action to be taken with typical diesel starting and manoeuvring systems is identified
 - 4.4 Manoeuvring and reversing systems of propulsion diesel engines are outlined
 - 4.5 Different methods of achieving reversing capability with direct-coupled propulsion diesels are compared
 - 4.6 Layout of a diesel-electric drive is compared and contrasted with the layout of a turbo electric drive
- 5 Analyse materials used in constructing diesel engines**
- 5.1 Common materials used in diesel engine construction are assessed, selection is justified, and typical compositions and physical properties of components are specified
 - 5.2 Dynamic stresses and loads are interpreted, service limitations are identified and different *methods of component fabrication* are

evaluated

- 5.3 Two-stroke and four-stroke operating cycle forces, couples and moments, relating to design principles of crankshafts, bedplates, foundations and crossheads are outlined
- 5.4 Out-of-balance gas and inertia forces, couples and moments are related to flywheels, balance weights and first/second order balancing
- 5.5 Factors contributing to torsional vibration are explained and methods of minimising or eliminating harmful effects of critical speeds are clarified
- 5.6 Pistons, liners, piston rings, bearings and crankshafts are calibrated to identify wear patterns, limits and means of correction
- 5.7 Alignment and adjustment criteria of crankshafts, chain-drives, integral thrust bearings and crossheads are specified
- 5.8 Specified working clearances and limits of all bearings, sliding surfaces and interference fits of typical diesel engines are compiled using engine builder manuals

6 Explain uptake and scavenge fires and air line, gearbox and crankcase explosions

- 6.1 Design and operational factors that contribute to fires in waste heat units are explained and methods of extinguishing and/or containing soot and hydrogen fires are specified
- 6.2 Routine cleaning procedures, inspection criteria, symptoms of fire and risks of isolation in service associated with waste heat units are identified
- 6.3 Operational factors that contribute to scavenge fires are identified, symptoms are outlined, methods of extinguishing are evaluated and routine inspection criteria of scavenge spaces are stated
- 6.4 Principles of explosive mixtures are clarified and how a starting airline explosion can occur is explained
- 6.5 How risk of scavenger fires may be minimised in service by protective devices and routine evaluation of starting air systems is clarified
- 6.6 Causes of gearbox and crankcase explosions in propulsion and auxiliary drives are outlined
- 6.7 How risks of gearbox and crankcase explosions may be minimised in service are explained and correct procedures to be taken in the event of warning of a hazardous atmosphere in both oil and dual-fuel engines are clarified

- 6.8 Operating principles of an oil-mist detector, crankcase breather and explosion relief doors are explained
- 6.9 Function of a piston rod scraper box is outlined, and causes of wear and appropriate adjustments are identified
- 7 Explain correct working practices associated with diesel engine operation, maintenance and repair**
 - 7.1 Safe working practices associated with isolating main and propulsion diesels under all emergency and routine situations are explained, including use of protective devices, interlocks and evaluation of their status
 - 7.2 Safe working practices associated with working in crankcases and other enclosed spaces are explained
 - 7.3 Safe working practices associated with safe handling of hydraulic tools and dangers of lifting/isolating heavy components both unaided and with lifting gear are explained
 - 7.4 Hazards of working with flammable liquids under pressure, chemicals, acids and hydrocarbons as well as selection criteria for appropriate protective clothing are explained
 - 7.5 Safe working strategies for diesel engine maintenance are planned using engine manufacturer instruction manuals and product data safety sheets
- 8 Analyse faults using combustion diagnostic equipment**
 - 8.1 Two-stroke and four-stroke theoretical cycle diagrams are compared with results recorded using diagnostic tools
 - 8.2 Combustion faults from typical diagrams are evaluated and corrective adjustments are specified
 - 8.3 Service combustion values are compared with trials or test bed figures
 - 8.4 Common faults associated with pressure charging and fuel injection systems are outlined
 - 8.5 Methods of pressure charging diesel engines are compared, and materials of construction, design features, operational maintenance and emergency procedures are correctly identified
 - 8.6 Causes of efficiency loss and surge are explained
 - 8.7 Scavenging systems and gas/air flow paths through a turbocharger, under normal and emergency operation modes are explained using relevant diagrams
- 9 Analyse**
 - 9.1 Flow of air and gas through a simple cycle marine gas turbine is

construction and operation of marine gas turbines		analysed
	9.2	Materials and construction of compressor, combustion system and turbine in single and two shaft designs are outlined
	9.3	Controls required for control and protection of marine gas turbines are detailed
	9.4	Function of <i>accessories</i> necessary for safe operation of marine gas turbines are explained

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access diagnostic information related to marine diesel engines and systems
- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain operation of marine diesel engines and systems
- Identify and apply relevant solutions for addressing problems associated with marine diesel engines and systems
- Identify and interpret diagnostic information, and perform mathematical calculations related to operating, maintaining and repairing marine diesel engines and systems
- Identify methods, procedures and materials needed for operating, maintaining and repairing marine diesel engines and systems
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret manuals, technical specifications, safety data sheets/material safety data sheets and manufacturer guides related to operating, maintaining and repairing marine diesel engines and systems

Required Knowledge:

- Chemical and physical properties of fuels and lubricants
- Components of diesel engines
- Crankcase and air-line explosions, scavenge and uptake fires
- Diesel engine lubrication systems
- Diesel engine propulsion and power generation
- Manoeuvring systems of diesel engines
- Pressure charging diesel engines, including common service faults, actions to rectify

faults, emergency operation and isolation procedures

- Principles of diesel engine operation
- Properties and characteristics of fires
- Safe working practices associated with diesel engines during operation, repair and maintenance
- Starting methods of diesel engines
- WHS/OHS legislation, policies and procedures

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- providing accurate and reliable information
- providing appropriate level of detail in responses.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where intermediate knowledge of marine diesel engines and systems can be demonstrated
- diagrams, specifications and other information required for performing basic calculations related to marine diesel engines and systems
- technical reference library with current publications on marine diesel engines and systems
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment

- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating intermediate knowledge of marine diesel engines and systems
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Methods of component fabrication may include:

- Ceramics
- Composite
- Forged
- Laser-hardening
- Plasma-spraying
- Welded

Accessories may include:

- Accessory gear
- Lube oil:
 - cooler
 - pump
 - filter
- Starting devices

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6015A Demonstrate intermediate knowledge of marine electrical systems

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to analyse complex switchboards, perform fault finding on electrical circuits, maintain circuit breakers, synchronise alternators and maintain emergency battery systems to ensure supply of shipboard electrical power on board a commercial vessel.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|--|
| 1 Analyse common faults in shipboard electrical machinery | <p>1.1 Effects and ways of detecting earth on 3-wire insulated and 4-wire earthed neutral systems are explained</p> <p>1.2 Effects of short circuits and operation of discrimination protection are explained</p> <p>1.3 Symptoms and effects of ‘light’ and ‘heavy’ short circuits on components and circuits are compared</p> <p>1.4 Effects of open circuits on <i>systems and components</i> transformers are analysed</p> <p>1.5 Causes and effects of ‘hot spots’ in circuits are identified</p> <p>1.6 Cause and effects of static electricity on shafting and when cleaning tanks are identified</p> |
| 2 Perform fault-finding on electrical circuits | <p>2.1 Safe procedure for determining insulation resistance of a 3-phase motor or alternator including protection of solid-state components and selection of suitable minimum insulation for the component is applied</p> <p>2.2 Procedure for safely drying out an electrical machine with a low IR is outlined</p> <p>2.3 Open circuit in a 3-phase motor is safely tested</p> <p>2.4 Procedure for testing internal short circuit in a 3-phase motor is clarified</p> |
| 3 Analyse complex shipboard switchboard layouts | <p>3.1 <i>Switchboard layouts</i> are interpreted</p> <p>3.2 Effects and indications of earths on the system including intermittent and multi earths are explained</p> <p>3.3 Safe procedure for locating earths on main and low voltage circuits including 24 V system is outlined</p> <p>3.4 Operation of preferential tripping arrangements for overload protection is explained</p> <p>3.5 Relationship between main and emergency switchboards is explained</p> <p>3.6 Different methods of start up after black outs are outlined</p> |
| 4 Explain electrical safety | <p>4.1 Potential <i>problems</i> associated with shore maintenance personnel working on ship electrical equipment are identified</p> |

- procedures for ship and shore personnel**
- 4.2 Safe procedure of isolating electrical machinery for repair or maintenance is applied
 - 4.3 Safe method of working on live electrical circuitry for purpose of repair or maintenance is explained
 - 4.4 Problems associated with shipboard electrical fires are explained
 - 4.5 Safe procedures for fighting shipboard electrical fires including fires in switchboards are clarified
- 5 Synchronise, parallel and load share alternators on manual and auto modes**
- 5.1 Process of manually synchronising alternator and sharing kW and kVAR loading under all loading conditions is explained
 - 5.2 Process of starting, testing and where applicable, of transferring emergency generator power on to main board, is explained
 - 5.3 Operation of synchronising lights, synchroscope and all meters associated with synchronising is outlined
 - 5.4 Operation of AVR and prime mover governor with respect to synchronising is outlined and how these can be adjusted at set points is explained
- 6 Examine operation, construction and maintenance of circuit breakers**
- 6.1 Features and applications of different types of circuit breakers are differentiated
 - 6.2 Closing and opening systems of circuit breakers are explained
 - 6.3 Arc extinguishing systems are explained
 - 6.4 Method for accessing an air circuit breaker for inspection is analysed
 - 6.5 Function and operation of protection devices associated with air circuit breaker and molded case circuit breaker are examined
- 7 Analyse function of emergency battery systems**
- 7.1 Different types and characteristics of batteries used for emergency supplies are identified
 - 7.2 Methods of battery charging and ways in which charge condition of the battery can be determined are explained
 - 7.3 Requirements of emergency supply and how transfer can occur without adversely affecting solid state components are explained
 - 7.4 Safety hazards associated with batteries, and procedures to be adopted to minimise explosion and short circuits are appraised
- 8 Explain hazards associated with**
- 8.1 Functional and operational requirements for a marine high voltage system are outlined

marine high voltage installations

- 8.2 High voltage marine installations are identified
- 8.3 Design features of high voltage installations are explained
- 8.4 Risks and safety procedures associated with working in high voltage environments are identified
- 8.5 Procedure for assisting suitably qualified personnel to carry out maintenance and repair of high voltage installation is outlined

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain intermediate principles of electrical circuits, switchboards, alternators and circuit breakers
- Identify and interpret numerical and graphical information in electrical diagrams and specifications for a commercial vessel
- Identify and suggest ways of rectifying electrical hazards and emergency situations on a vessel
- Identify methods, procedures and materials needed for testing marine electrical systems
- Impart knowledge and ideas through verbal , written and visual means
- Read and interpret written information related to electrical circuitry and components on commercial vessels
- Use electrical measuring and testing instruments

Required Knowledge:

- Alternating current (AC)/direct current (DC) voltage
- Alternators – construction, characteristics, synchronised operation
- Batteries
- Circuit breakers
- Circuits
- Earthing
- Electrical measuring and testing instruments
- Electrical safe working practices
- Electrical symbols, basic electrical diagrams/circuits

- Emergency battery systems
- Fault finding procedures
- Isolation procedures
- Phase angle, power factor and current flow
- Procedures for dealing with hazards and emergencies
- Regulations of relevant state/territory maritime and electrical licensing authorities
- Resistance, inductance and capacitance
- Risks and safety procedures associated with working in high voltage environments
- Safety, environmental and hazard control precautions and procedures relevant to marine electrical systems
- Switchboards and protection – purpose, testing and maintenance, equipment removal
- Work health and safety (WHS)/occupational health and safety (OHS) legislation and policies

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- providing accurate and reliable information
- providing appropriate level of detail in responses.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where intermediate knowledge of marine electrical systems can be demonstrated
- technical reference library with current publications on marine electrical systems
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the

workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating intermediate knowledge of marine electrical systems
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Systems and components may include:
- Motors
 - Transformers
- Switchboard layouts may include:
- DC systems
 - Dedicated power supplies
 - Dual supply for steering gear
 - Feed back and feed forward arrangements
 - Interconnection with low voltage
- Problems may include:
- Electric shock
 - Enclosed space work
 - Noncompliance with safe working procedures

- Unfamiliar with marine electrical systems
- Using equipment beyond safe working limits
- Working at heights

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6016A Demonstrate intermediate knowledge of marine steam turbines and main boilers

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMR5807A Manage the operation, monitoring and evaluation of the performance of steam propulsion plant on vessels over 750 kW propulsion power.

Unit Descriptor

This unit involves the skills and knowledge required to operate and maintain main steam propulsion plant and associated control systems on a commercial vessel.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 2 on commercial vessels greater than 3000 kW and forms part of the requirements for the Certificate of Competency Marine Engineer Class 2 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|---|-----|---|
| 1 Evaluate energy balance of steam turbine plant | 1.1 | Heat losses in a turbine and turbine system are analysed |
| | 1.2 | How steam properties change through a turbine are shown on an enthalpy/entropy diagram |
| | 1.3 | How air heaters and economisers affect turbine plant efficiency is explained |
| | 1.4 | Practical methods of verifying energy losses are detailed |
| 2 Explain construction and operation of feed system | 2.1 | Operation and components of the complete feed system are outlined |
| | 2.2 | Construction, operating principles and maintenance requirements of a regenerative condenser are explained |
| | 2.3 | Causes of loss of vacuum are identified |
| | 2.4 | Construction and operation of air ejectors, vacuums and extraction pumps are explained |
| | 2.5 | Construction and operation of gland condensers, low-pressure heaters, drain coolers and high-pressure heaters are explained |
| | 2.6 | General arrangement and construction of turbo-feed pumps is outlined |
| | 2.7 | Governor control is explained |
| | 2.8 | Operating principles and construction details of de-aerators are explained |
| 3 Explain construction, operation and repair of high-pressure water tube boilers | 3.1 | Operating principles of high-pressure boilers, including water and gas flow circulation are explained |
| | 3.2 | Drum, internal fittings and support and expansion arrangements are outlined |
| | 3.3 | Procedures for repairing a membrane wall furnace are clarified |
| | 3.4 | Operating principles and construction methods of integral and external superheaters are explained |
| | 3.5 | Construction and operation of economisers and air heaters is explained |
| | 3.6 | Chemistry of combustion is explained |
| | 3.7 | Typical burner register arrangements are outlined |

- 3.8 Construction, operation and maintenance of boiler gauge glasses and safety valves is explained
- 3.9 Operation of boiler control and soot blowing system is detailed
- 3.10 Blow-down procedure for a high pressure boiler is prepared
- 4 Explain requirements for feed water treatment for high-pressure water tube boilers**
 - 4.1 How salts are precipitated and how metal is corroded in the boiler and feed system is explained and method of prevention is outlined
 - 4.2 How oxygen is eliminated in high-pressure boilers is shown
 - 4.3 How pH is measured and controlled is explained
 - 4.4 Normal and maximum operating limits for boiler feed water treatment are identified and procedure to follow if these limits are exceeded is clarified
 - 4.5 Purpose and procedure for different types of tests of boiler water chemistry are explained
- 5 Explain construction and operation of high-pressure turbines**
 - 5.1 Flow of steam through nozzles is analysed, and pressure and velocity compounding are illustrated
 - 5.2 Construction of blades, bearings, glands, rotors and casings is explained
 - 5.3 Warming-through procedure prior to start up is explained
 - 5.4 Routine checks during operation are detailed
 - 5.5 Emergency operation of plant with one turbine inoperative is outlined
 - 5.6 Turbine shutdown procedure is clarified
 - 5.7 Routine checks carried out at a turbine plant survey are detailed
 - 5.8 Precautions necessary when turbine and gearing casings are open are explained and any repairs or adjustments that may be required are identified
 - 5.9 Performance of steam plant by routine observations of pressure temperature speed and vibration of turbine, gearing and associated systems is analysed
- 6 Explain turbine gearing**
 - 6.1 Single and double reduction gearing systems are outlined
 - 6.2 Use of double helical involute gear teeth is explained

arrangements	6.3	Advantages and disadvantages of single and double locked tandem gearboxes are detailed
	6.4	Purpose of fitting a nodal drive in gearing system is clarified
	6.5	Construction and reason for installing flexible couplings in gearing system is explained
	6.6	Layout of a turbo-electric drive is detailed
7 Analyse flow of air and gas through a simple cycle marine gas turbine	7.1	Construction of compressor, combustion system and single and two shaft turbines is explained
	7.2	Necessary controls required for control and protection of plant are confirmed
	7.3	<i>Accessories</i> necessary for safe operation of simple cycle marine gas turbines are listed

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access diagnostic information related to marine steam turbines
- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain basic operation of marine steam turbines
- Identify and apply relevant solutions to problems that can occur during operation of steam propulsion plant and associated systems on a steam vessel
- Identify and interpret diagnostic information, and perform mathematical calculations related to operating, maintaining and repairing marine steam turbines
- Identify methods, procedures and materials needed for operating, maintaining and repairing marine steam turbines
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret manuals, technical specifications, safety data sheets/material safety data sheets and manufacturer guides related to operating, maintaining and repairing marine steam turbines

Required Knowledge:

- Basic principles of operation of main steam propulsion and auxiliary systems on a steam

vessel, including:

- methods of turbine control, including safety devices
- symptoms, causes, effects and actions to be taken of defects of auxiliary steam turbines
- construction and operation of main and auxiliary steam turbines
- procedures for emergency operation of a steam turbine
- Construction and operation of feed system
- Construction and operation of high-pressure turbines
- Construction, operation and repair of high-pressure water tube boilers
- Energy balance for a steam turbine plant
- Established engineering practice and procedures for operation of shipboard steam propulsion plant and associated systems in warm-through, manoeuvring, start up, normal running, emergency and shut down situations
- Fundamental principles of steam propulsion systems and boilers
- Hazards and problems that can occur during operation of steam propulsion plant and associated systems, and appropriate preventative and remedial action
- Methods of lubricating principal components of a marine steam propulsion turbine and its associated gearing, and evaluating common faults, including common lubrication faults, symptoms, causes, and actions to be taken with such faults
- Operational characteristics and performance specifications for different types of steam propulsion plant and associated systems on a steam vessel of unlimited propulsion power
- Procedures for reading and interpreting readings and indications of performance of steam propulsion plant and associated systems
- Requirements for feed water treatment for high-pressure water tube boilers
- Simple cycle marine gas turbine
- Turbine gearing arrangements
- Types, properties, tests, applications and treatment of fuels, lubricants and solvents/chemicals used on board a steam vessel, including working principles, construction, maintenance and safe operation of centrifuges, filters, and other treatment devices
- Typical operating precautions for steam propulsion plant and associated systems to ensure operational performance is complies with bridge orders, technical specifications, survey requirements, and established safety and anti-pollution rules and regulations
- Units of measurement
- Work health and safety (WHS)/occupational health and safety (OHS) legislation and policies

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the

performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- providing accurate and reliable information
- providing appropriate level of detail in responses.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where intermediate knowledge of marine steam turbines and main boilers can be demonstrated
- diagrams, specifications and other information related to marine steam turbines
- technical reference library with current publications on basic marine steam turbines
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating intermediate knowledge of marine steam turbines and main boilers
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Accessories may include:

- Accessory gear
- Lube oil:
 - coolers
 - pumps
 - filters
- Starting devices

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6017A Demonstrate advanced knowledge of marine auxiliary boilers

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to explain the operation and maintenance of marine auxiliary boilers on a commercial vessel. It includes evaluating steam plant efficiency, interpreting steam plant cycles, evaluating repairs required for boilers and steam plants, survey procedures, and operating steam plant under different conditions.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|---|-----|--|
| 1 Evaluate steam plant efficiency | 1.1 | Combustion efficiency from flue gas constituents is assessed |
| | 1.2 | Steam and fuel consumption to obtain heating efficiency is analysed |
| | 1.3 | <i>Causes of loss of steam plant efficiency</i> are evaluated |
| | 1.4 | Requirements of inert gas generation of boiler plant are determined |
| 2 Interpret complex steam plant cycles | 2.1 | Operation, function and efficiency of dual pressure cycles and steam/steam generators are compared and contrasted |
| | 2.2 | Operation of dual pressure and pass in/out turbines is explained |
| 3 Evaluate boiler and steam plant repairs | 3.1 | Types and properties of materials used in <i>boilers and steam plant</i> are identified |
| | 3.2 | Common component <i>failures</i> in boilers and steam plant are explained |
| | 3.3 | Appropriate repairs for failed components in boilers and steam plant are determined |
| | 3.4 | <i>Constraints</i> on engineering staff engaged in repairing boilers and steam plant are explained |
| | 3.5 | Requirements to report defects in pressurised components of boilers are identified |
| 4 Explain methods of auxiliary steam plant operation and control under variable conditions | 4.1 | Methods of steam pressure control while manoeuvring and possible adverse impacts are analysed |
| | 4.2 | How dew point can be reached when operating at reduced power is examined |
| | 4.3 | How low powers can limit steam production by exceeding pinch point is explained |
| 5 Outline procedures surveying for boilers | 5.1 | Procedure for preparing a boiler for survey is explained |
| | 5.2 | Boiler inspection procedure that would cover all possible problem areas is planned |
| | 5.3 | Purpose and procedure for carrying out hydrostatic/hydraulic pressure tests and non destructive tests on auxiliary boilers are explained |
| 6 Analyse procedures for protecting steam plant during off | 6.1 | Procedures for decommissioning and laying up a boiler for short and long intervals are compared |
| | 6.2 | Processes for cleaning boilers are evaluated |

load conditions	6.3	Procedures for re-commissioning steam plant are explained
	6.4	Chief Engineer responsibilities for setting lifting pressure of <i>safety valves</i> are outlined
7 Assess hazards of operating steam plant under adverse or faulty operating conditions	7.1	Potential hazards of boiler operation with contaminated feed water are assessed
	7.2	Procedure for continuing boiler operation when contamination has exceeded acceptable limits is explained
	7.3	Effects of operating boiler with insufficient water level are explained and actions to be taken under loss of water conditions are identified
	7.4	Causes, consequences and relevant preventative measures associated with furnace explosions are analysed
	7.5	Operating conditions that can lead to an economiser fire and actions that can be taken to prevent and control such fires are evaluated
8 Explain operation and maintenance of heat transfer oil systems	7.6	Alternative methods for maintaining heating if a boiler or economiser has to be shut down are determined
	8.1	Operating procedures of heat transfer oil systems are explained
	8.2	Hazards associated with heat transfer oil systems are analysed
	8.3	Routine maintenance procedures associated with heat oil transfer systems are outlined

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access information related to marine auxiliary boilers
- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain operation of marine auxiliary boilers and impart knowledge and ideas verbally, in writing and visually
- Identify and apply relevant solutions for addressing complex problems associated with marine auxiliary boilers, such as maintaining the operation of marine auxiliary boilers under adverse conditions
- Identify and interpret diagnostic information and perform complex mathematical calculations related to operating, repairing and maintaining marine auxiliary boilers

- Identify methods, procedures and materials needed for operating, maintaining and repairing marine auxiliary boilers
- Read and interpret manuals, technical specifications, safety data sheets (SDS)/material safety data sheets (MSDS) and manufacturer guides related to operating, repairing and maintaining marine auxiliary boilers

Required Knowledge:

- Basic principles of operation of boilers and steam systems
- Boiler and steam plant repairs
- Combustion efficiency
- Combustion in boilers and related safety procedures, including importance of purging a boiler and other safety precautions taken when firing a boiler
- Common boiler defects and repair procedures
- Fittings mounted on boilers
- Fuel oil system for an auxiliary boiler
- Hazards:
 - associated with running boilers and steam plant
 - of operating steam plant under adverse or faulty operating conditions
- Heat transfer oil systems
- Methods of auxiliary steam plant operation and control under variable conditions
- Operating principles relating to steam generation in fired and unfired boilers
- Principles of boiler operation in normal and emergency situations
- Procedures for:
 - maintaining water level in boilers
 - protecting steam plant during off load conditions
 - surveying boilers
- Purpose of alarms and shut downs in marine boilers
- Steam plant:
 - efficiency
 - cycles
- Types of auxiliary boilers and typical operating pressures and temperatures
- Typical feed systems for marine boilers
- Treatment, sampling and testing of boiler water
- Work health and safety (WHS)/occupational health and safety (OHS) legislation, policies and procedures

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- providing accurate and reliable information
- providing appropriate level of detail in responses
- performing accurate and reliable calculations.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where advanced knowledge of marine auxiliary boilers can be demonstrated
- diagrams, specifications and other information required for performing advanced calculations related to marine auxiliary boilers
- technical reference library with current publications on marine auxiliary boilers and steam plant
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating advanced knowledge of marine auxiliary boilers
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Causes of loss of steam plant efficiency may include:

- Conduction-heat loss (such as fouled tubes)
- High flue-gas temperature
- Low combustion-air supply temperature
- Low feed-water supply temperature
- Low quality fuel
- Operation at low or cyclic loads
- Poor:
 - combustion
 - controls/instrumentation
 - water treatment
- Radiant-heat loss
- Too much excess air (i.e. high oxygen [O₂])

Boilers and steam plant may include:

- Condensers
- Economiser
- Feed pumps
- Fired
- High pressure
- Low pressure
- Medium pressure
- Steam – steam generators
- Unfired

Failures may include:

- Acid dew point corrosion
- Caustic gouging
- Corrosion fatigue
- Distortion
- Erosion
- Fatigue
- Hydrogen damage
- Maintenance damage
- Material flaws
- Over temperature
- Pitting
- Stress:
 - corrosion cracking
 - rupture
- Thermal fatigue
- Vibration
- Welding flaws

Constraints may include:

- Class requirements
- Location
- Reliability
- Time
- Type of materials

Safety valves may include:

- Boiler drum
- Economiser
- Superheater
- WHU

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6018A Demonstrate advanced knowledge of marine auxiliary machinery and systems

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to operate and maintain auxiliary machinery and associated systems on board a commercial vessel. This includes evaluating ship systems, assessing lubricants and lubricant contamination, and analysing the operation of major items of marine auxiliary machinery.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 1 and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Evaluate ship systems

- 1.1 Conventional systems are analysed from ship layout drawings and performance data
- 1.2 Viability and potential problems of new systems and advanced specialist vessels are evaluated
- 1.3 Suitable modifications are devised for systems that are not performing satisfactorily or recommendations are made on alternative systems
- 1.4 Manufacturer claims about new products and their suitability for use in existing conditions are evaluated
- 1.5 Performance of different pumps and heat exchangers is assessed and their applications are compared for different purposes
- 1.6 Performance of shipboard pollution control equipment is evaluated

2 Assess materials failure

- 2.1 Type of materials failure that impact on marine auxiliary components is analysed
- 2.2 Type and properties of metallic and non-metallic materials used in the marine field are evaluated
- 2.3 Ideal properties of materials required for components of *auxiliary machinery* are analysed
- 2.4 Repair methods used for auxiliary machines and *constraints* on engineering staff engaged in repairing auxiliary machinery are analysed
- 2.5 Type and purpose of destructive and non-destructive testing of materials are compared

3 Analyse lubrication

- 3.1 Mechanism of lubrication between two surfaces is explained
- 3.2 *Factors influencing good lubrication* are identified
- 3.3 Different types of lubrication applied to marine

- machinery are compared and contrasted
- 3.4 Relative advantages of synthetic lubricants and mineral oils are assessed
 - 3.5 Methods of assuring quality of lubrication are identified
- 4 Analyse fuel and lubricating oil contaminants**
- 4.1 Symptoms, effects and possible remedial actions for different types of contaminants in fuel are evaluated
 - 4.2 Types of *contaminants* that affect lubricants and remedial actions required for different forms of contamination are identified
 - 4.3 Products used to counter poor quality fuels and to improve properties of lubricating oils are assessed
 - 4.4 Safety measures to be applied when fuels are found to be outside class requirements are identified
- 5 Analyse shafting systems, bearings, couplings, clutches and shaft seals that form transmission system**
- 5.1 Different types and methods of checking alignment and wear of shafting, shaft bearings and thrust blocks are identified
 - 5.2 Assembly and dismantling procedures for muff and flange type couplings are compared and contrasted
 - 5.3 Different types, methods of operation and maintenance requirements of clutches are compared
 - 5.4 Different types, maintenance requirements and operation of stern tubes, tail shaft seals and stern bearing lubrication systems under adverse conditions are evaluated
- 6 Analyse steering gears and controllable pitch propeller systems**
- 6.1 Regulatory requirements for steering gears of different types of vessels are identified
 - 6.2 Operation of various types of steering gear arrangements are analysed
 - 6.3 Operation and performance of controllable pitch propeller (CPP) and fixed pitch systems are

- compared and contrasted
- 6.4 Modes of operation of CPP systems are explained
- 6.5 Effects and countermeasures, in the event of failure in the control system or seals of a CPP system, are identified
- 7 Analyse marine transmission systems**
- 7.1 Operation and performance of different marine transmission systems are compared and contrasted
- 7.2 Procedure for inspecting a set of reduction gears from a propulsion system is analysed
- 7.3 Types and locations of faults that may occur in gearing systems and repair options available are analysed
- 8 Analyse marine air compressors**
- 8.1 Procedures for assessing performance of reciprocating and rotary compressors by output and condition monitoring techniques are explained
- 8.2 Effects of multi staging, inter-cooling and clearance volume are explained
- 8.3 Importance of all fittings and safety devices in compressed air system is explained
- 8.4 Full automatic operation of starting air compressors is explained
- 9 Evaluate shipboard refrigeration and air conditioning systems**
- 9.1 Principle of air conditioning systems is explained and how ideal conditions are achieved in conditioned space is analysed
- 9.2 Automatic operation of a typical marine provision fridge plant capable of maintaining different temperatures in different cold rooms is analysed
- 9.3 Hazards associated with CFCs and HCFCs, and regulations controlling their production and usage are analysed
- 9.4 Procedure for evacuation and recovery of refrigerants from the system is outlined

- | | |
|---|--|
| 10 Evaluate operation of inert gas systems on crude oil tankers | 10.1 Location and functions of all components, fittings and safety devices in an inert gas system are identified |
| | 10.2 Operation of a typical inert gas system found on crude oil tankers is analysed |
| | 10.3 Operation and maintenance requirements of inert gas systems are explained |
| 11 Evaluate plant efficiency and relate problems in a turbo alternator | 11.1 Operating parameters and associated <i>protections</i> for turbo alternator systems are analysed |
| | 11.2 Procedure for assessing efficiency of auxiliary steam turbines is explained by analysing measured parameters |
| | 11.3 Methods of steam and air leak detection in turbo alternator systems are compared |
| | 11.4 Effects of fouling of condenser and changes in sea water temperature in turbo alternator systems are analysed |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access information and sketch diagrams to interpret and explain testing requirements related to the operation of marine auxiliary machines
- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain principles of marine auxiliary machines
- Identify and interpret complex numerical and graphical information related to operating, maintaining and repairing marine auxiliary machines on commercial vessels
- Identify and rectify faults and malfunctions in marine auxiliary machines on commercial vessels
- Identify methods, procedures and materials needed for operating, maintaining and repairing marine auxiliary machines on commercial vessels
- Impart knowledge and ideas through verbal, written and visual means
- Read and interpret complex written information related to the operation, performance and maintenance of marine auxiliary machines, including machinery specifications, machinery

design drawings, machine drawings, operational manuals, specifications and electrical and control circuit diagrams

Required Knowledge:

- Fuel and lubricating oil contaminants
- Fuels and basic principles of fuel systems
- Inert gas systems
- Lubrication
- Marine air compressors
- Marine transmission systems
- Materials failure
- Nature and causes of typical start up and shut down malfunctions of main and auxiliary machinery and associated systems, and available methods for their detection and rectification
- Operational characteristics and performance specifications for the different types of auxiliary machinery and associated systems usually found on a commercial vessel, including pumps, air compressors, steering gears, heat exchangers and evaporators
- Plant efficiency
- Principles and procedures of machinery lubrication
- Procedures for carrying out start up and shut down of main and auxiliary machinery and associated systems to ensure compliance with company and survey requirements and regulations
- Purpose and content of safety data sheets/material safety data sheets
- Safety, environmental and hazard control precautions and procedures relevant to start up and shut down of marine auxiliary machinery and associated systems
- Shafting systems, bearings, couplings, clutches and shaft seals that form the transmission system
- Ship systems
- Shipboard refrigeration and air conditioning systems
- Steering gears and controllable pitch propeller systems
- Types of auxiliary machinery and components
- Turbo alternators
- Work health and safety (WHS)/occupational health and safety (OHS) legislation and policies

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the

performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- providing accurate and reliable information
- providing appropriate level of detail in responses.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where advanced knowledge of marine auxiliary machinery and systems can be demonstrated
- technical reference library with current publications on auxiliary machinery
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating advanced knowledge of marine auxiliary machinery and systems
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for

Holistic assessment with other units relevant to the industry

assessment

sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Auxiliary machinery may include:

- Boiler
- Compressors
- Deck machinery
- Diesel generator
- Evaporators
- Pumps
- Refrigerating installation
- Separators
- Turbo alternators

Constraints may include:

- Class requirements
- Location
- Reliability
- Time

Factors influencing good lubrication may include:

- Alignment
- Condition of bearing surfaces
- Flow rate
- Load
- Purity of lubricant
- Running clearances
- Speed
- Temperature
- Viscosity

Contaminants may include:

- Air entrainment
- Incompatible fluids
- Moisture
- Particulate

Protections may include:

- Aerial displacement
- Condenser condition
- Expansion
- High air temperature
- High oil temperature
- Loss of vacuum
- Low oil pressure
- Overspeed:
 - mechanical
 - electrical
- Pressure
- Steam
- Steam condition
- Temperature
- Vibration

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6019A Demonstrate advanced knowledge of marine control systems and automation

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to operate control systems on board a commercial vessel. It includes basic knowledge of control theory and knowledge required to analyse the operation and performance of signal transmissions systems, electronic transmitters, final control element arrangements, electronic temperature sensors and transmitters, governors, PID electronic controllers, machinery space monitoring alarm and control systems.

It also includes knowledge of fault finding techniques for control systems, measurement and test equipment used for fault finding electronic apparatus, operational applications of analogue and digital programmable logic controllers, and procedures for programming, operating, and maintaining PLC controlled systems.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Explain control theory

- 1.1 Time lag is distinguished from time constant
- 1.2 How resistance and capacitance affect control and process system response is shown
- 1.3 Transfer function is defined
- 1.4 Effect of variations in undamped natural frequency on control systems is illustrated

2 Analyse signal transmissions systems used for monitoring, controlling and shutting down machinery

- 2.1 Methods and limitations of different signal transmissions systems are compared
- 2.2 Standard pneumatic system and standard analogue 4-20 mA system of signal transmission are compared and contrasted
- 2.3 System of a communications bus using digital signal transmission with optical and electronic systems is explained
- 2.4 Limitations and advantages of a communications bus system are analysed

3 Analyse electronic transmitters

- 3.1 Principles of operation of a typical 4-20 mA transmitter are explained
- 3.2 Application of strain gauges and changes in capacitance as sensors for pressure and differential pressure transmitters are outlined
- 3.3 *Methods of testing transmitter outputs* are explained
- 3.4 Application of differential pressure transmitters to liquid level sensing is analysed
- 3.5 Use of a differential pressure transmitter to measure flow is analysed and compared with

- non-restrictive electronic systems
- 4 Evaluate final control element arrangements**
- 4.1 Pneumatic, electric and hydraulic actuation are compared and contrasted
 - 4.2 Arrangements for locking pneumatic control valves in their last position on air failure are outlined
 - 4.3 Control valve trim characteristics are explained
 - 4.4 Control valve selection for machinery space duties are analysed
- 5 Evaluate electronic temperature sensors and transmitters**
- 5.1 Colour coding of tails and compensating cables for thermo couple types are identified
 - 5.2 Temperature/mV outputs and application of common thermo couple types are illustrated
 - 5.3 Relationship between resistance and temperature for PT100 resistance temperature device and method of testing three wire arrangements is explained
 - 5.4 Arrangements of interfacing thermo couples and RTDs with 4-20ma systems and 1-5 volt interface cards are analysed
- 6 Analyse PID electronic controllers**
- 6.1 Principle of operation of an electronic analogue 3-term controller and how adjustments are made is explained
 - 6.2 Open loop response and PID controller testing and calibration is demonstrated
 - 6.3 Application of modern single loop digital controller is explained
 - 6.4 Programming requirements for manual and auto tuning when adjusting digital controllers are demonstrated
- 7 Evaluate performance of machinery space monitoring alarm and control systems**
- 7.1 Capacitance sensing and float level monitoring systems are compared
 - 7.2 Single, two and three element boiler water level control systems involving feedwater and cascade systems are analysed

- 7.3 Requirements and systems to provide advanced combustion control systems and sequential control for burner management are outlined
- 7.4 Concepts and arrangements for central cooling and load dependent cooling control systems are explained
- 7.5 Main engine control arrangements for fixed pitch propeller and CPP systems requiring sequential control are analysed
- 7.6 Tests and procedures to meet UMS requirements are explained, and alarm and monitoring systems involving data loggers, alarm print outers, and trend analysis are evaluated
- 8 Explain fault-finding techniques for control systems**
 - 8.1 Governor adjustments are demonstrated and effect of incorrect adjustments is explained
 - 8.2 Common defects in mechanical and electronic governors are listed
 - 8.3 Indication of *faults* and procedures of fault finding in 4-20mA loops are explained
 - 8.4 Fault-finding techniques in pneumatic control systems and their respective components are analysed
 - 8.5 Fault-finding flow diagram is illustrated
 - 8.6 Off limit performance, fault detection and principles of rectifications for common engine room control systems are evaluated
- 9 Analyse measurement and test equipment used for fault-finding electronic apparatus**
 - 9.1 Principles of operation of cathode ray oscilloscope are explained
 - 9.2 Need for pulse shaping in electronics is examined
 - 9.3 Different methods of testing common alarms systems are compared
 - 9.4 Methods used in stabilisation, surveillance and monitoring of control power supplies are demonstrated
- 10 Analyse governors**
 - 10.1 Governor faults are diagnosed and interpreted, identifying and evaluating appropriate

adjustments and maintenance to be made

10.2 Specific governor applications requiring torque limitation, critical speed range avoidance are outlined

10.3 Typical electronic governors are explained using labelled diagrams to indicate major components and features

10.4 *Governor adjustments* to allow operation of propulsion and power generation diesels in both shared load and stand alone applications are specified

10.5 Response of a diesel engine governor on change in engine load using both feedback and feed forward control is explained using labelled diagrams to indicate major components and adjustments

11 Explain operational applications of analogue and digital programmable logic controllers

11.1 Methods of programming PLCs are assessed

11.2 Memory applications of PLCs are outlined

11.3 Input devices used with analogue PLCs are identified

11.4 Fibre optic data transmission systems are explained

11.5 Methods used for storing binary data and operating registers are explained

12 Document procedures for programming, operating and maintaining PLC controlled systems

12.1 Procedure for identifying required control system functions are explained

12.2 Procedure for connecting PLC to system control elements is outlined

12.3 System operating procedure is outlined

12.4 Procedure for modifying system and program as necessary to provide adequate and appropriate safety requirements, is outlined

12.5 Maintenance and fault-finding procedures are outlined

12.6 Required documentation is prepared and accuracy

is verified

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access information and sketch diagrams, and interpret and explain testing requirements related to control systems on commercial vessels
- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain advance principles of marine automation and process control and impart knowledge and ideas verbally, in writing and visually
- Identify and interpret numerical and graphical information, including schematic diagrams, relevant to control systems on commercial vessels
- Identify and suggest ways of rectifying faults and malfunctions in control systems on commercial vessels
- Identify methods, procedures and materials needed to operate and maintain control systems on commercial vessels
- Read and interpret written information related to operating control systems on commercial vessels

Required Knowledge:

- Analogue and digital programmable logic controllers
- Australian Standards for drawing symbols/layouts for schematic diagrams
- Characteristics and functions of temperature, pressure and viscosity of fuel
- Concept of 'fail safe' philosophy
- Concepts of unmanned machinery spaces (UMS), and automated monitoring and control of machinery
- Control and monitoring of ship machinery
- Control:
 - loops
 - theory
- Electronic:
 - temperature sensors and transmitters
 - transmitters
- Fault-finding techniques for control systems

- Final control element arrangements
- Governors
- Instrument process and control terms
- Machinery space monitoring alarm and control systems
- Measurement and test equipment used for fault-finding electronic apparatus
- Mechanical and electrical sensors
- Work health and safety (WHS)/occupational health and safety (OHS) legislation, policies and procedures
- PID electronic controllers
- Pneumatic and electrical instrumentation transmitters
- Principles of:
 - basic electronic circuits
 - basic pneumatic systems and action of pneumatic instruments
 - process control
- Safety devices, alarms and monitoring systems
- Sensing and transmitting elements
- Signal transmissions systems used for monitoring, controlling and shutting down machinery
- Tests and procedures required to meet UMS requirements

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- attention to detail when completing documentation
- providing accurate and reliable information
- providing appropriate level of detail in responses.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where advanced knowledge of marine control systems and automation can be demonstrated

- technical reference library with current publications on automation and process control
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating advanced knowledge of marine control systems and automation
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Methods of testing transmitter outputs may include:

- MA test point
- MV test point
- No test points

Faults may include:

- Earths
- Electronic component failure
- High resistance joints
- Open circuits
- Power supply faults
- Short circuits

Governor adjustments may include:

- Mismatching between prime mover types and responses

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6020A Demonstrate advanced knowledge of marine diesel engines and systems

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to analyse the operation and maintenance of marine diesel engines and systems on a commercial vessel. This includes evaluating fuel, cooling and lubrication systems; analysing starting, manoeuvring and reversing systems; analysing causes of vibration, scavenger fires and explosions; and interpreting combustion diagnostic equipment faults.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|--|-----|---|
| 1 Evaluate diesel fuel systems | 1.1 | Optimum combustion parameters, means of adjustment and legislation requirements limiting exhaust emissions are analysed |
| | 1.2 | Design modifications of pumps, camshafts and injectors for standard fuel types are evaluated |
| | 1.3 | Variable injection timing and fuel quality adjustments in service are justified, specifying common methods of adjustment |
| | 1.4 | Injection requirements for common diesel engine types, including combustion modifications for changes in engine service rating, are compared |
| | 1.5 | Faults and symptoms of common diesel fuel injection problems are analysed and appropriate adjustment is explained |
| | 1.6 | Work health and safety (WHS)/occupational health and safety (OHS) aspects of testing and handling fuel injection systems are explained |
| | 1.7 | Operation and normal operating pressures and temperatures of <i>fuel systems</i> are analysed |
| 2 Analyse cooling systems for main and auxiliary diesel engines | 2.1 | Thermal efficiency optimisation of diesel engines and causes of thermal loads on engine components are explained |
| | 2.2 | Cooling media selection is justified and various diesel-cooling methods are evaluated |
| | 2.3 | Requirements of a coolant are identified |
| | 2.4 | Corrosion principles and combustion side corrosion problems are explained |
| | 2.5 | <i>Appropriate action to be taken with common cooling system faults</i> is evaluated |
| | 2.6 | How cooling systems are commissioned, monitored and stored during idle periods is explained |
| | 2.7 | Reasons for load-dependant cooling of diesel alternators on heavy fuels is explained |
| | 2.8 | Use of additives in cooling water is explained |
| | 2.9 | <i>Normal operating temperatures, pressures and flow paths</i> of typical methods of cooling medium and slow speed diesel engine pistons, exhaust valves, cylinders, turbochargers and cylinder heads |

		are specified
3 Evaluate diesel engine lubrication requirements	3.1	Principles of engine lubrication are explained
	3.2	Different lubrication systems and demands each puts on oil are explained
	3.3	Methods for lubricating marine diesel engine components are specified and common faults are interpreted
	3.4	Conventional and synthetic lubricant properties and applications are identified
	3.5	<i>Sources of contamination</i> and deterioration of lubricants are analysed, treatment, monitoring and testing methods are explained, results are evaluated and appropriate action to be taken is outlined
	3.6	How lubricating oil is distributed to the guides, top-end, bottom-end and main bearings of diesel engines is explained using diagrams showing direction of flow, typical clearances and stating normal operating temperatures and pressures
	3.7	Methods of crosshead lubrication are outlined and compared
	3.8	<i>Methods of medium and slow speed cylinder lubrication</i> are evaluated
4 Analyse diesel engine starting and manoeuvring	4.1	Starting procedures for diesel engines for power generation, propulsion and emergency use are specified
	4.2	Starting and manoeuvring sequences/requirements for direct-coupled reversible and geared propulsion diesels, including CPP applications, are specified
	4.3	Common faults are analysed and appropriate action to be taken with diesel starting and manoeuvring systems is specified
	4.4	Major components of a propulsion diesel engine typical manoeuvring and reversing system are outlined using labelled diagrams, explaining how remote, local and emergency manoeuvring is achieved
	4.5	Methods of achieving reversing capability with direct-coupled propulsion diesels are evaluated
5 Analyse causes of vibration	5.1	Common materials used in diesel engine construction are identified, justifying selection and specifying typical compositions and physical properties of components
	5.2	Dynamic loads and stresses are summarised, identifying service

limitations, and different *methods of component fabrication and reclamation* are evaluated

- 5.3 Two- and four-stroke operating cycle forces, couples and moments, relating to design principles of crankshafts, bedplates, foundations and crossheads are analysed
 - 5.4 Out-of-balance gas and inertia forces, couples and moments, and their relationship with flywheels, balance weights, first/second order balancing and hull vibration are explained
 - 5.5 Factors contributing to torsional vibration are specified and methods of minimising or eliminating harmful effects of critical speeds are outlined
 - 5.6 Torsional vibration dampers/detuners are explained using labelled diagrams, indicating construction features and operating principles
 - 5.7 Calibration is applied to identify wear patterns, limits and means of restoring working clearances and limits of pistons, liners, piston rings, bearings and crankshafts, sliding surfaces and interference fits of typical diesel engines
 - 5.8 Alignment and adjustment criteria of crankshafts, chain-drives, integral thrust bearings and crossheads are specified
 - 5.9 Crankshaft deflection measurements are prepared and evaluated, alignment diagrams are constructed, and realignment procedures including restoration of crankshaft shrink-fit slippage, are proposed
- 6 Analyse scavenge and uptake fires, air-line, crankcase and gearbox explosions**
- 6.1 Operational and design factors contributing to waste heat unit fires are assessed
 - 6.2 Appropriate strategies for extinguishing/containing soot and hydrogen fires are selected
 - 6.3 **Hazard** reduction, inspection and isolation in service procedures are established
 - 6.4 Operational factors that may contribute to scavenge fires are identified and hazard reduction is planned
 - 6.5 Factors contributing to explosive mixtures are analysed and hazard reduction procedures for starting airlines are proposed and evaluated
 - 6.6 Inspection and test intervals are specified
 - 6.7 Causes of gearbox and crankcase explosions in propulsion and auxiliary drives are revised

- 6.8 How risks may be minimised in service by hazard reduction is specified
 - 6.9 Procedures to be implemented for hazardous atmosphere warning in oil and dual-fuel engines are evaluated
 - 6.10 Relevant diagrams are used to identify operating principles of oil-mist detectors, crankcase breathers and explosion relief doors
 - 6.11 Maintenance strategies are developed and criteria for piston rod scraper box inspection and maintenance intervals are specified
- 7 Plan safe working practices associated with diesel engine maintenance, operation and repair**
- 7.1 *Safe working practices for isolating main and propulsion diesels* under all operational contingencies are planned
 - 7.2 *Safe working practices for machinery in enclosed spaces* are planned
 - 7.3 Hazard reduction procedures for safe working with flammable liquids under pressure, chemicals, acids and hydrocarbons associated with engine overhaul and maintenance are planned
 - 7.4 Safe working strategies for diesel engine maintenance are planned according to manufacturer instruction manuals and product data safety sheets
- 8 Interpret combustion diagnostic equipment faults and relate to fuel injection and pressure charging systems**
- 8.1 Two- and four-stroke theoretical cycle diagrams are produced and discrepancies with results recorded by diagnostic tools are accounted for
 - 8.2 Combustion faults related to fuel injection and pressure charging systems are diagnosed, corrective action is specified and service values with trials or test bed figures are analysed
 - 8.3 Methods of pressure charging diesel engines are evaluated, efficiencies are determined from records, efficiency losses are accounted for and means of correction are identified
 - 8.4 Maintenance and emergency procedures for turbochargers and charge air coolers are planned
 - 8.5 *Design features of turbochargers and charge air coolers* are evaluated
 - 8.6 *Relevant diagrams* are applied to evaluate diesel scavenging systems, under normal and emergency operation modes

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access diagnostic information related to marine diesel engines and systems
- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain operation of marine diesel engines and systems, and impart complex information and ideas verbally, in writing and visually
- Identify and apply relevant solutions for addressing problems associated with marine diesel engines and systems
- Identify and interpret complex diagnostic information and perform mathematical calculations related to operating, repairing and maintaining marine diesel engines and systems
- Identify methods, procedures and materials needed for operating, maintaining and repairing marine diesel engines and systems
- Read and interpret manuals, technical specifications, safety data sheets (SDS)/material safety data sheets (MSDS) and manufacturer guides related to operating, repairing and maintaining marine diesel engines and systems

Required Knowledge:

- Basic principles of diesel engine operation
- Causes of vibration
- Combustion diagnostic equipment faults
- Components of diesel engines
- Cooling systems for main and auxiliary diesel engines
- Crankcase and air-line explosions, scavenge and uptake fires
- Diesel engine:
 - components
 - lubrication requirements
 - lubrication systems
 - propulsion and power generation
 - starting and manoeuvring
- Diesel fuel systems
- Fuel injection and pressure charging systems
- Manoeuvring systems of diesel engines
- Pressure charging diesel engines, including common service faults, actions to rectify faults, emergency operation and isolation procedures

- Properties and characteristics of fires
- Safe working practices associated with diesel engine maintenance, operation and repair
- Scavenge and uptake fires, air-line, crankcase and gearbox explosions
- Starting methods of diesel engines
- Turbocharger operation
- WHS/OHS legislation, policies and procedures

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- performing accurate and reliable calculations
- developing effective planning documents
- producing accurate and reliable information.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where advanced knowledge of marine diesel engines and systems can be demonstrated
- diagrams, specifications and other information required for performing basic calculations related to marine diesel engines and systems
- technical reference library with current publications on marine diesel engines and systems
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating advanced knowledge of marine diesel engines and systems
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Fuel systems may include:

- Conventional, low-inertia and dual-fuel (oil fuel/gas) injectors
- Fuel line pulsation damping devices
- Leakage protection
- Uni-fuel and dual-fuel systems (high/medium viscosity fuel types)

Appropriate action to be taken with common cooling system faults may include:

- Contamination
- Different cooling water treatments

Normal operating temperatures, pressures and flow paths may include:

- Bore cooling techniques
- Honeycomb techniques
- Strong-back techniques

Sources of contamination may include:

- Bacterial infection

Methods of medium and slow speed cylinder lubrication may include:

- Optimisation
- Running-in requirements
- Speed and load-dependant lubrication

Methods of component fabrication and reclamation may include:

- Ceramics
- Composite
- Forged
- Laser-hardening
- Plasma-spraying
- Welded

Hazards may include:

- Acids
- Chemicals
- Defective or bypassed machinery protective devices
- Defective or inappropriately adjusted exhaust systems
- Enclosed spaces
- Flammable liquids under pressure
- Hydrocarbons
- Leaking oil and fuel
- Lifting heavy components both unaided and with lifting gear

Safe working practices for isolating main and propulsion diesels may include:

- Identifying hazards
- Minimising hazards

Safe working practices for machinery in enclosed spaces may include:

- Handling heavy components
- Use of hydraulic tools

Design features of turbochargers and charge air coolers may include:

- Bearing types
- Materials

Relevant diagrams must include:

- Light spring diagrams

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6021A Demonstrate advanced knowledge of marine electrical systems

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to supply shipboard electrical power on board a commercial vessel. It includes analysing electrical layout systems, alternators, marine motors, lighting systems, power management and UPS systems, shipboard electrical equipment and high voltage power systems.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Evaluate advanced electrical layout systems
 - 1.1 Effects of power factor changes on prime mover, alternator and electrical system are analysed
 - 1.2 Methods of altering load power factor by means of capacitors or synchronous machines are explained
 - 1.3 Methods of obtaining constant frequency from a variable frequency output such as a main engine driven alternator and/or variable speed drives for a self discharging equipment are explained
 - 1.4 Protecting systems available for shaft driven alternators are evaluated
- 2 Analyse construction and principles of operation of different types of marine alternators
 - 2.1 Construction and *operating parameters* of different types of marine alternators are compared and contrasted
 - 2.2 Cooling systems, leak detection, monitoring and protection systems in different types of marine alternators are compared and contrasted
 - 2.3 Procedures for drying out an alternator with a low insulation resistance are explained
 - 2.4 Excitation systems and methods of flashing alternator after loss of excitation are appraised
 - 2.5 Systems used for protecting against high winding temperatures, circulating currents, loss of excitation and internal short circuit are evaluated
- 3 Analyse different types of direct current (DC) and alternating current (AC) marine motors
 - 3.1 Different types and applications of *marine motors* are compared and contrasted
 - 3.2 Difference between types of *encapsulation* is explained and where they should be used is justified
 - 3.3 *Motor ratings* and effect of overloading on different types of motor are assessed
 - 3.4 Possible *operational problems* associated with marine motors are analysed and appropriate

- remedial action is devised
- 3.5 Procedure for drying out a motor that has become unserviceable due to either long-term storage or immersion in seawater is formulated
 - 3.6 Effects of operating star connected motors compared with delta connected motors are distinguished and when this may be required is suggested
 - 3.7 *Different types and applications of special motors for deck and cargo operation* are analysed
- 4 Analyse requirements of motor starters for 3 phase and synchronous motors**
- 4.1 Differentiation is made between different types of *motor starters*
 - 4.2 Different types of starters are evaluated in terms of starting torque and current, and these are related to particular motor applications
 - 4.3 Simple starter circuit diagrams are evaluated and operating principles of motor starters are explained
 - 4.4 Documentation and circuit and wiring diagrams for fault-finding in motor starters are used
 - 4.5 Routine maintenance program for monitoring vibration and insulation resistance levels of motors is designed
- 5 Analyse lighting systems used on board ships**
- 5.1 Common types and applications of *lighting systems* are evaluated
 - 5.2 *Distribution layout systems* are explained
 - 5.3 Fault-finding method for lights and starter systems, including lighting in hazardous areas, is planned using circuit diagrams
- 6 Evaluate alternator excitation system design**
- 6.1 Different types of excitation systems and impact of load changes are compared
 - 6.2 Type, location and function of components involved in excitation are examined
 - 6.3 Function, cooling, failure mode and procedures for testing and changing diodes are explained

- 6.4 Functions of an AVR and how it may be incorporated into an excitation system are explained
 - 6.5 Process of fault-finding in an AVR and types, causes and remedies of common problems are explained
 - 6.6 *How excitation systems impact on output in normal and adverse circumstances* is assessed
- 7 Analyse power management and uninterruptable power systems (UPS) fitted to vessels**
- 7.1 Operational functions of power management systems during high load, overload and short circuit conditions are analysed
 - 7.2 Functions and components of UPS systems are evaluated
 - 7.3 Limitations of power management and UPS fitted to vessels are analysed
 - 7.4 System response under possible fault conditions of vessel power management and UPS are determined
- 8 Analyse vessel cathodic protection system**
- 8.1 Cathodic protection systems and how they interact are analysed
 - 8.2 Components of cathodic protection systems are identified and life cycle maintenance program is prepared
 - 8.3 Modifications required for operating parameters of cathodic protection systems when operating alongside an active wharf or another vessel are determined
 - 8.4 Likely causes of corrosion in relation to size, location or distribution of anodes or current densities are assessed
 - 8.5 Other corrosion problems in shipboard environment that may be cause of electrical problems are appraised
- 9 Assess requirements and components associated with electrical systems for hazardous**
- 9.1 Different types, limitation and nameplate identification of 'E' equipment are compared
 - 9.2 Requirements of classification societies are

- spaces on board vessels** distinguished from administrations regarding electrical installations on board vessels
- 9.3 Lighting and power supply requirements of pump rooms are identified
- 9.4 *Safety requirements* for electrical equipment and safety practices on board vessels and how these are extended when alongside a berth are analysed
- 10 Assess existing electrical shipboard equipment**
- 10.1 Existing and new shipboard electrical equipment and systems are compared to assess future requirements as well as potential problems and preventative measures
- 10.2 Performance of existing shipboard electrical equipment and systems is analysed and cost effectiveness studies for modifications or improvements are prepared
- 10.3 Factors involved in commissioning new electrical plant are evaluated
- 10.4 Procedures involved in organising survey of existing plant are outlined
- 10.5 Procedures involved in making recommendations for new systems consistent with modified new ship building requirements are outlined
- 11 Appraise high voltage electrical motor propulsion systems**
- 11.1 Safety requirements for working with high voltage systems are identified
- 11.2 Use of high voltage systems for propulsion and cargo handling is evaluated
- 11.3 Safe maintenance methods for high voltage switchgear and machines are analysed

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain advanced principles of lighting, cathodic protection, high voltage systems and impart knowledge and ideas verbally, in writing and visually
- Identify and interpret complex numerical and graphical information in electrical diagrams and specifications for a commercial vessel
- Identify and suggest ways of rectifying electrical hazards and emergency situations on a vessel
- Identify methods, procedures and materials needed for operating, maintaining and repairing complex marine electrical systems
- Read and interpret written information related to electrical circuitry and components on commercial vessels
- Use electrical measuring and testing instruments

Required Knowledge:

- Alternating current (AC)/direct current (DC) voltage
- AC and DC marine motors
- Alternators:
 - alternator excitation system design
 - construction
 - characteristics
 - synchronised operation
 - types
- Cathodic protection system
- Electrical:
 - layout systems
 - measuring and testing instruments
 - shipboard equipment
 - symbols, basic electrical diagrams/circuits
- High voltage electrical motor propulsion systems
- Lighting systems used on board ships
- Motor starters for three-phase and synchronous motors
- Phase angle, power factor, and current flow
- Power management and UPS fitted to vessels
- Procedures for dealing with hazards and emergencies
- Requirements and components associated with electrical systems for hazardous spaces on board vessels
- Resistance, inductance and capacitance

- Safe electrical working practices
- Work health and safety (WHS)/occupational health and safety (OHS) legislation and policies

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- providing accurate and reliable information
- providing appropriate level of detail in responses.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where advanced knowledge of marine electrical systems can be demonstrated
- technical reference library with current publications on marine electrical systems
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess

practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating advanced knowledge of marine electrical systems
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Operating parameters may include:

- Excitation current
- Insulation grade
- Operating temperature
- Speed

Marine motors may include:

- Polyphase
- Reduced starting current motors
- Single
- Speed changing
- Synchronous
- Variable speed

Encapsulation may include:

- Drip proof
- Submersible
- TEFC

Motor ratings may include:

- Continuous
- Short time

Operational problems may include:

- Loss of insulation resistance
- Open circuit
- Overheating
- Short circuit

Different types and applications of special motors for deck and cargo operation may include:

Motor starters may include:

Lighting systems may include:

Distribution layout systems must include:

How excitation systems impact on output in normal and adverse circumstances must include:

Safety requirements may include:

- Wrong connections
- Common faults
- Remedies for common faults
- DOL
- Primary and secondary resistance
- Soft or electronic starters
- Star-Delta
- Transformer starter
- Fluorescent
- Halogen
- Incandescent
- LED
- Mercury
- Sodium vapour
- Emergency lights
- Safety lights
- Loss of excitation
- Short circuit
- Company requirements
- Manufacturer requirements.
- Statutory requirements

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6022A Demonstrate advanced knowledge of marine steam turbines and main boilers

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMR5707A Manage the operation, monitoring and evaluation of the performance of steam propulsion plant on vessels of unlimited propulsion power.

Unit Descriptor

This unit involves the skills and knowledge required to operate and maintain main steam propulsion plant and associated control systems on a commercial vessel. It includes analysing: methods of improving plant efficiency; changes in feed system that occur during fluctuating loads; design and construction of high-pressure water tube boilers and ancillary equipment; operation, maintenance and performance of high-pressure water tube boilers and ancillary equipment; turbine operation, maintenance and performance; and turbine-gearing performance.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|---|-----|--|
| 1 Analyse methods of improving plant efficiency | 1.1 | Increase in Rankine efficiency of plant by increasing the pressure and temperature is analysed |
| | 1.2 | How regenerative feed heating and steam reheating increases overall plant efficiency is shown on an enthalpy/entropy diagram |
| | 1.3 | Efficiency calculations and performance evaluation for boilers, turbines, feed systems and total plant are performed |
| 2 Analyse changes in feed system that occur during fluctuating loads | 2.1 | Changes that occur during fluctuating loads are identified, detailing how make up to system and dump from system are performed |
| | 2.2 | Condenser level control methods, how condenser is supported and how expansion stresses are avoided are explained |
| | 2.3 | Loss of efficiency when heat transfer rate is interrupted is explained |
| | 2.4 | Test procedure to identify leaks in a condenser is created |
| | 2.5 | Types, features, common defects and maintenance requirements of two-stage and super cavitating extraction pumps are compared and contrasted |
| | 2.6 | Effects of air leaks in feed system and ineffective air removal in air ejector are explained |
| | 2.7 | Operation of a vacuum pump for air removal from a condenser is explained |
| | 2.8 | Operation of a turbo feed pump differential pressure governor taking into account constant pressure, increasing pressure and decreasing pressure differential governing is explained |
| | 2.9 | Alarms, shutdowns, automatic cut-in arrangements and testing of over speed trips for a boiler feed pump are outlined |
| 3 Analyse design and construction | 3.1 | Temperature load relationships and temperature control of superheater are analysed |

of high-pressure water tube boilers and ancillary equipment	3.2	Operation of superheater with parallel, contra and cross flow of gas/steam flow is predicted
	3.3	Correct material for high temperature operation of superheater tubes and headers is identified
	3.4	Tube fixing and support arrangements for superheater elements are explained
	3.5	Burner tip design and operation for steam atomising oil burners are compared
	3.6	Features of a three-element water level control system and relationship with burner management system are outlined
	3.7	Operation of a combustion control system fitted with cross limits on air and fuel is explained
	4 Analyse operation, maintenance and performance of high-pressure water tube boilers and ancillary equipment	4.1
4.2		How boiler is laid up for short and/or long periods is explained
4.3		Actions required after oil or salt water contamination are detailed
4.4		Chemical cleaning procedure to remove scale and oil deposits from internal surfaces of a boiler is explained
4.5		Tube failures are identified and suitable methods of repair are selected
4.6		Defects that can occur in economisers and how they can be repaired are listed
4.7		Maintenance inspection procedures to prevent superheater and economise fires are produced
4.8		Procedure to combat soot and steam/iron fires in generating banks, superheaters and economisers is outlined
4.9		Coordinate and congruent feed water treatment is illustrated on a caustic/phosphate graph
4.10		Different feedwater tests, procedure for each test and appropriate chemical treatments are explained
4.11		Program for an internal and external survey of a water tube boiler is compiled, defects that may be found and repair methods that will enable boiler to be returned to service are listed

- 4.12 Procedure for setting lift, adjusting blow-down of safety valves and carrying out an accumulation test on a boiler is outlined
- 4.13 Operation, desired temperature range and correct cleaning and maintenance requirements for tube and regenerative air heaters are detailed
- 4.14 Preparation and procedure for conducting hydraulic testing of a high pressure water tube boiler is explained
- 5 Analyse turbine operation, maintenance and performance**
 - 5.1 Relationship between sequential nozzle operation and bar lift in steam turbines is explained
 - 5.2 Principle of operation of different *trips and cut-outs* is explained
 - 5.3 Differentiation is made between resonance and critical speed, and their effect on the turbine operation is explained
 - 5.4 Types of *turbine vibration* and where each type is found in a turbine is analysed
 - 5.5 System torsional vibration and effect of operating at critical speeds and in-built design elements required to avoid critical speeds are explained
 - 5.6 Back pressure and self condensing turbo alternators are compared
 - 5.7 Governor system is explained
 - 5.8 *Turbine control systems* are explained
 - 5.9 Procedure for opening up turbine for survey, routine checks of blades, casings, rotors, bearings, glands, drains and the reassembly of turbine is explained
 - 5.10 Procedure for straightening a bowed turbine rotor is outlined
- 6 Evaluate turbine-gearing performance**
 - 6.1 Single and double reduction gearing systems are compared and contrasted
 - 6.2 Features and applications of double helical involute gear teeth are outlined
 - 6.3 Advantages and disadvantages of single and double locked train gearboxes are analysed
 - 6.4 Construction and reason for installing flexible couplings in gearing system is explained
 - 6.5 Features, functions and applications of star, planetary and solar

epicyclic gearing are compared and contrasted

6.6 Space savings resulting from use of epicyclic gearing are analysed

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access diagnostic information related to marine steam turbines
- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain operation of marine steam turbines and impart advanced knowledge and ideas verbally, in writing and visually
- Identify and apply relevant solutions to complex problems that can occur during operating steam propulsion plant and associated systems on a steam vessel
- Identify and interpret complex diagnostic information and perform complex mathematical calculations related to operating, repairing and maintaining marine steam turbines
- Identify methods, procedures and materials needed for operating, maintaining and repairing marine steam turbines
- Read and interpret complex manuals, technical specifications, safety data sheets (SDS)/material safety data sheets (MSDS) and manufacturer guides related to operating, repairing and maintaining marine steam turbines

Required Knowledge:

- Boiler operation, maintenance and performance
- Changes in feed system that occur during fluctuating loads
- Established engineering practice and procedures for operating shipboard steam propulsion plant and associated systems in warm through, manoeuvring, start up, normal running, emergency and shut down situations
- Fundamental principles of steam propulsion systems and boilers
- Hazards and problems that can occur during operation of steam propulsion plant and associated systems, and appropriate preventative and remedial action
- High-pressure water tube boilers and ancillary equipment
- Methods of lubricating principal components of a marine steam propulsion turbine and its associated gearing, and evaluating common faults, including common lubrication faults, symptoms, causes, and actions to be taken with such faults
- Operational characteristics and performance specifications for different types of steam propulsion plant and associated systems on a steam vessel of unlimited propulsion power

- Principles of operation of main steam propulsion and auxiliary systems on a steam vessel, including:
 - construction and operation of main and auxiliary steam turbines
 - methods of turbine control, including safety devices
 - procedures for emergency operation of a steam turbine
 - symptoms, causes, effects, and actions to be taken of defects of auxiliary steam turbines
- Procedures for reading and interpreting readings and indications of performance of steam propulsion plant and associated systems
- Turbine operation, maintenance and performance
- Turbine-gearing performance
- Types, properties, tests, applications and treatment of fuels, lubricants, and solvents/chemicals used on board a steam vessel, including a basic understanding of working principles, construction, maintenance and safe operation of centrifuges, filters and other treatment devices
- Typical operating precautions for steam propulsion plant and associated systems to ensure operational performance is in compliance with bridge orders, technical specifications, survey requirements and established safety and anti-pollution rules and regulations
- Units of measurement
- Ways of improving plant efficiency
- Work health and safety (WHS)/occupational health and safety (OHS) legislation and policies

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- performing accurate and reliable calculations
- producing accurate and reliable information.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where advanced knowledge of marine steam turbines and main boilers can

be demonstrated

- diagrams, specifications and other information required for performing complex calculations related to marine steam turbines
- technical reference library with current publications on marine steam turbines
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating advanced knowledge of marine steam turbines and main boilers
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Trips and cut-outs may include:

- Axial displacement
- Bearing high temperature
- High condenser level
- Loss of vacuum
- Over speed
- Vibration

Turbine vibration may include:

- Axial
- Torsional
- Transverse

Turbine control systems may include:

- Bridge control
- Emergency operation
- Hydraulic control
- Local control

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARL6023A Demonstrate advanced knowledge of ship operation and maintenance

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to ensure that vessels comply with regulatory and survey requirements as well as implementing maintenance and repair procedures associated with satisfying maintenance of class. It includes analysing regulatory framework impacting on commercial shipping operations; maintenance strategies relating to classification surveys; statutory survey requirements; and factors influencing vessel stability.

It also includes analysing repair and maintenance methods for hull work, pipe work and pumping systems, machinery, propellers and other items to satisfy maintenance of class position; international maritime dangerous goods code requirements; safe working practices in enclosed or confined spaces; dry docking procedures and responsibilities of engineering staff; and shipboard vibration.

Application of the Unit

This unit applies to the work of a Marine Engineer Class 1 on commercial vessels of unlimited propulsion power and forms part of the requirements for the Certificate of Competency Marine Engineer Class 1 issued by the Australian Maritime Safety Authority (AMSA).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Analyse regulatory framework impacting on commercial shipping operations

- 1.1 Functions of International Maritime Organization (IMO), its fields of influence, role of member states, adoption of recommendations through maritime legislation and exemptions are analysed
- 1.2 Role of International Labour Organization (ILO) Convention in relation to shipboard practices is analysed
- 1.3 **Key provisions of Australian maritime legislation** are analysed
- 1.4 Role of AMSA in relation to maritime safety, protection of marine environment, and aviation and marine search and rescue is explained
- 1.5 Role of Flag State administrations, Port State Control and other methods of implementation and enforcement of international agreements and conventions is analysed
- 1.6 Role of insurance underwriters, Protection and Indemnity (P & I) Clubs and procedures for lodging claims following machinery failure and/or damage are analysed
- 1.7 Role of classification societies, IACS and Memorandum of Agreement with Flag States is analysed
- 1.8 Role of ship owners and ship management companies regarding ISM Code and ship management responsibilities regarding operation and maintenance is analysed
- 1.9 Role of independent inspection agencies and adoption of inspection and maintenance guidelines for different ship types is analysed
- 1.10 Standards of Training, Certification & Watchkeeping (STCW) crew training requirements and implications

for emergency response, administration, operation and maintenance are analysed

1.11 **Key provisions of the Code of Safe Working Practice for Australian Seafarers** are analysed

2 Analyse maintenance strategies relating to classification surveys

2.1 Common **areas covered by classification** surveys are analysed

2.2 **Survey methods** are analysed

2.3 Terms of periodical, annual, renewal, intermediate and occasional surveys are identified

2.4 Common defects identified in **classification surveys** and appropriate remedial actions are analysed

3 Analyse statutory survey requirements

3.1 **Areas of vessel covered by statutory surveys** are identified

3.2 Statutory requirements for change of Flag, owner, and term expiry during layup are identified

3.3 Records and documentation required for statutory surveys are identified

3.4 Load line measurements and conditions of freeboard assignment are analysed

3.5 Key areas of maintenance and testing of load line items and actions for addressing identified maintenance requirements and defects are identified

3.6 Areas covered by safety construction surveys and associated faults, maintenance and repairs are identified

3.7 Procedures for planning safety equipment surveys and actions for addressing identified maintenance requirements and defects are analysed

3.8 Requirements for survey preparation under MARPOL are analysed

3.9 Survey requirements for safety radio, chemical and gas tanker certificates of fitness, and passenger ship safety certificates are analysed

3.10 Application of Port State Control surveys, Flag State jurisdiction and IMO guidelines in relation to vessel detention and identification of substandard ships are

analysed

4 Analyse factors influencing vessel stability

- 4.1 **Loss of GM** due to addition, removal or shift of mass on board is calculated
- 4.2 Action to be taken with partial loss of intact buoyancy is specified
- 4.3 Angle of Loll is explained
- 4.4 Causes of vessel instability during ballasting, bunkering, cargo pumping and other daily routines and possible corrective and avoidance measures are assessed
- 4.5 Risks associated with carrying thixotropic bulk cargo, deck cargo or grain and consequences of cargo movement or loss are outlined
- 4.6 Damage and intact stability requirements for merchant ships, countermeasures for Ro-Ro vessels and damage control assessment following collision or grounding is assessed
- 4.7 **Operational procedures to minimise and control flooding** are prepared
- 4.8 Stability requirements for routine and emergency dry docking, including stability assessment for the docking duration, are specified
- 4.9 Factors causing ship squat and other influences on vessel manoeuvrability are assessed

5 Maintain class certification

- 5.1 Methods for repair and maintenance are analysed
- 5.2 **Properties** of ordinary and high tensile hull grades of steel are analysed
- 5.3 Processes and materials used in underwater hull repairs are assessed
- 5.4 **Methods of minimising and controlling internal and external hull corrosion**, including bacterial corrosion of bilges and fuel tanks, are evaluated
- 5.5 Examination and repair techniques for fixed pitch and controllable propellers are assessed
- 5.6 Dismantling, inspection, repair and re-assembly of thrusters and rudders is explained

- 5.7 **Methods of performance testing shipboard pumping systems** are evaluated
- 5.8 Causes of common faults and methods of assessment of shipboard pumping systems are identified
- 5.9 Condition monitoring of machinery is compared with **planned maintenance systems**
- 5.10 Causes of damage to and losses of bulk ships and tankers, and appropriate remedies are explained
- 5.11 Types and purpose of special and enhanced surveys are outlined
- 6 Analyse International Maritime Dangerous Goods (IMDG) Code requirements**
 - 6.1 **Key principles of IMDG Code** are analysed
 - 6.2 Action plans for managing emergency situations on board a vessel involving dangerous goods are developed
 - 6.3 Criteria for evaluating effectiveness of action plans for managing emergency situations on board a vessel involving dangerous goods are established
- 7 Analyse safe working practices in enclosed spaces**
 - 7.1 **Hazards of shipboard enclosed spaces** are analysed
 - 7.2 Methods and regulatory requirements for testing atmosphere in enclosed spaces are outlined and evaluated
 - 7.3 Function, status and limitations of chemist certificate of compliance is explained
 - 7.4 Limits of exposure to common atmospheric hazards are stated
 - 7.5 Typical safe entry permit for enclosed spaces, covering hot work and cleaning, evacuation procedures, training and contingency evaluation is prepared
 - 7.6 Dangers of using cleaning solvents and painting in enclosed spaces using product safety data sheets (SDS)/material safety data sheets (MSDS) and work health and safety (WHS)/occupational health and safety (OHS) guidelines are assessed
- 8 Analyse dry docking procedures and responsibilities of**
 - 8.1 Dockyard contract, docking specifications and survey requirements are used to plan preparation of vessel for docking, explaining variations required for emergency

- engineering staff
 - docking
 - 8.2 Dock work schedules, responsibilities for engineering personnel and procedures for dock entry, duration and refloating are prepared
 - 8.3 **Inspection and maintenance procedures for hull and machinery items in dock** are explained
 - 8.4 In-water hull cleaning methods and preparation essential for in-water surveys is evaluated
 - 8.5 Types and application procedures of coatings used to protect ship hulls and tanks are identified
 - 8.6 Procedures for vessel layup to satisfy class, insurance, owner and statutory requirements are prepared
 - 8.7 Inspection and reactivation processes after prolonged layup are outlined
- 9 Analyse shipboard vibration**
 - 9.1 Appropriate *terms* are applied when describing vibration
 - 9.2 Influence of materials, construction, loading patterns and ship type on natural hull vibration patterns is assessed
 - 9.3 Significance of hull response to excitation by sea state, machinery and propulsion systems is explained
 - 9.4 Methods of prediction and in service assessment of resonant vibration are evaluated
 - 9.5 Vibration related structural and equipment damage and failure is identified
 - 9.6 **Solutions** to troublesome vibration are proposed
 - 9.7 Acceptable vibration limits using relevant standards are established
- 10 Analyse vessel bunkering requirements**
 - 10.1 Requirements for bunkering orders are analysed
 - 10.2 Procedures for taking bunkers are analysed
 - 10.3 Bunkering guidelines for spills and fire are analysed
 - 10.4 Methods and requirements for sampling fuels are analysed

10.5 Procedures for assessing the quality and quantity of fuels are explained

10.6 **Communication** requirements and procedures during bunkering operations are analysed

10.7 Methods for monitoring levels and facilitating changeover of tanks are analysed

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access information required in routine and emergency situations
- Assess own work outcomes and maintain knowledge of current codes, standards, regulations and industry practices
- Explain advanced concepts of ship operation and maintenance, and impart knowledge and ideas verbally, in writing and visually
- Identify, interpret and process complex numerical and graphical information required to analyse marine engineering functions and shipboard engineering related problems
- Identify hazards and risks, and determine appropriate ways of responding to hazards, malfunctions and emergency situations
- Identify methods and procedures needed to perform duties such as preparing for dry-docking and statutory surveys
- Read and interpret legislation and regulations related to maritime operations

Required Knowledge:

- Australian maritime legislation
- Classification societies
- Dry docking:
 - procedures
 - responsibilities of engineering staff
- Enclosed spaces
- Flag State responsibilities
- Hierarchy and organisational structure of shipboard personnel
- IMDG Code requirements
- Key international and Australian standards relating to shipping

- Key shipping authorities and organisations
- Maintenance strategies relating to classification surveys
- MARPOL
- Port State Control
- Regulatory framework impacting on commercial shipping operations
- Repair and maintenance methods for hull work, pipe work and pumping systems, machinery, propellers and other items to satisfy maintenance of class position
- Safe practices for working with lifting gear
- Safe working practices in enclosed or confined spaces
- Shipboard vibration
- Statutory survey requirements
- Types of ships and key features of ships
- Vessel stability
- Watertight integrity
- WHS/OHS legislation and policies

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- developing effective planning documents
- providing the required amount of detail in reports
- ensuring currency of relevant legislative and regulatory knowledge.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where advanced knowledge of ship operation and maintenance can be demonstrated
- technical reference library with current publications on commercial shipping
- tools, equipment and personal protective equipment

currently used in industry

- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate demonstrating advanced knowledge of ship operation and maintenance
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. **Italicised wording**, if used in the performance criteria, is detailed below.

- Key provisions of Australian maritime legislation includes:
- *AMSA legislation*
 - *Levy legislation*
 - *Marine pollution legislation*
 - *Navigation legislation*

- Key provisions of the Code of Safe Working Practice for Australian Seafarers includes:
- Shipping industry legislation
 - Shipping registration legislation
 - Other relevant legislation
 - Anchoring, docking and mooring
 - Carriage of dangerous goods
 - Entering and working in enclosed or confined spaces
 - General provisions
 - General duties and responsibilities
 - Manual lifting and carrying
 - Painting
 - Permit to work systems
 - Reporting of accidents
 - Safe access to ship
 - Safe movement about the ship
 - Safety in living accommodation
 - Shipboard:
 - emergencies and emergency equipment
 - health and safety
 - Specific vessel types
 - Tools and materials
 - Upkeep of wire and fibre ropes
 - Welding flame cutting and other hot work
 - Working:
 - aloft and over the side
 - with electricity and electrical equipment
 - with dangerous and irritating substances and radiations
 - in machinery spaces
 - in galleys, pantries and other food handling areas
- Areas covered by classification must include:
- Specific notations for cargo pumping arrangements for tankers
- Areas covered by classification may include:
- Automation
 - Boilers/pressure vessels
 - Cargo gear
 - Hull
 - Machinery
 - Tailshaft
- Survey methods may include:
- Continuous
 - Alternative

- Classification surveys must include:
- Special surveys
 - Hull work
 - Machinery
 - Pipe work
 - Pumping systems
 - Propellers
- Areas of vessel covered by statutory surveys must include:
- Links with classification society requirements for endorsement of class certificates
- Loss of GM must include:
- Derrick hook loads
 - Free surface effect
- Operational procedures to minimise and control flooding must include:
- Action to ensure watertight integrity of ship
 - Rules relating to watertight doors
- Stability requirements for routine and emergency dry docking must include:
- Stability assessment for docking duration
- Properties must include:
- Repair techniques and limitations
 - Weld ability
 - Welder qualification tests
- Methods of minimising and controlling internal and external hull corrosion must include:
- Bacterial corrosion of bilges and fuel tanks
- Methods of performance testing shipboard pumping systems must include:
- Bilge and ballast systems
 - Hydraulic deck machinery
- Shipboard pumping systems must include:
- Bilge and ballast systems, including predictive health monitoring
 - Hydraulic deck machinery
- Planned maintenance systems must include:
- Guidelines for classification society approval of substitution for continuous machinery surveys
- Principles of IMDG Code may include:
- Contains dangerous goods packagings/tanks which are of appropriate strength and which will prevent goods escaping
 - Groups dangerous goods together based on hazards they present in transport (classification)
 - Lays down principles for ensuring dangerous goods that will react dangerously together are kept apart
 - Lays down principles for where to place dangerous goods on board ship to ensure safe transport
 - Provides emergency response advice for

- dangerous goods involved in a fire or spillage on board ship
 - Requires standard documentation to be provided when dangerous goods are being transported
 - Uses hazard warning labels and other identifying marks to identify dangerous goods in transport
- Emergency situations may include:
- Dangerous goods
 - Disposal of dangerous/toxic materials
 - Firefighting
 - First aid
 - Hazard reduction
 - Reporting
- Hazards of shipboard enclosed spaces must include:
- Re-entry of compartments after a major fire
 - Release of a fixed firefighting medium
- Hazards of shipboard enclosed spaces may include:
- Engulfment
 - Explosion
 - Fire
 - Lack of oxygen
 - Toxic gases
- Inspection and maintenance procedures for hull and machinery items in dock must include:
- Hull coating systems
 - Measurement and evaluation of clearances
- Terms may include:
- Amplitude
 - Anti-node
 - Frequency
 - Mode
 - Node
 - Resonance
- Solutions may include:
- Damping
 - Detuning
 - Modification of ship:
 - design
 - operation
- Communication may include:
- Checklist
 - Rate
 - Safety
 - Stock method
 - Two way radio

Unit Sector(s)

Not applicable.

Competency Field

Marine Engineering

MARM3001A Apply knowledge of safety management system legal framework in the workplace

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to apply an understanding of the safety management system legal framework in a maritime workplace.

It includes accessing relevant legislation and contributing to any actions to ensure compliance with and an understanding of, safety management systems is achieved by seafarers, crew and other applicable maritime personnel.

Application of the Unit

This unit applies to people who assist marine surveyors or who undertake administration duties in the maritime industry and/or marine surveying sector.

It provides an understanding of obligations on all seafarers to ensure that safety management systems for vessel and crew safety are in place and comply with maritime legislation.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|--|
| 1 Identify and interpret safety management system legal framework | <ul style="list-style-type: none">1.1 Current <i>safety management system (SMS)</i>, <i>relevant legislation</i>, <i>standards</i>, and workplace policies and procedures impacting on the maritime industry are identified and accessed1.2 Relationship between SMS, relevant legislation, standards, and workplace policies and procedures is accurately interpreted to assist in identifying requirements for a range of different commercial vessel operations1.3 SMS documentation requirements for a commercial vessel operation are identified1.4 Master and crew member legal obligations and duties for training employees are identified1.5 Consequences of <i>non-compliance</i> with SMS, relevant legislation, standards, and workplace policies and procedures are clarified |
| 2 Contribute to activity that reflects safety management system legal framework | <ul style="list-style-type: none">2.1 Contributions are made to monitoring compliance with SMS, relevant legislation, standards and workplace policies and procedures for size and nature of operation2.2 Contributions are made to ensuring all work carried out on board vessel is undertaken in a safe manner according to SMS and relevant legislation, standards, and workplace policies and procedures2.3 Non-compliance with SMS, relevant legislation, standards, workplace policies and procedures is identified and <i>appropriate action</i> is taken2.4 Limits of own expertise and legal responsibilities are recognised, and appropriate sources of expertise are accessed as required |
| 3 Maintain up-to-date knowledge of safety management system legal framework and maritime industry requirements for commercial vessels | <ul style="list-style-type: none">3.1 <i>Sources</i> to access current information covering applicable legislation and guidelines relating to SMS are utilised3.2 Knowledge of SMS, relevant legislation, standards, and workplace policies and procedures is regularly updated3.3 Relevant information on SMS and SMS requirements is provided to seafarers and crew either on board a vessel or through general enquiry services |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Communicate effectively when contributing to formal and informal enquiries about SMS
- Prepare simple documents such as summary reports, audit reports and memos for a range of personnel including surveyors, managers, supervisors and seafarers
- Work under supervision of a marine surveyor

Required Knowledge:

- Obligations, rights and requirements of seafarers to understand and comply with relevant safety management legislation and common law as it applies to those involved in any safety training or setting up of and applying appropriate SMS
- Relevant state/territory and commonwealth work health and safety (WHS)/occupational health and safety (OHS) legislation, regulations, codes of practice and standards
- Research and data collection methods to obtain evidence of compliance with both SMS and WHS/OHS legislation
- WHS/OHS requirements and safe work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- ensuring currency of relevant legislative and regulatory knowledge
- producing accurate and reliable information.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where knowledge of SMS legal framework in the workplace can be applied
- tools, equipment and personal protective equipment

- currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate applying knowledge of SMS legal framework in the workplace
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. **Italicised wording**, if used in the performance criteria, is detailed below.

- Safety management system may include:
- Documents related to safety training for crew
 - Emergency systems
 - Fire procedures
 - Manufacturer guidelines for equipment

- Relevant legislation may include:
- Safety manuals, signs and equipment
 - Standing orders
 - Workplace safety and emergency procedures
 - Marine Safety (Domestic Commercial Vessel) National Law
 - National Standard for Commercial Vessels (NSCV):
 - particularly Part E as it applies in a given situation
 - Other legislation relevant to commercial vessels for operational systems
 - Relevant commonwealth and state/territory WHS/OHS Acts, regulations and codes of practice relating to:
 - common law
 - contract law
 - criminal law
 - dangerous goods
 - environmental protection
 - equal opportunity and anti-discrimination law
 - industrial relations law
 - workers' compensation
- Standards may include:
- Australian Standards
 - Guidance notes and instructions to surveyors issued by the Australian Maritime Safety Authority (AMSA)
 - Industry standards and codes of practice
 - International standards
 - National standards developed by the national maritime regulator
 - Other regulations and standards developed by WHS/OHS regulators
- Non-compliance may include:
- Inadequate systems of information, instruction training or supervision
 - Non-compliance with NSCV Part E requirements
 - Plant equipment or substances not maintained or used or stored in an unsafe condition
 - Poor consultative practices
 - Poor design
 - Workplace hazards not identified or controlled
 - Workplace systems not in place or inadequate
- Appropriate actions may include:
- Contributing to the identification of noncompliance with safety management requirements for size and nature of operation
 - Making recommendations about how compliance with SMS requirements could be achieved
 - Participating and assisting marine surveyors and other

maritime regulatory inspectors

- Participating in an SMS audit
- Participating in an SMS inspection
- Providing information on appropriate methods of implementing, monitoring and evaluating actions to ensure SMS compliance
- Reporting breaches of compliance to responsible persons or authorities
- Where required, making notes or drafting reports related to compliance levels with SMS requirements

Sources may include:

- Audits
- Australian and international standards
- Hazard, incident and investigation reports
- Industry bodies
- Manufacturer manuals and specifications
- Regulators
- Regulatory authorities
- SMS specialists
- Training, information sessions and forums
- Unions
- Websites, journals and newsletters
- WHS/OHS professional bodies

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying

MARM3002A Apply vessel construction theory to marine survey tasks

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to recognise how the construction and structural issues of commercial vessels relate to marine survey tasks.

Application of the Unit

This unit applies to people:

- who assist marine surveyors or undertake administration duties in the maritime industry and/or marine surveying sector
- working in the maritime industry as a marine surveyor assistant and may form part of requirements for the Certificate IV in Domestic Commercial Vessel Survey and accreditation as a marine surveyor by Australian Maritime Safety Authority (AMSA) under Marine Safety (Domestic Commercial Vessel) National Law.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|---|--|
| 1 Identify major parts of a hull relevant to commercial vessel inspections and surveys | <p>1.1 <i>Appropriate nomenclature</i> is used to identify major parts of hull to be inspected as part of <i>commercial vessel</i> marine survey</p> <p>1.2 Structure of vessel hull in plan-view, profile, cross-section and perspective are accurately analysed across a range of different <i>plans and drawings</i> of vessels to determine survey requirements</p> <p>1.3 Use of plans and drawings in the survey are identified and applied during survey plan development</p> |
| 2 Identify commercial vessel types and their structure | <p>2.1 <i>Basic factors determining design of commercial vessels are outlined</i></p> <p>2.2 Features of vessel designed to ensure its watertight and weather tight integrity are identified and maintained</p> <p>2.3 Survey or inspection plan relating to vessel design is identified and implemented</p> <p>2.4 Vessel construction methods and materials are identified and used as the basis to determine inspection and survey tasks</p> |
| 3 Interpret basic vessel stability criteria | <p>3.1 <i>Basic stability theory</i> as outlined in the National Standard for Commercial Vessels (NSCV) in relation to construction of a commercial vessel is accurately defined and basic stability calculations are performed</p> <p>3.2 Purpose of a vessel stability assessment is correctly explained</p> <p>3.3 Documentation and records required by surveyor to assess stability of vessel are identified and confirmed according to NSCV</p> |
| 4 Apply vessel construction theory to survey | <p>4.1 Different <i>types of vessel materials</i> are identified to determine scope of survey</p> <p>4.2 Survey plan appropriate to type of vessel is developed according to survey requirements and discussed with surveyor</p> <p>4.3 Feedback on survey plan is sought from others and possible changes or improvements are clarified where required and incorporated</p> |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Carry out calculations associated with vessel stability using basic stability criteria calculations
- Estimate, measure and calculate time required to complete tasks
- Interpret, apply and convey information verbally, in writing and diagrammatically
- Interpret numerical data
- Maintain documentation
- Read and interpret vessel specifications and drawings
- Record and report workplace information
- Work under supervision of a marine surveyor

Required Knowledge:

- Basic stability theory, and use and purpose of a vessel stability book
- Commercial vessel types and their structure
- Nomenclature relevant to vessel construction
- Other guidance such as:
 - Marine Orders
 - NSCV
 - Marine Safety (Domestic Commercial Vessel) National Law
- Principal design features of small vessels related to stability and watertight integrity
- Process of constructing commercial vessels
- Work health and safety (WHS)/occupational health and safety (OHS) legislation, policies and procedures

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- providing accurate and reliable information
- developing effective planning documents
- attention to detail when completing documentation
- performing accurate and reliable calculations.

Context of and specific

Performance is demonstrated consistently over time and in a

resources for assessment

suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where applying vessel construction theory to marine survey tasks can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate applying vessel construction theory to marine survey tasks
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work

environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Appropriate nomenclature may include:
- All of the terms in the NSCV and referenced standards
- Commercial vessels may include:
- Any vessel currently defined as a commercial vessel in Marine Safety (Domestic Commercial Vessel) National Law
- Plans and drawings may include:
- Any plan as referred to in the NSCV
 - Bilge diagram
 - Cargo arrangement /tank plan
 - Docking plans
 - Fire and evacuation
 - General arrangement plan
 - Lines plan
 - Sections and views
 - Shell expansion plan
 - System operating procedures
- Basic factors must include:
- Australian and New Zealand Standards
 - Class rules
 - NSCV
 - Uniform Shipping Laws (USL) Code
- Basic factors may include:
- Framing requirements
 - Plating
 - Scantlings
- Basic stability theory may include:
- Differences between transverse and longitudinal stability and causes of list and trim
 - Effects of density of sea water on draught and freeboard of a small vessel
 - Impact of design and hull shape on stability
 - Relationship between light displacement, loaded displacement and deadweight tonnage
 - Relationship between weight and buoyancy in relation to floating bodies reserve buoyancy equilibrium
 - Stability terms and definitions
 - Any other terms referred to in standard works on small ship naval architecture
- Types of vessel materials may include:
- Ferrocement
 - Laminated materials and fabrics
 - Laminated timber
 - Moulded fibre composites
 - Riveting
 - Welded and riveted

- Welded metal
- Wood
- Any other methods relevant to local commercial vessel market referred to in standard works on small craft construction

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying

MARM3003A Identify factors that affect a commercial vessels's fitness for purpose

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to identify the construction and design characteristics that contribute to the watertight integrity and fitness for purpose of a commercial vessel.

Application of the Unit

This unit applies to people who assist marine surveyors or who undertake administration duties in the maritime industry and/or marine surveying sector.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|---|-----|---|
| 1 Plan for vessel survey | 1.1 | Range of <i>commercial vessels</i> that may be surveyed or inspected are identified and survey regime for each is accurately documented |
| | 1.2 | Hull shapes of typical commercial vessels are identified and verified for accuracy with surveyor |
| | 1.3 | Type of survey to be carried out is accurately identified and basic survey plan is developed |
| 2 Identify and explain structural components and materials | 2.1 | Types, properties and application of <i>common materials</i> used in construction of typical commercial vessels are identified and noted in survey plan |
| | 2.2 | Basic structural <i>components</i> used on typical commercial vessels are correctly identified and noted in survey plan |
| | 2.3 | Inspection requirements for materials and components are documented and verified with surveyor |
| 3 Identify issues relating to vessel water and weather tight integrity | 3.1 | <i>Range and types of deterioration</i> that affect fitness for purpose of a vessel are identified and confirmed with surveyor |
| | 3.2 | <i>Preservation and corrosion control methods</i> to maintain fitness for purpose are outlined and confirmed with surveyor |
| | 3.3 | Deterioration of vessel hull or structure is accurately identified either in water or on slipway |
| | 3.4 | Typical requirements concerning watertight and weather tight structural integrity of vessels are identified and confirmed with surveyor |
| 4 Determine vessel reporting requirements | 4.1 | Need for vessel to be fit for its intended purpose is outlined and where questionable, is reported to <i>relevant personnel</i> |
| | 4.2 | Condition of vessel and related action is communicated clearly and concisely with others |
| | 4.3 | Mandatory and regulatory reporting requirements in relation to general work practices are followed |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Communicate effectively verbally and in writing when describing and reporting condition and fitness for purpose of commercial vessels
- Follow required:
 - work health and safety (WHS)/occupational health and safety (OHS) procedures and precautions when monitoring condition and fitness for purpose of commercial vessels
 - work schedules according to organisational requirements
- Read, interpret and apply instructions, stability book, vessel plans and specifications relevant to inspecting condition and fitness for purpose of commercial vessels
- Recognise routine indicators of deterioration when inspecting condition and fitness for purpose of commercial vessels
- Use technical terms related to vessel construction, components and material
- Work under supervision of a marine surveyor

Required Knowledge:

- Applicable commonwealth, state/territory legislation, regulations, standards, codes of practice and established safe practices relevant to full range of processes for conducting a survey for commercial vessels
- Causes and indicators of vessel deterioration
- Construction, layout and subdivision requirements of a range of different commercial vessels
- Corrosion and deterioration control measures including surface preparation and coatings
- Methods for determining fitness for purpose of commercial vessels
- Principal stresses that act on structure of commercial vessels
- Properties and application of materials used in constructing commercial vessels
- WHS/OHS legislation, regulations, codes of practice, standards, policies and procedures

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- developing effective planning documents

- providing the required amount of detail in reports
- providing accurate and reliable information.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where identifying factors that affect fitness for purpose of a commercial vessel can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate identifying factors that affect fitness for purpose of a commercial vessel
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Commercial vessels must include:

- Vessels defined as commercial in Marine Safety (Domestic Commercial Vessel) National Law

Common materials may include:

- Aluminium
- Ferro cement
- Fibre composites
- Fibre reinforced plastic
- Plywood
- Steel
- Timber

Components may include:

- Bulk heads
- Collision bulkheads
- Deck
- Deck beams
- Deck plating
- Hatches and hatchways
- Hull
- Keel
- Portholes
- Propellers
- Rudders
- Stem and stern
- Stringers
- Strakes and chines
- Thrusters
- Ventilators

Range and types of deterioration may include:

- Dissimilar metals
- Fungal attack
- Insect attack
- Metal fatigue and corrosion
- Osmosis

Preservation and corrosion control methods may include:

- Fendering and insulation
- Design
- Preservation of timber:
 - painting
 - oiling
 - varnishing

- Preservation of metals:
 - sacrificial anodes
 - anti-corrosive paints
 - Earthing and bonding
 - Impressed current systems
- Relevant personnel may include:
- Delegates of the national regulator
 - Owners and operators of commercial vessels

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying

MARM3004A Work in the marine surveying sector

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to work in the marine surveying sector. It includes identifying and accessing relevant industry standards and regulations for conducting surveys of domestic commercial vessels. It also looks at the role and legal responsibilities of a marine surveyor for domestic commercial vessels, the survey task and the statutory requirements for surveying commercial vessels.

Application of the Unit

This unit applies to people who assist marine surveyors or who undertake administration duties in the maritime industry and/or marine surveying sector.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|---|-----|---|
| 1 Scope framework for marine surveys | 1.1 | International and national <i>authorities</i> that govern the maritime industry are identified |
| | 1.2 | <i>Standards, legislation</i> and regulations applicable to marine surveyor and marine surveying tasks for <i>commercial vessels</i> are identified and accessed |
| | 1.3 | Standards, legislation and regulations applicable to marine environment protection and its relation to marine surveys and inspections are identified and accessed |
| | 1.4 | Range of <i>clients</i> and <i>stakeholders</i> who would require marine surveyor and/or inspector services are identified |
| | 1.5 | Legal standing of marine survey report is explained |
| | 1.6 | Legal and/or financial implications for inaccurate reporting of marine survey are explained |
| 2 Clarify areas of responsibility for marine surveyors | 2.1 | Range of services provided by marine surveyors is outlined |
| | 2.2 | <i>International and national conventions, laws and codes of practice</i> that govern and regulate marine surveys of commercial vessels are identified |
| | 2.3 | Behavioural characteristics, ethics and personal conduct required of a marine surveyor are explained |
| 3 Determine requirements for conducting commercial vessel survey | 3.1 | Different <i>types of marine surveyors</i> and their roles are accurately defined |
| | 3.2 | Terms ‘survey’ and ‘audit’ are accurately explained in relation to commercial vessel survey |
| | 3.3 | <i>Purpose</i> and range of commercial vessels surveys is accurately outlined |
| 4 Scope survey process under supervision | 4.1 | Objectives, principal work activities, costs and constraints are identified and explained |
| | 4.2 | Relevant standards, legislation and regulations are defined in relation to conducting commercial vessel marine surveys |
| | 4.3 | Procedures and <i>processes for collecting information</i> when conducting a survey are outlined |
| | 4.4 | Importance of <i>communicating</i> with others is explained and implemented |

- 4.5 **Tools and equipment** required to conduct a range of different marine surveys are identified
- 4.6 Relevant **survey** and **supporting documents** related to type of survey are identified and accessed
- 4.7 Process of gathering relevant information through observation is outlined
- 4.8 Importance of accurate recording of information and events during and after a survey is explained
- 4.9 Requirements for use of verified factual information when making recommendations are identified
- 5 Identify scope of surveyor behavioural conduct and ethics**
- 5.1 Behavioural characteristics and personal conduct required of a marine surveyor are outlined
- 5.2 Conflicts of interest and other vested interests that would affect survey outcome and/or report are identified and resolved with surveyor
- 5.3 Strategies to deal effectively with conflicts of interest are applied
- 5.4 Risks related to possible confrontations and need for effective risk management techniques are identified and discussed with surveyor
- 6 Outline requirements of an effective survey report**
- 6.1 Appropriate formats for a range of different survey reports are identified
- 6.2 Means of presenting survey report to a range of stakeholders are explained
- 6.3 Reports are reviewed by **relevant personnel** and achievement of document objectives and requirements are outlined
- 6.4 Security of information and privacy requirements are identified

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access current legislation, marine orders, standards and information relevant to marine surveying sector
- Accurately complete relevant documentation and reports within own scope of

responsibility

- Accurately operate technical and electronic equipment
- Communicate effectively verbally and in writing
- Develop a rapport with colleagues and people external to the organisation
- Identify and apply appropriate conduct and ethical behaviour
- Resolve conflict
- Use a range of communication techniques such as establishing rapport, listening, probing, reflecting, negotiation, conflict resolution
- Work under supervision of a marine surveyor

Required Knowledge:

- Domestic commercial vessel operations
- Effective listening and communication techniques
- Equal employment opportunity, equity and diversity principles
- Government legislation and regulations relating to:
 - accepted codes of behaviour/codes of practice
 - combined Uniform Shipping Laws (USL) Code and National Standard for Commercial Vessels (NSCV)
 - environmental protection
 - load lines
 - Marine Safety (Domestic Commercial Vessel) National Law
 - International Convention for the Prevention of Pollution from Ships (MARPOL) and safety of life at sea (SOLAS) and how they apply to survey tasks
 - work health and safety (WHS)/occupational health and safety (OHS)
- IMO Conventions and Codes, including Australian Maritime Safety Authority (AMSA) Marine Orders and how they apply to survey purpose
- Industry specific codes of conduct and ethics
- Legal requirements relating to recording, security and privacy of information
- Organisational policies and guidelines relating to interviews and information gathering prior to and during the survey
- Range of different survey types for commercial vessels
- Reporting requirements including appropriate format and content
- Risks related to marine surveying tasks
- Role of surveyor
- Statutory survey schedules
- Tools required for different survey types
- WHS/OHS requirements and safe work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- ensuring currency of relevant legislative and regulatory knowledge
- effectively liaising with internal and external authorities and/or agencies.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where working in the marine surveying sector can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate working in the marine surveying sector
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Authorities may include:
- AMSA and their delegates
 - Workplace and or industry health and safety committees
- Standards may include:
- National Standard for the Administration of Marine Safety (NSAMS)
 - NSCV/USL Code
 - WHS/OHS standards
- Legislation may include:
- Government legislation and regulations relating to:
 - environmental protection
 - maritime
 - international legislation/codes of behaviour
 - Marine Safety (Domestic Commercial Vessel) National Law
 - Navigation Act
 - WHS/OHS legislation, regulations, codes of practice
- Commercial vessels may include:
- Vessels identified as commercial vessels in national law
- Clients and stakeholders may include:
- Classification societies
 - Environmental agencies/authorities
 - Government bodies
 - Insurers and financiers
 - Lawyers
 - Owners and operators of vessels and/or charters
 - Port authorities
 - Salvage associations

International and national conventions, laws and codes of practice may include:

- International convention:
 - collision regulations
 - load lines
 - maritime labour convention (MLC)
 - MARPOL
 - SOLAS
 - Standards of Training, Certification & Watchkeeping (STCW)

Types of marine surveyors may include:

- Relevant maritime legislation and regulations
- Relevant WHS/OHS legislation and policies
- Classification society (class)
- Government (statutory)
- Independent (private)
- Insurance company

Purpose may include:

- Damage or accident, survey or investigation assistance
- Fitness of vessel and/or crew for its purpose
- MLC
- Vessel related surveys for:
 - compass adjustment
 - radio surveys
 - hull/machinery/safety equipment
 - load line

Costs may include:

- Associated costs such as travel, accommodation
- Conducting the survey
- Preparation time for the survey
- Writing the survey

Constraints may include:

- Geographical
- Inclement weather
- Legal
- Timeframes
- WHS/OHS risks

Processes for collecting information may include:

- Gathering relevant facts
- Maintaining case files
- Observing
- Obtaining linear measurement
- Reviewing supporting documentation
- Sampling
- Specimen collection
- Taking photographs

Communicating may include:

- Active listening
- Constructive feedback
- Control of tone of voice
- Questioning to clarify and confirm understanding
- Using language and concepts appropriate to the individual
- Using open and enquiring questions
- Using positive, confident and cooperative language
- Verbal and non-verbal language

Tools and equipment may include:

- Business technology, internet connection, sounding tapes
- Communication equipment
- Drill, hammer/welder's hammer, draft survey hydrometer, screw driver
- Entry authority
- Hydrometer, thermometers, scraper
- Labels, plastic sampling bags, sampling equipment
- Mirror, small mallet
- Notebook
- Personal protective equipment (respirators, gloves, overalls, boots, hearing protection, goggles, masks)
- Recording equipment, Dictaphone, camera, mobile phone, pocket calculator
- Satellite imagery, photographs
- Storage equipment/facilities
- Tape measure/measuring wheel

Survey documents may include:

- Checklists
- Guidelines
- Relevant legislation and extracts from standards

- Supporting documents may include:
- Case files/incident reports
 - Certificates of survey, operation, registration
 - Commercial documentation
 - Deck and engine logs
 - Forms (such as application forms, notification forms)
 - Nautical charts and publications
 - Notices (such as seizure notice, infringement notice)
 - Operating manuals and owner instructions
 - Plans
 - Previous surveys
 - Safety management system
 - Ship log books and other recordkeeping instruments
 - Vessel stability book
 - Voyage details, stow plans and manifest
- Relevant personnel may include:
- Crew
 - Manager of private survey company
 - Owners or owner representatives of vessels and/or charters
 - Port authorities
 - Representatives of:
 - classification societies
 - government
 - law firm
 - protection and indemnity clubs
 - Salvage associations
 - Stevedores
 - Work colleagues

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying

MARM4001A Assess compliance with marine environment protection requirements

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to survey a commercial vessel to determine compliance with marine regulations for the protection of the environment.

Application of the Unit

This unit applies to people working in the maritime industry as a marine surveyor assistant and forms part of requirements for the Certificate IV in Domestic Commercial Vessel Survey.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Prepare for
 - 1.1 Relevant *national and state/territory standards and regulatory requirements* for preventing pollution to marine environment are

- survey** identified, reviewed and incorporated into survey plan
- 1.2 **Sources and types of pollutants** common to a range of different commercial vessels are identified and verified with principal surveyor
 - 1.3 Powers of surveyor relevant to detecting and reporting marine pollution protection compliance in respect to vessel operations are identified and confirmed against regulatory requirements, and organisational policy and procedures
 - 1.4 **Preventative and remedial anti-pollution procedures** are identified according to relevant standards and regulatory requirements
 - 1.5 Survey plan is developed and survey schedule is agreed with **relevant personnel**
- 2 Survey compliance levels**
- 2.1 Survey is carried out according to agreed schedule, and **machinery and equipment** are inspected for compliance with marine protection requirements
 - 2.2 **Flammable and hazardous materials** on board vessel are inspected for compliance with storage and anti-pollution requirements
 - 2.3 **Records** relevant to preventing pollution on board commercial vessels are reviewed for compliance with relevant national and state/territory legislation and regulatory requirements
 - 2.4 Procedures, systems and measures used to prevent a range of pollution types are reviewed with vessel owner/s or crew
 - 2.5 Management of **environmental issues that may not be covered under marine safety regulations** are identified and communicated to vessel owner/s and crew during survey
- 3 Finalise survey**
- 3.1 Measures for treating a range of different pollutants, machinery and equipment identified as non-compliant are discussed with vessel owner/s and crew
 - 3.2 Action plan to rectify this non-compliance is agreed and documented in survey report
 - 3.3 Survey report is finalised and reviewed for completeness before submission to the authority
 - 3.4 Non-compliance relating to protecting marine environment is recorded and reported according to statutory requirements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Accurately identify statutory requirements for pollution prevention systems and procedures for commercial vessels
- Communicate effectively verbally and in writing
- Complete required documents related to breaches of environmental protection legislation
- Read and interpret instructions and procedures related to environmental considerations
- Recognise pollution control problems and hazards that may occur on a commercial vessel and take appropriate mitigating action
- Work safely and collaboratively with others when surveying environmental considerations
- Work under supervision of a marine surveyor

Required Knowledge:

- Certificates and other documents required by relevant Australian and/or international legislation, and conventions for protecting marine environment
- Effects on marine environment of various possible pollution incidents
- Operational characteristics of emission control equipment used on various types and sizes of commercial vessels
- Operational requirements of water, fuel, bilge, waste, pollution and recycling management processes used on various types and sizes of commercial vessels
- Pollution control problems and related measures to protect marine environment
- Powers of surveyors and regulatory authorities in respect to vessel operations related to pollution prevention and compliance to standards
- Relevant legislation, regulations, codes of practice, policies and procedures to protect marine environment
- Requirements under relevant Australian and/or international legislation and conventions for reporting incidents related to breaches of statutory codes and measures for protecting marine environment
- Sources of information and documentation, including:
 - certificates and other documents required by regulations for protecting marine environment
 - equipment manufacturer instructions and recommended procedures
 - instructions of relevant maritime authorities
 - operational orders
 - relevant regulations for type of vessel involved
 - relevant standards for protecting marine environment, including guidelines issued under the Australian Intergovernmental Agreement on a National System for the Prevention and Management of Marine Pest Incursions

- vessel log where relevant
- Work health and safety (WHS)/occupational health and safety (OHS) legislation, regulations, codes of practice, policies and procedures

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- developing effective planning documents
- providing high quality reports
- ensuring currency of relevant reference material
- ensuring behaviour reflects relevant current legislative and regulatory requirements.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where assessing compliance with marine environment protection requirements can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate assessing compliance with marine environment protection requirements
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

National and state/territory standards and regulatory requirements may include:

- Australian Intergovernmental Agreement on a National System for the Prevention and Management of Marine Pest Incursions
- International Convention for the Prevention of Pollution from Ships (MARPOL)
- National Plan to Combat the Pollution of the Sea by Oil
- Protection of the Sea (Prevention of Pollution from Ships) Act 1983
- Relevant sections of National Standard for Commercial Vessels (NSCV) relating to protecting marine environment

Sources of pollutants may include:

- Bilges
- Deck equipment
- Engines
- Food waste
- Fuel:
 - containments and transfer systems
 - pumps

- Types of pollutants may include:
- Hydraulic pumps
 - Lubricants, gas, cleaning and coating products
 - Sewage pumps
 - Vents, drains, toilets
 - Air
 - Ballast water
 - Batteries and gasses
 - Cargo and packaging
 - Engine:
 - exhaust fumes and ventilation systems
 - noise
 - Grey water, black water and ventilation
 - Noise
 - Oil, sewage, garbage, noxious substances
 - Unknown fluids
- Preventative and remedial anti-pollution procedures may include:
- Design and construction features such as save-alls, vents, filling points, combing drains, scuppers, freeing ports, bilges and strum boxes
 - Legislative requirements such as garbage disposal at sea guidelines for:
 - controlling gas and smoke polluting emissions
 - effectively managing waste, pollution and recycling processes
 - effectively managing ballast operations
 - preventing cargo spillages
 - preventing fuel and oil spillages
 - Operational procedures such as fuel transfer, ballast operations, cargo operations (including lashing)
 - Pollution control signage
 - Shipboard housekeeping
- Relevant personnel may include:
- Attending surveyor
 - Environmental protection agency
 - Maritime authorities
 - Owner master or agent of vessel
 - Other interested parties
- Machinery and equipment may include:
- Effective management of ballast operations
 - Emission control equipment
 - Pollution control instructions
 - Pumps
 - Shipboard housekeeping
 - Valves
 - Waste storage and recycling equipment

- Flammable and hazardous materials may include:
- Water management equipment, including cooling water, ballast water and bilge systems
 - Chemicals
 - Cleaning products
 - LPG cooking gas
 - Lubricants
 - Spare fuel
- Records may include:
- Ballast record book
 - Deck and engine room log books
 - Garbage record books
 - Oil record books
 - Sewage record books, including test results
- Environmental issues that may not be covered under marine safety regulations may include:
- Ballast water management
 - Damage to sensitive environments through anchoring
 - Fishing restrictions
 - Laying pots/traps/moorings
 - Noise

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying

MARM4002A Assist in the survey of commercial vessels

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to assist an accredited surveyor in the survey of commercial vessels. It covers the requirements necessary to effectively plan, monitor and implement a marine survey for a range of commercial vessels. The unit includes evaluating survey and reporting outcomes.

Application of the Unit

This unit applies to people working in the maritime industry as a marine surveyor assistant and forms part of requirements for the Certificate IV in Domestic Commercial Vessel Survey.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Plan a marine 1.1 Applicable *work health and safety (WHS)/occupational health and*

- survey for a commercial vessel**
- safety (OHS), environmental, legislative and organisational requirements* relevant to conducting marine surveys for *commercial vessels* are identified and implemented
- 1.2 *Environmental awareness issues* are considered according to relevant legislation, regulations and site specific requirements
 - 1.3 *Survey purpose, scope and procedures* are identified and checked with appropriate personnel as required
 - 1.4 *Relevant information and documentation* is obtained, interpreted and verified with surveyor for impact on current survey
 - 1.5 *Survey tools, equipment* and personnel requirements are coordinated, scheduled and confirmed with surveyor
 - 1.6 Permit or licence requirements are identified and organised according to organisational requirements
 - 1.7 Survey is planned, scheduled and communicated to *relevant personnel*
- 2 Observe and assist with conducting and monitoring survey**
- 2.1 Survey plan is verified with surveyor
 - 2.2 Consultation with relevant personnel is carried out during survey activity as required
 - 2.3 Survey procedures are monitored to ensure required survey outcome is achieved
 - 2.4 Survey plan is modified as required in response to equipment, personnel, site condition changes and environmental requirements, and is verified with surveyor
 - 2.5 Regular communication with relevant personnel is maintained to ensure continuous workflow and progress
- 3 Finalise survey**
- 3.1 Relevant personnel are informed of results according to organisational requirements
 - 3.2 *Required documentation* is completed according to survey plan and is verified by surveyor
 - 3.3 *Survey report* is prepared in an appropriate format, processed according to organisational requirements and checked for accuracy by surveyor
 - 3.4 Survey results are communicated in an appropriate manner to owner/agent of vessel

- 3.5 Survey data is archived according to organisational requirements
- 3.6 Survey outcomes are recorded and reported according to site procedures and organisational requirements
- 4 Review survey**
 - 4.1 Survey documentation and data are compiled and organised for review, and checked as accurate by surveyor
 - 4.2 Evaluation of survey plan and processes is undertaken and documented for use in reviewing and revising future surveys
 - 4.3 Improvements or recommended actions arising from survey plan evaluation are signed off by surveyor, and recorded and reported according to organisational requirements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Accept and act on feedback
- Accurately interpret numerical data required as part of survey processes
- Coordinate and schedule tools, equipment and personnel requirements appropriate to survey procedures
- Document suitable checking and survey procedures
- Elicit information from a variety of sources
- Estimate, measure and calculate time required to complete tasks
- Identify problems and arrange appropriate corrective action
- Interpret and accurately apply information from legislation, regulations and codes of practice
- Interpret, apply and convey information verbally, in writing and diagrammatically
- Maintain documentation
- Observe situations and analyse information
- Prepare interview documentation using accurate expression and appropriate level formality in structure and format
- Read and interpret:
 - plans accurately
 - survey documentation and data
- Record and report workplace information
- Use and maintain relevant tools, equipment and materials

- Use appropriate communication and interpersonal techniques with colleagues and people external to the organisation
- Use computers for word processing and manipulation of statistical data
- Use critical analysis, evaluation and deductive reasoning
- Work safely and continually review changing work environment
- Work under supervision of a marine surveyor
- Write reports using appropriate formats

Required Knowledge:

- Applicable commonwealth, state/territory legislation, regulations, codes of practice, standards, and established safe practices relevant to conducting a survey for commercial vessels
- Appropriate mathematical procedures for estimating and measuring, including calculating time to complete tasks
- Environmental protection requirements, including safe disposal of waste and compliance with marine environment protection legislation
- Established communication channels and protocols
- Legal and organisational requirements for documentation
- Organisational policy, procedures, guidelines and protocols
- Own and others areas of responsibility
- Permit, licensing and certification requirements required by maritime industry authorities
- Procedures for recording and reporting information
- Purposes of surveys including statutory, trade, insurance, sale and purchase
- Research and sampling techniques
- Responding to diversity
- Responses to non-compliance
- Risk management
- Security storage of evidence/information
- Scope, depth and frequency of marine surveys
- Survey procedures
- Types of tools and equipment, and procedures for their safe use and maintenance
- WHS/OHS legislation, regulations, codes of practice, standards, policies and procedures

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the

performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- communicating effectively and following safe work practices while assisting with a marine survey
- assisting in the implementation of a survey plan for a commercial vessel in at least three different survey purpose contexts
- developing effective planning documents
- providing high quality reports
- ensuring high level of detail in recordkeeping
- performing accurate and reliable calculations.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where assisting in the survey of commercial vessels can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate assisting in the survey of commercial vessels
- direct observation of the candidate applying relevant

WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

WHS/OHS requirements must include:

- Atmospheric monitoring
- Elimination of hazardous materials and substances
- Fatigue management
- First aid equipment
- Hazard and risk control
- Manual handling including shifting, lifting and carrying
- Personal protective equipment and clothing
- Safety data sheets (SDS)/material safety data sheets (MSDS)
- Safety equipment
- Site specific and/or organisational requirements

Environmental requirements must include:

- Legislation
- Organisational policies and procedures
- Site specific and/or organisational requirements
- Workplace practices

Legislative requirements must include:

- Applicable sections of Marine Safety (Domestic Commercial Vessel) National Law
- National Standard for Commercial Vessels (NSCV)
- State/territory legislation, guidelines and handbooks applicable to safe construction, modification and operation of commercial vessels
- USL Code
- WHS/OHS Act

Organisational requirements must include:

- Anti-discrimination
- Award and enterprise agreements

- Code of conduct
 - Confidentiality and privacy
 - Environment
 - Equal opportunity
 - Industrial relations
 - Professional indemnity and public liability
 - Record management systems and archiving
 - Relevant industry codes of practice
 - WHS/OHS
- Commercial vessels must include:
- Vessels defined in Marine Safety (Domestic Commercial Vessel) National Law
- Environmental awareness issues must include:
- Asbestos
 - Bilge
 - Blasting
 - Coatings
 - Fluids identified and otherwise
 - Exhaust
 - Garbage
 - Noise
 - SDS/MSDS
 - Sewages
- Survey purpose must include:
- Initial and periodic surveys of domestic commercial vessels
- Survey scope must include:
- National Standards for Administration of Marine Safety
- Survey procedures must include:
- Emergency
 - Evacuation
 - Handling
 - Observation
 - Organisational guidelines and code of conduct
 - Safety
- Relevant information and documentation may include:
- Case files/incident reports
 - Certificates of survey, operation
 - Checklists
 - Deck and engine logs
 - Details of survey location
 - Forms (such as application forms, notification forms)
 - Insurance certificates
 - Licence or permit requirements
 - Notices (such as seizure notice, infringement notice)
 - Operating manuals and owners instructions

Survey tools, equipment may include:

- Plans and charts
- Previous surveys
- Safety management system
- Ship log books and other recordkeeping instruments
- Vessel Stability Book
- Barcol hardness tester
- Boroscope
- Communication equipment:
 - internet connection
 - mobile phone
- Drill, hammer/welder's hammer, screwdriver, small mallet
- Entry authority
- Hydrometer
- ICT equipment
- Labels
- Light meters
- Mirror
- Moisture meter
- Noise meter
- Personal protective equipment (such as respirators, gloves, overalls, boots, hearing protection, goggles, masks)
- Photographs
- Pocket calculator
- Recording equipment:
 - camera
 - dictaphone
 - notebook
- Scraper
- Silver chloride reference cell
- Sounding tapes
- Tape measure/measuring wheel
- Thermography
- Thermometers
- Ultrasonics

Relevant personnel may include:

- Crew
- Manager of private survey company
- Owners or owner representatives of vessels and/or charters
- Port authorities
- Representatives of:
 - classification societies
 - government

- law firm
- protection and indemnity clubs
- Stevedores
- Work colleagues
- Yard personnel

Required documentation must include:

Consideration of:

- checklists
- diaries
- legislative requirements
- logs
- organisational requirements
- survey purpose
- technical evaluations
- type of vessel to be surveyed

Survey report may include:

- Advice given
- Costs
- Data analysis
- Difficulties or issues faced
- Documents copied
- Measurements recorded
- Photographs
- Recommendations for future work results
- Test results

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying

MARM4003A Assist in the survey of vessel mechanical features

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to assist in the survey of operational systems. It covers identifying the principal characteristics of vessel propulsion, steering gear system, deck machinery, pumping systems, power generation, refrigeration plant and navigational systems that require periodic surveys for regulatory requirements.

Application of the Unit

This unit applies to people working in the maritime industry as a marine surveyor assistant and forms part of requirements for the Certificate IV in Domestic Commercial Vessel Survey.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Follow

1.1 Types of *propulsion systems* used on a range of commercial vessels

- requirements for surveying propulsion systems** are accurately identified, and survey requirements are confirmed with surveyor and documented according to organisational requirements
- 1.2 **Shafting systems** operation and maintenance principles are identified and applied to survey plan as necessary
- 1.3 Requirements for inspecting propulsion systems and detecting faults are identified and applied during survey
- 2 Follow requirements for surveying marine engines**
- 2.1 Main components of a four-stroke and two-stroke diesel engine and outboard petrol engines are identified and survey requirements are documented according to organisational requirements
- 2.2 Diesel and outboard petrol engine operation **terminology** and principles are applied during survey, in documentation and in reports
- 2.3 **Main components** of marine diesel engine, with its associated gearing are identified, and survey requirements are confirmed with surveyor and documented according to organisational requirements
- 2.4 **Engine operating principles** are defined and considered in survey task where necessary
- 2.5 Inspection tasks related to engines are defined and applied
- 3 Follow requirements for surveying electrical systems**
- 3.1 Vessel batteries, starter motors and **power distribution systems** are assessed, and survey requirements are confirmed with surveyor and documented according to organisational requirements
- 3.2 Types of **power generating plants** used on board a range of commercial vessels are identified and survey requirements are documented as necessary
- 3.3 Alternating current (AC) and direct current (DC) generator principles of operation and operating procedures are defined and survey requirements are documented
- 3.4 Precautions and procedures for electrical safety during inspection of electrical circuitry and equipment are adhered to according to work health and safety (WHS)/occupational health and safety (OHS) and other organisational requirements
- 4 Follow requirements for surveying refrigeration plant**
- 4.1 Principal features and operating characteristics of **refrigeration systems** used on commercial vessels are identified and survey requirements are confirmed with surveyor, and documented according to organisational requirements
- 4.2 **Environmental issues** and responsibilities concerning refrigeration systems are accurately identified during survey

- 4.3 Maintenance requirements of refrigeration systems used on a range of commercial vessels are confirmed with surveyor and documented according to organisational requirements
- 5 Follow requirements for surveying vessel pumping systems**
- 5.1 Principal features and *operating characteristics of typical pumping systems* and pumping system components used on a range of commercial vessels are confirmed with surveyor and documented according to organisational requirements
- 5.2 Inspection tasks for pumping systems are identified and applied during survey
- 5.3 Maintenance requirements for vessel pumping systems used on a range of commercial vessels are confirmed with surveyor and documented according to organisational requirements
- 6 Follow requirements for surveying steering gear systems**
- 6.1 Principal features and operating characteristics of marine *hydraulic systems* typical of a range of commercial vessels to be inspected are identified and confirmed with surveyor, and documented according to organisational requirements
- 6.2 Principal features and operating characteristics of typical *steering systems and components* to be inspected are identified and confirmed with surveyor, and documented according to organisational requirements
- 6.3 Requirements for inspecting steering systems and detecting faults are applied during survey
- 7 Follow requirements for surveying deck machinery**
- 7.1 Common types of *deck machinery* typical to a range of commercial vessels are identified and confirmed with surveyor, and documented according to organisational requirements
- 7.2 Requirements for inspecting a range of deck machinery and detecting faults are applied during survey
- 7.3 Faults in machinery are detected, confirmed with surveyor and actions to rectify issues are agreed and documented in survey report
- 8 Follow requirements for surveying navigational systems**
- 8.1 Principal features and operational characteristics of a typical *navigational system* for size and nature of vessel are accurately identified and confirmed with surveyor, and documented according to organisational requirements
- 8.2 Navigational equipment and systems are identified and appropriate inspection techniques are incorporated into survey plan
- 8.3 Faults in navigational equipment and non-conforming equipment are confirmed with surveyor, and actions to rectify issues are identified

and documented in survey report

- 9 Apply risk management practices for surveying fuel systems**
- 9.1 Range of fuel systems and their operational requirements are identified and confirmed with surveyor
 - 9.2 *Typical risks* associated with survey tasks for fuel systems are identified and risk minimisation strategies are applied during survey
 - 9.3 Faults and non-conforming systems are confirmed with surveyor, and actions to rectify issues are identified and documented in survey report

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply risk management and risk minimisation techniques
- Carry out calculations
- Communicate effectively verbally and in writing
- Identify and follow all safety procedures and precautions
- Read and interpret safety data sheets (SDS)/material safety data sheets (MSDS) accurately
- Read and interpret:
 - instructions for auxiliary machinery and systems to be tested
 - machinery performance readings and indications
- Recognise:
 - faulty equipment on vessels to be inspected
 - routine problems that relate to auxiliary machinery and systems on domestic commercial vessels
- Work under supervision of a marine surveyor

Required Knowledge:

- Battery types, care, maintenance
- Commercial vessel classifications and survey requirements for various operational systems, and their components
- Compatibility and durability of construction materials
- Construction and layout of a typical vessel including layouts for pipework, propulsion system and installed machinery
- Environmental controls and regulations for primary, secondary or ancillary systems and

their components

- Ethical behaviour and industry codes of practice
- Features and characteristics of typical faults and signs of deterioration in operational systems and components
- Features of different engine types and sizes
- Forms, causes and prevention of corrosion in a marine environment
- Insurance, liability and professional indemnity requirements for self and others
- Interaction of vessel structures and mechanical systems
- Maintaining watertight integrity
- National Standard for Commercial Vessels (NSCV) and National Standard for the Administration of Marine Safety (NSAMS)
- Operational characteristics and performance specifications for different types of marine internal combustion engines and propulsion machinery usually found on vessels
- Principal features of fittings and machinery found on typical vessels and characteristics of engine/plant and ancillary equipment
- Procedures for:
 - checking connection, installation and mounting of machinery and components
 - reading and interpreting machinery performance readings and indications
- Purpose and content of SDS/MSDS
- Report writing requirements for a range of different survey tasks
- Safety, environmental and hazard control precautions and procedures relevant to checking and basic maintenance of fittings and machinery
- Typical problems related to inspecting and maintaining operational and navigational systems
- Typical vessel and machinery specifications, operating manuals and specifications
- WHS/OHS requirements and safe work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- developing effective planning documents
- providing high quality reports
- ensuring behaviour reflects relevant current legislative and

Context of and specific resources for assessment

- regulatory requirements
- ensuring currency of relevant WHS/OHS skills and knowledge
- attention to detail when completing documentation.

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where assisting with surveying operational systems can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate assisting with surveying operational systems
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Propulsion systems may include:
- Inboard and outboard engines
 - Propulsion plant – prime mover (diesel engine), shaft and propellers (fixed and controlled pitch)
 - Schottel or similar azimuth systems
 - Thrusters
 - Water jet units
- Shafting systems may include:
- Gear box
 - Propeller
 - Shaft:
 - seals
 - bearings
 - couplings
 - Stern bearing
 - Thrust block
- Terminology and main components may include:
- Bearings
 - Bed plate
 - Crankshaft drive
 - Cylinder block
 - Exhaust:
 - system
 - valve
 - Filters
 - Flywheel
 - Fuel:
 - injector
 - pump
 - Heat exchanger
 - Injector
 - Inlet valve
 - Piston
 - Turbo chargers
- Engine operating principles may include:
- Requirements for diesel engines for:
 - propulsion
 - power generation
 - emergency use
- Power distribution systems may
- Circuit breakers

- include:
- Distribution boards
 - Shore power changeover arrangements
- Power generating plants may include:
- Diesel engine
 - Hybrid system
 - Solar generation
 - Wind generation
- Refrigeration systems may include:
- Compressors
 - Different types of gasses
 - Evaporators
- Environmental issues may include:
- Chlorofluorocarbons (CFCs) used in refrigerants
 - Diesel and steam engines to power refrigeration, lights, pumps and other functions
 - Ozone depleting substances (ODSs)
 - Water treatment chemicals and chemicals from refrigeration equipment
- Operating characteristics of typical pumping systems may include:
- Back flooding prevention procedures
 - Drive systems, belts, clutches and motors
 - Fire, bilge and tank circulating systems
 - Standard identification markings
 - Strainers, strum and mud boxes, and foot valves
 - Use of flexible materials and hoses
 - Valve types, including their construction and maintenance
- Hydraulic systems may include:
- Electro hydraulic steering gears
 - Emergency operation in electrical or hydraulic failure
 - Preventative and remedial maintenance requirements of hydraulic systems
 - Simple hydraulic circuits
- Steering systems and components may include:
- Rudder and stock support bearings
 - Rudder construction features
 - Rudder types
 - Glands, packing and seals
 - Requirements for maintaining and testing steering and related hydraulic systems
 - Steering operation using hydraulic, cable, rod and gear
 - Tiller arm attachment
- Deck machinery may include:
- Basic hydraulic systems
 - Derricks and booms
 - Fishing gear
 - Lifting equipment

- Navigation system may include:
- Safeguards and protective devices for winches
 - Small cranes
 - Winches
 - Windlasses
 - AIS
 - Charts
 - Compass
 - GPS
 - Plotters
 - Radar
 - Sounders
- Typical risks may include:
- Fire
 - Inhalation and poisoning
 - Injury
 - Marine pollution

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying

MARM4004A Evaluate vessel stability

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to evaluate stability of a commercial vessel for marine survey purposes using available stability information. It covers principles of stability data and calculations, how to calculate stability and role of surveyor in assessing stability information.

Application of the Unit

This unit applies to people working in the maritime industry as a marine surveyor assistant and forms part of requirements for the Certificate IV in Domestic Commercial Vessel Survey.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Determine data 1.1 Effect of *basic data*, information and vessel stability calculations is

- requirements** identified, reviewed and applied to assessment of stability
- 1.2 Basic data requirements for *commercial vessels* are correctly identified
- 1.3 Importance and function of vessel stability book on survey task is accurately explained
- 2 Evaluate simplified stability data**
- 2.1 Appropriate stability data and information required for size and type of vessel is identified and assessed for compliance against regulatory requirements
- 2.2 Calculated stability data is correlated with the stability criteria set out in stability book and is confirmed as an accurate evaluation of vessel stability condition by surveyor
- 2.3 *Precautions* to rectify operations that may affect stability and watertight integrity of vessel are identified and confirmed with surveyor
- 2.4 Actions to ensure weight distribution does not compromise vessel safety are identified, confirmed with surveyor and incorporated into survey task as required
- 2.5 Actions to be taken in anticipation of environmental changes that may affect vessel stability are identified, confirmed with surveyor and incorporated into survey task as required
- 2.6 Actions to be taken in *emergency situations* to maintain vessel stability within safe limits are identified, confirmed with and implemented promptly and effectively
- 3 Carry out reporting requirements**
- 3.1 Recorded calculations are reviewed by surveyor for accuracy and relevance
- 3.2 Draft survey report is developed and reviewed with surveyor for accuracy and compliance
- 3.3 Feedback provided on draft survey report is acknowledged and draft report is amended as required
- 3.4 Storage and security of information is identified, and records are stored and filed according to organisational and regulatory requirements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Carry out calculations associated with vessel stability using basic stability criteria calculations, including interpreting and correlating resultant data
- Interpret measurements and observations required when maintaining vessel stability
- Read and interpret vessel specifications and drawings
- Read, interpret and apply simple instructions for maintaining vessel stability
- Select and use relevant equipment according to instructions
- Work under supervision of a marine surveyor

Required Knowledge:

- Basic stability theory, including:
 - equilibrium
 - impact of design and hull shape on stability
 - principles of stability
 - relationship between weight and buoyancy in relation to floating bodies
 - reserve buoyancy
 - terms and definitions
- Difference between transverse and longitudinal stability, and causes of list and trim
- Effects of density of water on draught and freeboard of vessel
- Effects on vessel stability that has been bilged
- Information contained in basic stability data book supplied to vessel and how this information is used to maintain vessel in a stable condition during operations
- Marine Safety (Domestic Commercial Vessel) National Law
- Principal design features of vessels related to stability and watertight integrity, such as:
 - maintenance and survey requirements necessary to maintain watertight integrity of vessel
 - openings in hull and on main deck of vessel and safe working practices that must be followed to maintain watertight integrity
- Principal factors that affect operational stability of vessel and related measures that can be taken to maintain stability, including:
 - adding and removing weights
 - additions and alterations to vessel structure
 - free surface effect of slack tanks
 - operation of lifting equipment
 - roll period
 - stiff and tender condition

- water on deck
- Recording stability calculations in survey report
- Relationship between lightship, loaded displacement and deadweight
- Relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- Steps involved in bringing unstable vessel to a stable condition

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- analysing, planning and carrying out vessel stability calculation for at least five different types and size of vessels
- performing accurate and reliable calculations
- attention to appropriate level of detail in recordkeeping
- providing high quality reports.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where evaluating vessel stability using available information can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate evaluating vessel stability using available information
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Basic data may include:
- Certificate of survey
 - Vessel log
 - Vessel plans and drawings
 - Vessel stability data book
- Commercial vessels must include:
- Vessels defined as commercial vessels in Marine Safety (Domestic Commercial Vessel) National Law
- Precautions may include:
- Ballast management
 - Closing openings exposed to weather
 - Damage control measures to maintain, stabilise or restore watertight integrity of hull during an emergency
 - Managing distribution of load on vessel
 - Managing position, stowage and lashing of cargo, stores and equipment, and location of passengers
 - Taking precautions when using lifting equipment and associated gear

- Emergency situations may include:
- Flooding when there is damage to hull
 - Inadequate securing of weights on board
 - Unplanned movement of heavy items or stores and equipment on board vessel

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying

MARM4005A Implement a systematic approach to the audit of safety management systems

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to implement a systematic approach to the audit of safety management system (SMSs) on commercial vessels.

Application of the Unit

This unit applies to individuals with responsibilities for auditing SMSs including safety plans and equipment, work health and safety (WHS)/occupational health and safety (OHS) policies, procedures, and instruction and training for self, crew and others.

It includes advising vessel owners, masters and and/or crew on the requirements for developing and implementing appropriate safety systems and plans.

This unit applies to people working in the maritime industry as a marine surveyor assistant and forms part of requirements for the Certificate IV in Domestic Commercial Vessel Survey.

The unit may apply to a range of different commercial vessels and vessel operations.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|---|-----|---|
| 1 Scope legislative and regulatory framework | 1.1 | <i>Relevant legislation and standards</i> for the role of surveyor in auditing SMSs are identified and evaluated |
| | 1.2 | Relevant safety management legislation and standards for vessel owners and operators, and implications for managing safety of crew and others is identified and evaluated |
| | 1.3 | Sources of information and data for impact on hazards, risks and management of SMSs on <i>commercial vessels</i> are monitored |
| 2 Determine safety management priorities and identify implementation plans | 2.1 | <i>Safety management priorities</i> are determined in consultation with colleagues and other workplace <i>consultative arrangements</i> |
| | 2.2 | Appropriate <i>implementation plans</i> are identified to ensure preparedness for SMS audit |
| | 2.3 | Input from surveyors, <i>SMS specialists and technical advisors</i> is sought when required |
| 3 Audit vessel safety management systems for vessel operations and provide advice to control risks | 3.1 | Vessel SMSs are identified and assessed for compliance |
| | 3.2 | Existing safety management arrangements are identified and advice on proposed changes is provided |
| | 3.3 | Appropriate advice is provided to vessel owners and operators on <i>risk mitigation</i> |
| | 3.4 | Disputes relating to SMS implementation issues are handled effectively and negotiation skills are employed to ensure agreement on <i>SMS action plans</i> |
| | 3.5 | Regulatory documentation and vessel history are updated to reflect advice provided and agreed actions plans, according to organisational or legislative requirements |
| 4 Evaluate effectiveness of approach to audit of safety management systems | 4.1 | <i>Sources of external and internal SMS information and data</i> are accessed as part of evaluation |
| | 4.2 | Need for any external evaluation input is identified and action is taken as appropriate |
| | 4.3 | <i>Stakeholders</i> are consulted for evaluation input |
| | 4.4 | Areas for improvement are identified, documented and actioned |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Address disputes relating to SMS implementation issues
- Build relationships with stakeholders (internal and external to organisation)
- Communicate effectively verbally and in writing
- Consult on and negotiate development, implementation and audit of SMS requirements for commercial vessels
- Inspect compliance level of safety management systems
- Relate to people from diverse backgrounds and to people with diverse abilities
- Research and evaluate relevant SMS information and data
- Sequence tasks and meet timelines
- Use a range of software and office equipment to access internal and external SMS information and data
- Work under supervision of a marine surveyor

Required Knowledge:

- Internal and external sources of SMS information and data
- Internal and external survey environment
- Legislative requirements for:
 - compliance timeframes
 - consulting with vessel operators and owners
 - exercising powers to enforce compliance requirements
 - information and data collection
 - recordkeeping
- Organisational policies and procedures for the audit of SMSs
- Principles and practices of systematic approaches to surveying and improving SMSs for commercial vessels
- Principles relating to:
 - hazard identification
 - hierarchy of control
 - risk management
 - systematic approaches to SMSs
- Relevant state/territory and commonwealth legislation, codes of practice and standards

- Roles and responsibilities of surveyors as specified in relevant legislation
- Targeted communication skills and strategies to communicate effectively with people at all levels within the organisation
- WHS/OHS legislation, regulations, codes of practice, standards, policies and procedures

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- producing accurate and reliable information
- ensuring integrity of data
- attention to detail when completing documentation.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where implementing a systematic approach to the audit of SMSs can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate implementing a systematic approach to the audit of SMSs
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Relevant legislation and standards may include:

- Commonwealth, state and territory WHS/OHS legislation
- Marine Safety (Domestic Commercial Vessel) National Law
- National Standard for Commercial Vessels (NSCV)
- National Standard for the Administration of Marine Safety (NSAMS)

Commercial vessels must include:

- Vessels defined as commercial vessels in Marine Safety (Domestic Commercial Vessel) National Law

Safety management priorities may include:

- Identifying:
 - high risk vessels
 - known hazards to vessel operations
 - range and types of additional compliance arrangements

Consultative arrangements may include:

- Health and safety representatives
- Industry associations and peak bodies
- Involvement in SMS activities such as observing inspections and surveys
- Regulatory and other SMS consultative and planning committees
- Unions

- Implementation plans may include:
- Work group meetings
 - Communicating with vessel owners and operators about new requirements
 - Developing procedures and policies for SMS audit
 - Negotiating compliance timeframes based on risk documented plans developed in negotiation with vessel owners and operators to improve SMS management, which allocates items to be addressed and timeframes
 - Procedures for reporting hazards and non-compliance
 - SMS performance indicators for a range of different commercial operations
- SMS specialists may include:
- Industry peak bodies
 - ISM code auditors
 - Other surveyors
 - Regulators
 - Risk management specialists
 - WHS/OHS specialists
- Technical advisors may include:
- Engineers
 - Legal practitioners
 - Maintenance and trades people
 - Naval architects
 - Shipwrights
 - Workplace trainers and assessors
- Risk mitigation may include:
- Engaging consultants
 - Interpreting legislation to vessel operations and size
 - Ongoing self-assessment and testing of systems
 - Reducing operational capacity
 - Repairs and maintenance
 - Safety data sheets/material safety data sheets
 - Training of crew
- SMS action plans may include:
- Changes to:
 - management practices
 - operational environment
 - operational practices and conditions
 - work processes and systems
 - Equipment purchases
 - Introducing new technology
 - Introducing training and instruction
 - Material purchases
 - Organisational restructure
 - Other labour market changes
 - Refreshing skills

Sources of external and internal SMS information and data may include:

- Consultants
- Employees/colleagues
- Government departments/agencies including SMS authorities and organisations such as AMSA
- Industry networks and associations
- Internet sites
- Manufacturer manuals and specifications
- Newspapers and journals, trade/industry publications
- SMS and other relevant legislation
- SMS specialists
- Technical data

Stakeholders may include:

- Colleagues and other supervisors
- Managers/employer
- Maritime safety authorities
- SMS committees
- Tradespeople
- Vessel owners and operators

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying

MARM4006A Survey lifesaving appliances, fire and other safety systems

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to assess operational condition of lifesaving appliances, fire and other safety systems, including verifying the monitoring of systems and their components to ensure they function.

Application of the Unit

This unit applies to people working in the maritime industry as a marine surveyor assistant and forms part of requirements for the Certificate IV in Domestic Commercial Vessel Survey.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|--|
| 1 Identify requirements for lifesaving appliances, fire and other safety systems | <ul style="list-style-type: none">1.1 Types of <i>lifesaving appliances, fire</i> and other safety <i>systems</i> relevant to type of vessel under survey are identified and incorporated into survey plan1.2 Maintenance requirements for lifesaving appliances, fire and other safety systems are identified and incorporated into survey plan according to <i>regulatory requirements</i>1.3 Correct type and scale of safety equipment is identified according to size, type and operational area of vessel being surveyed1.4 Documentation requirements for safety systems for vessel size and nature are identified, accessed and confirmed against survey plan |
| 2 Assess operational condition of lifesaving appliances, fire and other safety systems | <ul style="list-style-type: none">2.1 Powers and responsibility for inspecting and reporting operational condition of lifesaving appliances, fire and other safety systems are identified, reviewed and applied to survey tasks2.2 Inspection and assessment of condition of lifesaving appliances, fire and other safety systems and <i>consumables</i> is carried out according to regulatory and organisational requirements2.3 Inspection and assessment of <i>maintenance procedures</i> for lifesaving appliances, fire and other safety systems and consumables on board a commercial vessel are carried out according to regulatory and organisational requirements |
| 3 Review and report on documentation for lifesaving appliances, fire and other safety systems | <ul style="list-style-type: none">3.1 <i>Records and certificates</i> related to routine monitoring and maintenance of condition of lifesaving appliances, fire and other safety systems and equipment is reviewed3.2 Actions to be taken to maintain, repair or replace lifesaving appliances, fire and other safety systems are communicated to appropriate personnel according to organisational and/or regulatory requirements3.3 Recordkeeping and reporting requirements related to condition of lifesaving appliances, fire and other safety systems are carried out according to regulatory and organisational requirements |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Communicate effectively verbally and in writing
- Identify variations in equipment and systems between different vessels, and when equipment and systems are changed on a vessel
- Read and interpret technical specifications and other graphical information related to lifesaving appliances, fire and other safety systems and consumables
- Receive and interpret oral and written orders and instructions related to maintaining operational condition of lifesaving appliances, fire and other safety systems
- Recognise faults and defects in lifesaving appliances, fire and other safety systems, and take appropriate action to report non-compliance or maintenance requirements
- Work under supervision of a marine surveyor

Required Knowledge:

- Applicable sections of the Marine Safety (Domestic Commercial Vessel) National Law
- Importance of maintaining lifesaving appliances, fire and other safety systems and equipment, and potential consequences if systems and/or equipment are not operational during an emergency
- Safety management system (SMS) plans, procedures, checklists and instructions (where applicable) as they relate to lifesaving appliances, fire and other safety systems and equipment
- Lifesaving appliances and fire systems:
 - installation
 - maintenance
 - use
- Relevant legislation, regulations, codes of practice, policies and procedures related to maintaining lifesaving appliances, fire and other safety systems and equipment
- Relevant state and territory maritime regulations
- Statutory and organisational requirements for documenting condition and maintenance procedures and outcomes for lifesaving appliances, fire and other safety systems and equipment used on board vessels
- Work health and safety (WHS)/occupational health and safety (OHS) legislation, regulations and codes of practice

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- developing effective planning documents
- providing high quality reports.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where surveying lifesaving appliances, fire and other safety systems can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate surveying lifesaving appliances, fire and other safety systems
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to

the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- | | |
|---------------------------------------|--|
| Lifesaving appliances may include: | <ul style="list-style-type: none">• Emergency position indicating radio beacons (EPIRBs)• First aid• Life:<ul style="list-style-type: none">• buoys• jackets• Pyrotechnics• Search and rescue transponders (SARTs)• Self-contained breathing apparatus (SCBA)• Survival craft |
| Fire systems may include: | <ul style="list-style-type: none">• Air flaps• CO2• Dry chemical and wet foam• Fan shut-offs• Fire detection alarms• Foam• Portable fire extinguishers• Water |
| Regulatory requirements must include: | <ul style="list-style-type: none">• National Standard for Commercial Vessels (NSCV)• Marine Safety (Domestic Commercial Vessel) National Law• WHS/OHS legislation, regulations and codes of practice |
| Consumables may include: | <ul style="list-style-type: none">• Batteries for detectors, radios, beacons, etc.• Dry and wet chemicals used in fire extinguishers• First aid• Flares• Survival rations |
| Maintenance procedures must include: | <ul style="list-style-type: none">• Identifying faults in and damage to lifesaving appliances, fire and other safety systems and equipment• Routine checks for operational serviceability of lifesaving appliances, fire and other safety systems and equipment |
| Records and certificates may | <ul style="list-style-type: none">• Licensed contractor certificates of inspection• Lifesaving appliances, fire and other safety systems and equipment operational and maintenance instructions and |

include:

- recommended procedures
- NSCV and applicable Australian and international regulatory requirements
- Relevant maritime authority instructions for the maintenance and serviceability of shipboard lifesaving appliances, fire and other safety systems and equipment
- SMS plans, procedures, checklists and instructions
- Vessel log books

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying

MARM5001A Calculate, assess and report on vessel trim and stability

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to assess and report on vessel trim and intact stability as part of the survey function. It is limited to undertaking practical stability tests, simplified stability calculations, reporting inclining experiments and consideration of damage stability implications.

Application of the Unit

This unit applies to people working in the maritime industry as a domestic commercial vessel marine surveyor and may form part of accreditation requirements for surveyors under Australian legislation.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|--|
| 1 Plan and prepare stability testing | <p>1.1 <i>Applicable stability criteria</i> for class of vessel and its operations are identified and confirmed against <i>regulatory requirements</i></p> <p>1.2 Differences between Uniform Shipping Laws (USL) and National Standard for Commercial Vessels (NSCV) standards for assessing stability are identified and applied to survey plan as required</p> <p>1.3 <i>Information and data</i> is used to establish and verify stability characteristics required for safe operation</p> <p>1.4 Types of stability related hazards that may occur during all types of operations are identified</p> <p>1.5 Range of intended and/or likely vessel loading conditions are accurately identified and their impact on stability is assessed</p> |
| 2 Calculate vessel trim and stability | <p>2.1 Simplified stability calculations are performed to assess compliance with applicable stability criteria</p> <p>2.2 Stability assessment methods for equivalent solutions are applied as necessary according to regulatory requirements</p> <p>2.3 Trim, draughts and freeboard are measured accurately to safely and efficiently allow assessment of compliance with criteria</p> <p>2.4 Effects of weight distribution that may compromise vessel safety are included in stability assessment</p> <p>2.5 Computer-based stability programs are used as appropriate to assist with assessing compliance</p> <p>2.6 Results are verified to confirm compliance</p> <p>2.7 Vessel is not put at risk during assessment</p> |
| 3 Apply tests, assessments and theories to confirm compliance | <p>3.1 <i>Tests and assessments</i> that could assist to confirm stability compliance are verified and carried out according to safety instructions</p> <p>3.2 Small angle stability theories are used to establish metacentric height (GM) through transverse movement of weights across vessel deck</p> <p>3.3 Causes of inaccuracies and limitations of assumptions in tests, assessments and theories are interpreted accurately and considered in stability assessment report</p> |
| 4 Identify other impacts on | <p>4.1 <i>Types and effects of damage</i> on vessel stability are identified and considered according to regulatory requirements</p> |

stability calculations	4.2	Damage <i>stability considerations</i> are accurately identified and effect of damage is correctly quantified
	4.3	<i>Operational impact</i> on stability is identified and considered in compliance assessment
	4.4	Vessel safety management plan is reviewed to ensure known or likely impacts on stability are included
5 Document and report findings	5.1	Records are maintained and reports are prepared according to regulatory and organisational guidelines
	5.2	Survey report is completed according to regulatory requirements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access and interpret a variety of information
- Analyse information and data
- Anticipate and solve problems that may occur in calculations
- Ballast management
- Calculate trim and stability using statutory formula and criteria
- Carry out a range of different stability tests and assessments
- Collate and prepare required documentation
- Collect and accurately interpret valid and reliable data and/or regulations
- Identify and correct causes of erratic or excessive deviation in mass movements during an inclining experiment
- Identify gaps in data and source additional information
- Identify hazards, assess risks, and develop and implement risk treatment options
- Liaise with relevant people to obtain information
- Read and accurately interpret vessel specifications and design drawings
- Relate effectively to people from a range of social, cultural and ethnic backgrounds
- Resolve conflict and negotiate effectively
- Select and use appropriate equipment
- Undertake research
- Use calculation and stability software
- Work independently and unsupervised

Required Knowledge:

- Application of vessel construction principles and stability assessments applicable to a wide range of operational contexts
- Theories relating to damage stability and precautions to be taken to ensure down-flooding or progressive flooding does not occur
- Calculations and formulas related to determining vessel trim and stability
- Cargo loading and impact on stability
- Configuration and subdivision requirements of a typical vessel including:
 - collision bulkhead
 - down flooding
 - deck edge immersion
 - freeboard and bulkhead deck
 - watertight compartments
 - weather tight compartments
 - vessel bulkhead
- Correct identification and use of equipment and data required for stability tests and calculations
- Damage control measures designed to maintain, stabilise or restore hull watertight integrity
- Definition of intact stability
- Distribution of load on a vessel
- Implications and management of free surface effect
- - Information and data requirements, and statutory documents such as stability book, safety management plans, certificate of operation, vessel history
 - Naval architectural theory to the level necessary to carry out stability assessments for a range of domestic commercial vessels surveyor is intending to survey
 - Procedures for:
 - carrying out an inclining experiment
 - determining weights to be added or subtracted from calculated displacement to determine lightship displacement
 - maintaining vessel security and stability
 - measuring draughts and or freeboard to determine displacement of a vessel i.e. carrying out a lightship measurement
 - Recordkeeping requirements
 - Regulatory requirements for:
 - calculating vessel stability
 - surveying vessels

- vessel compliance to trim and stability
- Requirements for conducting a load line survey
- Risk management
- Safety management procedures and precautions when determining vessel trim and stability
- Simplified stability criteria as outlined in NSCV Part C6A and C6C
- Survey report requirements
- Typical problems and solutions related to vessel trim and stability
- Types of simplified stability tests
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and safe work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- analysing, planning and assessing trim and stability for at least five different vessels varying size and operational limits
- carrying out and reporting on at least three inclining experiments and three lightship measurements
- developing effective planning documents
- providing high quality reports
- performing accurate and reliable calculations
- ensuring behaviour reflects relevant current legislative and regulatory requirements.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where calculating, assessing and reporting on vessel trim and stability can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that

impacts on work activities

- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate calculating, assessing and reporting on vessel trim and stability
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. **Bold italicised wording**, if used in the performance criteria, is detailed below.

Applicable stability criteria may include:

- NSCV guidelines
- USL Code

Regulatory requirements may include:

- Marine Safety (Domestic Commercial Vessel) National Law
- NSCV

Information and data may include:

- Cargo information
- Load lines
- Means to:
 - sound tanks
 - read draught marks
- Stability book

Tests and assessments may include:

- Buoyancy and stability after flooding
- Freeboard
- Lightship measurement
- Practical inclining
- Roll period test
- Simplified stability tests
- Stability proof test

Types and effects of damage may include:

- Added mass
- Flooding
- Large amounts of water on deck
- Lost buoyancy

Stability considerations may include:

- Ballast management
- Closing openings
- Damage control measures to maintain, stabilise or restore watertight integrity of hull
- Distribution of load on a vessel
- Positioning of stowage and lashing of cargo, stores and equipment
- Taking action to avoid or minimise cargo shift
- Taking precautions when using lifting equipment and other associated equipment

Operational impact may include:

- Ballast
- Cargo
- Crew movement
- Cross connections
- Lifting gear (including cranes on deck)
- Passengers and passenger movements
- Towing
- Vessel mooring arrangements
- Wind /ice and other weather constraints

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying

MARM5002A Conduct a range of surveys on domestic commercial vessels

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to conduct new construction, alteration, change of class or use surveys on domestic commercial vessels according to Marine Safety (Domestic Commercial Vessel) National Law. It includes survey planning, carrying out a survey and providing a survey report.

Application of the Unit

This unit applies to people working in the maritime industry as a domestic commercial vessel marine surveyor and may form part of accreditation requirements for surveyors under Australian legislation.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|--|
| 1 Plan and prepare for survey task | <ul style="list-style-type: none">1.1 Relevant standards for vessel hull and superstructure are accurately identified and accessed to support survey task1.2 Vessel survey regime is identified and relevant regulatory requirements, organisational requirements and procedures for survey scope are accessed and reviewed1.3 Vessel survey regime is confirmed against regulatory and organisational requirements1.4 Survey scope and depth is confirmed against relevant regulatory and organisational requirements1.5 Survey purpose, objectives and variations are identified with relevant personnel1.6 Operational limits, certificate of operations and previous certificates of survey are reviewed to identify and take into consideration any special conditions, equivalent solutions, specific areas of operations and other regulatory limitations, exceptions or conditions that may impact on survey task1.7 Survey equipment and tools to carry out survey are accurately identified and selected prior to survey task |
| 2 Confirm features of vessel and approved plans | <ul style="list-style-type: none">2.1 Types of hull machinery and systems common to domestic commercial vessels are accurately identified and regulatory or additional standards are accessed and reviewed for use in survey2.2 Common materials used in hull construction and superstructure are identified and regulatory or additional standards are accessed and reviewed for use in survey2.3 Set of approved plans is obtained and read prior to start of survey |
| 3 Conduct non periodic vessel surveys | <ul style="list-style-type: none">3.1 Type of survey is determined and full preparations are made to ensure successful completion of survey3.2 Vessel survey is carried out according to scope of survey, regulatory requirements and approved plans3.3 Changes to operational equipment or equivalent solutions are identified and examined for fitness both in or out of water as required by survey schedule3.4 Non conformance to approved plans or regulatory requirements are identified and appropriate follow-up action is carried out |

- 3.5 Vessel plans and supporting survey documentation are altered according to organisational and regulatory practices to ensure they reflect 'as-built' vessel
- 3.6 Vessel systems are surveyed to ensure they meet statutory requirements
- 4 Report and act on non-compliance**
 - 4.1 Non-compliance is detected, recorded and reported according to regulatory and organisational requirements
 - 4.2 *Specialist support services* are identified and sourced as appropriate
 - 4.3 Risks arising from detected non-compliance are reported and communicated to relevant personnel
 - 4.4 Relevant provisions of legislation appropriate to level of risk detected are identified and followed
 - 4.5 *Appropriate reports and documentation* relating to survey are developed and managed according to organisational and regulatory requirements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Analyse and evaluate available data and observations to form logical conclusions
- Carry out engineering measurements and apply metric and imperial conversions
- Communicate effectively verbally and in writing
- Develop and use research techniques to identify gaps in knowledge and to recognise professional development opportunities
- Disseminate and clarify technical information
- Identify strengths, weaknesses and failure modes of common marine construction materials
- Implement work health and safety (WHS)/occupational health and safety (OHS) principles and protection of the marine environment
- Interpret engineering drawings and diagrams
- Interpret relevant legislation, regulations, codes of practice, standards and rules
- Manage risks
- Provide customer service

- Read and interpret vessel plans
- Recognise own professional limitations
- Undertake research and analysis using relevant reference material
- Use computers
- Work independently and unsupervised
- Write technical reports

Required Knowledge:

- Acoustic and thermal insulation principles and practices
- Awareness of working stresses in vessel under load or in a seaway
- Basic principles of stability, procedures for incline experiments, simple roll test, stable and unstable equilibrium
- Commercial vessel classifications and survey requirements for various areas of operations
- Compatibility and durability of construction materials
- Composite production methods, quality assurance and secondary bonding techniques
- Damage propagation caused by defects, poor engineering practice and/or transmission of dynamic forces
- Domestic commercial vessel systems, installation and maintenance
- Documentation and checklists:
 - construction drawings
 - defect list
 - historical records
 - National Standard for the Administration of Marine Safety (NSAMS) Section 4
 - procedural forms
 - safety management systems
 - stability book
 - standard operating procedures
 - vessel files
- Elementary ergonomic design principals and methods for reducing harm to crew in a seaway
- Environmental controls and regulations
- Forms, causes and prevention of corrosion in a marine environment
- Galvanic series of common metals used in boat building
- Hull forms and vessel types
- Implications of poor ventilation practice
- Insurance, liability and professional indemnity
- Interaction of vessel structures, mechanical systems and appropriate installation practices

- Maintaining watertight integrity
- Marine craft construction:
 - methods, materials and vessel anatomy
 - terminology and definitions
- Marine-grade adhesives, mechanical fasteners, sealants and caulking materials
- Marine protective coatings, fairing compounds and finishes
- Principles of sheathing
- Repair techniques and maintenance procedures for common marine craft construction materials
- Report writing formats
- Safe working practices and risk assessment procedures
- Suitable structural support for out-of-water vessels to prevent topple, sag, hog and/or damage from local stress concentrations
- Vessel construction and repair principles and practices, and the National Standard for Commercial Vessels (NSCV)
- Welding techniques, procedures and standards
- WHS/OHS requirements and safe work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- conducting a range of surveys on domestic commercial vessels in at least three or more contexts
- developing effective planning documents
- communicating effectively with others as required
- providing high quality reports.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where conducting a range of surveys on domestic commercial vessels can be conducted
- tools, equipment and personal protective equipment

- currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate conducting a range of surveys on domestic commercial vessels
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. **Italicised wording**, if used in the performance criteria, is detailed below.

Relevant standards may include:

- Australian Standards
- Class rules and instructions
- Manufacture guidelines
- Marine Orders

- National Standard for the Administration of Marine Safety (NSAMS) Section 4
 - NSCV
 - Safety data sheets (SDS)/material safety data sheets (MSDS)
 - Safety of life at sea (SOLAS)
 - Uniform Shipping Laws (USL) Code
 - WHS/OHS
- Survey regime must include:
- Class of vessel
 - Survey depth and level of vessel
- Relevant regulatory requirements may include:
- Australian/New Zealand Standards (AS/NZS), in particular:
 - AS/NZS ISO 9001: 2008 Quality Management Systems - requirements
 - Marine Safety (Domestic Commercial Vessel) National Law
 - NSCV:
 - Part B – General Requirements
 - Part C – Vessel Construction
 - Part E – Operational Practices
 - NSAMS Section 4
- Survey scope and depth may include:
- Condition
 - Initial
 - Modification/further building
 - Repair/damage
- Survey equipment and tools may include:
- Communication equipment
 - Draft survey hydrometer
 - Drill
 - Entry authority
 - Hammer/welder's hammer
 - Meat piercing thermometer
 - Mirror
 - Non-destructive evaluation (NDE) tools
 - Personal protective equipment such as respirators, gloves, overalls, boots, hearing protection, goggles, masks
 - Plastic sampling bags
 - Pocket calculator
 - Recording equipment:
 - camera
 - dictaphone
 - lap top computer
 - notebook

- Sampling equipment:
 - silver nitrate test kit for chlorides
 - test kit equipment
 - thermometers
 - water-detecting paste
 - Scraper
 - Screwdriver
 - Small mallet
 - Sounding tapes
 - Storage equipment/facilities
 - Tape measure/measuring wheel
- Types of hull may include:
- Box
 - Catamaran
 - Foils
 - Non water displacement
 - Shallow draft
 - Single
 - Wave piercing
- Domestic commercial vessels must include:
- Vessels defined as commercial vessels in Marine Safety (Domestic Commercial Vessel) National Law
- Materials may include:
- Aluminium
 - Cement
 - Composite
 - Fibreglass
 - Steel
 - Timber
- Survey schedule may include:
- Change of class survey
 - Damage/repair or condition surveys
 - Equivalent solution or deemed-to-satisfy surveys
 - In-water
 - Out-of-water
- Follow-up action may include:
- Engineering delegate approval of non conformance
 - Securing authoritative approval
- Specialist support services may include:
- Analytical laboratories
 - Electrical
 - Gas fitting/inspection
 - Naval architects
 - NDE services
 - Noise
 - Pressure vessel testing

Appropriate reports and documentation may include:

- Certificate of operation
- Certificate of survey
- Statements of compliance
- Survey report

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying

MARM5003A Conduct an audit of safety management systems

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to conduct a regulatory audit of the safety management system (SMS) on a domestic commercial vessel.

It involves systematic examination against National Standard for the Administration of Marine Safety (NSAMS) audit criteria to determine conformance with planned arrangements and the effectiveness of the approach to managing operational safety.

Application of the Unit

This unit applies to people working in the maritime industry as a domestic commercial vessel marine surveyor and may form part of accreditation requirements for surveyors under Australian legislation.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|--|---|
| 1 Carry out preliminary planning | <p>1.1 Audit scope, objectives and benchmark are verified against regulatory requirements</p> <p>1.2 Relevant documentation is identified and obtained</p> <p>1.3 Resources required to conduct audit are identified and arranged</p> <p>1.4 Timing requirements are identified and audit is scheduled in agreement with relevant personnel</p> |
| 2 Develop safety management system audit plan | <p>2.1 Provision of valid and reliable evidence of a systematic approach to managing safety and risk controls within the context of the certificate of operation is ensured by nature of information and data collected</p> <p>2.2 Relevant personnel and stakeholders who may need to be consulted for corroborating evidence are included in sources of evidence</p> <p>2.3 Opportunities for corroborating evidence are included in information and data collection strategies</p> <p>2.4 Security, confidentiality, impartiality and equity issues are addressed through information and data collection strategies</p> <p>2.5 Audit plan is developed and documented</p> |
| 3 Develop safety management system audit tool | <p>3.1 Benchmark criteria, nature of risks, identified relevant information and certificate of operation are accurately reflected in audit tool/s</p> <p>3.2 Ability of audit tool/s to focus on evaluation of performance of SMS management processes is ensured</p> <p>3.3 Ability of audit tool/s to produce consistent outcomes if used by others is ensured</p> <p>3.4 Collection of evidence in a timely and efficient manner is supported by audit tool/s</p> |
| 4 Undertake safety audit activities | <p>4.1 Entry interview is carried out and records of evidence and findings are progressively documented and retained in an appropriate format</p> <p>4.2 Workplace hazard identification activities being undertaken are determined and compared to safety management plan</p> <p>4.3 Processes and systems are examined to determine whether hazards of long latency and low frequency/high consequence are included and minimised</p> <p>4.4 Processes and systems are examined to determine whether risks to</p> |

- persons other than employees are identified and minimised
- 4.5 Organisational factors that impact on the SMS and safety management plan are identified
 - 4.6 Own health and safety is addressed during audit according to organisational requirements and standards for safe work practices
 - 4.7 Compliance of information and data collection and evaluation activities with legal requirements is ensured
 - 4.8 Information and data collection and evaluation activities are carried out ethically
 - 4.9 Exit meetings with relevant personnel and stakeholders are conducted as required
- 5 Assess, evaluate and advise on effectiveness of approach to safety and risk management**
- 5.1 Outcomes of the risk assessment process are assessed for validity, reliability and inclusion of all major safety risks, in particular demonstrated use of risk assessment methods in the organisation/on the vessel
 - 5.2 Risk controls are evaluated for suitability and effectiveness in relation to organisational SMS
 - 5.3 Scope of organisational processes to monitor ongoing implementation of approaches to managing safety are evaluated
 - 5.4 Systematic analysis is undertaken to identify areas of compliance and non-compliance
 - 5.5 Advice is provided on impact of legislation and standards on selection, suitability and implementation of a range of safety management plans
- 6 Report on safety audit outcomes**
- 6.1 Compliance evaluation outcomes are documented and reported to relevant personnel and stakeholders
 - 6.2 Hazards identified during audit are reported promptly to *appropriate person/s*
 - 6.3 Evaluation results are compared against audit criteria
 - 6.4 *Objective evidence of audit findings and recommendations* are presented to client at closing meeting
 - 6.5 Possible challenges to report are anticipated and further explanations are prepared to promote acceptance
 - 6.6 Corrective action and *follow-up processes* are recommended

according to regulatory requirements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access and enter internal and external information on work health and safety (WHS)/occupational health and safety (OHS)
- Access relevant SMS information and data
- Advise on and negotiate development of additional safety plans and monitor designated actions
- Attend to detail when making observations and recording outcomes
- Make observations of workplace tasks and interactions between people, their activities, equipment, environment and systems
- Manage own tasks within a timeframe
- Relate effectively to personnel at all levels of the organisation, safety specialists and emergency services personnel as required
- Review and analyse relevant workplace information and data
- Use language appropriate to work group and task
- Work independently and unsupervised
- Write complex reports, procedures and plans

Required Knowledge:

- Benefits, limitations and use of a range of communication strategies and tools appropriate to workplace
- Characteristics, mode of action and units of measurement of major hazard types
- Concept of common law duty of care
- Development of tools such as positive performance indicators (PPIs) in assessing safety management performance
- Difference between:
 - common law and statutory law
 - hazard and risk
- Ethics related to professional practice
- Formal and informal communication and consultation processes
- Hierarchy of control and considerations for choosing between different control measures, such as possible inadequacies of particular control measures

- How workforce characteristics and composition impacts on risk and a systematic approach to managing safety for example:
 - communication skills
 - cultural background/workplace diversity
 - gender
 - structure and organisation of workforce e.g. part-time, casual and contract workers, shift rosters, geographical location
 - language, literacy and numeracy
 - workers with specific needs
- How vessel characteristics and certificate of operation may impact on SMS such as:
 - commercial activity
 - geographical location
 - maintenance requirements for vessel operating systems and work equipment
 - operational limits
 - passengers
 - size of vessel/ type of vessel
- Internal and external sources of SMS information and data
- Language, literacy and cultural profile of vessel employees
- Limitations of generic hazard and risk checklists and risk ranking processes
- Maritime legislative requirements for safety management plans and compliance
- Methods for:
 - collecting reliable information and data, commonly encountered problems in collection, and strategies for overcoming such problems
 - providing evidence of compliance with maritime and WHS/OHS legislation
- Nature and use of information and data that provides valid and reliable results on safety management performance processes (including PPIs) and limitations of other types of measures
- Nature of maritime and typical vessel work requirements and processes (including work flow, planning and control) and hazards relevant to particular workplace
- Organisational culture as it impacts on safety, risk management and change
- Other functional areas that impact on safety management plans, systems and processes
- Principles and practices of a systematic approach to managing safety
- Principles of:
 - human behaviour and response to interactions with human, physical and task environment to identify psychosocial hazards
 - incident causation and injury processes
- Professional liability in relation to providing advice
- Range of risk analysis/assessment techniques and tools, and application and limitations of these techniques and tools, and auditing methods and techniques
- Requirements for :

- recordkeeping that addresses WHS/OHS, risk management, privacy and other relevant legislation
- reporting under WHS/OHS and other relevant legislation including notifying and reporting incidents
- Requirements of WHS/OHS and standards related to systematically managing safety
- Requirements under hazard-specific WHS/OHS legislation and codes of practice
- Risk as a measure of uncertainty and factors that affect risk
- Roles and responsibilities under WHS/OHS legislation of employees including supervisors, contractors and other external WHS/OHS inspectors and advisors
- Sampling methodologies, application and related statistical measures
- Standard maritime industry controls for a range of hazards
- Standards related to SMS information and data, statistics and records management including requirements for information and data under elements of systematically managing safety
- State/territory and commonwealth WHS/OHS legislation, regulations, codes of practice, associated standards and guidance material, including prescriptive and performance approaches, and links to other relevant legislation such as industrial relations, equal employment opportunity, workers compensation, rehabilitation
- Structure and forms of legislation including regulations, codes of practice, associated standards and guidance material
- Types of hazard identification tools
- WHS/OHS requirements and safe work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- conducting maritime SMS audits against certificate of operation requirements for at least five vessels varying in size and operational limits
- developing effective planning documents
- providing high quality reports
- ensuring behaviour reflects relevant current legislative and regulatory requirements
- ensuring currency of relevant WHS/OHS skills and

Context of and specific resources for assessment	<p>knowledge.</p> <p>Performance is demonstrated consistently over time and in a suitable range of contexts.</p> <p>Resources for assessment include access to:</p> <ul style="list-style-type: none">• industry-approved marine operations site where conducting an audit of SMSs can be conducted• tools, equipment and personal protective equipment currently used in industry• relevant regulatory and equipment documentation that impacts on work activities• range of relevant exercises, case studies and/or other simulated practical and knowledge assessments• appropriate range of relevant operational situations in the workplace. <p>In both real and simulated environments, access is required to:</p> <ul style="list-style-type: none">• relevant and appropriate materials and equipment• applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.
Method of assessment	<p>Practical assessment must occur in an:</p> <ul style="list-style-type: none">• appropriately simulated workplace environment and/or• appropriate range of situations in the workplace. <p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:</p> <ul style="list-style-type: none">• direct observation of the candidate conducting an audit of SMSs• direct observation of the candidate applying relevant WHS/OHS requirements and work practices.
Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p> <p>In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.</p> <p>Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.</p>

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Benchmark may include:
- Australian or international standards for maritime safety management
 - Specific industry standards (such as fishing, pearling, charter cruise, cargo)
 - Standards developed:
 - by WHS/OHS authorities
 - internally by the organisation or by commercial organisations or industry bodies
- Regulatory requirements must include:
- Marine Safety (Domestic Commercial Vessel) National Law
- Relevant documentation may include:
- Codes of practice
 - Guidance material
 - Industry standards
 - Organisational documents
 - WHS/OHS legislation, regulations and codes of practice
- Resources may include:
- Equipment
 - Specialist personnel
- Systematic approach to managing safety may include:
- Comprehensive set of processes that are combined in a methodical and ordered manner to minimise risk of injury or ill health in the workplace such as:
 - allocation of resources
 - communication and consultation
 - hazard and risk management
 - processes of WHS/OHS planning
 - recordkeeping and reporting
 - review and evaluation for ongoing safety improvement
 - training and competency
- Information and data collected may include:
- Claims
 - Complaints
 - Enforcement notices and actions
 - Hazard logs
 - Incident and injury reports
 - Information and data changes since last audit such as new equipment, processes, products, substances or certificate of operation
 - Interviews with management, supervisors, work groups, employees and other parties across a range of levels and roles

including:

- health and safety representatives
- maritime regulators
- contractors
- Legal reports
- Management system documentation including:
 - policies and procedures
 - position descriptions
 - duty statements
- Observations in workplace, work operations and records
- Operational documentation including:
 - completed forms
 - schedules
 - checklists
 - log books
 - minutes of meetings
 - action plans
 - maintenance reports
 - health surveillance records
- Previous management system reports and industry risk profiles
- Reports and management reviews
- Surveillance audits
- Training materials and records
- Employees and other parties across a range of levels and roles including:
 - customers/clients/passengers
 - health and safety representatives
 - industry associations
 - regulators
 - where appropriate, contractors

Relevant personnel and stakeholders may include:

- Management, persons in control of workplace, supervisors
- Information and data required to be on hand
- Locations to be inspected
- Meetings to be scheduled, people to be interviewed
- Personnel involved
- Sampling methodology including statistical measures
- Scope of audit
- Timelines

Audit plan may include:

Audit tool/s may include:

- Instruments for collecting evidence and conducting analysis and evaluation (not the same as audit criteria or benchmark), which may be:

- adapted from existing tools
 - developed specifically for the purpose
 - purchased or accessed from existing tools
 - And may include:
 - descriptions of required characteristics to be checked
 - limitations for and instructions for use
 - performance checklists
 - sets of questions to be asked
- Appropriate person/s may include:
- Owner
 - Person in control of vessel
- Objective evidence may include:
- Information and data obtained through:
 - measurement
 - observation
 - tests
- Audit findings and recommendations must include:
- Benefits to be achieved by adopting audit report recommendations
 - Clear and concise
- Follow-up processes may include:
- Agreed meeting date with client following sufficient time for implementation of corrective actions, and may include:
 - checking rigour of original audit findings
 - providing new non-conformance report/s as required
 - verifying effectiveness of recommendations and control action/s, particularly in correction of non-compliance

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying

MARM5004A Develop marine survey reports

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to report on survey findings and provide information to clients and stakeholders on issues related to the marine survey.

Application of the Unit

This unit applies to people working in the maritime industry as a domestic commercial vessel marine surveyor and may form part of accreditation requirements for surveyors under Australian legislation.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|--------------------------|-----|---|
| 1 Report findings | 1.1 | Relevant <i>documentation</i> , evidence, facts and information gathered during survey activities is collated and prepared for inclusion in |
|--------------------------|-----|---|

- report
- 1.2 Contentious information or findings are promptly forwarded to **key stakeholders**, and where necessary, involved parties are personally briefed or have opportunities to discuss report prior to compilation
 - 1.3 Reports are thoroughly and accurately prepared, and type of survey carried out is reflected in reports
 - 1.4 Client requirements, organisation policy and relevant legislation or codes of practice are complied with, in report format
 - 1.5 Reports are updated periodically to accurately reflect current status of survey
- 2 Provide information on marine survey tasks**
- 2.1 Stakeholders are accurately and thoroughly informed of **risks** identified during survey
 - 2.2 Prompt **information** is given to clients and stakeholders
 - 2.3 Survey report and information is based on an objective assessment of vessel being surveyed
- 3 Present information**
- 3.1 Information is presented within specified time, according to client and organisational requirements
 - 3.2 Information is presented in required format, style and structure using relevant **business equipment and technology**
 - 3.3 Report is maintained with due regard to client confidentiality according to organisational and legislative requirements
 - 3.4 **Feedback** is incorporated into future reports

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access and interpret relevant information
- Access and update records electronically
- Access web-based information services
- Analyse and evaluate information and findings
- Determine and confirm information, using questioning and active listening as required
- Interview, consult and negotiate with clients and others

- Liaise with others, share information and listen
- Make effective presentations
- Perform calculations related to achieving required outcomes
- Perform marine survey on a domestic commercial vessel
- Plan and sequence work
- Read and interpret documentation from a variety of sources, and record and consolidate relevant related information
- Use computer applications (word processing, spreadsheet, database, specific purpose computer systems) to assist in achieving required outcomes
- Use language and concepts appropriate to cultural differences
- Work independently and unsupervised
- Write effective reports

Required Knowledge:

- Effective listening techniques
- Privacy requirements
- Relevant legislation and industry codes of practice
- Risk management principles and strategies
- Risks related to:
 - survey reports
 - vessel condition, salvage, hire, sale
- Safety management system (SMS)
- Survey processes
- Survey reporting principles and practice for different types of survey tasks
- Work health and safety (WHS)/occupational health and safety (OHS) legislation, regulations, codes of practice, policies and procedures

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- effectively liaising with internal and external

Context of and specific resources for assessment

- authorities/agencies
- providing high quality reports
- ensuring currency of relevant legislative and regulatory knowledge
- producing accurate and reliable information.

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where developing marine survey reports can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate developing marine survey reports
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Documentation may include:

- Correspondence
- Legal/government/professional/other documents
- Reference to all evidence/information considered
- Reports from others such as loss adjusters/assessors/ insurers, shipwrights, tradesmen, specialists and other surveyors
- Survey:
 - books
 - files
- Vessel records

Key stakeholders may include:

- Client
- Government or statutory authorities
- Industry associations
- Insurance broker or agent
- Insurer
- Legal or other practitioners
- Manufacturers
- Marine authorities
- Master or crew
- Mortgagee
- Suppliers
- Third parties
- Trustee
- Vessel owner

Risks may include:

- Casualty
- Damage
- Loss or liability
- Repairs
- SMS
- Tangible or intangible
- WHS/OHS

Information may include:

- Historical data
- Maintenance schedules
- Operating environment of organisation or vessel
- Other survey reports and relevant survey documentation

- Business equipment and technology may include:
- Vessel condition
 - Cameras
 - Computers
 - Data storage devices
 - Email
 - Facsimile machines
 - Internet, extranet and intranet
 - Photocopiers, printers, scanners
 - Software applications, such as databases and word applications
- Feedback may include:
- Clients and colleagues
 - Documentation and reports
 - Quality assurance data
 - Questionnaires

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying

MARM5005A Participate in investigating marine incidents

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to participate in planning, conducting and reporting investigations of marine incidents that have resulted in, or have a potential to result in, injury or damage to persons, vessels, property or marine environment.

Application of the Unit

This unit applies to people working in the maritime industry as a domestic commercial vessel marine surveyor and may form part of accreditation requirements for surveyors under Australian legislation.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Undertake initial 1.1 Statutory and legal obligations are identified and *relevant*

- assessment of incident** *government agencies* are advised as required
- 1.2 Key *stakeholders and interested parties* are identified and notified as appropriate
 - 1.3 Factors affecting *complexity* of investigation are determined and surveyor competency to conduct investigation is determined based on required specialised skills and knowledge
 - 1.4 Area is checked to ensure it is safe
 - 1.5 Integrity of site and personnel is established and maintained according to legal requirements and to ensure objectivity of information collected
- 2 Participate in establishing investigation processes**
- 2.1 Organisational policies and procedures, and national law for marine incident investigation are accessed and applied
 - 2.2 Scope of investigation is defined taking account of legislative requirements and client instructions
 - 2.3 *Investigation team* appropriate to level of responsibility in investigation is convened
 - 2.4 Involvement of stakeholders and interested parties is managed according to legislative requirements
 - 2.5 Resources and expert advice required to assist in incident assessment are identified and sourced
 - 2.6 *Barriers to investigation* are identified and addressed
 - 2.7 Development and implemented of action plans and timelines is ensured
- 3 Collect information and data for analysis**
- 3.1 Sources of information and data are identified and accessed
 - 3.2 Incident site, equipment and other evidence is inspected
 - 3.3 Gathering of information and data by others is facilitated
 - 3.4 Photographs, measurements and documentary evidence are taken and recorded, taking objectivity, confidentiality and legal implications into account
 - 3.5 Site, evidence and necessary documentation is appropriately secured
- 4 Analyse information and**
- 4.1 Understanding and identification of *conceptual basis for analysis* is ensured

- data**
- 4.2 **Timeline of events** leading up to incident is constructed using vessel records and other available data
 - 4.3 Causative event/s and **conditions and circumstances** that may have contributed to causative event are accurately identified and documented
 - 4.4 Intervention points on timeline for prevention are identified
- 5 Compile investigation report**
- 5.1 Results of analysis are documented in a format to suit required **target audience** and legal requirements
 - 5.2 Report is phrased in objective terms, and evidence and reasons for conclusions are cited
 - 5.3 Recommendations for prevention are included in report
 - 5.4 Relevant information and data is disseminated to key personnel, stakeholders and external agencies as appropriate, following appropriate authorisation
 - 5.5 Findings from report are used to develop further prevention strategies

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access data on marine investigations, accidents and incidents from a variety of sources
- Access relevant marine incident information and data
- Analyse relevant workplace information and data
- Carry out calculations (such as vessel stability)
- Communicate effectively with personnel at all levels of the organisation, marine incident specialists and, as required, emergency services personnel
- Conduct effective formal and informal meetings
- Consult and negotiate with others to develop plans and to implement and monitor designated actions
- Contribute to assessing resources needed to systematically manage marine incidents and, where appropriate, access these resources
- Identify areas for improvement with the survey of marine incidents
- Make observations of workplace tasks and interactions between people, their activities, equipment, environment and systems

- Manage:
 - incident and responsibilities of self and others
 - own tasks within a timeframe
- Pay attention to detail when making observations and recording outcomes
- Prepare reports for a range of target groups and stakeholders
- Produce accurate information and data related to vessel, crew and/or marine environment
- Use a range of communication media
- Use basic measuring equipment including reading scales and dials applicable to selected hazards
- Use language and literacy skills appropriate to task
- Work independently and unsupervised

Required Knowledge:

- Characteristics, mode of action and survey tasks for major and minor marine incidents
- Concept of common law duty of care
- Ethics related to professional practice
- Formal and informal communication and consultation processes, and key personnel related to communication
- How the characteristics and composition of the workforce impact on risk and the systematic approach to managing a marine incident, for example:
 - communication skills
 - cultural background/workplace diversity
 - gender
 - language, literacy and numeracy
 - structure and organisation of workforce (part-time, casual and contract workers, shift rosters, geographical location)
 - workers with specific needs
- Internal and external sources of information and data
- Language, literacy and cultural profile of the work group
- Legislative requirements for marine incident information and data, and consultation
- Marine incident causation for a range of different incidents including marine environment incidents
- Methods of providing evidence of compliance with maritime legislation
- Nature of workplace processes (including work flow, planning and control) and hazards relevant to particular workplace, vessel and vessel operations
- Organisational policies and procedures
- Other functional areas that impact on managing marine incidents
- Principles and practices of continuity and validity of evidence retention for potential legal

action

- Requirements for:
 - recordkeeping that addresses privacy, maritime and other applicable legislation
 - reporting marine incidents under legislation, organisational policy and procedures, codes of practice including notification and reporting of incidents
- Requirements under hazard specific legislation and codes of practice
- Rights of marine safety inspectors
- Roles and responsibilities of vessel employees and other stakeholders including agents and contractors
- Standard industry controls for a range of hazards
- State/territory and commonwealth maritime legislation (acts, regulations, codes of practice, associated standards and guidance material) including prescriptive and performance approaches and links to other relevant legislation such as industrial relations, work health and safety (WHS)/occupational health and safety (OHS) and duty of care
- WHS/OHS requirements and safe work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- developing effective planning documents
- communicating effectively with others as required
- producing accurate and reliable information
- effectively liaising with internal and external authorities/agencies
- providing high quality reports.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where participating in investigating marine incidents can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that

impacts on work activities

- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate participating in investigating marine incidents
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Relevant government agencies may include:

- Australian Maritime Safety Authority (AMSA)
- Australian Transport Safety Bureau (ATSB)
- Environment protection agencies
- Maritime authorities
- Police and other emergency services
- WHS/OHS specialists

- Stakeholders and interested parties may include:
- Community
 - Coroner
 - Government agencies, including WHS/OHS and emergency service agencies
 - Importers
 - Installers
 - Insurance companies
 - Managers
 - Manufacturers
 - Media
 - Naval architects and marine engineers
 - Organisation board or advisory council
 - Persons in control of workplaces
 - Politicians
 - Ship personnel
 - Sub-contractors
 - Suppliers and distributors
 - Unions
 - Workgroup members and people who may be exposed to similar situations
- Complexity may include:
- Administrative implications
 - Conflict of interest issues
 - Existence of secondary hazards
 - International conventions
 - Involvement of external agencies
 - Language competencies of parties involved
 - Legal implications arising from incident or post incident related matters
 - Level of public or political interest
 - Number of other parties, including sub-contractors
 - Privacy laws
 - Seriousness of injury or other outcomes
 - Technical implications
- Investigation team may include:
- Emergency service personnel
 - Government representatives
 - Legal advisors and technical experts
 - Other surveyors
 - Photographers
- Barriers to investigation may include:
- Availability of:
 - research data and analysis or testing equipment
 - technical design information and data relevant to investigation

- Changes to incident scene
 - Condition of witnesses
 - Cultural issues
 - Economic implications
 - Geographical location and/or accessibility
 - Lack of records
 - Legal restrictions or limitations (temporary, short-term or long-term)
 - Length of time from when incident occurred/first identified
 - Limited resources available
 - Political and community stakeholder sensitivity
 - Ship personnel (attitude and or desire to protect self and others)
 - Time limits imposed
 - Weather, tides
- Conceptual basis for analysis may include:
- Focusing on ‘why’ and ‘how’ rather than ‘what’
 - Emphasising analysis of operations at time of incident
 - Encouraging an open minded, objective approach
 - Not focusing on individual behaviour or fault
- Timeline of events may include:
- Events that extend back in time as far as required, not just immediate events
 - Verbal reports from crew
 - Vessel records and logs
- Conditions and circumstances may include:
- Cargo
 - Equipment failure
 - Fatigue
 - Key person absence
 - Number of crew
 - Onboard safety systems and WHS/OHS procedures
 - Stability
 - Type of:
 - equipment
 - vessel
 - Vessel operations
 - Weather
- Target audience may include:
- Environment protection agencies
 - Insurance agents
 - Maritime authorities
 - Organisation
 - Police or coroner

- Vessel owner/s

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying

MARM5006A Survey hull and superstructure of a commercial vessel

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to undertake a survey of hull and superstructure of a commercial vessel according to relevant regulations. It includes planning survey, carrying out survey and providing survey report.

Application of the Unit

This unit applies to people working in the maritime industry as a domestic commercial vessel marine surveyor and may form part of accreditation requirements for surveyors under Australian legislation.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Plan and prepare for survey task**
 - 1.1 **Relevant standards** for vessel hull and superstructure are accurately identified and accessed to support survey task
 - 1.2 Vessel **survey regime** is identified and **relevant regulatory requirements**, organisational requirements and procedures for survey scope are accessed and reviewed
 - 1.3 Vessel survey regime is confirmed against regulatory and organisational requirements
 - 1.4 **Survey scope and depth** is confirmed against relevant regulatory and organisational requirements
 - 1.5 Survey purpose, objectives and variations are identified with relevant personnel
 - 1.6 Operational limits, certificate of operations and previous certificates of survey are reviewed to identify and take into consideration any special conditions, equivalent solutions, specific areas of operations and other regulatory limitations, exceptions or conditions that may impact on survey task
 - 1.7 **Survey equipment and tools** to carry out survey are accurately identified and selected prior to survey task
- 2 Confirm hull type and material construction**
 - 2.1 **Types of hull** common to **domestic commercial vessels** are accurately identified and regulatory or additional standards are accessed and reviewed for use in survey
 - 2.2 Common **materials** used in hull construction and superstructure are identified and regulatory or additional standards are accessed and reviewed for use in survey
 - 2.3 Construction, type of hull and materials are confirmed prior to survey by accessing vessel records
- 3 Conduct periodic survey of hull and superstructure**
 - 3.1 Survey of hull and superstructure is carried out according to regulatory requirements
 - 3.2 Changes to operational equipment or equivalent solutions are identified and examined for fitness both in or out of water as required by **survey schedule**
 - 3.3 **Watertight openings and skin fittings** are inspected for compliance
 - 3.4 **Deformation and integrity** of hull and superstructure are inspected

- for compliance
- 3.5 *Paint and coatings* are inspected for condition
- 3.6 Cathodic protection is inspected where applicable
- 3.7 Superstructure weather tightness is checked for integrity
- 3.8 *Appendages* are inspected for integrity
- 4 Report and act on non-compliance**
- 4.1 Non-compliance is detected, recorded and reported according to regulatory and organisational requirements
- 4.2 *Specialist support services* are identified and sourced as appropriate
- 4.3 Risks arising from detected non-compliance are reported and communicated to relevant personnel
- 4.4 Relevant provisions of legislation appropriate to level of risk detected are identified and followed
- 4.5 *Appropriate reports and documentation* relating to survey are developed and managed according to organisational and regulatory requirements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Analyse and evaluate available data and observations to form logical conclusions
- Carry out engineering measurements and apply metric and imperial conversions
- Communicate effectively verbally and in writing
- Develop and use research techniques to identify gaps in knowledge and to recognise professional development opportunities
- Disseminate and clarify technical information
- Identify strengths, weaknesses and failure modes of common marine construction materials
- Implement work health and safety (WHS)/occupational health and safety (OHS) principles and protection of the marine environment
- Interpret engineering drawings
- Interpret relevant legislation, regulations, codes of practice, standards and rules

- Manage risks
- Provide customer service
- Recognise own professional limitations
- Undertake research and analysis using relevant reference material
- Use computers
- Work independently and unsupervised
- Write technical reports

Required Knowledge:

- Acoustic and thermal insulation principles and practices
- Awareness of working stresses in vessel under load or in a seaway
- Basic principles of stability, procedures for incline experiments, simple roll test, stable and unstable equilibrium
- Commercial vessel classifications and survey requirements for various areas of operations
- Compatibility and durability of construction materials
- Composite production methods, quality assurance and secondary bonding techniques
- Damage propagation caused by defects, poor engineering practice and/or transmission of dynamic forces
- Documentation and checklists:
 - construction drawings
 - defect list
 - historical records
 - National Standard for the Administration of Marine Safety (NSAMS) Section 4
 - procedural forms
 - safety management systems
 - stability book
 - standard operating procedures
 - Uniform Shipping Laws (USL) Section 14 Appendix 2
 - vessel files
- Elementary ergonomic design principals and methods for reducing harm to crew in a seaway
- Environmental controls and regulations
- Forms, causes and prevention of corrosion in a marine environment
- Galvanic series of common metals used in boat building
- Hull forms and vessel types
- Implications of poor ventilation practice
- Insurance, liability and professional indemnity
- Interaction of vessel structures, mechanical systems and appropriate installation practices

- Maintaining watertight integrity
- Marine craft construction:
 - methods, materials and vessel anatomy
 - terminology and definitions
- Marine-grade adhesives, mechanical fasteners, sealants and caulking materials
- Marine protective coatings, fairing compounds and finishes
- Principles of sheathing
- Repair techniques and maintenance procedures for common marine craft construction materials
- Report writing formats
- Safe working practices and risk assessment procedures
- Suitable structural support for out-of-water vessels to prevent topple, sag, hog and/or damage from local stress concentrations
- Welding techniques, procedures and standards
- WHS/OHS requirements and safe work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- undertaking survey of hull and superstructure of a commercial vessel in at least three or more contexts
- developing effective planning documents
- communicating effectively with others as required
- providing high quality reports.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where undertaking survey of hull and superstructure of a commercial vessel can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that

impacts on work activities

- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate undertaking survey of hull and superstructure of a commercial vessel
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. **Bold italicised wording**, if used in the performance criteria, is detailed below.

Relevant standards must include:

- Australian/New Zealand Standards (AS/NZS)
- Class
- Manufacture guidelines
- Marine Orders
- National Standard for the Administration of Marine Safety (NSAMS) section 4

- National Standard for Commercial Vessels (NSCV)
 - Safety data sheets (SDS)/material safety data sheets (MSDS)
 - Safety of life at sea (SOLAS)
 - Uniform Shipping Law (USL)
 - WHS/OHS
- Survey regime must include:
- Class of vessel
 - Survey depth and level of vessel
- Relevant regulatory requirements may include:
- AS/NZS, in particular:
 - AS/NZS ISO 9001: 2008 Quality Management Systems - requirements
 - Marine Safety (Domestic Commercial Vessel) National Law
 - NSCV
 - Part B – General Requirements
 - Part C – Vessel Construction
 - Part E – Operational Practices
 - NSAMS Section 4
- Survey scope and depth may include:
- Condition
 - Initial
 - Modification/further building
 - Periodic survey (in or out of water)
 - Repair/damage
- Survey equipment and tools may include:
- Communication equipment
 - Draft survey hydrometer
 - Drill
 - Entry authority
 - Hammer/welder's hammer
 - Meat piercing thermometer
 - Mirror
 - Personal protective equipment such as respirators, gloves, overalls, boots, hearing protection, goggles, masks
 - Photographs
 - Plastic sampling bags
 - Pocket calculator
 - Recording equipment:
 - camera
 - dictaphone
 - lap top computer
 - notebook
 - Sampling equipment:

- silver nitrate test kit for chlorides
 - test kit equipment
 - thermometers
 - water-detecting paste
 - Scraper
 - Screwdriver
 - Small mallet
 - Sounding tapes
 - Storage equipment/facilities
 - Tape measure /measuring wheel
- Types of hull may include:
- Box
 - Catamaran
 - Foils
 - Non water displacement
 - Shallow draft
 - Single
 - Wave piercing
- Domestic commercial vessels may include:
- Vessels defined as commercial vessels in Marine Safety (Domestic Commercial Vessel) National Law
- Materials may include:
- Aluminium
 - Cement
 - Composite
 - Fibreglass
 - Steel
 - Timber
- Survey schedule may include:
- Twelve months
 - Twenty-four months
 - Thirty-months
 - Five year cycle with NSAMS:
 - periodic survey (either annual or bi-annual)
 - change of class survey
 - safety equipment only survey
 - damage/repair or condition surveys
 - equivalent solution or deemed-to-satisfy surveys
 - SMS components
 - in water
 - out of water
- Watertight openings and skin fittings may include:
- Cooling water systems
 - Doppler log
 - Drain plugs

- Hatch
 - Inlet valve
 - Sea chest
 - Stabilisers
- Deformation and integrity may include:
- Blisters
 - Chemical attack
 - Cracking
 - Degradation
 - Distortion
 - Dry rot
 - Isolated damage
 - Leaching
 - Out of trim
 - Structural failure
 - Ultra violet (UV) breakdown
 - Water ingress
 - Weathering
- Paint and coatings may include:
- Anti fouling
 - Copper sheathing
 - Gel based
- Appendages may include:
- Bilge keels
 - Keel coolers
 - Rudders
 - Stabilisers
- Specialist support services may include:
- Analytical laboratories
 - Chemical (sewage systems)
 - Electrical
 - Naval architects
 - Non-destructive evaluation (NDE) services
 - Noise
 - Pressure vessel testing
- Appropriate reports and documentation may include:
- Certificate of operation
 - Certificate of survey
 - Statements of compliance
 - Survey report

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying

MARM5007A Survey vessel operational systems

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to undertake a periodic survey of vessel operational systems including propulsion and steering gear systems, deck machinery, pumping systems, power generation, refrigeration plant, liquid petroleum gas (LPG) systems for appliances and navigational systems.

Application of the Unit

This unit applies to people working in the maritime industry as a domestic commercial vessel marine surveyor and may form part of accreditation requirements for surveyors under Australian legislation.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|---|---|
| 1 Identify survey requirements | <p>1.1 Relevant standards for vessel equipment and operational systems are identified, accessed and incorporated into survey plan as required</p> <p>1.2 Survey scope and depth is confirmed against relevant standards and organisational requirements</p> <p>1.3 Operational limits, certificate of operations and previous certificates of survey are reviewed for special conditions or equivalent solutions</p> <p>1.4 Equipment and operational system requirements for survey and range of variations are accurately identified, selected and tested for serviceability</p> |
| 2 Prepare for survey | <p>2.1 Operational systems to be surveyed for type, size and nature of vessel operations are accurately identified, reviewed and incorporated into survey plan</p> <p>2.2 Relationships between different operational systems are accurately interpreted and items to be surveyed are noted in survey plan</p> <p>2.3 Maintenance records are obtained and reviewed to confirm survey scope</p> |
| 3 Conduct periodic survey of operational systems | <p>3.1 Survey of operational systems is carried out according to regulatory requirements</p> <p>3.2 Primary and secondary operational systems and their components are surveyed according to survey schedule</p> <p>3.3 Changes to operational equipment or equivalent solutions are identified and examined for fitness both in or out of water as required by survey schedule</p> |
| 4 Report and act on non-compliance | <p>4.1 Non-compliance is detected, recorded and reported according to regulatory and organisational requirements</p> <p>4.2 Risk arising from non-compliance is detected, reported and communicated to relevant personnel</p> <p>4.3 Relevant provisions of legislation appropriate to level of risk detected are identified and followed</p> <p>4.4 Appropriate reports and documentation related to survey are developed and managed according to regulatory and organisational requirements</p> |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Accurately interpret relevant codes, standards, rules and regulations for vessel operational systems
- Analyse and evaluate available data and observations to form logical conclusions
- Carry out:
 - engineering measurements and apply metric and imperial conversions
 - inspecting and testing operational systems according to regulatory and organisational requirements
- Communicate effectively verbally and in writing
- Implement principles of work health and safety (WHS)/occupational health and safety (OHS) and marine environment protection measures
- Follow up reports
- Negotiate and resolve conflict
- Question and investigate
- Read and interpret:
 - machinery performance readings and indications
 - plans and drawings
 - technical information
- Recognise faulty equipment
- Select and use appropriate tools and equipment
- Undertake research and analyse reference material and manufacturer data sheets
- Work independently and unsupervised
- Write reports

Required Knowledge:

- Battery types, care and maintenance
- Commercial vessel classifications and survey requirements for various operational systems and their components
- Compatibility and durability of construction materials
- Construction and layout of a typical commercial vessel, including layouts for pipework, tail shaft assembly and installed machinery
- Environmental controls and regulations for primary, secondary or ancillary systems and their components
- Ethical behaviour and industry codes of practice
- Features and characteristics of typical faults and signs of deterioration in operational

systems and components

- Features of different engine types and sizes
- Forms, causes and prevention of corrosion in a marine environment
- Insurance, liability and professional indemnity requirements for self and others
- Interaction of vessel structures and mechanical systems
- Maintaining watertight integrity
- Operational characteristics and performance specifications for different types of marine internal combustion engines and propulsion machinery usually found on vessels of up to 750 kW propulsion power
- Principal features of fittings and machinery found on typical small vessels and characteristics of engine/plant and ancillary equipment
- Procedures for:
 - checking fittings, machinery and components
 - reading and interpreting machinery performance readings and indications
- Purpose and content of safety data sheets (SDS)/material safety data sheets (MSDS)
- Relevant sections of state and territory maritime regulations, National Standard for Commercial Vessels (NSCV) and Uniform Shipping Laws (USL) Code dealing with maintaining small vessels
- Report writing requirements for a range of different survey tasks
- Safety, environmental and hazard control precautions and procedures relevant to checking and basic maintenance of fittings and machinery
- Typical problems related to inspecting and maintaining operational systems
- Typical vessel and machinery specifications, operating manuals and specifications
- WHS/OHS requirements and safe work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- ensuring currency of relevant WHS/OHS skills and knowledge
- providing high quality reports
- developing effective planning documents

Context of and specific resources for assessment

- communicating effectively with others as required.

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where undertaking survey of vessel operational systems can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate undertaking survey of vessel operational systems
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- | | |
|---|---|
| Relevant standards may include: | <ul style="list-style-type: none"> • Class rules and approvals • General servicing requirements for operational equipment • Manufacturer guidelines and servicing requirements • Marine orders • National Standard for the Administration of Marine Safety (NSAMS) Section 4 • NSCV and USL Code as applicable • Organisational standards • SDS/MSDS • Safety management systems (SMS) • Safety of life at sea (SOLAS) • Australian/New Zealand Standards (AS/NZS): <ul style="list-style-type: none"> • AS/NZS 3000: Electrical installations • AS/NZS 3004: Electrical installations – verification guidelines • WHS/OHS |
| Survey scope and depth may include: | <ul style="list-style-type: none"> • Class of vessel • Grandfathering conditions • Survey cycle in accordance with NSAMS Chapter 4: <ul style="list-style-type: none"> • change of class survey • damage/repair or condition surveys • equivalent solution or deemed-to-satisfy surveys • periodic survey (either annual or bi-annual) • Survey level of vessel |
| Operational limits may include: | <ul style="list-style-type: none"> • As defined in certificate of operations and/or certificate of survey • Testing requirements for electrical and fire systems |
| Regulatory requirements may include: | <ul style="list-style-type: none"> • Marine Safety (Domestic Commercial Vessel) National Law • NSCV • Regulations and marine orders • USL Code |
| Primary and secondary operational systems must include: | <ul style="list-style-type: none"> • Maintenance and servicing requirements as well as general condition of: <ul style="list-style-type: none"> • ballast • bilge pumping systems |

- communication equipment
- electrical systems
- engines and auxiliaries
- fire and safety systems
- fuel systems
- hydraulic systems
- machinery systems
- navigational systems
- piping and pumping systems
- power generating plants such as hybrid systems, wind and solar generation
- propulsion systems
- refrigeration
- sanitary systems
- steering systems
- tanks

- Equivalent solutions may include:
- As noted in certificate of operation or certificate of survey
 - As noted in NSCV Part B
 - National register of exemptions and equivalent solutions

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying

MARM5008A Undertake a periodic statutory survey

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to undertake statutory periodic surveys of vessels.

Application of the Unit

This unit applies to people working in the maritime industry as a domestic commercial vessel marine surveyor and may form part of accreditation requirements for surveyors under Australian legislation.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Identify survey
 - 1.1 Vessel *survey regime* is identified and *relevant regulatory requirements*, organisational requirements and procedures for survey

- scope** scope are accessed and reviewed
- 1.2 Vessel survey regime is confirmed against relevant regulatory requirements
 - 1.3 Survey scope and depth is confirmed against relevant regulatory and organisational requirements
 - 1.4 Survey purpose objectives and *variations* are clarified with *relevant personnel*
 - 1.5 Relevant regulatory and organisational requirements are reflected in survey plan
- 2 Plan and prepare for survey**
- 2.1 *Clients/representatives* are informed of *survey schedule* according to relevant regulatory and organisational requirements
 - 2.2 Survey time and location are confirmed with relevant personnel
 - 2.3 *Vessel history and supporting documents* are located and reviewed in preparation for survey
 - 2.4 *Operational limits*, certificate of operations and previous certificates of survey are reviewed for special conditions or equivalent solutions and included in survey plan where required
 - 2.5 Relevant standards for vessel equipment are identified, accessed and included in survey plan as required
 - 2.6 *Survey tools and equipment* requirements for survey and range of variations are accurately identified, selected and tested for serviceability
 - 2.7 Likelihood of confrontation or risks to self are identified and managed according to organisational procedures
 - 2.8 *Risks* related to scope of survey are identified and managed according to organisational procedures
- 3 Conduct survey**
- 3.1 *Legal requirements* for conducting periodic surveys are reviewed and applied
 - 3.2 Purpose and scope of survey is confirmed with clients/representatives
 - 3.3 Continued existence, quantity and/or type of components, systems or equipment on board vessel is verified, examined and/or tested according to survey schedule
 - 3.4 Degradation or loss of functionality in components, systems or equipment is noted for repair, deficiency or renewal in survey report

- 3.5 Vessel construction, machinery or equipment not under survey but noted as unsafe are reported according to relevant regulatory, legislative and organisational requirements
 - 3.6 Survey findings are documented in vessel history log in a systematic order and according to survey schedule and organisational requirements
 - 3.7 Survey results are confirmed with clients/representatives, and improvements and actions required to issue certificate of survey for vessel are noted and issued to clients/representatives
- 4 Finalise survey**
- 4.1 Survey outcomes are logged or reported to relevant personnel according to organisational requirements
 - 4.2 Improvement actions required are reviewed for compliance before certificate of survey is issued
 - 4.3 Results of final compliance requirements are forwarded to relevant personnel for certification

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Accurately interpret standards and guidelines, and apply rules and/or regulatory requirements to survey tasks
- Carry out survey tasks in a logical sequence according to organisational operating procedures
- Communicate effectively with a diverse range of clients/representatives and staff
- Conduct vessel history searches
- Follow instructions, regulations, marine orders, organisational operating procedures
- Identify defects, faults and corrosion to operational systems, hull and superstructure, safety and fire equipment
- Operate technical and electronic equipment
- Select and use suitable equipment including personal protection equipment
- Use a range of communication techniques including:
 - establishing rapport
 - listening
 - negotiating
 - probing

- reflecting
- resolving conflict
- Use appropriate communication and interpersonal techniques with colleagues and people external to the organisation
- Use business technology and common software programs
- Work independently and unsupervised
- Write reports

Required Knowledge:

- Applicable Australian/New Zealand Standards (AS/NZS), in particular:
 - AS/NZS 3000: 2007 Electrical installations
 - AS/NZS 3017: 2007 Electrical installations – verification guidelines
 - AS/NZS ISO 9001: 2008 Quality Management Systems – requirements
- Certificates of operation and how they apply to the survey task, in particular:
 - assessment of seafarer eligibility
 - certificate of survey requirements
 - restrictions and endorsements
 - safety management system (SMS) requirements
- International conventions and acts such as International Convention for the Prevention of Pollution from Ships (MARPOL), safety of life at sea (SOLAS)
- International conventions for load lines
- Legal requirements relating to recording information
- Marine Safety (Domestic Commercial Vessel) National Law
- National and international regulations, International Maritime Organisation (IMO) Conventions and Codes, including Australian Maritime Safety Authority (AMSA) Marine Orders
- National Standard for Commercial Vessels (NSCV) relating to conducting periodic surveys and in particular:
 - Part B – General Requirements
 - Part E – Operational Practices
- National Standard for the Administration of Marine Safety (NSAMS)
- Risk management principles and techniques
- Role of surveyor in carrying out periodic statutory surveys
- State/territory and local government legislation and regulations relating to:
 - environmental protection
 - maritime regulations
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and safe work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- analysing, planning and conducting a periodic survey for at least three different vessels and under different conditions
- developing effective planning documents
- communicating effectively with others as required
- providing high quality reports.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where undertaking a periodic statutory survey can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate undertaking a periodic statutory survey
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Survey regime may include:

- Class of vessel
- Survey level of vessel

Relevant regulatory requirements may include:

- Australian/New Zealand Standards (AS/NZS), in particular:
 - AS/NZS 3000: 2007 Electrical installations
 - AS/NZS 3017: 2007 Electrical installations – verification guidelines
 - AS/NZS ISO 9001: 2008 Quality Management Systems - requirements
- NSCV
 - Part B – General Requirements
 - Part E – Operational Practices

Variations may include:

- Combined Uniform Shipping Laws (USL) Code and NSCV
- Equivalent solutions
- NSCV
- Pre USL Code
- USL Code

Relevant personnel may include:

- Classification societies
- Colleagues
- Government bodies

- Clients/representatives may include:
- Owners or owner representatives of vessels and/or charters
 - Port authorities
 - Classification societies
 - Environmental agencies/authorities
 - Government bodies
 - Lawyers
 - Owners of vessels and/or charterers
 - Port authorities
- Survey schedule may include:
- Twelve months
 - Twenty-four months
 - Thirty-months
 - Five year cycle with NSAMS:
 - periodic survey (either annual or bi-annual)
 - change of class survey
 - safety equipment only survey
 - damage/repair or condition surveys
 - equivalent solution or deemed-to-satisfy surveys
 - SMS components
 - in water
 - out of water
- Vessel history and supporting documents may include:
- Case files/incident reports
 - Commercial documentation
 - Current survey practice, both formal and informal
 - Current vessel designs, practices and materials
 - Deck and engine logs
 - Forms (such as application forms, notification forms)
 - Insurance certificates
 - Notices (such as seizure notice, infringement notice)
 - Previous surveys and Certificates of Survey
 - Relevant national and international standards
 - Ship log books and other recordkeeping instruments
 - Vessel Stability Book
- Operational limits may include:
- Certificate of operations
 - Certificate of survey
 - Restrictions and endorsements
 - SMS
- Survey tools and equipment may include:
- Communication equipment
 - Draft survey hydrometer
 - Drill
 - Entry authority

- Hammer/welder's hammer
 - Mallet
 - Mirror
 - Personal protective equipment such as respirators, gloves, overalls, boots, hearing protection, goggles, masks
 - Photographs
 - Plastic sampling bags
 - Pocket calculator
 - Recording equipment:
 - camera
 - dictaphone
 - laptop computer
 - notebook
 - Sampling equipment:
 - silver nitrate test kit for chlorides
 - test kit equipment
 - thermometers
 - water-detecting paste
 - Satellite imagery
 - Scraper
 - Screwdriver
 - Sounding tapes
 - Storage equipment/facilities
 - Tape measure/measuring wheel
 - Age of vessel
 - Area of operation, nature of operation
 - Incident history of particular class of vessels
 - Operational and maintenance performance of operator
 - Personal attributes of operator/client
 - Physical attributes of vessel
- Risks may include:
- Common law
 - Conflict of interest
 - Consequences and penalties for noncompliance
 - Duty of care
 - Ethical behaviour
 - Requirements under Marine Safety (Domestic Commercial Vessel) National Law
- Legal requirements may include:

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying

MARM5009A Establish a marine surveyor practice

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to develop a business plan that includes a marketing, sales and promotional strategy to grow a small surveyor business. It includes researching and developing an integrated business plan for achieving business goals and objectives.

Application of the Unit

This unit applies to people working in the maritime industry as a marine surveyor.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|-------------------------------|---|
| 1 Prepare to develop a | 1.1 Essential components of a <i>business plan</i> are identified and reviewed for suitability for inclusion in overall plan for size and nature of |
|-------------------------------|---|

business plan	proposed business
	1.2 Sources and costs of finance to be included <i>financial plan</i> are identified and required business liquidity and profitability is outlined
	1.3 Business resources and required legal and compliance requirements to be considered are identified and documented
2 Develop a business plan	2.1 Proposed business operation and overall <i>business goals and objectives</i> are identified and documented
	2.2 Operational requirements are identified to effectively produce/deliver products/services
	2.3 Specialist services and sources of advice are identified, where required, and costed according to resources available
	2.4 Vision statement is developed that reflects business objectives
	2.5 Target markets are identified through <i>market research data</i>
	2.6 <i>Competitor analysis</i> is obtained and <i>market position</i> the business is developed/reviewed
3 Develop strategies for minimising risks	3.1 Specific interests and objectives of relevant people are identified and their support for planned business direction is sought and confirmed
	3.2 Risk management strategies are identified and developed according to business goals and objectives, and relevant legal requirements
	3.3 Contingency plan is developed to address potential areas of non-conformance with plan
4 Develop business promotion plans	4.1 <i>Business brand</i> is developed
	4.2 <i>Benefits</i> of practice products/services are identified
	4.3 <i>Promotional tools</i> are selected and included in business plan and <i>applicable legislation</i> is incorporated as required
5 Develop sales plans	5.1 Plans to increase sales through <i>yield per existing client</i> are identified and developed for immediate or future inclusion in plan
	5.2 Plans and strategies to grow business and add new clients and sales are developed
	5.3 Proposed plans are ranked according to priority
	5.4 Action plan to implement top ranked plan is developed and agreed with any relevant personnel

- 5.5 Business work practices are reviewed to ensure they support plans
- 6 Implement and monitor promotional strategy**
- 6.1 *Promotional package* is created to meet sales plan requirements, relevant legislative requirements and to enhance business corporate image
- 6.2 Promotional strategy is implemented within budget in specified timeframes
- 6.3 Criteria to measure effectiveness of sales/promotional strategy is established
- 6.4 Adjustments to promotional strategy or service distribution are made as necessary to ensure required result is being obtained

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Access and interpret relevant information
- Access and update records electronically
- Access web-based information services
- Assess business performance
- Determine and confirm information using questioning and active listening techniques
- Liaise with others and share information
- Make presentations
- Manage:
 - databases
 - projects
- Market products and services
- Negotiate effectively with clients and others
- Perform calculations related to achieving required outcomes
- Plan and sequence work
- Read and interpret documentation from a variety of sources
- Record and consolidate relevant related information
- Solve problems
- Use computer applications (word processing, spreadsheet, database, specific purpose computer systems) to assist in achieving required outcomes
- Use language and concepts appropriate to cultural differences

- Use statistical/data analysis and interpretation
- Work independently and unsupervised

Required Knowledge:

- Business/organisational policy and procedure development and implementation
- Commonwealth, state/territory and local government legislative requirements relating to business operations, especially in regard to:
 - anti-discrimination
 - due diligence
 - equal employment opportunity
 - governance requirements
 - industrial relations
 - work health and safety (WHS)/occupational health and safety (OHS) and environmental issues
- How to acquire and interpret relevant data
- Industry:
 - compliance requirements
 - market position relative to type of survey and business operations
- Information technology and communications systems
- Marketing and promotional principles
- Methods of evaluating current industry/organisation product and marketing mix
- Planning processes
- Preparation of a business plan
- Principles of risk management relevant to business planning
- Relevant:
 - common law, legal systems and procedures
 - industry codes of practice
- Reasons for and benefits of, business planning
- Setting goals and objectives
- Types of business planning:
 - feasibility studies
 - strategic, operational, financial and marketing planning
- WHS/OHS requirements and safe work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- developing effective planning documents
- communicating effectively with others as required
- attention to detail when completing documentation
- ensuring behaviour reflects relevant current legislative and regulatory requirements.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where establishing a marine surveyor practice can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate establishing a marine surveyor practice
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Business plan may include:
- Business opportunities, which may be influenced by:
 - amount and types of finance available
 - expected financial viability
 - skills of operator
 - Details of ownership/management
 - Finance, expenditure statement, balance sheet and cash flow forecast, projections for the initial years of operation assumptions underlying business plan, expected level of inflation and taxation, expected trend of interest rate, capital expenditure and its timing, stock turnover, debtor collection period, creditor payment period, return on investment
 - Level of risk involved, risk assessment and management
 - Market focus of business
 - Marketing requirements
 - Need to raise finance and requirements of lenders
 - Organisation/operational arrangements
 - Proposed size and scale of business
 - Recognition of any seasonal or cyclical (time-based) elements, which are crucial to business success
 - Resources required and available
 - Sources of funding
 - Specialist services and sources of advice that may be required
 - Staffing
 - Stages in business development
- Financial plan may include:
- Analysis of sales by product/service, identifying where they were sold and to whom
 - Cash flow estimates for each forward period

- Current financial state of enterprise (or owner/operator)
 - Estimates of profit and loss projections for each forward period
 - Financial performance to date (if applicable)
 - Likely return on investment
 - Monthly, quarterly or annual returns
 - Non-recurrent asset calculations
 - Profit, turnover, capital and equity targets
 - Projected profit targets, pricing strategies, margins
 - Projections of likely financial results (budgeting)
 - Projections, which may vary depending on importance of such information and stage in life of business
 - Resources required to implement proposed marketing and production strategies (staff, materials, plant and equipment)
 - Review of financial inputs required (sources and forms of finance)
 - Risks and measures to manage or minimise risks
 - Working, fixed, debt and equity capital
- Business goals and objectives may include:
- Achievable, measurable, realistic, time defined
 - Customer needs
 - Family benefits
 - Goal and objective plans, systems and processes
 - Lifestyle issues
 - Market focus of business
 - Short, medium, or long-term goals
 - Social responsibility
- Market research data may include:
- Australian Bureau of Statistics (ABS)
 - Chambers of commerce information
 - Client surveys
 - Data about:
 - existing clients
 - possible new clients
 - Data from external sources such as other like businesses, industry associations and regulators
 - Industry reports
 - Internet
 - Libraries
 - Personal interviews
 - Primary market research
 - Secondary market research (available research by other people)
 - Small business surveys
 - Telephone surveys
 - Trade associations/journals
- Competitor
- Competitor:

- analysis may include:
- offerings
 - profile in market place
 - promotion strategies and activities
- Market position may include:
- Data on:
 - augmented product (total package of features/benefits)
 - communication
 - core product and or the goods or services provided
 - cost components
 - distribution strategies
 - market position
 - marketing channels
 - new/changed products
 - place
 - price
 - pricing objectives (profit, market penetration)
 - pricing strategies (cost plus, supply/demand, ability to pay)
 - product services or mix of services
 - product/services differentiation from competitors
 - promotion
 - promotion budget
 - promotional strategies
 - tangible product (what is perceived)
 - target audience
- Business brand may include:
- Attention, interest, desire, action (AIDA)
 - Business image
 - Practice/business logo/letterhead/signage
 - Facility decor
 - Phone answering protocol
 - Slogans
 - Style guide
 - Templates for communication/invoicing
 - Writing style
- Benefits may include:
- Benefits as perceived by client
 - Features as perceived by client
- Promotional tools may include:
- Advertising
 - Brochures
 - Direct mail
 - Networking and referrals
 - Newsletters (print and/or electronic)
 - Press releases

- Publicity and sponsorship
 - Seminars
 - Telemarketing/cold calling
 - Websites
- Applicable legislation may include:
- Consumer protection
 - Corporate governance
 - Marine insurance
 - Marine Safety (Domestic Commercial Vessel) National Law
 - National Standard for Commercial Vessels (NSCV)
 - Trade practices
 - WHS/OHS
- Yield per existing client may include:
- Packaging fees
 - Raising charge out rates/fees
 - Reducing discounts
 - Selling more services to existing clients
- Promotional package may include:
- Directing to existing or new clients
 - Client newsletters or bulletins
 - Media advertising (radio, television, newspapers, trade journals, direct marketing)
 - Product service brochures
 - Products or give-a-ways and third party services
 - Sponsorship

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying

MARN1001A Apply general purpose hand skills aboard a vessel

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to perform general purpose hand duties aboard a vessel.

Application of the Unit

This unit applies to general purpose hands working in the maritime industry on vessels up to 80 metres. They could be working independently or as part of a vessel crew.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|---------------------------------|-----|--|
| 1 Use and maintain ropes | 1.1 | <i>Rope types</i> and common areas of use are correctly identified |
| | 1.2 | Ropes are checked for wear and any damage is reported according to |

- workplace procedures
- 1.3 Ropes are coiled and stowed correctly
 - 1.4 ***Knots and hitches*** are tied neatly and securely, and are used according to their correct application
 - 1.5 Ropes are spliced neatly and securely according to their correct application and rope ends are whipped where instructed, to maintain good condition
- 2 Operate deck machinery and emergency stops**
- 2.1 Prior to use, ***deck machinery*** is checked and prepared for operation
 - 2.2 ***Operations*** are carried out safely according to instructions
 - 2.3 Emergency stops on motor and machinery are operated in response to an emergency situation
- 3 Assist in securing vessel at anchor**
- 3.1 Prior to letting go, anchor and equipment are prepared as instructed and organisational communications are followed
 - 3.2 Instructions provided are complied with in relation to quantity of anchor cable run out or recovered
 - 3.3 During operation, control of the cable is maintained within safe operating limits
 - 3.4 On completion of anchoring operations, anchor and equipment are secured according to instructions
 - 3.5 Throughout all operations, anchoring area is kept free of loose ropes, wires and debris
- 4 Assist in securing and adjusting vessel position during mooring operations**
- 4.1 At all times, ***mooring lines*** and associated equipment are handled safely
 - 4.2 Mooring plan and organisational communications are followed
 - 4.3 Throughout ***mooring operations***, mooring area is kept free of loose ropes, wires and debris
 - 4.4 Tension on ropes is maintained at an appropriate level for the stage and nature of the operation
 - 4.5 Mooring lines are secured according to instructions provided
 - 4.6 Equipment malfunction or problems encountered during operations are promptly reported
- 5 Assist in**
- 5.1 Cargo and cargo handling equipment are checked to ensure they are

securing vessel for sea		stowed securely
	5.2	Hatches and openings are checked to ensure they are secured, where necessary
	5.3	Maintenance equipment is returned to storage location and secured
	5.4	Assistance is provided in testing equipment as instructed
	5.5	All mooring lines are stowed and secured
	5.6	Assistance is provided in stowing the gangway
6 Perform tasks aloft and over vessel side	6.1	Area and equipment for working aloft or over the side are prepared as instructed
	6.2	Required precautions are taken when working aloft or over the side
	6.3	Chairs, safety harnesses and appropriate safety equipment are used according to workplace procedures
	6.4	Tasks are completed safely according to instructions and organisational safety management system
	6.5	After use, equipment is maintained and stored
7 Assist with safe refuelling operations	7.1	All personal protective equipment is accessed and used
	7.2	Safety boundary for the refuelling process is established
	7.3	Instructions are followed to ensure spill prevention systems are correctly deployed
	7.4	Instructions are followed in completing tasks related to the refuelling or fuel transfer process

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Assist in different types of mooring operations
- Handle ropes and wires
- Lash cargo
- Operate emergency stops
- Perform an eye splice, back splice and a short splice

- Perform common whipping on ropes
- Prepare deck machinery for use
- Secure equipment and objects for sea passage, transit in port or ready for use
- Tie common knots, bends and hitches
- Undertake refuelling operations safely
- Use capstans
- Use cranes and derricks
- Use different anchoring and mooring winches
- Use synthetic rope and wire mooring lines

Required Knowledge:

- Anchor cable markings
- Characteristics of different types of mooring ropes
- Construction of different types of rope
- Correct application of common knots, bends and hitches
- Different configurations of mooring lines for various parts of a vessel
- Different types of anchor
- Emergency stop procedures
- Hazards that could occur if the operation is not properly controlled
- Maintenance of different types of rope
- Means of access
- Organisational:
 - safety management system
 - standard operating procedures
- Procedures for working in confined spaces
- Refuelling procedures
- Requirements for access equipment
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to, and satisfy all of, the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- anchoring in varying weather conditions
- following all instructions carefully
- working safely at all times.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where general purpose hand skills can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate performing general purpose hand skills
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to

the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Rope types may include:
- Braided
 - Kevlar
 - Natural fibre
 - Polyester
 - Plaited
 - Wire core rope
 - Wire rope
- Knots and hitches must include:
- Bowline
 - Clove hitch
 - Eye splice
 - Reef knot
 - Round turn and two half hitches
 - Rolling hitch
 - Short splice
- Deck machinery may include:
- Capstans
 - Cranes
 - Derricks
 - Winches
 - Windlasses
- Operations must include:
- Anchoring in varying weather conditions
 - Berthing and unberthing
 - Loading or discharging
- Mooring lines may include:
- Back springs
 - Bow and stern ropes
 - Breast lines
 - Fore and aft springs
- Mooring operations may include:
- Adjustments from both fore and aft mooring positions
 - Making fast and letting go to a single-point mooring
 - Making fast and letting go fore and aft to a wharf
 - Rigging and recovering means of access to the vessel
- Tasks may include:
- Hull maintenance

- Painting
- Renewing wires and ropes

Unit Sector(s)

Not applicable.

Competency Field

Seamanship

MARN2001A Apply seamanship skills aboard a vessel up to 12 metres

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to apply practical seamanship skills and techniques as part of work duties aboard a vessel up to 12 metres.

Application of the Unit

This unit applies to Coxswain Grade 1 and Coxswain Grade 2 working in the maritime industry on vessels up to 12 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Use and** 1.1 *Rope types* and common areas of use are correctly identified

- maintain ropes**
- 1.2 Ropes are checked for wear and repairs are undertaken according to manufacturer guidelines
 - 1.3 Ropes are coiled and stowed correctly
 - 1.4 ***Knots and hitches*** are tied neatly and securely, and are used according to their correct application
 - 1.5 Ropes are spliced neatly and securely according to their correct application
 - 1.6 Rope ends are whipped where appropriate to maintain good condition
- 2 Secure vessel at anchor**
- 2.1 Prior to letting go, ***anchor and equipment*** are prepared
 - 2.2 Quantity of anchor cable run out or recovered is appropriate to the depth of water, weather and sea conditions, and tidal range in area of operation
 - 2.3 During operation, control of the cable is maintained within safe operating limits
 - 2.4 Degree to which anchor and equipment are secured on completion of anchoring operations is appropriate to forecast conditions
 - 2.5 During all operations, anchoring area is kept free of loose ropes, wires and debris
- 3 Secure vessel at a berth**
- 3.1 At all times, ***mooring lines*** and associated equipment are handled safely
 - 3.2 Throughout operations, mooring area is kept free of loose ropes, wires and debris
 - 3.3 Tension on ropes is maintained at an appropriate level for the stage and nature of the operation
- 4 Check condition and seaworthiness of vessel**
- 4.1 ***Coverage*** and frequency of checks and inspections on vessel seaworthiness are undertaken according to workplace procedures and organisational safety management system
 - 4.2 Watertight integrity is checked and appropriate action is taken to prepare for prevailing and forecast weather and sea conditions
 - 4.3 Degree to which vessel is ***secured*** is appropriate to prevailing and forecast conditions
 - 4.4 ***Irregularities*** are identified and appropriate action is taken to rectify the situation

- 4.5 Irregularities beyond ability to rectify are reported in time to enable remedial action to be taken
 - 4.6 Reports of condition are completed according to workplace procedures
- 5 Conduct refuelling operations**
- 5.1 All personal protective equipment is accessed and used
 - 5.2 Safety boundary for the refuelling process is established
 - 5.3 Spill prevention systems are correctly deployed
 - 5.4 Refuelling operations are performed safely and according to organisational safety management system

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Check seaworthiness and general condition of a vessel up to 12 metres
- Coil and stow ropes
- Handle ropes
- Identify deterioration and causes in hull and fittings
- Perform an eye splice and a short splice
- Perform common whipping on ropes
- Perform letting go and weighing anchor
- Prepare and throw a heaving line
- Refuel a vessel according to safety regulations and the organisational safety management system requirements
- Secure a vessel alongside using vessel mooring lines
- Tie reef-knot, bowline, clove hitch, round turn and two half hitches, rolling hitch
- Use a sea anchor as emergency steering

Required Knowledge:

- Basic structural parts of a small vessel
- Considerations to make when selecting an anchorage
- Correct application of common knots and hitches
- How to make a vessel watertight

- Maintenance of synthetic and natural fibre ropes
- Mooring line arrangements for securing at a berth
- Principles of maintaining watertight integrity
- Procedure for anchoring
- Procedure for deploying a sea-anchor
- Types of anchors used on small vessels up to 12 metres
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to, and satisfy all of, the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- being aware of own ability and limits to rectify irregularities and faults
- providing the required amount of detail in reports.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where the application of seamanship skills aboard an appropriate vessel up to 12 metres can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate performing seamanship skills
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Rope types may include:

- Braided
- Kevlar
- Natural fibre
- Plaited
- Polyester
- Wire core rope
- Wire rope

Knots and hitches may include:

- Bowline
- Clove hitch
- Eye splice
- Reef knot
- Rolling hitch
- Round turn and two half hitches
- Short splice

- Anchor and equipment may include:
- Anchor buoy
 - Anchor securing arrangements
 - Sea anchor
 - Single anchor
 - Twin anchor
 - Windlass
- Mooring lines may include:
- Back springs
 - Bow and stern ropes
 - Breast lines
 - Fore and aft springs
- Coverage may include
- Accommodation spaces
 - Engine room
 - Galley
 - Personal facilities
 - Storage spaces
 - Wheelhouse
- Secured may include:
- Accommodation and storage spaces
 - Anchors
 - Galley, stores and equipment
 - Materials on deck and below
 - Large objects likely to move in a sea way
 - Openings
- Irregularities may include:
- Affecting the safety and integrity of:
 - crew
 - equipment
 - materials, such as cargo
 - vessel

Unit Sector(s)

Not applicable.

Competency Field

Seamanship

MARN3001A Perform seamanship operations on board a vessel up to 24 metres

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to apply practical seamanship skills and techniques as part of operations on board a vessel up to 24 metres.

Application of the Unit

This unit applies to a Master working in the maritime industry on vessels up to 24 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|---------------------------------|---|
| 1 Use and maintain ropes | 1.1 <i>Knots, hitches and bends</i> using rope are correctly made and used in the course of operations on board a vessel |
|---------------------------------|---|

- and wires**
- 1.2 Ropes are spliced neatly and securely according to their correct application and rope ends are whipped where appropriate to maintain good condition
 - 1.3 Breaking strain and safe working loads of rope and wire is determined and applied as load limits in the course of operations on board a vessel
 - 1.4 Wear and damage to rope and wire is recognised
 - 1.5 Rope and wire is maintained and stored according to organisational procedures
- 2 Operate lifting gear**
- 2.1 *Lifting gear* is checked and prepared for operation prior to use
 - 2.2 Defective lifting gear is isolated and reported according to organisational procedures
 - 2.3 Loads are correctly attached using appropriate slings and rigging gear according to organisational procedures and safety requirements
 - 2.4 Maximum and safe working load limits are determined and not exceeded
 - 2.5 Lifting gear is safely operated to carry out operations
- 3 Secure vessel at anchor**
- 3.1 Prior to letting go, *anchor and equipment* are prepared and crew is briefed
 - 3.2 Quantity of anchor cable run out or recovered is appropriate to depth of water, weather and sea conditions, and tidal range in area of operation
 - 3.3 Control of the cable is maintained within safe operating limits during anchoring operations
 - 3.4 Degree to which anchor and equipment is secured on completion of anchoring operations is appropriate to forecast conditions
 - 3.5 Anchoring area is kept free of loose ropes, wires and debris during all operations
- 4 Secure vessel at a berth**
- 4.1 At all times, mooring lines and associated equipment are handled safely
 - 4.2 Throughout operations, mooring area is kept free of loose ropes, wires and debris
 - 4.3 Tension on ropes is maintained at an appropriate level for the stage

- and nature of the operation
- 4.4 Tension on shore-power leads and other umbilicals are monitored
- 5 Check condition and seaworthiness of vessel**
- 5.1 **Coverage** and frequency of checks and inspections on vessel seaworthiness are undertaken according to organisational procedures
- 5.2 Watertight integrity is checked and appropriate action is taken to prepare for prevailing and forecast weather and sea conditions according to vessel seaworthiness plans and regulatory requirements
- 5.3 Degree to which vessel is **secured** is appropriate to prevailing and forecast conditions
- 5.4 **Irregularities** are identified and appropriate action is taken to rectify the situation
- 5.5 Irregularities beyond ability to rectify are reported in time to enable remedial action to be taken
- 5.6 Reports of vessel condition are completed according to organisational procedures
- 6 Check stability of vessel**
- 6.1 **Information** from vessel stability data book is used to determine loading limits and displacement from draft
- 6.2 **Stability conditions** for proposed nature of voyage and operations are confirmed and meet required stress and stability criteria
- 7 Perform tasks aloft and over vessel side**
- 7.1 Area and equipment for working aloft or over the side are prepared according to organisational procedures
- 7.2 Required precautions are taken when working aloft or over the side
- 7.3 Chairs, safety harnesses and appropriate safety equipment are used according to organisational procedures
- 7.4 Portable ladders are used correctly to perform tasks
- 7.5 **Tasks** are completed safely according to instructions
- 7.6 Equipment is inspected, maintained and stored after use according to organisational procedures
- 8 Lash and secure stores, cargo and access ways**
- 8.1 Lashing equipment is inspected, maintained and correctly stored after use according to organisational procedures
- 8.2 Cargo is stowed according to recognised principles and organisational procedures relating to transport and handling of dangerous goods

- 8.3 Cargo is lashed and secured according to recognised principles and organisational procedures
 - 8.4 Equipment and items on deck and in galley spaces are secured according to organisational procedures
 - 8.5 Personnel access ways are rigged and secured according to organisational procedures
 - 8.6 Accommodation spaces and personnel facilities on board vessel are checked and correctly secured for sea according to organisational procedures
- 9 Supervise refuelling operations**
- 9.1 All personal protective equipment is accessed and used
 - 9.2 Amount of fuel required is calculated
 - 9.3 Instructions are provided to ensure safety boundary for refuelling process is established
 - 9.4 Spill prevention systems are correctly deployed
 - 9.5 Instructions are provided to ensure refuelling operations are performed safely
 - 9.6 Notification of intention to refuel is made to authorities and other nearby operations

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Anchor vessel according to depth and prevailing winds
- Check seaworthiness of vessel
- Complete basic stability calculations
- Correctly coil and stow ropes
- Correctly sling loads ready for lifting
- Correctly interpret vessels stability data
- Ensure watertight integrity of vessel
- Inspect and maintain harnesses, safety lines and other equipment for working aloft
- Perform an eye splice and a short splice
- Perform appropriate whippings on ropes and line

- Prepare and throw a heavy line
- Recognise damaged or worn ropes, wires and chains
- Recognise routine problems during lifting and rigging operations
- Refuel vessel with due regard to regulations and organisational procedures
- Safely handle ropes and wires
- Safely operate winches and windlasses
- Safely work aloft or over the side
- Secure vessel at its berth according to operational requirements and prevailing conditions
- Select and use appropriate rigging and lifting gear
- Tie figure-eight knot, reef knot, bowline and cod-end knot
- Tie half hitch, clove hitch, round turn and two half hitches, rolling hitch and timber hitch
- Use knots, hitches and securing arrangements

Required Knowledge:

- Anchoring principles and methods for different conditions
- Basic structural parts of a small vessel
- Communication techniques when operating lifting gear
- Construction of vessel sufficient to understand which areas need to be made watertight
- Correct application of common knots and hitches
- Correct use and maintenance of equipment used for working aloft and over the side
- Dangers of working with ropes under tension
- Different types of anchors and where they can be most effectively used
- How to determine breaking strain and safe working load for ropes and equipment
- How to make vessel watertight
- Maintenance of different types of rope, wire and chain
- Methods of securing cargo including vehicles, stores and equipment on vessel before it puts to sea
- Pollution regulations
- Precautions to take when working aloft or overside
- Principles and limitations of lifting equipment and components
- Principles of safe handling and transport of dangerous cargo
- Procedures for checking and operating lifting equipment
- Regulations affecting watertight integrity
- Routine and emergency operation of anchors
- Use of sea anchors
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- being aware of own ability and limits to rectify irregularities
- providing the required amount of detail in reports.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where performing seamanship skills aboard a vessel up to 24 metres can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate performing seamanship skills
- direct observation of the candidate applying relevant

WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Knots, hitches and bends must include:

- Bowline
- Clove hitch
- Cod-end knot
- Figure-eight knot
- Half hitch
- Reef knot
- Rolling hitch
- Round turn and two half hitches
- Sheet bend
- Timber hitch

Lifting gear may include:

- Blocks (including chain blocks and power blocks)
- Cargo handling wires, ropes and chains
- Derricks and cranes
- Drum ends and capstans
- Eye bolts
- Hooks
- Ropes, slings and strops
- Shackles
- Swivels

Anchor and equipment may include:

- Anchor buoy
- Anchor securing arrangements
- Anchor windlass
- Sea anchor
- Single anchor
- Twin anchor

- Coverage may include:
- Accommodation spaces
 - Bow doors (barges)
 - Engine room
 - Galley
 - Storage spaces including freezer rooms
 - Wheelhouse
- Secured may include:
- Accommodation and storage spaces
 - Air pipes
 - Anchors
 - Doors
 - Galley, stores and equipment
 - Hatches
 - Large objects likely to move in a sea way
 - Materials on deck and below
 - Openings
 - Skylights
 - Tanks
- Irregularities must include:
- Affecting the safety and integrity of the:
 - vessel
 - crew and passengers
 - equipment
 - materials, such as cargo
- Information must include:
- Basic principles of stability
 - Impact of design and hull
 - Terms and definitions
- Stability conditions must include:
- Adding and removing weights
 - Additions or alterations to original configuration
 - Effects of slack tanks
 - Effects of water on deck
 - Hauling netting using power block
 - Roll period
 - Snagged trawl (hookup)
 - Stiff and tender vessel
 - Transferring weights using a crane or other lifting device
- Tasks may include:
- Using portable ladders to access heights up to 1.8 metres
 - Working at heights more than 1.8 metres

Unit Sector(s)

Not applicable.

Competency Field

Seamanship

MARN3002A Use seamanship skills on board a vessel

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to apply practical seamanship skills as part of operations on board a vessel.

Application of the Unit

This unit applies to an Integrated Rating to assist the responsible officer in a range of seamanship activities as required on a range of vessels.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|---------------------------------|---|
| 1 Use and maintain ropes | 1.1 <i>Knots, splices, stoppers, whippings and servings</i> are created and used in the course of operations on board a vessel |
|---------------------------------|---|

- and wires**
- 1.2 Ropes are spliced neatly and securely according to their correct application and rope ends are whipped where appropriate to maintain good condition
 - 1.3 Breaking strain and safe working loads of rope and wire is determined and applied as load limits in the course of operations on board a vessel
 - 1.4 Wear and damage to rope and wire is recognised
 - 1.5 Rope and wire is maintained and stored according to organisational procedures
- 2 Secure vessel at anchor**
- 2.1 ***Anchor and equipment*** is prepared for use according to instructions
 - 2.2 Control of the cable is maintained within safe operating limits during anchoring operations
 - 2.3 Anchor and equipment are secured on completion of anchoring operations as instructed for the anticipated forecast conditions
 - 2.4 Anchoring area is kept free of loose ropes, wires and debris during all operations
- 3 Secure vessel at a berth**
- 3.1 ***Mooring lines and associated equipment*** are handled safely at all times
 - 3.2 Mooring area is kept free of loose ropes, wires and debris throughout operations
 - 3.3 Rope stoppers are correctly applied to transfer mooring lines when securing the vessel or tug
 - 3.4 Securing a tug using tug or ships lines is carried out safely and tug lines are monitored at all times
 - 3.5 Tension on ropes is maintained at an appropriate level for the stage and nature of the operation
 - 3.6 Tension on shore-power leads and other umbilicals is monitored
- 4 Lash and secure stores, cargo and access ways**
- 4.1 ***Lashing equipment*** is inspected, maintained and correctly stored after use according to organisational procedures
 - 4.2 Cargo is stowed according to recognised principles and organisational procedures relating to the transport and handling of dangerous goods
 - 4.3 Cargo is lashed and secured according to recognised principles and organisational procedures

- 4.4 Equipment and items on deck and in galley spaces are secured according to organisational procedures
- 4.5 Personnel access ways are rigged and secured according to organisational procedures
- 4.6 Accommodation spaces and personnel facilities on board vessel are checked and correctly secured for sea according to organisational procedures
- 5 Rig and unrig safely**
 - 5.1 Bosun's chairs and staging are rigged and unrigged, and safety for use is ensured
 - 5.2 Pilot ladders and hoists are rigged and safety for use is ensured
 - 5.3 Gangways and other access ways are rigged
 - 5.4 *Deck equipment* is rigged and unrigged
- 6 Conduct fuelling and oil transfer operations**
 - 6.1 All personal protective equipment is accessed and used
 - 6.2 Safety boundary for the fuelling and transferring operations is established
 - 6.3 Spill prevention systems are correctly deployed
 - 6.4 Tank levels are correctly measured and reported pre and post fuelling and transferring operations
 - 6.5 Fuelling and transferring operations are performed safely, and associated valves and pipelines are secured on completion to avoid spillages
 - 6.6 Appropriate action is taken to handle incidents arising during fuelling and transferring operations according to organisational procedures and regulatory requirements
 - 6.7 Effective communication is maintained with crew during fuelling and transferring operations to ensure the safety and integrity of the vessel and crew

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Correctly coil and stow ropes
- Correctly measure and report tank levels
- Operate anchoring equipment under various conditions such as anchoring, weighing anchor, securing for sea and in emergencies
- Perform:
 - eye splice and a short splice
 - appropriate whippings on ropes and line
- Prepare and throw a heaving line
- Rig and unrig bosun's chairs, staging and pilot ladders
- Safely handle ropes and wires
- Secure a vessel at its berth according to operational requirements
- Secure from fuelling and transferring operations
- Tie a:
 - figure-eight knot, reef knot, bowline and cod-end knot
 - half hitch, clove hitch, round turn and two half hitches, rolling hitch and timber hitch
- Use knots and hitches and securing arrangements

Required Knowledge:

- Anchoring principles and methods for different conditions
- Capacities, safe working loads and breaking strengths of mooring equipment
- Correct application of common knots and hitches
- Dangers of working with ropes under tension
- Different types of anchors and where they can be most effectively used
- Function of mooring and tug lines and how each line functions as part of an overall system
- Maintenance of different types of rope, wire and chain
- Methods of securing cargo including vehicles, stores and equipment on a vessel before it puts to sea
- Preparations for fuelling and transfer operations
- Principles of safe handling and transport of dangerous cargo
- Procedures and events for the use of anchors in various operations
- Procedures and order of events for making fast and letting go mooring, tug lines and wires
- Procedures for connecting and disconnecting fuelling and transfer hoses
- Procedures relating to incidents that may arise during fuelling and transferring operations
- Procedures relating to the rigging and unrigging of:
 - bosun's chairs and staging
 - pilot ladders, hoists, rat-guards and gangways

- Routine and emergency operation of anchors
- Use of sea anchors
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- lashing and securing moveable equipment, especially on deck, in holds and freezers
- anchoring a vessel in varying weather conditions
- rigging a sea anchor to control a specified rate and direction of drift and/or angle to sea
- ensuring currency of relevant legislative and regulatory knowledge.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where applying seamanship skills aboard a vessel can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate performing seamanship skills
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Knots, splices, stoppers, whippings and servings must include:

- Bowline
- Clove hitch
- Cod-end knot
- Figure-eight knot
- Half hitch
- Reef knot
- Rolling hitch
- Round turn and two half hitches
- Sheet bend
- Timber hitch

Anchor and equipment may include:

- Anchors and cables
- Anchor buoy
- Anchor securing arrangements
- Anchor windlass
- Sea anchor

Mooring lines and associated equipment must

- Bitts
- Bollards

include:

- Capstan
- Chocks
- Mooring wires
- Synthetic and fibre lines
- Tug lines and wires
- Winches
- Windlass

Lashing equipment may include:

- Chains
- Ropes
- Tensioning device
- Webbing
- Wires

Deck equipment must include:

- Bow and stern cargo doors
- Gangways
- Hatch covers
- Hoists
- Pilot ladders
- Rat-guards
- Side doors

Incidents may include:

- Failure of communications systems
- Leakage from faulty valves and hoses
- Tank overflow

Unit Sector(s)

Not applicable.

Competency Field

Seamanship

MARN4001A Manage seaworthiness of a vessel up to 80 metres

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMB607B Monitor condition and seaworthiness of a coastal vessel up to 80 metres.

Unit Descriptor

This unit involves the skills and knowledge required to manage vessel in a seaworthy condition for all stages of a voyage or operation being undertaken.

Application of the Unit

This unit applies to those working in the capacity of Master on a range of vessels up to 80 metres.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|---|--|
| 1 Supervise weather tight and watertight integrity of vessel | <ul style="list-style-type: none">1.1 Principal <i>structural components</i> of vessel are identified from vessel drawings to understand the function of these components in relation to conventional vessel design1.2 Pumping and pipeline systems of vessel are investigated to establish survivability of vessel in case of flooding and mage control1.3 Procedures for maintaining weather tight and watertight integrity of vessel are interpreted and implemented according to vessel safety management plan and regulations1.4 Crew are instructed on requirements of plan and their responsibilities1.5 <i>Actions</i> are instigated to confirm weather tight and watertight integrity of vessel at all times |
| 2 Take action to meet changed sea and weather conditions | <ul style="list-style-type: none">2.1 Weather forecasts and observations of sea and weather conditions are used to predict situations that may jeopardise vessel weather tight and watertight integrity2.2 Effect of severe wind and rolling in associated sea conditions on vessel weather tight and watertight integrity is recognised2.3 Effect of water on deck on vessel weather tight and watertight integrity is ascertained2.4 Appropriate action is taken to maintain vessel weather tight and watertight integrity according to organisational procedures |
| 3 Maintain records | <ul style="list-style-type: none">3.1 <i>Relevant documents and records</i> are completed and maintained as required according to regulatory and organisational requirements3.2 Relevant documents are sent to appropriate bodies and copies are filed according to regulatory and organisational requirements3.3 Documents are stored according to regulatory and organisational requirements |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Appropriately use bilge and other pumping arrangements

- Assess damage control measures
- Complete required records
- Maintain weather tight and watertight integrity of vessel
- Read and interpret vessel specifications, drawings and operational manuals

Required Knowledge:

- Bilge pumping arrangements
- Different vessel types
- Effects of adding and removing weights, water on deck, slack tanks, rolling period, stiff and tender vessel, additions or alterations to vessels
- Principal parts of vessel and their various functions
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- attention to appropriate level of detail in recordkeeping
- attention to detail when completing documentation.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where managing seaworthiness of a vessel up to 80 metres can be demonstrated
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the

workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing seaworthiness of a vessel up to 80 metres
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Structural components must include:

- Design characteristics attributing to watertight integrity
- Principal components of vessel structure
- Structural arrangements to restrain fires
- Watertight and collision bulkheads

Actions may include:

- Closing openings
- Ensuring passenger distribution does not exceed allowed limits.
- Ensuring stores, cargo and equipment are properly stowed and lashed
- Establishing procedures for restoring or managing weather

- Relevant documents and records may include:
- tight and watertight integrity during an emergency
 - Maintaining stability condition within approved limits
 - Methods for testing tanks and other watertight openings
 - Deck and official log book entries
 - Notes of protest
 - Safety management plan

Unit Sector(s)

Not applicable.

Competency Field

Seamanship

MARN5001A Maintain seaworthiness of a vessel

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMB4607A Apply information on vessel structure to maintenance and seaworthiness.

Unit Descriptor

This unit involves the skills and knowledge required to maintain the seaworthiness of a vessel.

Application of the Unit

This unit has application for a Watchkeeper Deck and Master < 500 GT.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|----------------------------------|---|
| 1 Check weather tight and | 1.1 <i>Structural members of vessel</i> are investigated to establish weather tight and watertight requirements of vessel |
|----------------------------------|---|

- watertight integrity of vessel**
- 1.2 *Inspections of vessel* are planned according to regulatory and organisational requirements
 - 1.3 Checks are completed to confirm weather tight and watertight integrity of vessel at all times
 - 1.4 *Defects and damage* to vessel are identified and reported according to organisational procedures
- 2 Take action to meet environmental changes**
- 2.1 Anticipated sea and weather conditions are analysed to identify *situations that may jeopardise vessel weather tight and watertight integrity*
 - 2.2 Effect of severe wind and rolling in associated sea conditions on vessel weather tight and watertight integrity is recognised
 - 2.3 Effect of water on deck on vessel weather tight and watertight integrity is ascertained
 - 2.4 *Appropriate action* is taken to maintain vessel weather tight and watertight integrity according to organisational procedures
- 3 Maintain records**
- 3.1 *Relevant documents and records* are completed and maintained as required according to regulatory and organisational requirements
 - 3.2 Relevant documents are sent to appropriate bodies and copies are filed according to regulatory and organisational requirements
 - 3.3 Documents are stored according to regulatory and organisational requirements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Complete required records
- Read and interpret vessel specifications and drawings
- Take actions to ensure and maintain the weather tight and watertight integrity of vessel

Required Knowledge:

- Application of appropriate safety, environment and hazard control procedures
- Characteristics of stress and the principal stresses acting on a vessel

- Corrosion control methods
- Damage control measures that may be required to maintain the integrity of the hull
- Fundamental actions to be taken in the event of partial loss of intact buoyancy
- Fundamentals of watertight integrity
- Maintenance procedures contained in the safety management system
- Principal materials used in the construction of a vessel
- Principal structured members and layout of a vessel and the proper names for various parts
- Principles and procedures to ensure the watertight integrity of vessel hull
- Procedures for checking and inspecting vessel seaworthiness
- Stability, trim and stress tables, diagrams and stress calculating equipment
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- attention to appropriate level of detail in recordkeeping
- awareness of one's surroundings and changes to these surroundings.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where maintaining seaworthiness of a vessel can be conducted
- marine operations site where assessment of damage control measures may be demonstrated
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other

- simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate maintaining seaworthiness of a vessel
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Structural members of vessel may include:

- Bulkheads including the collision bulkhead
- Frames
- Freeboard deck
- Hatch and tank openings
- Longitudinal and transverse girders
- Shell plating
- Tank tops
- Various types of keel arrangements

- Inspections of vessel may include:
- Watertight and weather tight compartments
 - Inspection of hull and fittings during dry-docking
 - Inspections required after completion of maintenance work
 - Inspections required after docking prior to refloating
 - Inspections to be made after any situation which may have caused damage to the vessel
 - Pre sailing inspections
 - Routine inspections
- Defects and damage may include:
- Corrosion to operating or structural parts of the vessel
 - Damage to the vessel through cargo shift
 - Hatch cover seals
 - Structural damage through collision, grounding or fire
 - Watertight door seals and closing arrangements
- Situations that may jeopardise vessel weather tight and watertight integrity may include:
- Collision, grounding or fire
 - Failure to conduct appropriate inspections
 - Heavy weather damage
- Appropriate actions may include:
- Avoiding adverse weather
 - Checking the security of the vessel
 - Closing openings
 - Ensuring appropriate equipment is in readiness for damage control
 - Ensuring free surface is minimised in ballast and fuel tanks
 - Ensuring freeing ports allow water taken on deck to clear
 - Ensuring passenger distribution does not exceed allowed limits
 - Ensuring stores, cargo and equipment are properly stowed and lashed
 - Establishing procedures for restoring or managing weather tight and watertight integrity during an emergency
 - Maintaining the stability condition within approved limits
 - Testing of tanks and other watertight areas
- Relevant documents and records may include:
- Equipment manufacturer instructions
 - Log books, including oil record and garbage log books as applicable

- Organisational operation orders under the ISM Code
- Plans and drawings
- Relevant maritime regulations and legislative requirements
- Stability data manual

Unit Sector(s)

Not applicable.

Competency Field

Seamanship

MARN6001A Manage cargo operations

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to plan and ensure safe loading, stowage, securing and care during the voyage and unloading of cargo.

Application of the Unit

This unit applies to maritime workers working in the maritime industry as a Master Unlimited.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|-----------------------------|--|
| 1 Develop cargo plan | 1.1 <i>Cargo</i> to be loaded is identified and its characteristics and dimensions are established |
|-----------------------------|--|

- 1.2 Communication is conducted with terminal personnel to establish loading and unloading arrangements
 - 1.3 **Information and equipment** is used in planning to ensure hull stress is kept within acceptable limits
 - 1.4 **Cargo plan** is prepared according to legislative and organisational requirements
- 2 Oversee cargo operations**
- 2.1 **Preparations for loading** are monitored according to the stowage plan and organisational procedures
 - 2.2 Regulations, procedures and instructions are interpreted to ensure that cargo is correctly identified, inspected and confirmed against documentation
 - 2.3 Communication is maintained with crew and terminal personnel involved in cargo loading/unloading to facilitate loading/unloading
 - 2.4 Cargo operations are managed to ensure they comply with regulations, procedures and instructions
 - 2.5 Vessel stability is monitored during loading/unloading operations
 - 2.6 Ballast management procedures are carried out according to organisational procedures and port authority requirements
 - 2.7 Action is taken in the event of a **cargo handling incident or emergency** to secure the cargo and the vessel and to maintain the safety of persons involved
 - 2.8 All **cargo handling documentation** is completed in accordance with organisational procedures and regulatory requirements
- 3 Comply with legislation for dangerous cargo**
- 3.1 Regulations, procedures and instructions are interpreted to ensure that dangerous cargo is correctly identified, inspected and confirmed against documentation, prior to cargo operations
 - 3.2 Information regarding the dangerous cargo is made readily available in the event of an incident
 - 3.3 Cargo operations are managed to ensure they comply with regulations, operational and security procedures and cargo plan
 - 3.4 Hazards associated with dangerous cargo are identified and action is taken to minimise risk to personnel, cargo, vessel and the environment
 - 3.5 Action is taken in the event of a dangerous cargo handling incident or emergency to secure the cargo and the vessel and to maintain the

- safety of persons involved
- 3.6 All documentation is completed according to organisational procedures and regulatory requirements
- 4 Manage the care of cargo during the voyage**
- 4.1 Plan for the care of cargo during the voyage is prepared according to organisational and customer requirements, and relevant regulations
- 4.2 *Cargo care operations* are managed to ensure they comply with regulations, procedures and instructions
- 4.3 Cargo stowage and security is managed to ensure stability and stress conditions remain within safe limits at all times during the voyage
- 4.4 Extent and frequency of cargo condition monitoring is determined appropriate to its nature and prevailing conditions
- 4.5 Hazards associated with cargo stowage are identified and action is taken to minimise risk to personnel, cargo, vessel and the environment
- 4.6 Unacceptable or unforeseen variations in the condition or specification of the cargo is promptly recognised and remedial action is taken immediately to safeguard the safety of the vessel and those on board
- 4.7 All documentation is completed according to organisational procedures and regulatory requirements
- 5 Manage emergencies related to cargo**
- 5.1 *Initial actions* taken on becoming aware of emergency are according to contingency plans and are appropriate to the urgency of the situation and the nature of the emergency
- 5.2 Onboard personnel are given information and instructions clearly and accurately
- 5.3 Procedures are implemented to combat emergency and protect persons on board
- 5.4 Communications are established with *others* to facilitate the emergency response process
- 5.5 Injured persons are provided with assistance
- 5.6 Contact is maintained with others at all times to keep them briefed on the emergency response process
- 5.7 Preparation for abandoning vessel is undertaken, if required
- 5.8 Cessation of emergency is communicated to appropriate personnel

- 6 Complete documentation related to cargo**
- 6.1 Correct log book entries are made relating to cargo operations and incidents according to regulatory requirements and organisational procedures
 - 6.2 Letter of protest is completed in the event of an incident relating to cargo operations and care
 - 6.3 Cargo reports and documentation are completed and maintained according to regulatory requirements and organisational procedures
 - 6.4 Independent cargo surveyor reports, where applicable, are received and acknowledged
 - 6.5 Cargo samples, where provided, are correctly documented and secured

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply international regulations, codes and standards concerning the safe handling, stowage, securing and transport of cargo
- Conduct loading and unloading operations to ensure vessel stability, trim and stress limitations are not exceeded at any time
- Conduct and record tests and inspections of cargo handling equipment according to regulations and organisational procedures
- Correctly read and interpret drafts
- Establish procedures for safe cargo handling according to provisions of the relevant instruments such as IMDG Code, IMSBC Code, MARPOL 73/78 Annexes III and V and other relevant information
- Explain the basic principles for establishing effective communications and improving working relationships between vessel and terminal personnel
- Stow and secure cargo on board vessels
- Use all available shipboard data related to loading, care and unloading of bulk cargo
- Use draft survey methods to determine vessel displacement
- Use stability and trim diagrams, and stress-calculating equipment to keep hull stress and stability within acceptable limits at all times

Required Knowledge:

- Application of ventilation requirements for various cargo
- Confined space entry procedures
- Dangerous goods classification, signage, stowage and segregation requirements under the IMDG Code and relevant Marine Orders
- Effect on trim and stability of cargo and cargo operations
- IMDG Code, IMSBC Code, MARPOL 73/78 Annexes III and V and other relevant information including AMSA Marine Orders and Notices relating to cargo carriage, loading and unloading
- International regulations, codes and standards concerning the safe handling, stowage, securing and transport of cargo
- Loading and unloading operations with special regard to the transport of cargo identified in the Code of Safe Practice for Cargo Stowage and Securing
- Loading cargo and ballasting to keep hull stress within acceptable limits
- Maintenance of survey certification required for cargo handling equipment
- Stowage and securing of cargo on board vessels including cargo-handling gear, and securing and lashing equipment
- World load line zones and associated draft limitations
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- ensuring currency of relevant regulatory and legislative knowledge
- developing effective planning documents
- providing high quality reports.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where managing cargo operations can be conducted

- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate managing cargo operations
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Cargo may include:

- Explosives
- General cargo, break bulk, unitised or in containers
- Hazardous or dangerous goods

Information and equipment may include:

- Heavy lifts
- Liquids in portable containers
- Livestock
- Mineral concentrates
- Refrigerated cargo
- Scrap, pig iron ingots, steel coils and sheets
- Solid bulk materials
- Timber
- Automatic data-based (ADB) equipment
- Bulk Cargo Codes
- Calculations relating to drafts, deadweight, stability, trim and stress
- Cargo and lashing codes
- IMDG Code
- Knowledge of ballasting and deballasting procedures
- Relevant AMSA Marine Orders
- Requirements for loading and care of various cargo types
- Requirements for the carriage of grain and timber cargo
- Shipboard data including drawings, load limitations, safe working loads
- Stability and trim diagrams
- Stress-calculating equipment

Cargo plan must include:

- Allocating cargo containers requiring refrigeration appropriate spaces
- Avoiding incompatible cargo stowage
- Calculations relating to stability and stress
- Ensuring cargo is evenly distributed to maintain acceptable trim at all phases of the voyage
- Ensuring the unloading sequence is effective
- Observing regulations relating to hazardous material/dangerous goods stowage

Preparations for loading may include:

- Checking hatch covers for water tightness
- Checking holds to ensure they are clean, dry and free of smell
- Covering bilges with tarpaulins/wrappers before loading if required
- Ensuring survey certification for all cargo handling equipment is valid and cargo record book is available for inspection
- Following confined space entry procedures where necessary
- Inspecting access arrangements in holds to ensure they are in a safe condition

- Cargo handling incidents or emergencies may include:
- Reviewing supplies of dunnage, mats and cargo securing equipment to ensure sufficient are available
 - Cargo shift
 - Damaged cargo
 - Damaged dangerous goods and escaping cargo or fumes
 - Failure of cargo handling equipment, including lashings
 - Failure of refrigeration machinery
 - Fire in cargo spaces
 - Incorrect ventilation
 - Incorrectly stowed cargo
 - Spontaneous combustion
- Cargo handling documentation may include:
- Cargo Gear Register
 - Cargo plan
 - Letter of protest
 - Log book
 - Ship/shore safety and security checklists
 - Stability, trim and stress records
- Cargo care operations may include:
- Checking cargo lashings
 - Maintaining ventilation requirements
 - Monitoring cargo temperatures liable to spontaneous combustion
 - Monitoring refrigerated cargo temperatures
- Initial actions may include:
- Contact with relevant authorities and organisational personnel
 - Locating fire as a result of fire or smoke or fire alarms
 - Positioning vessel to minimise effects of weather and sea conditions
 - Securing cargo when safe to do so
- Others may include:
- Harbour Master
 - Organisational personnel
 - Other vessels
 - Relevant maritime safety authorities

Unit Sector(s)

Not applicable.

Competency Field

Not applicable.

MARO1001A Perform basic lookout duties

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to contribute to a safe lookout on a vessel up to 80 metres under instructions from the Master.

Application of the Unit

This unit applies to general purpose hands working in the maritime industry on vessels up to 80 metres. They could be working independently or as part a vessel crew.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | |
|---------------------------------|--|
| 1 Follow instructions to | 1.1 <i>Scheduled checks and inspections</i> are conducted to comply with instructions |
|---------------------------------|--|

monitor vessel situation when moored or anchored	1.2	Appropriate action is taken in the event of <i>irregularities or abnormal conditions</i> to maximise the safety and integrity of the vessel
	1.3	Restrictions on access to the vessel by visitors are followed according to instructions
	1.4	VHF equipment is <i>monitored</i> and information communicated to the Master if appropriate
2 Follow instructions to monitor vessel situation when at sea	2.1	Proper lookout is maintained at all times according to instructions
	2.2	Lights, shapes and sound signals are correctly recognised
	2.3	Effective communication is maintained with the Master on matters relevant to the safety and integrity of the vessel
	2.4	VHF equipment is monitored and information communicated to the Master when appropriate
3 Respond to potential emergency situations	3.1	<i>Emergency situations</i> are promptly reported to the Master
	3.2	Distress signals are recognised and reported

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Communicate effectively with others on lookout issues and arrangements
- Correctly report other ships, objects, lights and navigation marks in relation to the ship's head
- Identify and report lights, buoys and sound signals
- Monitor and anticipate hazards and risks that may arise during lookout duties
- Monitor VHF equipment
- Respond to helm and engine orders given by the Master

Required Knowledge:

- International Regulations for Preventing Collisions at Sea
- Navigation lights, shapes and sound signals
- Typical emergency situations and appropriate action and solutions

- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- communicating required information in a timely manner
- providing required amount of detail in reports.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where performing basic lookout duties can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate performing basic lookout duties

- direct observation of candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Scheduled checks and inspections include:

- Coverage
- Frequency
- Timing

Irregularities or abnormal conditions may include:

- Events affecting the safety and integrity of:
 - vessel
 - crew
 - equipment
 - materials, such as cargo

Monitored may include:

- Communications with other vessels
- Communications with those on shore
- Weather reports and warnings

Emergency situations may include:

- Cargo shift
- Collision
- Dragging anchor
- Failure of vessel equipment and navigational lights
- Fire
- Fog or restricted visibility
- Heavy weather
- Loss of engine or propulsion controls
- Loss of mooring lines
- Loss of watertight integrity
- Person overboard

- Reception of distress signal
- Stranding
- Sudden list or loll
- Synchronous rolling

Unit Sector(s)

Not applicable.

Competency Field

Watchkeeping

MARO3001A Contribute to monitoring and controlling a safe engine watch

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to contribute to a safe engine watch on a vessel under instructions from the officer of the watch.

Application of the Unit

This unit applies to those sailing on any vessel in the capacity of an Integrated Rating where engine watchkeeping duties are to be performed.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Follow

1.1 Propulsion unit and auxiliary machinery are *monitored* according to

instructions to monitor engine-room machinery and equipment		manufacturer specifications and organisational procedures
	1.2	Deviations are identified and reported according to organisational procedures
	1.3	Unsafe conditions and potential hazards are recognised, and risk is assessed and reported according to organisational procedures
	1.4	Unsafe conditions and hazards are rectified according to organisational procedures
	1.5	Effective communication is maintained with the officer of the watch on matters relevant to the safety and integrity of the vessel
	1.6	Procedures for relief, maintenance and handover of a watch are followed
2 Respond to potential emergency situations	2.1	<i>Emergency situations</i> are promptly reported to the officer of the watch
	2.2	<i>Alarms</i> are recognised and reported
	2.3	Control measures to minimise the emergency are implemented
	2.4	Containment procedures are applied where appropriate
	2.5	Appropriate safety procedures are followed and personal protective equipment is used according to organisational procedures
	2.6	Emergency is eliminated where possible, and if not practical, actions are taken to control the emergency
	2.7	Appropriate <i>firefighting equipment</i> is identified to carry out firefighting operations

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Communicate effectively with officer of the watch on matters relevant to watchkeeping duties
- Conform to established procedures and practices in taking initial action on becoming aware of the emergency or abnormal situation
- Maintain the integrity of emergency alarm systems at all times
- Monitor and anticipate hazards and risks that may arise during engine watchkeeping

duties

- Monitor propulsion and auxiliary machinery according to instructions during watchkeeping duties
- Recognise potential hazards, assess risks and report them to the officer of the watch
- Respond to engine orders given by officer of the watch
- Use internal communications and alarm systems

Required Knowledge:

- Alarms associated with engine room machinery and their meaning
- Correct use of monitoring equipment used in the engine room
- Emergency duties and alarm signals
- Engine room alarm systems and the distinguish between the various alarms
- Escape routes from machinery spaces
- Information required to maintain a safe engine watch
- Monitoring equipment used in the engine room
- Orders as they relate to watchkeeping
- Procedures for the relief, maintenance and handover of a watch
- Requirements for the safe operation of boilers
- Shipboard terms and definitions
- Terms used in machinery spaces and names of machinery and equipment
- Typical engine emergency situations and appropriate action and solutions
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- performing basic engine watchkeeping duties under instruction on a vessel moored, at anchor or under way
- communicating clearly and concisely and acknowledging

Context of and specific resources for assessment

- orders in a seamanlike manner
- seeking advice/clarification from the officer of the watch where watch information or instructions are not clearly understood
- conforming to accepted practices and procedures in the maintenance, handover and relief of the watch.

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where contributing to monitoring and controlling a safe engine watch can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate contributing to monitoring and controlling a safe engine watch
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being

performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Monitored may include:

- Boiler water levels and steam pressure
- Engine room machinery temperatures
- Oil levels

Emergency situations may include:

- Fire, including engine room scavenge fires
- Generator failure
- Loss of engine cooling water

Alarms must include:

- Bilge
- Boiler level and pressure
- Fire extinguishing gas alarms
- Temperature

Firefighting equipment must include:

- Fixed gas systems
- Fixed water systems
- Portable extinguishers

Unit Sector(s)

Not applicable.

Competency Field

Watchkeeping

MARO3002A Contribute to monitoring and controlling a safe navigational watch

Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to contribute to a safe navigational watch on a vessel under instructions from the officer of the watch.

Application of the Unit

This unit applies to those sailing on any vessel in the capacity of an Integrated Rating where navigational watchkeeping duties are to be performed.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Follow

1.1 *Scheduled checks and inspections* are conducted to comply with

instructions to monitor vessel situation when moored or anchored	<p>instructions</p> <p>1.2 Appropriate action is taken in the event of <i>irregularities or abnormal conditions</i> to maximise the safety and integrity of the vessel</p> <p>1.3 Restrictions on access within the vessel are enforced according to Master instructions</p> <p>1.4 VHF is <i>monitored</i> and information communicated to the Master if appropriate</p> <p>1.5 Procedures for the relief, maintenance and handover of a watch are followed</p>
2 Follow instructions to monitor vessel situation when at sea	<p>2.1 Responsibilities of a lookout are identified</p> <p>2.2 Proper lookout is maintained by sight and hearing at all times in accordance with instructions</p> <p>2.3 Lights, shapes and sound signals are correctly recognised</p> <p>2.4 Approximate bearing of a sound signal, light or other object is reported in degrees or points to the officer of the watch</p> <p>2.5 Effective communication is maintained with the officer of the watch on matters relevant to the safety and integrity of the vessel</p> <p>2.6 VHF is monitored and information communicated to the officer of the watch if appropriate</p> <p>2.7 Procedures for the relief, maintenance and handover of a watch are followed</p>
3 Respond to potential emergency situations	<p>3.1 <i>Emergency situations</i> are promptly reported to the officer of the watch</p> <p>3.2 <i>Distress signals</i> are recognised and reported</p> <p>3.3 False distress alerts are avoided and correct action is taken in the event of accidental activation</p> <p>3.4 Integrity of emergency and distress alerting systems is maintained at all times</p>

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Communicate effectively with officer of the watch on matters relevant to watchkeeping duties
- Conform to established procedures and practices in taking initial action on becoming aware of the emergency or abnormal situation
- Correctly report other ships, objects lights and navigation marks in relation to the ships head
- Identify and report lights, buoys and sound signals
- Monitor and anticipate hazards and risks that may arise during watchkeeping duties
- Monitor VHF equipment
- Recognise potential hazards, assess and report risks to the officer of the watch
- Respond to orders given by the officer of the watch
- Use internal communications and alarm systems

Required Knowledge:

- Emergency duties and alarm signals
- Information required to maintain a safe watch
- International Regulations for Preventing Collisions at Sea
- Navigation lights and shapes and sound signals
- Order as they relate to watchkeeping
- Procedures for the relief, maintenance and handover of a watch
- Pyrotechnic distress signals, satellite emergency position indicating radio beacons (EPIRBs) and search and rescue transponders (SARTs)
- Shipboard terms and definitions
- Typical emergency situations and appropriate action and solutions
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required

this unit

Knowledge and include:

- communicating clearly and concisely and acknowledging orders in a seamanlike manner
- seeking advice/clarification from the officer of the watch where watch information or instructions are not clearly understood
- conforming to accepted practices and procedures in the maintenance, handover and relief of the watch.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where contributing to monitoring and controlling a safe navigational watch can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate contributing to monitoring and controlling a safe navigational watch
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Scheduled checks and inspections may include:
- Coverage
 - Frequency
 - Timing
- Irregularities or abnormal conditions may include:
- Events affecting the safety and integrity of:
 - vessel
 - crew
 - equipment
 - materials such as cargo
- Monitored may include:
- Communications with other vessels
 - Communications with those onshore
 - Weather reports and warnings
- Emergency situations may include:
- Cargo shift
 - Collision
 - Dragging anchor
 - Failure of vessel equipment and navigational lights
 - Fire, including engine room scavenge fires
 - Fog or restricted visibility
 - Heavy weather
 - Loss of:
 - engine or propulsion controls
 - watertight integrity
 - mooring lines
 - Person overboard
 - Reception of distress signal
 - Stranding
 - Sudden list or loll
 - Synchronous rolling
- Distress signals must include:
- Pyrotechnic distress signals
 - SARTs

- Satellite EPIRBs

Unit Sector(s)

Not applicable.

Competency Field

Watchkeeping

MARO5001A Maintain a safe navigational watch

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMF3007B Maintain a safe navigational watch.

Unit Descriptor

This unit involves the skills and knowledge required to apply the accepted principles and procedures to be observed in maintaining a watch according to bridge resource management principles to ensure a safe navigational watch on a vessel.

Application of the Unit

This unit has application for a Watchkeeper Deck, Master < 500 GT and Master (Unlimited).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Maintain watch** 1.1 Own responsibility for the safety of navigation is clearly defined at all times including periods when the Master is on the bridge and while

- on the bridge** under pilotage
- 1.2 Proper lookout is maintained at all times according to organisational procedures and regulatory requirements
 - 1.3 **Lights, shapes and sound signals** are correctly recognised and acted upon
 - 1.4 Frequency and extent of monitoring traffic, vessel and environment are scheduled to conform with organisational procedures and regulatory requirements
 - 1.5 **Bridge communication** is maintained with other team members on matters relevant to the safety and integrity of the vessel
 - 1.6 Clear and unambiguous bridge communications are maintained and clarification is sought from or given to other team members when watch information or instructions are not clearly understood
 - 1.7 Internal and external communications systems are used according to organisational procedures
 - 1.8 Conduct, handover and relief of the watch is completed according to organisational procedures and regulatory requirements
- 2 Maintain watch when anchored**
- 2.1 Organisational procedures and regulatory requirements are complied with through frequency, timing and coverage of scheduled checks and inspections
 - 2.2 Appropriate action is taken in the event of **irregularities or abnormal conditions** to maximise the safety and integrity of the vessel
 - 2.3 Restrictions on access to the vessel by non-authorised persons are followed according to organisational procedures and regulatory requirements
 - 2.4 Internal and external communications systems are used according to organisational procedures
- 3 Respond to potential collision and emergency situations**
- 3.1 Potential collision situations are analysed and appropriate action is taken in ample time according to regulatory requirements
 - 3.2 Correct responses are made to **emergencies** and situations that pose a danger to the vessel and personnel on board
 - 3.3 Distress signals are recognised and appropriate action is taken to initiate search and rescue operations
 - 3.4 Master is called in the event of a navigational incident which falls outside own responsibility

- | | | |
|---|-----|---|
| 4 Resource the bridge according to bridge resource management principles | 4.1 | Bridge resource management principles are interpreted to establish the functions and responsibilities of the watchkeeping team on board a vessel |
| | 4.2 | Resources are allocated and assigned as needed in correct priority to perform necessary tasks to obtain and maintain situational awareness |
| | 4.3 | Watchkeeping schedule is developed with due consideration to team experience |
| | 4.4 | Instructions on watchkeeping and lookout requirements are clearly and unambiguously given in relation to monitoring traffic, vessel and environment |
| | 4.5 | Clear and unambiguous roles and responsibilities of watchkeeping team are determined and allocated |
| | 4.6 | Effective communication is maintained with team on <i>matters relevant to safety and integrity of vessel</i> |
| | 4.7 | <i>Questionable decisions and/or actions</i> are dealt with using an appropriate challenge and response |
| 5 Maintain navigation records | 5.1 | <i>Proper record</i> of the movements and activities related to the navigation of the vessel is maintained |
| | 5.2 | Records are filed and stored according to organisational procedures |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Allocate and assign resources as needed in correct priority to perform necessary tasks
- Apply principles of bridge resource management
- Appropriately challenge and respond to questionable decisions and/or actions
- Clearly define responsibility for the safety of navigation at all times
- Communicate effectively with others on watchkeeping issues, arrangements and requirements
- Conform with accepted principles and procedures in the conduct, handover and relief of the watch
- Correctly provide sound signals
- Correctly recognise lights, shapes and sound signals

- Give and receive clear and unambiguous communications
- Identify and solve problems that may arise during watchkeeping duties, report problems and issues and take appropriate action based on available information
- Identify and implement effective leadership behaviours
- Interpret and implement procedures relevant to the role and responsibilities of watchkeeper
- Maintain a proper lookout at all times and in such a way as to conform to accepted principles and procedures
- Maintain a proper record of the movements and activities relating to the navigation of the vessel
- Modify activities dependent on differing vessel contingencies, risk situations and environments
- Monitor and anticipate hazards and risks that may arise during watchkeeping duties and take appropriate action
- Monitor traffic, the ship and the environment to conform with accepted principles and procedures
- Report according to the General Principles for Ship Reporting Systems and VTS procedures
- Select and use appropriate internal and external communications equipment during watchkeeping
- Share an accurate understanding of current and predicted vessel state, navigation path and external environment with team members
- Use information from navigational equipment to maintain a safe navigational watch
- Use routing according to the General Provisions on Ships' Routing

Required Knowledge:

- AMSA watchkeeping procedures contained in Marine Orders
- Blind pilotage techniques
- Bridge instrumentation, controls and alarms relevant to the function of watchkeeping
- Bridge procedures on board a vessel
- Bridge resource management principles including allocation, assignment and prioritisation of resources; effective communication; assertiveness and leadership; obtaining and maintaining situational awareness; consideration of team experience
- Causes of groundings, collisions and casualties
- Content, application and intent of the International Regulations for Preventing Collisions at Sea
- Fatigue management principles and techniques
- Functions and responsibilities of the watchkeeping team on board a vessel
- IALA buoyage system A and B

- Manual and electronic navigational aids available to the bridge team and procedures for their operation and use during a watch
- Maritime communication techniques on board a vessel
- Navigational hazards and implications for watchkeeping
- Operating procedures for typical navigational aids
- Precautions necessary when navigating in or near traffic separation schemes or other routing measures
- Principles and use of navigational recording devices for keeping records of the operation, behaviour and performance of the vessel and navigation equipment
- Principles for the use of vessel routing and reporting systems for safe navigation
- Principles to be observed in keeping a navigational watch
- Procedures for the conduct, handover and relief of a watch
- Procedures for the use of internal communications and alarm systems
- Signs of fatigue
- Typical bridge instrumentation, controls and alarms and their functions
- Typical watchkeeping problems and emergency situations, and appropriate actions and solutions
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- ensuring behaviour reflects relevant current legislative and regulatory requirements
- ensuring currency of relevant legislative and regulatory knowledge.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- appropriate vessel or simulator to demonstrate maintaining a safe navigational watch

- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate maintaining a safe navigational watch
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Lights, shapes and sound signals must include:

- Alternative power source for lights
- Day time shapes for a vessel more than 500 gross tonnage
- Emergency lights for a vessel more than 500

- gross tonnage
- Bridge communication may include:
- Means of making sound signals for a vessel more than 500 gross tonnage
 - Navigation lights for a vessel more than 500 gross tonnage
 - Communication with engine room
 - Verbal instruction relating to watchkeeping duties
 - Written Masters instructions
- Irregularities or abnormal conditions may include:
- Dragging anchor
 - Fog and restricted visibility
 - Heavy weather, including cyclones
- Emergencies may include:
- Person overboard
 - Search and rescue operations
- Matters relevant to safety and integrity of vessel may include:
- Maintenance of proper lookout
 - Navigation path and maintenance of vessels position
 - Traffic density
 - Visibility
 - Weather and sea conditions
- Questionable decisions and/or actions may include:
- Excessive speed in heavy weather or reduced visibility
 - Inappropriate action to avoid collision
 - Incorrect helm orders
- Proper records may include:
- Course recorder
 - Courses steered and vessel position
 - Echo sounder recordings
 - Log book entries
 - Passage plan
 - Radar log book
 - Weather reports

Unit Sector(s)

Not applicable.

Competency Field

Watchkeeping

MARO5002A Transmit and receive information by the Global Maritime Distress and Safety System

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMME807C Transmit and receive information by GMDSS subsystems and equipment.

Unit Descriptor

This unit involves the skills and knowledge required to transmit and receive information by global maritime distress and safety system (GMDSS) subsystems and equipment.

Application of the Unit

This unit applies to those in charge of or performing radio duties on a ship required to participate in the GMDSS.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- 1 Operate GMDSS subsystems and equipment to send and receive messages**
 - 1.1 ***GMDSS communication equipment*** is operated to send and receive various types of signals according to manufacturer instructions, established GMDSS procedures and regulatory requirements
 - 1.2 GMDSS procedures appropriate for the sea area concerned are correctly applied according to regulatory requirements
 - 1.3 ***Regulations*** and procedures applicable to vessel stations equipped with GMDSS communication equipment and digital selective calling facilities are applied during radio communication
 - 1.4 Work health and safety (WHS)/occupational health and safety (OHS) procedures and hazard control strategies are applied when operating radio equipment according to vessel ISM Code safety management system

- 2 Maintain radio equipment**
 - 2.1 ***Routine maintenance checks*** are conducted on GMDSS equipment according to manufacturer specifications and organisational procedures
 - 2.2 Out-of-specification performance and faults are investigated using fault finding techniques
 - 2.3 Identified faults and defective equipment and component parts are rectified or replaced according to manufacturer specifications and organisational procedures

- 3 Provide radio services during emergencies**
 - 3.1 ***Emergencies*** are correctly identified according to organisational procedures
 - 3.2 Organisational procedures are conformed with when taking initial action on becoming aware of an emergency or abnormal situation
 - 3.3 Communications are established with others using GMDSS communication equipment to facilitate the emergency response process
 - 3.4 Contact is maintained at all times with others to keep them briefed on the emergency response process
 - 3.5 Radio procedures as defined in the international and national radio regulations and safety of life at sea (SOLAS) convention are applied during the emergency

- 4 Maintain records**
 - 4.1 ***Records*** are completed and maintained as required according to regulatory and organisational requirements

- 4.2 Relevant records are sent to appropriate bodies and copies are filed according to regulatory and organisational requirements
- 4.3 Documents are stored according to regulatory and organisational requirements

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Apply WHS/OHS procedures when operating GMDSS subsystems and equipment
- Communicate effectively with others when using GMDSS subsystems and equipment
- Conduct operational checks on GMDSS subsystems and equipment
- Keep records of radio communications
- Operate GMDSS subsystems and equipment according to manufacturer instructions
- Read and interpret instructions for the use of GMDSS subsystems and equipment
- Recognise typical faults with GMDSS subsystems and equipment, and take appropriate action
- Use the phonetic alphabet

Required Knowledge:

- Basic principles and features of marine radio communications including correct use of frequencies, frequency bands and modes of emission; frequencies for routine call and reply; distress, urgency and safety communication; definition of coverage and sea areas for digital selective calling (DSC); radio calling, replying and relaying procedures; purpose of silence periods when operating radio equipment; limitations on the performance of different types of marine radio equipment; purpose for and procedures for the monitoring of calling and working frequencies; methods of communicating vessel position
- Different types of marine radio equipment, their features, applications, operating characteristics and operating procedures
- Hazards associated with radio transmission and the repair and maintenance of radio equipment and related hazard control measures
- International and national radio regulations applicable to mobile marine communication
- Maintenance strategies and requirements for GMDSS equipment as defined in SOLAS and Radio Regulations
- Means to prevent the transmission of false distress alerts
- Operational checks including checking radio performance; testing fuses; measuring

capacity of batteries and the specific gravity of the electrolyte; measuring on and off load voltage

- Principles of radio propagation including basic propagation mechanisms at LF, MF, HF and VHF; maximum user frequency (MUF); optimum working frequency (OWF); frequency bands; classes of emission; duplex, simplex paired frequencies and ITU channels
- Procedures for:
 - keeping records of radio communication
 - transmitting and decoding the phonetic alphabet excluding the figure code
 - using various GMDSS systems and services including Inmarsat services (B, C, M and E); Enhanced Group Calling system (EGC); DSC facilities and usage; EGC receiver; MSI services; NAVTEXT system; SafetyNET system
- Prohibitions on connecting non-GMDSS equipment
- Radio communication problems and appropriate actions and solutions
- Radio equipment faults, defects and related fault finding techniques
- Requirements of ship reporting systems
- Types, applications and features of basic antenna systems used in marine radio communications
- Use of radio medical services

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- ensuring currency of relevant legislative and regulatory knowledge
- attention to appropriate level of detail in recordkeeping.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where transmitting and receiving information by GMDSS subsystems and equipment can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate transmitting and receiving information by GMDSS subsystems and equipment
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

GMDSS communication equipment must include:

- Antennas
- Batteries
- Digital selective calling (DSC) equipment
- ECG receiver
- Electrical and radio cable connections
- Electrical fuses
- Emergency position indicating radio beacon (EPIRB)
- Medium frequency/high frequency (MF/HF) equipment
- Navtext receiver
- Search and rescue transmitter (SART)
- Very high frequency (VHF) equipment

Regulations must include:

- IMO STCW 95 Code concerning radio communication
- Australian Maritime Safety Authority (AMSA) Marine Orders
- SOLAS Convention
- ITU Regulations

Routine maintenance checks may include:

- Battery level checks
- Equipment testing

Emergencies may include:

- Abandon ship
- Assisting vessels in distress
- Fire on board ship
- Partial or full breakdown of radio installations
- Rescuing persons from the water

Records may include:

- Radio communication log
- Records of radio communication

Unit Sector(s)

Not applicable.

Competency Field

Watchkeeping

MARO5003A Transmit and receive information by visual signalling

Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMME307B Transmit and receive information by visual signalling.

Unit Descriptor

This unit involves the skills and knowledge required to transmit and receive information by visual signalling.

Application of the Unit

This unit has application for a Watchkeeper Deck, Master < 500 GT and Master (Unlimited).

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | |
|--|-----|---|
| 1 Use code to send and receive messages by flashing light | 1.1 | <i>Codes</i> for letters and numerals are correctly recognised |
| | 1.2 | <i>Message</i> is correctly coded and sent using a <i>flashing light</i> |
| | 1.3 | Message transmitted in code by flashing light is correctly decoded |
| 2 Use International Code of Signals to send and receive messages with flags | 2.1 | Flags used in the International Code of Signals are correctly recognised |
| | 2.2 | Message is correctly coded and sent with flags using the International Code of Signals |
| | 2.3 | Message coded and sent with flags using the International Code of Signals is correctly decoded |
| 3 Maintain records of visual communications | 3.1 | Records of messages sent and received are completed and maintained as required according to regulatory and organisational requirements |
| | 3.2 | Relevant records are sent to appropriate bodies if requested and copies are filed according to regulatory and organisational requirements |
| | 3.3 | Documents are stored according to regulatory and organisational requirements |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Communicate effectively with others, including the Master, when transmitting and receiving information by visual signalling
- Keep records of visual signalling communications
- Read and interpret maritime regulations relating to visual signalling
- Transmit and receive by Morse light, distress signal SOS as specified in Annex IV of the Australian Maritime Safety Authority, and Appendix 1 of the International Code of Signals
- Transmit and receive messages using flags according to the International Code of Signals
- Use the International Code of Signals

Required Knowledge:

- International Code of Signals
- Australian Maritime Safety Authority
- Procedures for sending visual messages with flags using the International Code of Signals
- Procedures for using a flashing light to send messages using Morse code
- Visual signalling of single-letter signals as specified in the International Code of Signals
- Work health and safety (WHS)/ occupational health and safety (OHS) requirements and work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- ensuring currency of relevant legislative and regulatory knowledge
- attention to appropriate level of detail in recordkeeping.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where transmitting and receiving information by visual signalling can be conducted or an approved simulated environment
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate transmitting and receiving information by visual signalling
- direct observation of candidate applying relevant WHS/OHS requirements and work practices
- computer-based assessment that measures the speed and accuracy of transmitting and receiving visual signals.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Codes must include:

- Morse code
- Single letter and numeral international code flags

Messages may include:

- Distress signal SOS
- Medical advice
- Single letter flag signal codes

Flashing lights may include:

- Fixed mast installation
- Mirrors
- Morse signalling lamp

Unit Sector(s)

Not applicable.

Competency Field

Watchkeeping

BSBADM307B Organise schedules

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	<p>This unit describes the performance outcomes, skills and knowledge required to manage appointments and diaries for personnel within an organisation, using manual and electronic diaries, schedules and other appointment systems.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.</p>
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Application of the Unit

Application of the unit	<p>This unit applies to individuals employed in a range of work environments who provide administrative support to teams and individuals in the management of diaries, schedules and other appointment mechanisms.</p>
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Establish schedule requirements	1.1. Identify <i>organisational requirements</i> and protocols for diaries and staff <i>planning tools</i> 1.2. Identify organisational procedures for different types of appointments 1.3. Determine personal requirements for <i>diary and schedule items</i> for individual personnel 1.4. Establish appointment priorities and clarify in discussion with individual personnel
2. Manage schedules	2.1. Identify <i>recurring appointments</i> and deadlines, and schedule these in accordance with individual and organisational requirements 2.2. Establish availability of attendees, and schedule new appointments in accordance with required time lines and diary commitments 2.3. Negotiate <i>alternative arrangements</i> and confirm when established appointments are changed 2.4. <i>Record appointments</i> and manage schedules in accordance with <i>organisational policy and procedures</i>

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to discuss and confirm requirements and priorities of others and to question others to clarify information
- literacy skills to read a range of procedural texts and to write simple instructions
- negotiation skills to schedule appointments where there are competing demands
- numeracy skills to estimate time, plan accurately and keep records
- problem-solving skills to negotiate task distribution and timing for appointments with other members of the group
- time management skills to allow realistic time lines to schedule appointments.

Required knowledge

- key provisions of relevant legislation from all forms of government, standards and codes that may affect aspects of business operations, such as:
- anti-discrimination legislation
- ethical principles
- codes of practice
- privacy laws
- occupational health and safety (OHS)
- relationship between satisfactorily organising another person's schedule and achieving team goals
- responsibility that is involved in making arrangements for others.

Evidence Guide

EVIDENCE GUIDE

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Evidence of the following is essential:

- maintaining schedules which meet individual and organisational needs
- prioritising and negotiating competing demands.

EVIDENCE GUIDE	
Context of and specific resources for assessment	<p>Assessment must ensure:</p> <ul style="list-style-type: none"> • access to an actual workplace or simulated environment • access to office equipment and resources • access to a range of diaries, planners and calendars to record and schedule appointments.
Method of assessment	<p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • review of authenticated documents from the workplace or training environment • analysis of responses to case studies and scenarios • demonstration of techniques in a workplace or simulated environment • review of testimony from team members, colleagues, supervisors or managers.
Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:</p> <ul style="list-style-type: none"> • other general administration units.

Range Statement

RANGE STATEMENT	
<p>The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.</p>	
<p><i>Organisational requirements</i> may include:</p>	<ul style="list-style-type: none"> • availability of information • electronic linked diaries and schedules • linking personal and executive diaries • priority clients and personnel • protocols in contacting other personnel within

RANGE STATEMENT	
	<ul style="list-style-type: none"> and outside organisation • recording systems
<i>Planning tools</i> may include:	<ul style="list-style-type: none"> • appointment book • appointment view and planner view in electronic scheduling systems • calendar • desk diary • electronic calendar or diary • in/out boards and whiteboards • manual planners • planning wall chart
<i>Diary and schedule items</i> may include:	<ul style="list-style-type: none"> • conferences • deadlines • leave (for both immediate person and others whose absence affects the person) • meetings • recurring appointments • teleconferences • travel
<i>Recurring appointments</i> may include:	<ul style="list-style-type: none"> • board meetings • committee meetings • staff meetings
<i>Alternative arrangements</i> may include:	<ul style="list-style-type: none"> • cancelling pre-arranged appointments • inserting additional appointments after a schedule has been prepared • re-scheduling existing appointments
<i>Appointments</i> may be recorded in:	<ul style="list-style-type: none"> • calendar • diary • electronic system • filing system • paper system
<i>Organisational policy and procedures</i> may include:	<ul style="list-style-type: none"> • adequate time between appointments • leave • limit on total appointments in any one day • lunch breaks • OHS issues • stress minimisation • sufficient time to complete projects and to meet deadlines • time off in lieu

Unit Sector(s)

Unit sector	
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Competency field

Competency field	Administration - General Administration
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Co-requisite units

Co-requisite units		

BSBFLM303C Contribute to effective workplace relationships

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	<p>This unit describes the performance outcomes, skills and knowledge required to gather information and maintain effective working relationships and networks, with particular regard to communication and representation.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.</p>
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Application of the Unit

Application of the unit	<p>Frontline managers have a key role in contributing to efficient and effective work teams within the context of the organisation. They play a prominent part in motivating, mentoring, coaching and developing team cohesion through providing leadership for the team and forming the bridge between the management of the organisation and the team members.</p> <p>At this level, work will normally be carried out within known routines, methods and procedures which require the exercise of some discretion and judgement.</p> <p>This unit is related to BSBWOR401A Establish effective workplace relationships.</p>
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	
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Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Seek, receive and communicate information and ideas	1.1. Collect <i>information</i> associated with the achievement of work responsibilities from appropriate <i>sources</i> 1.2. Communicate ideas and information to <i>diverse audiences</i> in an appropriate and sensitive manner 1.3. Seek contributions from internal and external sources to develop and refine new ideas and approaches in accordance with organisational processes 1.4. Facilitate <i>consultation processes</i> to allow employees to contribute to issues related to their work, and promptly communicate outcomes of consultation to the work team 1.5. Promptly deal with and resolve issues raised, or refer them to <i>relevant personnel</i>
2. Encourage trust and	2.1. Treat people with integrity, respect and empathy

ELEMENT	PERFORMANCE CRITERIA
confidence	2.2. Encourage effective relationships within the framework of <i>the organisation's social, ethical and business standards</i> 2.3. Gain and maintain the trust and confidence of <i>colleagues, customers and suppliers</i> through competent performance 2.4. Adjust interpersonal styles and methods in relation to the organisation's social and cultural environment
3. Identify and use networks and relationships	3.1. Identify and utilise <i>workplace networks</i> to help build relationships 3.2. Identify and describe the value and benefits of networks and other work relationships for the team and the organisation
4. Contribute to positive outcomes	4.1. Identify difficulties and take action to rectify the situation within own level of responsibility according to organisational and legal requirements 4.2. Support colleagues in resolving work difficulties 4.3. Regularly review <i>workplace outcomes</i> and implement improvements in consultation with relevant personnel 4.4. Identify and resolve <i>poor work performance</i> within own level of responsibility and according to organisational policies 4.5. Deal constructively with conflict, within the organisation's established processes

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- ability to relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities
- coaching and mentoring skills to provide support to colleagues
- functional literacy skills to access and use workplace information
- relationship management and communication skills to:
 - interpret information from a variety of people
 - respond to unexpected demands from a range of people

REQUIRED SKILLS AND KNOWLEDGE

- gain the trust and confidence of colleagues
- deal with people openly and fairly
- forge effective relationships with internal and/or external people.

Required knowledge

- principles and techniques associated with relationship management, including:
 - developing trust and confidence
 - behaving consistently in work relationships
 - identifying the cultural and social environment
 - identifying and assessing interpersonal styles
 - establishing networks
 - identifying and resolving problems
 - handling conflict
 - managing poor work performance
 - monitoring and improving work relationships
 - using anti-discrimination/bias strategies and making contributions
- relevant legislation from all levels of government that may affect business operation, especially in regard to:
 - occupational health and safety and environmental issues
 - equal opportunity
 - industrial relations
 - anti-discrimination.

Evidence Guide

EVIDENCE GUIDE

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Evidence of the following is essential:

- using culturally appropriate communication techniques to share work-based information with teams and individuals in accordance with organisation policies
- developing networks and building team relationships

EVIDENCE GUIDE	
	<ul style="list-style-type: none"> regularly reviewing workplace outcomes to identify and resolve issues and implement improvements within own level of responsibility and according to organisational policies.
Context of and specific resources for assessment	<p>Assessment must ensure:</p> <ul style="list-style-type: none"> access to appropriate documentation and resources normally used in the workplace.
Method of assessment	<p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate oral or written questioning to assess knowledge and understanding of principles of relationship management and organisation's social, ethical and business standards presentation of examples of actions taken by the candidate to build networks and contribute to positive workplace relationships and outcomes.
Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:</p> <ul style="list-style-type: none"> other management or frontline management units.

Range Statement

RANGE STATEMENT	
<p>The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.</p>	
Information may include:	<ul style="list-style-type: none"> archived, filed and historical background data electronic or manual transmission individual and team performance data marketing and customer-related data

RANGE STATEMENT	
	<ul style="list-style-type: none"> • organisation policies and procedures • planning and organisational documents including the outcomes of continuous improvement and quality assurance • written or verbal communications
<i>Sources</i> of information may be:	<ul style="list-style-type: none"> • external, such as: <ul style="list-style-type: none"> • external customers • web based resources • reports • internal, such as: <ul style="list-style-type: none"> • supervisors, managers and peers • organisation policies and procedures • workplace documents
<i>Diverse audiences</i> may include:	<ul style="list-style-type: none"> • persons with specific social, cultural and other needs that require a range of strategies and approaches including adjusting communication
<i>Consultation processes</i> may include:	<ul style="list-style-type: none"> • feedback to the work team and relevant personnel in relation to outcomes of the consultation process • opportunity for employees to contribute ideas and information
<i>Relevant personnel</i> may include:	<ul style="list-style-type: none"> • OHS committees and OHS representatives • people with specialist responsibilities • supervisors, managers and other employees • union representatives/groups
<i>The organisation's social, ethical and business standards</i> may refer to:	<ul style="list-style-type: none"> • implied standards such as honesty and respect relative to the organisation culture and generally accepted within the wider community • rewards and recognition for high performing staff • standards expressed in legislation and regulations such as anti-discrimination legislation • written standards such as those expressed in: <ul style="list-style-type: none"> • vision and mission statements • policies • code of workplace conduct/behaviour • dress code • statement of workplace values

RANGE STATEMENT	
<i>Colleagues, customers and suppliers</i> may include:	<ul style="list-style-type: none"> employees at the same level and more senior managers internal and external contacts people from a wide variety of social, cultural and ethnic backgrounds team members
<i>Workplace networks</i> may be:	<ul style="list-style-type: none"> formal or informal individuals or groups internal or external structured or unstructured
<i>Workplace outcomes</i> may include:	<ul style="list-style-type: none"> OHS processes and procedures performance of the work team
<i>Poor work performance</i> may relate to:	<ul style="list-style-type: none"> self or work team; or it may extend to the organisation as a whole

Unit Sector(s)

Unit sector	
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Competency field

Competency field	Management and Leadership - Frontline Management
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Co-requisite units

Co-requisite units	

BSBMGT403A Implement continuous improvement

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	<p>This unit describes the performance outcomes, skills and knowledge required to implement the organisation's continuous improvement systems and processes. Particular emphasis is on using systems and strategies to actively encourage the team to participate in the process, monitoring and reviewing performance, and identifying opportunities for further improvements.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.</p>
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Application of the Unit

Application of the unit	<p>Frontline managers have an active role in implementing the continuous improvement process to achieve the organisation's objectives. Their position, closely associated with the creation and delivery of products and services, means that they have an important role in influencing the ongoing development of the organisation.</p> <p>At this level, work will normally be carried out within routine and non routine methods and procedures, which require planning and evaluation, and leadership and guidance of others.</p>
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	
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Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Implement continuous improvement systems and processes	<p>1.1. Implement <i>systems</i> to ensure that individuals and teams are actively encouraged and supported to <i>participate in decision making processes</i>, assume responsibility and exercise initiative</p> <p>1.2. Communicate the organisation's <i>continuous improvement processes</i> to individuals and teams, and obtain feedback</p> <p>1.3. Ensure effective <i>mentoring and coaching</i> allows individuals and teams to implement the organisation's continuous improvement processes</p>
2. Monitor and review performance	<p>2.1. Use the organisation's systems and <i>technology</i> to monitor and review progress and to identify ways in which planning and operations could be improved</p> <p>2.2. Improve <i>customer service</i> through continuous improvement techniques and processes</p>

ELEMENT	PERFORMANCE CRITERIA
	2.3. Formulate and communicate recommendations for adjustments to those who have a role in their development and implementation
3. Provide opportunities for further improvement	3.1. Implement <i>processes to ensure that team members are informed of savings and productivity/service improvements</i> in achieving the business plan 3.2. Document work performance to aid the identification of further opportunities for improvement 3.3. Manage records, reports and recommendations for improvement within the organisation's systems and processes

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to:
 - coach and mentor team members
 - gain the commitment of individuals and teams to continuously improve
- innovation skills to design better ways of performing work.

Required knowledge

- principles and techniques associated with:
 - benchmarking
 - best practice
 - change management
 - continuous improvement systems and processes
 - quality systems.

Evidence Guide

EVIDENCE GUIDE

The Evidence Guide provides advice on assessment and must be read in conjunction with the

EVIDENCE GUIDE	
performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	<p>Evidence of the following is essential:</p> <ul style="list-style-type: none"> • taking active steps to implement, monitor and adjust plans, processes and procedures to improve performance • supporting others to implement the continuous improvement system/processes, and to identify and report opportunities for further improvement • knowledge of principles and techniques associated with continuous improvement systems and processes.
Context of and specific resources for assessment	<p>Assessment must ensure:</p> <ul style="list-style-type: none"> • access to appropriate documentation and resources normally used in the workplace.
Method of assessment	<p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> • assessment of written reports • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • observation of presentations • oral or written questioning to assess knowledge of principles and techniques associated with change management • review of how the organisation's continuous improvement processes was communicated to individuals and teams • review of documentation of work performance.
Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:</p> <ul style="list-style-type: none"> • other units from the Certificate IV in Frontline Management.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Systems may refer to:

- forums, meetings
- newsletters and reports
- organisational policies and procedures
- web-based communication devices

Participation in decision making processes may include:

- feedback in relation to outcomes of the consultative process
- processes which ensures all employees have the opportunity to contribute to organisational issues

Continuous improvement processes may include:

- cyclical audits and reviews of workplace, team and individual performance
- evaluations and monitoring of effectiveness
- implementation of quality systems, such as International Standardization for Organization (ISO)
- modifications and improvements to systems, processes, services and products
- policies and procedures which allow the organisation to systematically review and improve the quality of its products, services and procedures
- seeking and considering feedback from a range of stakeholders

Mentoring and coaching may refer to:

- providing assistance with problem-solving
- providing feedback, support and encouragement
- teaching another member of the team, usually focusing on a specific work task or skill

Technology may include:

- computerised systems and software such as databases, project management and word processing
- telecommunications devices
- any other technology used to carry out work roles and responsibilities

RANGE STATEMENT	
<i>Customer service</i> may be:	<ul style="list-style-type: none"> • internal or external • to existing, new or potential clients
<i>Processes to ensure that team members are informed of savings and productivity/service improvements</i> may refer to:	<ul style="list-style-type: none"> • email/intranet, newsletters or other communication devices • newsletters and bulletins • staff reward mechanisms • team meetings

Unit Sector(s)

Unit sector	
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Competency field

Competency field	Management and Leadership - Management
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Co-requisite units

Co-requisite units	

BSBWOR203B Work effectively with others

Modification History

Release	Comments
Release 1	<p>This version first released with <i>BSB07 Business Training Package version 6.0</i>.</p> <p>Revised unit. Required knowledge and Range Statement changed to include environmentally sustainable practices</p> <p>Replaces BSBWOR203A Work effectively with others</p>

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to work in a group environment promoting team commitment and cooperation, supporting team members and dealing effectively with issues, problems and conflict.

Application of the Unit

This unit applies to individuals who perform a range of routine tasks using a limited range of practical skills and fundamental knowledge of teamwork in a defined context under direct supervision or with limited individual responsibility.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Element	Performance Criteria

Element	Performance Criteria
<i>Elements describe the essential outcomes of a unit of competency.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.</i>

Elements and Performance Criteria

1. Develop effective workplace relationships	<p>1.1 Identify own <i>responsibilities and duties</i> in relation to <i>workgroup members</i> and undertake activities in a manner that promotes cooperation and good relationships</p> <p>1.2 Take time and resource constraints into account in fulfilling work requirements of self and others</p> <p>1.3 Encourage, acknowledge and act upon constructive <i>feedback</i> provided by others in the workgroup</p>
2. Contribute to workgroup activities	<p>2.1 Provide <i>support to team members</i> to ensure workgroup goals are met</p> <p>2.2 Contribute constructively to workgroup goals and tasks according to organisational requirements</p> <p>2.3 Share <i>information</i> relevant to work with workgroup to ensure designated goals are met</p> <p>2.4 Identify and plan <i>strategies/opportunities for improvement</i> of workgroup in liaison with workgroup</p>
3. Deal effectively with issues, problems and conflict	<p>3.1 Respect differences in personal values and beliefs and their importance in the development of relationships</p> <p>3.2 Identify any linguistic and cultural differences in communication styles and respond appropriately</p> <p>3.3 Identify issues, problems and conflict encountered in the workplace</p> <p>3.4 Seek assistance from workgroup members when issues, problems and conflict arise and suggest possible ways of dealing with them as appropriate or refer them to the appropriate person</p>

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- literacy skills to read and understand the organisation's policies and work procedures, to write simple instructions for particular routine tasks and to interpret information gained from correspondence
- communication skills to request advice, to receive feedback and to work with a team
- technology skills to select and use technology appropriate to a task
- culturally appropriate communication skills to relate to people from diverse backgrounds and people with diverse abilities.

Required knowledge

- key provisions of relevant legislation from all levels of government that may affect aspects of business operations, such as:
 - anti-discrimination legislation
 - ethical principles
 - codes of practice
 - privacy laws
 - occupational health and safety (OHS)
 - environmentally sustainable work practices
- organisational policies, plans and procedures
- workgroup member responsibilities and duties, and relationship to individual responsibilities and duties.

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	<p>Evidence of the following is essential:</p> <ul style="list-style-type: none"> • providing support to team members to ensure goals are met • seeking feedback from clients and/or colleagues and taking appropriate action • knowledge of appropriate conflict resolution techniques.

Context of and specific resources for assessment	<p>Assessment must ensure:</p> <ul style="list-style-type: none"> • access to an actual workplace or simulated environment • access to office equipment and resources • examples of customer complaints or staff conflict.
Method of assessment	<p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • analysis of responses to case studies and scenarios • demonstration of techniques • observation of demonstrated techniques in resolving conflict • observation of presentations • review of documentation identifying and planning strategies/opportunities for workgroup improvement.
Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:</p> <ul style="list-style-type: none"> • interpersonal communication units • other industry capability units.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Responsibilities and duties may include:	<ul style="list-style-type: none"> • Code of Conduct • job description and employment arrangements • organisation's policy relevant to work role • skills, training and competencies • supervision and accountability requirements including OHS • environmentally sustainable working practices • team structures.
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Workgroup members may include:	<ul style="list-style-type: none"> • coach/mentor • other members of the organisation • peers/work colleagues/team/enterprise • supervisor or manager.
Feedback on performance may include:	<ul style="list-style-type: none"> • formal/informal performance appraisals • obtaining feedback from clients • obtaining feedback from supervisors and colleagues • personal, reflective behaviour strategies • routine organisational methods for monitoring service delivery.
Support to team members may include:	<ul style="list-style-type: none"> • explaining/clarifying • helping colleagues • problem-solving • providing encouragement • providing feedback to a team member • undertaking extra tasks if necessary.
Information to be shared may include:	<ul style="list-style-type: none"> • acknowledging satisfactory performance • acknowledging unsatisfactory performance • assisting a colleague • clarifying the organisation's preferred task completion methods • encouraging colleagues • open communication channels • workplace hazards, risks and controls.
Strategies/opportunities for improvement may include:	<ul style="list-style-type: none"> • career planning/development • coaching, mentoring and/or supervision • formal/informal learning programs • internal/external training provision • performance appraisals • personal study • recognition of current competence (RCC)/skills recognition/initial assessment • work experience/exchange/opportunities • workplace skills assessment.

Unit Sector(s)

Industry Capability – Workplace Effectiveness

Custom Content Section

Not applicable.

BSBWOR301B Organise personal work priorities and development

Modification History

Release	Comments
Release 1	<p>This version first released with <i>BSB07 Business Training Package version 6.0</i></p> <p>Revised unit. Performance criteria and required skills updated to focus on learning and development practices, KPIs and compliance with policy and procedures.</p> <p>Replaces BSBWOR301A Organise personal work priorities and development</p>

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to organise own work schedules, to monitor and obtain feedback on work performance, and to maintain required levels of competence. Operators may exercise discretion and judgement using appropriate theoretical knowledge of work scheduling and performance improvement to provide technical advice and support to a team.

Application of the Unit

This unit applies to individuals who are skilled operators and apply a broad range of competencies in various work contexts.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Element	Performance Criteria
<i>Elements describe the essential outcomes of a unit of competency.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.</i>

Elements and Performance Criteria

1. Organise and complete own work schedule	<p>1.1 Ensure that <i>work goals, objectives</i> or <i>KPIs</i> are understood, negotiated and agreed in accordance with <i>organisational requirements</i></p> <p>1.2 Assess and prioritise workload to ensure tasks are completed within identified timeframes</p> <p>1.3 Identify <i>factors affecting the achievement of work objectives</i> and incorporate contingencies into work plans</p> <p>1.4 Use <i>business technology</i> efficiently and effectively to manage and monitor scheduling and completion of tasks</p>
2. Monitor own work performance	<p>2.1 Accurately monitor and adjust personal work performance through self-assessment to ensure achievement of tasks and compliance with legislation and work processes or KPIs</p> <p>2.2 Ensure that <i>feedback on performance</i> is actively sought and evaluated from colleagues and clients in the context of individual and group requirements</p> <p>2.3 Routinely identify and report on variations in the quality of and <i>products and services</i> according to organisational requirements</p> <p>2.4 Identify <i>signs of stress</i> and effects on <i>personal wellbeing</i></p> <p>2.5 Identify <i>sources of stress</i> and access appropriate <i>supports and resolution strategies</i></p>
3. Coordinate personal skill development and learning	<p>3.1 Identify personal learning and professional development needs and skill gaps using self-assessment and advice from colleagues and clients in relation to role and organisational requirements</p> <p>3.2 Identify, prioritise and plan opportunities for undertaking personal skill development activities in liaison with work groups and relevant personnel</p> <p>3.3 Access, complete and record <i>professional development</i></p>

	<p><i>opportunities</i> to facilitate continuous learning and career development</p> <p>3.4 Incorporate formal and informal feedback into review of further learning needs</p>
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Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to give and receive constructive feedback relating to development needs
- literacy skills to read and understand the organisation's procedures
- planning skills to organise work priorities according to work goals and objectives
- problem-solving skills to solve routine problems
- self-management skills to:
 - comply with policies and procedures
 - consistently evaluate and monitor own performance
 - seek learning opportunities.

Required knowledge

- key provisions of relevant legislation from all levels of government that may affect aspects of business operations, such as:
 - anti-discrimination legislation
 - ethical principles
 - codes of practice
 - privacy laws
 - occupational health and safety (OHS)
- organisational policies, plans and procedures
- methods to elicit, analyse and interpret feedback
- principles and techniques of goal setting, measuring performance, time management and personal assessment
- competency standards and how to interpret them in relation to self
- methods to identify and prioritise personal learning needs.

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	<p>Evidence of the following is essential:</p> <ul style="list-style-type: none"> • preparing work plans • scheduling and prioritising work objectives and tasks • knowledge of the principles and techniques of goal setting, measuring performance, time management and personal assessment.
Context of and specific resources for assessment	<p>Assessment must ensure:</p> <ul style="list-style-type: none"> • access to an actual workplace or simulated environment • access to office equipment and resources • examples of work schedules and performance improvement plans.
Method of assessment	<p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • review of self-assessment documentation outlining learning and development needs • analysis of responses to case studies and scenarios • demonstration of techniques • oral or written questioning to assess knowledge of methods to identify and prioritise personal learning needs • evaluation of planning for personal skill development activities and professional development opportunities.
Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p>

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

<p><i>Work goals and objectives</i> may include:</p>	<ul style="list-style-type: none"> • budgetary targets • production targets • reporting deadlines • sales targets • team and individual learning goals • team participation.
<p><i>KPIs</i> may include:</p>	<ul style="list-style-type: none"> • key performance indicators on customer satisfaction • key performance indicators on customer effort • monitoring time taken to answer calls • operating within reporting protocols • score tools such as net promoter • understanding metrics.
<p><i>Organisational requirements</i> may include:</p>	<ul style="list-style-type: none"> • access and equity principles and practice • business and performance plans • defined resource parameters • ethical standards • goals, objectives, plans, systems and processes • legal and organisational policies, guidelines and requirements • OHS policies, procedures and programs • quality and continuous improvement processes and standards • quality assurance and/or procedures manuals.
<p><i>Factors affecting the achievement of work objectives</i> may include:</p>	<ul style="list-style-type: none"> • budget constraints • competing work demands • environmental factors such as time, weather • resource and materials availability • technology/equipment breakdowns • unforeseen incidents • workplace hazards, risks and controls.
<p><i>Business technology</i> may include:</p>	<ul style="list-style-type: none"> • computer applications • computers • email

	<ul style="list-style-type: none"> • facsimile machines • internet/extranet/intranet • modems • personal schedulers • photocopiers • printers • scanners.
Feedback on performance may include:	<ul style="list-style-type: none"> • formal/informal performance appraisals • obtaining feedback from clients • obtaining feedback from supervisors and colleagues • personal, reflective behaviour strategies • routine organisational methods for monitoring service delivery.
Products and services may include:	<ul style="list-style-type: none"> • either products or services • goods • ideas • infrastructure • private or public sets of benefits.
Signs of stress may include:	<ul style="list-style-type: none"> • absence from work • alcohol or other substance abuse • conflict • poor work performance.
Personal wellbeing may include:	<ul style="list-style-type: none"> • cultural • emotional • social • spiritual.
Sources of stress may include:	<ul style="list-style-type: none"> • complex tasks • cultural issues • work and family conflict • workloads.
Supports and resolution strategies may include:	<ul style="list-style-type: none"> • awareness raising • counselling • employee assistance programs (EAP) • family support • group activities • job design • mediation • sharing load • time off • training.
Professional development	<ul style="list-style-type: none"> • career planning/development

<i>opportunities</i> may include:	<ul style="list-style-type: none">• coaching, mentoring and/or supervision• formal/informal learning programs• internal/external training provision• performance appraisals• personal study• quality assurance assessments and recommendations• recognition of current competence/skills recognition• work experience/exchange/opportunities• workplace skills assessment.
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Unit Sector(s)

Industry Capability – Workplace Effectiveness

Custom Content Section

Not applicable.

CHCCOM403A Use targeted communication skills to build relationships

Modification History

Not Applicable

Unit Descriptor

Descriptor

This unit describes the knowledge and skills required to apply specific workplace communication techniques to build and maintain relationships with clients and colleagues based on respect and trust

Application of the Unit

Application

The communication skills described in this unit should be applied to target specific communication issues and may be applied across a range of workplace contexts involving application of a range of communication strategies to address specific needs and issues, working with various levels of social and cultural diversity

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Not Applicable

Employability Skills Information

Employability Skills

This unit contains Employability Skills

Elements and Performance Criteria Pre-Content

Elements define the essential outcomes of a unit of competency.

The Performance Criteria specify the level of performance required to demonstrate achievement of the Element. Terms in italics are elaborated in the Range Statement.

Elements and Performance Criteria

ELEMENT

PERFORMANCE CRITERIA

1. *Communicate effectively* with clients and staff

1.1 Identify and use appropriate communication strategies to:

- establish rapport
- exchange information
- facilitate resolution of issues
- defuse potentially difficult situations

1.2 Conduct *interviews* according to *established procedures*

1.3 Give feedback and advice in a way which reflects current identified good practice

1.4 Demonstrate respect for individual, cultural and social differences, needs and rights in communicating with clients and colleagues

1.5 If communication break down occurs, respond appropriately and refer to other staff or specialist services if required to ensure duty of care responsibilities are met

1.6 Respond to enquiries in a manner that promotes achievement of mutual outcomes

1.7 Respect and consider differences in views in a way that values and encourages the contributions of others

1.8 Ensure communication represents the organisation effectively where appropriate

2. Contribute to the implementation of effective

2.1 Implement strategies to check on the effectiveness of communication with clients and colleagues

ELEMENT**PERFORMANCE CRITERIA**

- communication strategies
- 2.2 Facilitate access to interpretive and translation services as required
- 2.3 Regularly review established channels of communication to ensure clients and co workers are informed of relevant information in a timely way
- 2.4 Provide coaching in effective communication to colleagues and clients as required
- 2.5 Maintain relevant work-related networks and relationships as required to ensure client needs and organisation objectives are met
3. Use specific communication techniques to maintain constructive interaction
- 3.1 Put in place strategies to develop a trusting relationship that will enable negotiation of communication barriers
- 3.2 Use communication skills and processes to identify and address barriers to communication and facilitate identification of individual issues
- 3.3 Use effective skills in listening and providing feedback to ensure stories are heard and to support exploration and validation of issues raised
- 3.4 Seek agreement on processes to be followed to address issues within scope of own abilities, skills and work role
- 3.5 Make referral for conflict resolution and mediation as appropriate
4. Facilitate discussions
- 4.1 Provide *opportunities* to fully explore all relevant issues
- 4.2 Routinely use strategies that encourage all group members to participate equally, including seeking and acknowledging contributions from all members
- 4.3 Routinely contribute to and follow objectives and agendas for meetings and discussions
- 4.4 Provide relevant information to groups as appropriate to facilitate outcomes
- 4.5 Evaluate group communication strategies to promote ongoing participation of all parties
- 4.6 Implement strategies to ensure the specific

ELEMENT**PERFORMANCE CRITERIA**

communication needs of individuals within the group are identified and addressed

5. Identify communication strategies to build relationships with clients who are involuntary or present communication challenges
- 5.1 Identify and address specific communication barriers such as:
- closed or unreceptive attitudes
 - mistrust or misunderstanding of people, organisations, systems and/or processes
 - emotional states, such as fear, anger and frustration
- 5.2 Identify areas of mistrust or conflict that may require resolution
- 5.3 Identify the need to include *additional parties*

Required Skills and Knowledge**REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level required for this unit.

Essential knowledge:

It is critical that the candidate demonstrate knowledge of:

- Effective communication strategies and techniques to address barriers and build and maintain relationships
- Recognition of communication styles of individuals
- Basic group dynamics and facilitation of group discussion

The candidate must also be able to demonstrate relevant knowledge required to effectively perform task skills; task management skills; contingency management skills and job/role environment skills as outlined in elements and performance criteria, such as knowledge of:

- Cross cultural communication protocols

REQUIRED SKILLS AND KNOWLEDGE

- Non-verbal communication strategies
- Communication techniques to maintain constructive interactions
- Barriers to communication

Essential skills:

It is critical that the candidate demonstrate the ability to:

- Provide evidence that all communication with clients and colleagues is appropriate to individual needs and the situation and promotes achievement of organisation objectives
- Use strategies to meet particular communication needs/difficulties
- Address individual issues in a timely way and in a manner which maintains the integrity of the individual
- Know when to provide referrals to conflict resolution and mediation

In addition, the candidate must be able to effectively do the task outlined in elements and performance criteria of this unit, manage the task and manage contingencies in the context of the identified work role

These include the ability to:

- Apply a full range of communication techniques including:
 - reflective and active listening, respectful responding, empathy, feedback and rapport
 - addressing communication barriers through application of a range of strategies
 - recognition of non-verbal triggers
 - clarification of boundaries of work role
- Apply oral communication skills required to fulfil job roles as specified by the organisation/service:
 - skills in asking questions, providing clear information, listening to and understanding workplace instructions, and clarifying workplace instructions when necessary
 - service/organisation may require competence in English or community language, depending on client group

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the

EVIDENCE GUIDE

Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate this unit of competency:

- The individual being assessed must provide evidence of specified essential knowledge as well as skills
- This unit will be most appropriately assessed in a work context or in simulated work environment and under the normal range of work conditions
- Assessment is recommended to be on more than one occasion and must include the range of clients who access the service

Access and equity considerations:

- All workers in community services should be aware of access, equity and human rights issues in relation to their own area of work
- All workers should develop their ability to work in a culturally diverse environment
- In recognition of particular issues facing Aboriginal and Torres Strait Islander communities, workers should be aware of cultural, historical and current issues impacting on Aboriginal and Torres Strait Islander people
- Assessors and trainers must take into account relevant access and equity issues, in particular relating to factors impacting on Aboriginal and/or Torres Strait Islander clients and communities

Context of and specific resources for assessment:

- This unit can be assessed independently, however holistic assessment practice with other community services units of competency is encouraged
- Resources required for assessment include access to relevant workplace or simulated realistic workplace setting where assessment may take place

Method of assessment:

- Assessment may include observation, questioning and evidence gathered from the workplace and/or simulated work environment, including written work

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Communicate effectively includes:

- Effective use of questioning, speaking, and listening and non-verbal communication techniques
- Identifying and evaluating what is occurring within an interaction in a non-judgemental way
- Making decisions about appropriate words, behaviour, posture
- Using clarifying, summarising questions
- Putting together a response that is culturally appropriate
- Expressing an individual perspective
- Expressing own philosophy, ideology and background and exploring the impact of this on the communication
- Exploring and unpacking problems
- Using active and reflective listening appropriately
- Providing sufficient time to enable stories to be told
- Providing summarising and reflective responses in conflict situations
- Confirming that required information is accessed or message communicated

Non-verbal communication includes:

- Gestures
- Posture
- Facial expression

Interviews may include:

- Discussion of staffing issues
- Routine information collection
- Maintaining confidentiality
- Evidential-based
- Non disclosure

RANGE STATEMENT

- Disclosure
- Established procedures may refer to:*
- Commonwealth and State legislation
 - International conventions relating to the rights of individuals
 - Organisation policy and procedures
 - Relevant program standards
 - Duty of care and ethical practice
- Presentation of information includes:*
- Clarity
 - Appropriate sequencing
 - Delivery within an appropriate time
 - Utilising media to enhance presentation, if appropriate
 - Addressing audience needs
- Opportunities will include:*
- Allowing sufficient time to hear individual stories
 - Encouraging a full exploration of issues
 - Encouraging validation of individual issues
- Additional parties may include:*
- Trusted friends
 - Case workers
 - Family members
 - Nominated adults

Unit Sector(s)

Not Applicable

HLTFA311A Apply first aid

Modification History

HLT07 Version 4	HLT07 Version 5	Comments
HLTFA301C Apply first aid	HLTFA311A Apply first aid	Updated in V5 - changes to competency outcomes of first aid units

Unit Descriptor

Descriptor

This unit of competency describes the skills and knowledge required to provide first aid response, life support, management of casualty(s), the incident and other first aiders, until the arrival of medical or other assistance

Application of the Unit

Application

These skills and knowledge may be applied in a range of situations, including community and workplace settings

Training Package users should ensure implementation is consistent with any specific workplace and/or relevant legislative requirements in relation to first aid, including State/Territory requirements for currency

Application of these skills and knowledge should be contextualised as required to address specific industry, enterprise or workplace requirements and to address specific risks and hazards and associated injuries

A current Senior First Aid, Workplace Level 2 or Level 2 qualification may provide evidence of skills and knowledge required by this competency unit. However, as with all evidence of competence, evidence must be assessed against the requirements

specified in the unit of competency

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Not Applicable

Employability Skills Information

Employability Skills This unit contains Employability Skills

Elements and Performance Criteria Pre-Content

Elements define the essential outcomes of a unit of competency.

The Performance Criteria specify the level of performance required to demonstrate achievement of the Element. Terms in italics are elaborated in the Range Statement.

Elements and Performance Criteria

ELEMENT

1. Assess the situation

PERFORMANCE CRITERIA

1.1 Identify assess and minimise *hazards* in the situation that may pose a risk of injury or illness to self and others

1.2 Minimise immediate *risk* to self and casualty's health and safety by controlling any hazard in accordance with work health and safety requirements

1.3 Assess casualty and identify injuries, illnesses and conditions

ELEMENT	PERFORMANCE CRITERIA
2. Apply first aid procedures	<p>2.1 Adopt a communication style to match the casualty's level of consciousness</p> <p>2.2 Use available <i>resources and equipment</i> to make the casualty as comfortable as possible</p> <p>2.3 Respond to the casualty in a culturally aware, sensitive and respectful manner</p> <p>2.4 Determine and explain relevant first aid procedures to provide comfort</p> <p>2.5 Seek consent from casualty prior to applying first aid management</p> <p>2.6 Provide <i>first aid management</i> in accordance with <i>established first aid principles and procedures</i></p> <p>2.7 Seek first aid assistance from others in a timely manner and as appropriate</p> <p>2.8 Correctly operate first aid equipment for first aid management according to manufacturer/supplier's instructions and procedures</p> <p>2.9 Use safe manual handling techniques</p> <p>2.10 Monitor <i>casualty's condition</i> and respond in accordance with established first aid principles and procedures</p> <p>2.11 Finalise casualty management according to casualty's needs and first aid principles</p>
3. Communicate details of the incident	<p>3.1 Request ambulance support and/or appropriate medical assistance according to relevant circumstance</p> <p>3.2 Accurately convey observation of casualty's condition and management activities to ambulance services / relieving personnel</p> <p>3.3 Accurately assess and <i>report details</i> of casualty's physical condition, changes in conditions, management and response to management in line with established procedures</p> <p>3.4 Maintain confidentiality of records and information in line with privacy principles and statutory and/or organisation policies</p>
4. Evaluate own performance	<p>4.1 Seek feedback from <i>appropriate clinical expert</i></p> <p>4.2 Recognise the possible psychological impacts on</p>

ELEMENT**PERFORMANCE CRITERIA**

rescuers involved in critical incidents

4.3 Participate in debriefing/evaluation to improve future response and address individual needs

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Essential knowledge:

The candidate must be able to demonstrate essential knowledge required to effectively do the task outlined in elements and performance criteria of this unit, manage the task and manage contingencies in the context of the identified work role

This includes a demonstrated understanding of:

- Awareness of stress management techniques and available support
- First aid management, based on a risk assessment relevant to the workplace or community setting of:
 - abdominal injuries
 - allergic reactions
 - altered and loss of consciousness
 - asthma
 - anaphylaxis
 - bleeding
 - burns – thermal, chemical, friction, electrical
 - cardiac arrest
 - chest pain
 - choking/airway obstruction
 - drowning
 - envenomation – snake, spider, insect and marine bites and stings
 - environmental impact such as hypothermia, hyperthermia, dehydration, heat stroke
 - injuries- cold and crush injuries; eye and ear injuries; head, neck and spinal injuries; minor skin injuries; needle stick injuries; soft tissue injuries including sprains, strains, dislocations, fractures
 - medical conditions, including cardiac conditions, epilepsy, diabetes, asthma and other respiratory conditions
 - poisoning and toxic substances (including chemical contamination)
 - respiratory distress

- seizures
- shock
- stroke
- substance misuse – common drugs and alcohol, including illicit drugs
- unconsciousness, not breathing or not breathing normally
- Guidelines for provision of first aid as outlined in Australian Resuscitation Council (ARC) Guidelines and guidelines of Australian national peak clinical bodies and State / Territory legislation and regulations
- Social / legal issues including:
 - duty of care
 - confidentiality
 - importance of debriefing
 - need to be culturally aware, sensitive and respectful
 - own skills and limitations
- Understanding of:
 - basic work health and safety requirements in the provision of first aid
 - basic principles and concepts underlying the practice of first aid
 - chain of survival
 - infection control principles and procedures, including use of standard precautions
 - priorities of management in first aid when dealing with life threatening conditions
 - procedures for dealing with major and minor injury and illness
- Understanding of the use of an Automated External Defibrillator (AED), including when to use and when not to
- Understanding the causes of asphyxia due to body position

Essential skills:

It is critical that the candidate demonstrate the ability to effectively do the task outlined in elements and performance criteria of this unit, manage the task and manage contingencies in the context of the identified work role

This includes the ability to:

- Apply first aid principles
- Call an ambulance and/or medical assistance according to relevant circumstances and report casualty(s) condition
- Communicate effectively and assertively in an incident
- Conduct an initial casualty assessment
- Management of:
 - Anaphylaxis using adrenalin auto-injector
 - Avoiding asphyxia due to body position
 - Bronchospasm using bronchodilator and spacer device
 - Cardiac arrest using single rescuer procedure, including the demonstration of a seamless changeover between operators

- External haemorrhage
- Fractures, sprains and strains using arm slings, roller bandages and other appropriate immobilisation techniques
- Unconscious casualty including using a recovery position
- Demonstrate:
 - ability to call an ambulance
 - consideration of the welfare of the casualty
 - safe manual handling
 - site management to prevent further injury
 - understanding of causes contributing to asphyxia due to body position
- Demonstrate correct procedures for performing CPR using a manikin, including standard precautions (i.e. as per unit *HLTCPR211A Perform CPR*)
- Demonstrate infection control, including use of standard precautions
- Evaluate own response and identify appropriate improvements where required
- Follow State and Territory work health and safety legislative requirements
- Make prompt and appropriate decisions relating to managing an incident in the workplace
- Plan an appropriate first aid response in line with established first aid principles, ARC Guidelines and guidelines of Australian national peak clinical bodies, industry standards and State / Territory legislation and regulations and respond to contingencies in line with own skills
- Prepare a written incident report or provide information to enable preparation of an incident report
- Provide assistance with self-medication as per subject's own medication regime and/or administer medication in line with State/Territory legislation and regulations, organisation policies and any available medical/pharmaceutical instructions
- Unpack, activate and follow prompts of an AED

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package. The evidence guide supplements assessment requirements that apply to all units in this Training Package. Users of this evidence guide should first read the package's assessment guidelines.

- Critical aspects of assessment:*
- The individual being assessed must provide evidence of essential knowledge and essential skills
 - Competence should be demonstrated working individually and as part of a first aid team
 - Consistency of performance should be demonstrated over the required range of situations relevant to the

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package. The evidence guide supplements assessment requirements that apply to all units in this Training Package. Users of this evidence guide should first read the package's assessment guidelines.

workplace or community setting

- Currency of first aid knowledge and skills is to be demonstrated in line with ARC Guidelines and guidelines of Australian national peak clinical bodies and State / Territory legislation and regulations
- Skills in performing first aid procedures are to be assessed through demonstration, with questioning to confirm essential knowledge
- Demonstration of first aid procedures over the required range of situations relevant to the workplace setting must be demonstrated using standard precautions and first aid equipment including roller bandages, triangular bandages, other trauma dressings, bronchodilator and spacer device, adrenalin auto-injectors and AED
- For assessment purposes, demonstration of skills in CPR procedures requires using a model of the human body (resuscitation manikin) in line with ARC Guidelines
- All workers in the health industry should be aware of access and equity issues in relation to their own area of work
- All workers should develop their ability to work in a culturally diverse environment
- In recognition of particular health issues facing Aboriginal and Torres Strait Islander communities, workers should be aware of cultural, historical and current issues impacting on health of Aboriginal and Torres Strait Islander people
- Assessors and trainers must take into account relevant access and equity issues, in particular relating to factors impacting on health of Aboriginal and/or Torres Strait Islander clients and communities

Context and resources required for assessment:

Access and equity considerations:

Related units:

This unit incorporates the content of units:

- HLTCPR211A Perform CPR
- HLTFA211A Provide basic emergency life support

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Range Statement

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Contextualisation to address specific requirements may include:

- First aid provision under specific constraints or circumstances (e.g. in confined spaces, in maritime work environment or in work environment involving identified risks/hazards)
- Focus on first aid management of specific types of injury

Established first aid principles and procedures include:

- Australian Resuscitation Council Guidelines
- Guidelines of Australian national peak clinical bodies
- Primary First Aid Principles to:
 - Preserve life
 - Prevent illness, injury and condition(s) becoming worse
 - Promote recovery
 - Protect the unconscious casualty

Hazards may include:

- State/Territory legislation and regulations
- A source or situation with the potential for harm in terms of human injury or ill-health, damage to property, the environment, or a combination of these
- Relevant hazards may be classified under the headings:
 - Biological hazards
 - Chemical hazards
 - Hazards associated with manual handling
 - Physical hazards

Risks may include:

- Environmental risks
- Exposure to blood and other body substances
- Risks associated with the proximity of other workers and bystanders
- Risks from body position
- Risks from equipment, machinery and substances
- Risks from vehicles
- Risks from first aid equipment
- Risk of further injury to the casualty

Casualty's condition is managed for:

- Abdominal injuries
- Airway obstruction
- Allergic reactions

- Altered and loss of consciousness
- Bleeding
- Body position
- Burns – thermal, chemical, friction, electrical
- Cardiac arrest
- Chest pain
- Choking/airway obstruction
- Drowning
- Envenomation – snake, spider, insect and marine bites and stings
- Environmental impact such as hypothermia, hyperthermia, dehydration, heat stroke
- Injuries: cold and crush injuries; eye and ear injuries; head, neck and spinal injuries; minor skin injuries; needle stick injuries; soft tissue injuries including sprains, strains, dislocations, fractures
- Medical conditions, including cardiac conditions, epilepsy, diabetes, asthma and other respiratory conditions
- Poisoning and toxic substances (including chemical contamination)
- Respiratory distress
- Seizures
- Shock
- Stroke
- Substance misuse – common drugs and alcohol, including illicit drugs
- Unconsciousness, not breathing or not breathing normally
- Infection control
- Legal and social responsibilities of first aider
- The setting in which first aid is provided, including:
 - industry/site specific regulations, codes etc.
 - location and nature of the incident
 - location of emergency services personnel
 - situational risks associated with, for example, electrical and biological hazards, weather, motor vehicle accidents
 - State and Territory work health and safety legislative requirements
 - workplace policies and procedures
 - WHS requirements
- The use and availability of first aid equipment and

First aid management must take into account:

- resources
- Resources and equipment are used appropriate to the risk to be met and may include:*
- AED
 - Auto-injector
 - Bronchodilator and spacer device
 - First aid kit
 - Puffer/inhaler
 - Resuscitation mask or barrier
- Appropriate clinical expert may include:*
- Ambulance officer/paramedic
 - Appropriately qualified health care professional
- Report details should include:*
- Time
 - Description of injury/illness
 - First aid management
 - Incident details
 - Location
 - Vital signs
- Report details may include:*
- Administration of medication including:
 - date
 - dose
 - person administering
 - time
 - Fluid intake/output, including fluid loss via:
 - blood
 - faeces
 - urine
 - vomit
 - Injury report forms
 - Workplace documents as per organisation requirements

Unit Sector(s)

Not Applicable

HLTFA403C Manage first aid in the workplace

Modification History

HLT07 Version 4	HLT07 Version 5	Comments
HLTFA403B Manage first aid in the workplace	HLTFA403C Manage first aid in the workplace	ISC upgrade changes to remove references to old OHS legislation and replace with references to new WHS legislation. Updated unit codes to First Aid references.

Unit Descriptor

Descriptor

This unit addresses the establishment and maintenance of facilities to enable or facilitate the provision of appropriate first aid in the workplace

Application of the Unit

Application

The skills and knowledge described in this competency unit are suitable for those in nominated workplace first aider roles

Training Package users should ensure implementation is consistent with any specific workplace and/or relevant legislative requirements in relation to WHS and provision of first aid

Application of these skills and knowledge should be contextualised as required to address specific industry, enterprise or workplace requirements and to address specific risks and hazards and associated injuries

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Not Applicable

Employability Skills Information

Employability Skills This unit contains Employability Skills

Elements and Performance Criteria Pre-Content

Elements define the essential outcomes of a unit of competency.

The Performance Criteria specify the level of performance required to demonstrate achievement of the Element. Terms in italics are elaborated in the Range Statement.

Elements and Performance Criteria

ELEMENT

PERFORMANCE CRITERIA

- | | |
|---|--|
| 1. Establish a workplace first aid facility | <p>1.1 Plan a <i>first aid facility</i> in the workplace to address <i>workplace and legislative requirements</i></p> <p>1.2 Identify potential <i>workplace hazards</i> and assess <i>associated risks</i> as a basis for determining <i>first aid resource</i> requirements</p> <p>1.3 Identify and prepare first aid equipment and resources required to address identified workplace requirements</p> <p>1.4 Identify personnel requirements in line with legislative and workplace requirements</p> <p>1.5 Establish and maintain links with relevant <i>first aid bodies and professional organisations</i> to maintain currency in the field and for referral purposes</p> <p>1.6 Access and provide information in the workplace to encourage risk minimisation and facilitate access to first aid facilities as appropriate</p> |
| 2. <i>Manage</i> a workplace first aid facility | <p>2.1 Monitor and maintain availability of adequate resources to support workplace first aid response</p> |

ELEMENT**PERFORMANCE CRITERIA**

- 2.2 Conduct regular inspections of stock and equipment to ensure currency and operational readiness in line with workplace requirements
- 2.3 Ensure equipment is recovered and reprocessed and that waste is disposed of safely according to legislative and workplace procedures
- 2.4 Ensure equipment and resources are stored and maintained in line with relevant legislation and manufacturer's/supplier's instructions
- 2.5 Contribute to the review of risks in the workplace and validation of organisation policies and procedures relating to the provision of first aid
- 2.6 Contribute to planning for response to major workplace incidents
- 2.7 Deploy appropriate equipment, resources and personnel to ensure timely and effective first aid response in line with workplace requirements
- 2.8 Use safe manual handling techniques
3. Manage workplace first aid records
- 3.1 Ensure *documentation* is completed as required according to legislation and workplace procedures
- 3.2 Maintain first aid records in line with legislative requirements and workplace security practices
- 3.3 Send relevant documents to appropriate bodies in line with workplace and legislative requirements
- 3.4 Maintain confidentiality of records and information in line with privacy principles and statutory and/or organisation policies
4. Evaluate the provision of first aid in the workplace
- 4.1 Evaluate management of workplace incidents and develop an action plan in consultation with relevant parties to improve first aid response in the workplace if required
- 4.2 Participate in debriefing/evaluation in order to improve future operations and address individual needs
- 4.3 Ensure first aid response is provided in a culturally aware, sensitive and respectful manner
- 4.4 Implement and evaluate workplace management

ELEMENT**PERFORMANCE CRITERIA**

procedures in accordance with risk assessment

4.5 Formulate and review contingency planning to identify and select alternative management principles and procedures as required

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level required for this unit.

Essential knowledge:

The candidate must be able to demonstrate essential knowledge required to effectively do the task outlined in elements and performance criteria of this unit, manage the task and manage contingencies in the context of the identified work role

This includes knowledge of:

- Working knowledge of:
 - Australian Resuscitation Council (ARC) Guidelines relating to provision of first aid
 - company/organisation standard operating procedures (SOPS)
 - first aid risk assessment practices and procedures
 - first aiders' skills and limitations in relation to first aid response in the workplace
 - how to gain access to and interpret Safety Data Sheets (SDS)
 - legal responsibilities and duty of care
 - occupational health and safety requirements in the provision of first aid
 - priorities of management in first aid
 - procedures for dealing with major and minor accidents in the workplace
 - safe storage and handling of medication in the workplace
- First aid equipment and resources to manage injuries and illnesses addressed in HLTFA311A: Apply first aid and HLTFA412A: Apply advanced first aid
- First aid management procedures for conditions identified in the Range Statement
- Infection control principles and procedures, including using standard precautions
- State/territory regulations, legislation and policies relating to:
 - currency of first aid skills and knowledge
 - first aid training
 - occupational health and safety requirements in the provision of first aid

REQUIRED SKILLS AND KNOWLEDGE

- workplace first aid provision
- Stress management techniques and available support
- Social issues, with particular reference to workplace culture, issues and resources and associated organisation requirements:
 - importance of first aid response to be culturally aware, sensitive and respectful
 - debriefing counselling procedures
 - consent and confidentiality
 - own skills and limitations

Essential skills:

It is critical that the candidate demonstrate the ability to effectively do the task outlined in elements and performance criteria of this unit, manage the task and manage contingencies in the context of the identified work role

This includes the ability to:

- Apply first aid principles in the workplace
- Assess workplace first aid requirements
- Communicate effectively and assertively and show leadership in an incident
- Conduct an initial casualty assessment and prioritisation
- Conduct/review first aid risk assessment
- Demonstrate:
 - adequate infection control procedures - use of standard precautions
 - consideration of the welfare of casualties and first aiders
 - incident management skills
 - safe manual handling
 - safe storage and handling of medication in the workplace
 - safe storage and handling procedures for pressurised gases
- Implement WHS guidelines
- Interpret, use and maintain records of the range of documentation required by the workplace and regulatory authorities
- Maintain first aid equipment and resources in operational condition
- Make prompt and appropriate decisions relating to managing an incident in the workplace
- Manage a first aid response in an identified workplace context
- Plan an appropriate first aid response in line with established first aid principles, ARC Guidelines and/or State/Territory regulations, legislation and policies and respond appropriately to contingencies in line with own level of skills and knowledge
- Take into account opportunities to address waste minimisation, environmental responsibility and sustainable practice issues
- Use high level literacy and numeracy skills as required to read, interpret, address and

REQUIRED SKILLS AND KNOWLEDGE

communicate guidelines, protocols and reporting requirements

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Critical aspects of assessment:

- The individual being assessed must provide evidence of specified essential knowledge as well as skills
- Consistency of performance should be demonstrated over the required range of situations relevant to the workplace
- Currency of first aid knowledge and skills is to be demonstrated in line with state/territory regulations, legislation and policies, ARC and industry guidelines

Interdependence of units:

Competence in this unit may be assessed individually or with other related competency units, such as:

- Occupational health and safety
- Risk assessment
- Emergency procedures

Access and equity considerations:

- All workers in the health industry should be aware of access and equity issues in relation to their own area of work
- All workers should develop their ability to work in a culturally diverse environment
- In recognition of particular health issues facing Aboriginal and Torres Strait Islander communities, workers should be aware of cultural, historical and current issues impacting on health of Aboriginal and Torres Strait Islander people
- Assessors and trainers must take into account relevant access and equity issues, in particular relating to factors impacting on health of Aboriginal

EVIDENCE GUIDE

and/or Torres Strait Islander clients and communities

Related units:

This unit should be assessed either after or in conjunction with achievement of the following related competency unit:

- HLTFA412A Apply advanced first aid

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Workplace first aid facility may involve:

- First aid room/clinic
- First aid kits suited to specific workplace needs
- First aid equipment and resources
- Availability of personnel trained to provide first aid

Workplace first aid management must take into account:

- Workplace policies and procedures
- Industry/site specific regulations, codes
- Workplace WHS requirements
- State and territory workplace health and safety legislative requirements

Workplace and legislative requirements for a first aid facility include:

- State/territory regulations, legislation and policies
- Specific industry requirements, regulations and/or WHS issues
- Specific hazards present in the workplace
- Number of employees in the workplace
- Number of different workplace sites/locations
- Proximity to local services, including doctors,

RANGE STATEMENT

hospital, ambulance and other emergency services

First aid resources may include but are not limited to:

Non-consumables:

- Equipment, such as:
 - oxygen resuscitation/cylinders
 - AED
 - thermometers
 - auto-injectors
 - back boards
 - stretchers
 - soft bag resuscitator
 - first aid kit
 - casualty's medication
 - analgesic inhalers
 - analgesic gas equipment
 - resuscitation mask or barrier
 - spacer device
 - cervical collars
 - Personal Protective Equipment
- Relevant texts and documentation, such as:
 - Australian Resuscitation Council Guidelines
 - first aid principles, policies and procedures
 - reference materials including SDSs, relevant Occupational Health and Safety Act and Regulations
 - first aid code of practice/compliance codes
 - workplace records and blanks
- Communication systems and equipment

First aid resources may include but are not limited to:

Consumables:

- First aid kits, including bandages, tape, scissors, splinter removers, antiseptic, eye management, disinfectants, resuscitation masks, emergency numbers and contacts, etc
- Dressings
- Ointments
- Cold packs

RANGE STATEMENT

- Analgesics
- Splints
- Sharps disposal
- Bio-hazardous waste bags/bins
- Medical grade oxygen
- Bandages
- Medication
- Personal protective equipment
- Eye wash
- Disinfectants
- Bronchodilators

Workplace hazards and risks may include:

- Hazards associated with workplace equipment, machinery, substances and processes
- Environmental risks
- Risks associated with first aid response involving:
 - first aid equipment (oxygen cylinders, AED)
 - exposure to blood and other body substances
 - risk of further injury to the casualty
 - risks associated with the proximity of other workers and bystanders

First aid bodies and professional organisations may include:

- Australian Resuscitation Council (ARC)
- Support Groups
- Registered Providers/Authorities
- Emergency services

First aid management skills must include:

- Administration of analgesic gases in accordance with ARC Guidelines, state/territory regulations, legislation and policies and industry requirements
- CPR
- Infection control
- AED (where available)

First aid management must account for:

- Location and nature of the workplace
- Environmental conditions e.g. electricity, biological risks, weather, motor vehicle accidents
- Location of emergency services personnel

RANGE STATEMENT

- Number of casualties and potential casualties
- Use and availability of first aid equipment, resources and pharmaceuticals
- Types of dangers/risks to the casualty and any others in the vicinity of the situation
- Confined spaces, subject to industry need

Documentation may include:

- Incident/injury reports
- Casualty history forms
- Disease notification
- Workcover forms
- Medication registers
- Workers' compensation
- Day book
- Pre-participation records (sport)
- Medical histories
- Management records
- Stock records
- Infection control records
- Training records
- First aid risk assessment

Unit Sector(s)

Not Applicable

PSPGOV314A Contribute to conflict management

Modification History

Release	TP Version	Comments
3	PSP12V1	Unit descriptor edited.
2	PSP04V4.2	Layout adjusted. No changes to content.
1	PSP04V4.1	Primary release.

Unit Descriptor

This unit covers the requirement to contribute to conflict management in the workplace between self and others, such as staff or clients. It includes recognising the presence of conflict, dealing with emotions, overcoming barriers to communication, gathering the facts, agreeing on and implementing action. It does not include managing conflict between two other parties, formal negotiation, counselling or conducting mediation.

In practice, contributing to conflict management may overlap with other generalist or specialist public sector work activities such as acting ethically, complying with legislation, working effectively, working with diversity, using workplace communication strategies, etc.

This is one of 4 units of competency in the *Working in Government* and *Human Resource Management* Competency Fields that deal with conflict. Related units are:

- PSPGOV411A Deal with conflict
- PSPGOV508A Manage conflict
- PSPHR603B Provide advisory and mediation services
-
- No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication

Application of the Unit

Not applicable.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements are the essential outcomes of the unit of competency. Together, performance criteria specify the requirements for competent performance. Text in *bold italics* is explained in the Range Statement following.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Recognise the presence of conflict	<p>1.1 <i>Conflict situations</i> and/or the potential for conflict are recognised and confirmed.</p> <p>1.2 The signs, stages and <i>causes of conflict</i> are identified.</p> <p>1.3 <i>Conflict situations</i> are avoided where appropriate, and assistance sought when necessary.</p> <p>1.4 Records of actual/potential conflict are completed in accordance with organisational policy and procedures.</p>
2. Deal with emotions	<p>2.1 Own behaviour and feelings about the situation are reflected on.</p> <p>2.2 Own emotions are recognised and managed.</p> <p>2.3 The other party's emotions are acknowledged and dealt with in a manner that prevents escalation.</p>
3. Overcome barriers to communication	<p>3.1 Barriers to effective communication are identified.</p> <p>3.2 Factors and issues relevant to the situation are identified, clarified and confirmed using appropriate <i>communication techniques</i>.</p> <p>3.3 Third party support is sought if necessary in accordance with <i>legislation, policy and procedures</i>.</p> <p>3.4 <i>Social and cultural differences</i> are taken into account in the communication style and approach taken.</p>

ELEMENT	PERFORMANCE CRITERIA
4. Gather the facts	<p>4.1 The other party is encouraged to relate the facts as they see them.</p> <p>4.2 Information from the other party, as well as emotions or behaviour, is assessed.</p> <p>4.3 Facts from own point of view are shared with the other party objectively .</p> <p>4.4 Additional information is gathered and included where possible, to ensure all perspectives are considered.</p>
5. Agree on and implement action	<p>5.1 <i>Strategies</i> to solve the problem/issue are determined in consultation with the other party.</p> <p>5.2 Where necessary, approval on agreed strategies is obtained in accordance with organisational policy and procedures, and strategies are implemented.</p> <p>5.3 Progress is monitored with other party to confirm the effectiveness of the agreed action.</p> <p>5.4 Records and reports are completed in accordance with legislation, organisational policy and procedures.</p> <p>5.5 Where agreement cannot be reached on strategies for resolution, the problem/issue is referred in accordance with organisational policy and procedures.</p>

Required Skills and Knowledge

This section describes the essential skills and knowledge and their level, required for this unit.

Skill requirements

Look for evidence that confirms skills in:

- using a range of communication techniques with a diverse workforce and client base including assertiveness, listening, non-verbal communication, language style, problem solving
- using problem solving to deal with unexpected issues or attitudes
- dealing with difficult situations and people
- responding to diversity, including gender and disability
- applying procedures relating to occupational health and safety and environment in the context of conflict resolution

Knowledge requirements

Look for evidence that confirms knowledge and understanding of:

- legislation, regulations, organisational policies, procedures and guidelines relating

to managing conflict in the public sector workplace, including equal employment opportunity, diversity, anti-discrimination, harassment, occupational health and safety, privacy, confidentiality, freedom of information

- types of conflict in the workplace and typical causes
- conflict theory including signs, stages, levels, factors involved, results
- group processes and roles people play
- organisational structures and workplace culture
- different social and cultural practices
- conflict resolution skills and strategies
- personal power and positional power
- grievance procedures in the public sector
- equal employment opportunity, equity and diversity principles
- public sector legislation such as occupational health and safety and environment in the context of conflict resolution

Evidence Guide

The Evidence Guide specifies the evidence required to demonstrate achievement in the unit of competency as a whole. It must be read in conjunction with the Unit descriptor, Performance Criteria, the Range Statement and the Assessment Guidelines for the Public Sector Training Package.

Units to be assessed together

- *Pre-requisite* units that must be achieved prior to this unit: *Nil*
- *Co-requisite* units that must be assessed with this unit: *Nil*
- *Co-assessed units* that may be assessed with this unit to increase the efficiency and realism of the assessment process include, but are not limited to:
 - PSPETHC301B Uphold the values and principles of public service
 - PSPGOV301B Work effectively in the organisation
 - PSPGOV302B Contribute to workgroup activities
 - PSPGOV308B Work effectively with diversity
 - PSPGOV312A Use workplace communication strategies
 - PSPLEGN301B Comply with legislation in the public sector
 - PSPOHS301A Contribute to workplace safety

Overview of evidence requirements

In addition to integrated demonstration of the elements and their related performance criteria, look for evidence that confirms:

- the knowledge requirements of this unit
- the skill requirements of this unit
- application of Employability Skills as they relate to this unit
- contribution to conflict management in a range of (3 or more)

contexts (or occasions, over time)

Resources required to carry out assessment

These resources include:

- legislation, policy, procedures and protocols relating to the public sector
- grievance procedures in the public sector
- strategies and guidelines for dealing with workplace conflict
- case studies and workplace scenarios to capture the range of situations likely to be encountered when contributing to conflict management

Where and how to assess evidence

Valid assessment of this unit requires:

- a workplace environment or one that closely resembles normal work practice and replicates the range of conditions likely to be encountered when contributing to conflict management, including coping with difficulties, irregularities and breakdowns in routine
- contribution to conflict management in a range of (3 or more) contexts (or occasions, over time)

Assessment methods should reflect workplace demands, such as literacy, and the needs of particular groups, such as:

- people with disabilities
- people from culturally and linguistically diverse backgrounds
- Aboriginal and Torres Strait Islander people
- women
- young people
- older people
- people in rural and remote locations

Assessment methods suitable for valid and reliable assessment of this competency may include, but are not limited to, a combination of 2 or more of:

- case studies
- portfolios
- questioning
- scenarios
- simulation or role plays
- authenticated evidence from the workplace and/or training courses

For consistency of assessment

Evidence must be gathered over time in a range of contexts to ensure the person can achieve the unit outcome and apply the competency in different situations or environments

Range Statement

The Range Statement provides information about the context in which the unit of competency is carried out. The variables cater for differences between States and Territories and the Commonwealth, and between organisations and workplaces. They allow for different work requirements, work practices and knowledge. The Range Statement also provides a focus for assessment. It relates to the unit as a whole. Text in ***bold italics*** in the Performance Criteria is explained here.

<p><i>Conflict situations</i> may relate to:</p>	<ul style="list-style-type: none"> • conflicts with work colleagues • refusals to follow directions/guidance • customer complaints/dissatisfaction • disagreements with members of the public • bystander behaviour • drug or alcohol affected persons • persons suffering emotional distress
<p><i>Causes of conflict</i> may include:</p>	<ul style="list-style-type: none"> • personality clashes • poor communication • competing needs • cross-cultural issues • abuse of power • workplace bullying • customer dissatisfaction • gender issues • inter-generational issues
<p><i>Conflict solutions</i> may include:</p>	<ul style="list-style-type: none"> • unsafe situations • escalating situations • situations presenting physical danger • situations beyond one's level of expertise or comfort zone
<p><i>Communication techniques</i> may include:</p>	<ul style="list-style-type: none"> • verbal and non-verbal language • questioning and listening • cooperative language • control of emotions, voice and body language • constructive feedback • reflection • summarising • re-phrasing • paraphrasing • presenting options • using language and concepts suited to the occasion and the other party • showing a willingness to compromise
<p><i>Legislation, policies and</i></p>	<ul style="list-style-type: none"> • State/Territory or Commonwealth legislation, regulations,

<i>procedures</i> may include:	<p>organisational policies, procedures and guidelines relating to the conflict management in the public sector, including equal employment opportunity, diversity, anti-discrimination, harassment, occupational health and safety, privacy, confidentiality, freedom of information</p> <ul style="list-style-type: none"> • public sector standards • codes of practice • codes of ethics • security standards
<i>Social and cultural differences</i> may include:	<ul style="list-style-type: none"> • beliefs and values • social conventions • family relationships • codes of conduct • cultural observances • verbal and non-verbal language
<i>Strategies</i> may include:	<ul style="list-style-type: none"> • a partnership approach • working cooperatively on solving the problem • third party assistance • mediation

Unit Sector(s)

Not applicable.

Competency field

Working in Government.

PSPGOV417A Identify and treat risks

Modification History

Release	TP Version	Comments
3	PSP12V1	Unit descriptor edited.
2	PSP04V4.2	Layout adjusted. No changes to content.
1	PSP04V4.1	Primary release.

Unit Descriptor

This unit covers the identification and treatment of risk using the organisation's risk management procedures and treatments. It applies to the risks inherent in all aspects of everyday work in the public sector as well as to specific functional activities and projects related to the particular mandate of the organisation. The unit covers establishment of the risk context, identification, analysis and evaluation of risks, risks treatment, and monitoring and review of risk treatment plan.

In practice, identifying and treating risk occurs in the context of other generalist or specialist public sector work activities such as acting ethically, complying with legislation, applying government processes, handling classified information, using resources, administering projects, providing parliamentary support, making arrests, using financial processes, undertaking scientific research, awarding contracts, undertaking native title assessments, assessing compensation claims, road transport compliance, etc.

This is one of 4 units of competency in the *Working in Government and Management* Competency Fields that deal with risk. Related units are:

- PSPGOV517A Coordinate risk management
- PSPMNGT608B Manage risk
- PSPMNGT704A Undertake enterprise risk management
-
- No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication
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Application of the Unit

Not applicable.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements are the essential outcomes of the unit of competency. Together, performance criteria specify the requirements for competent performance. Text in ***bold italics*** is explained in the Range Statement following.

Elements and Performance Criteria

ELEMENT

PERFORMANCE CRITERIA

1. Establish the risk context

- 1.1 The nature and extent of the work activity are established within the broader ***organisational context***.
- 1.2 The outcomes to be achieved are identified and documented as required.
- 1.3 The relationship between the activity and its environment is analysed and critical ***factors*** in the environment that may impact on the achievement of outcomes are identified.
- 1.4 ***Stakeholders*** are identified and consulted to identify their opinions, concerns and needs related to the activity and the management of risks related to it.
- 1.5 ***Risk evaluation criteria*** are determined for the activity in accordance with ***legislation, policy and procedures*** related to ***risk management*** in the organisation.

2. Identify risks

- 2.1 ***Method/s for identifying risks*** are selected in accordance with risk management policy and procedures, budgetary and time constraints relative to the type of activity to be undertaken.

ELEMENT**PERFORMANCE CRITERIA**

- 2.2 *Sources of risk* are identified and documented as required.
- 2.3 *Risk events* related to each source of risk are identified and recorded in accordance with risk management policy and procedures.
- 2.4 Consultation and communication is undertaken to ensure all possible risks are identified.
- 3. Analyse risks**
- 3.1 The *probability of identified risks* occurring is analysed and rated in accordance with risk management policy and procedures.
- 3.2 The *consequences of identified risks* occurring are analysed and rated according to organisational procedures.
- 3.3 Current *control measures* for any of the identified risks are considered in the risk analysis, and residual risks are analysed and included if necessary.
- 3.4 *Levels of risk* are determined in accordance with risk matrix used by the organisation.
- 3.5 Consultation/communication is undertaken as required to confirm risk levels, and *analysis is documented* in accordance with organisational risk management procedures.
- 4. Evaluate risks**
- 4.1 Risks are evaluated by comparing the level of risk with risk evaluation criteria established at the beginning of the risk management process.
- 4.2 The importance of the activity, its outcomes and the degree of control over the risks are considered.
- 4.3 Potential and actual losses which may arise from the risk are considered.
- 4.4 Benefits and opportunities presented by the risk are taken into account.
- 4.5 Risks are identified as *acceptable* or *unacceptable* in accordance with risk evaluation criteria, and confirmation/approval is obtained in accordance with risk management policy and procedures.
- 4.6 Unacceptable risks are prioritised and the reason/s for acceptance of risks is documented.
- 5. Treat risks**
- 5.1 *Options for treating risks* are determined in accordance with risk management policy and procedures.
- 5.2 The best treatment option is selected and a cost-benefit analysis is undertaken to compare the cost of implementing the treatment with the benefits.
- 5.3 A *risk treatment plan* is prepared, approved and communicated to those who will be involved in implementation.

ELEMENT	PERFORMANCE CRITERIA
	5.4 Changes required to operational structure, procedures or staffing in order to implement risk treatments are negotiated in accordance with organisational policy and procedures.
	5.5 <i>Resources</i> are arranged and risk treatment plan is implemented in accordance with risk management policy and procedures.
6. Monitor and review risk treatment plan	6.1 <i>Changes</i> in the organisational environment and factors impacting on the organisation are monitored for their impact on risks and existing risk treatments.
	6.2 Risk treatments for unacceptable risks are monitored and adjusted as required to ensure they remain effective.
	6.3 Acceptable risks are monitored to ensure these risk levels do not increase over time.
	6.4 Consultations are conducted and data relating to risks and risk treatments are collected, analysed and used to improve risk management in own area of operation.
	6.5 Risk treatment plan is reviewed in accordance with timetable for review of plan and updated as required.
	6.6 Input is provided into formal reviews/audits of risk in the organisation to improve risk management outcomes.

Required Skills and Knowledge

This section describes the essential skills and knowledge and their level, required for this unit.

Skill requirements

Look for evidence that confirms skills in:

- applying legislation, regulations and policies relating to risk management
- researching and analysing the wider context affecting the organisation
- assessing and evaluating risks
- monitoring and reviewing risks and risk treatments
- communicating and consulting with a diverse range of stakeholders
- estimating and arranging resources needed for implementation of risk treatments
- responding to diversity, including gender and disability
- applying procedures relating to occupational health and safety and environment in the context of risk management

Knowledge requirements

Look for evidence that confirms knowledge and understanding of:

- legislation, regulations, policies, procedures and guidelines relating to risk

management

- AS/NZS ISO31000:2009 Risk management - Principles and Guidelines
- HB 436:2004 (Guidelines to AS/NZS 4360:2004) Risk Management Guidelines Companion to AS/NZS 4360:2004
- the organisation's risk management framework
- the relationship of risk to context - how the context may define the risks
- the importance of consultation and communication at every stage of the risk management cycle
- risk management as a core activity of everyday work in the public sector
- the diversity of risks in the public sector
- equal employment opportunity, equity and diversity principles
- public sector legislation such as occupational health and safety and environment in the context of risk management

Evidence Guide

The Evidence Guide specifies the evidence required to demonstrate achievement in the unit of competency as a whole. It must be read in conjunction with the Unit descriptor, Performance Criteria, the Range Statement and the Assessment Guidelines for the Public Sector Training Package.

Units to be assessed together

- *Pre-requisite* units that must be achieved prior to this unit: *Nil*
- *Co-requisite* units that must be assessed with this unit: *Nil*
- *Co-assessed units* that may be assessed with this unit to increase the efficiency and realism of the assessment process include, but are not limited to:
 - PSPETHC401A Uphold and support the values and principles of public service
 - PSPFIN401A Use public sector financial processes
 - PSPGOV402B Deliver and monitor service to clients
 - PSPGOV405B Provide input to change processes
 - PSPGOV406B Gather and analyse information
 - PSPGOV409A Provide support to Parliament
 - PSPGOV422A Apply government processes
 - PSPGOV419A Work with interpreters
 - PSPLAND402A Undertake native title assessments
 - PSPPM405A Administer simple projects
 - PSPPROC410A Administer contracts
 - PSPREG406C Make arrests
 - PSPSEC405A Handle security classified information

Overview of evidence

In addition to integrated demonstration of the elements and their

requirements

related performance criteria, look for evidence that confirms:

- the knowledge requirements of this unit
- the skill requirements of this unit
- application of Employability Skills as they relate to this unit
- identification and treatment of risks in a range of (3 or more) contexts (or occasions, over time)

Resources required to carry out assessment

These resources include:

- legislation, policy, procedures and protocols relating to risk management
- AS/NZS ISO 31000:2009 Risk management - Principles and Guidelines
- HB 436:2004 (Guidelines to AS/NZS 4360:2004) Risk Management Guidelines Companion to AS/NZS 4360:2004
- other national and international risk management standards
- case studies and workplace scenarios to capture the range of risk management situations likely to be encountered

Where and how to assess evidence

Valid assessment of this unit requires:

- a workplace environment or one that closely resembles normal work practice and replicates the range of conditions likely to be encountered when identifying and treating risks, including coping with difficulties, irregularities and breakdowns in routine
- identification and treatment of risks in a range of (3 or more) contexts (or occasions, over time).

Assessment methods should reflect workplace demands, such as literacy, and the needs of particular groups, such as:

- people with disabilities
- people from culturally and linguistically diverse backgrounds
- Aboriginal and Torres Strait Islander people
- women
- young people
- older people
- people in rural and remote locations.

Assessment methods suitable for valid and reliable assessment of this competency may include, but are not limited to, a combination of 2 or more of:

- case studies
- portfolios
- projects
- questioning
- scenarios

- authenticated evidence from the workplace and/or training courses

For consistency of assessment

Evidence must be gathered over time in a range of contexts to ensure the person can achieve the unit outcome and apply the competency in different situations or environments

Range Statement

The Range Statement provides information about the context in which the unit of competency is carried out. The variables cater for differences between States and Territories and the Commonwealth, and between organisations and workplaces. They allow for different work requirements, work practices and knowledge. The Range Statement also provides a focus for assessment. It relates to the unit as a whole. Text in ***bold italics*** in the Performance Criteria is explained here.

<p><i>Organisational context</i> may include:</p>	<ul style="list-style-type: none"> • the organisation, how it is organised, and its capabilities • the organisation's functions: <ul style="list-style-type: none"> • political • operational • financial • social • legal • commercial • the various stakeholders and clients • any official resources, including physical areas and assets, that are vital to the operation of the organisation • key operational elements and services of the organisation • any major projects • the relationship between the organisation and the environment in which it operates
<p><i>Environmental factors</i> may be:</p>	<ul style="list-style-type: none"> • social • economic • legal • technological • environmental
<p><i>Stakeholders</i> may include:</p>	<ul style="list-style-type: none"> • employees • managers • volunteers • unions • financial managers • self-insurers

	<ul style="list-style-type: none"> • clients • suppliers • contractors • service providers • community organisations • the public
Risk evaluation criteria are:	<ul style="list-style-type: none"> • used to rank risks and decide whether they are acceptable or not • affected by: <ul style="list-style-type: none"> • legal requirements • perceptions of internal/external stakeholders • cost-benefit analysis, for example, cost of risk management being less than financial cost if the risk occurred
Legislation, policy and procedures may include:	<ul style="list-style-type: none"> • Commonwealth and State/Territory legislation relating to risk management • national and international codes of practice and standards, such as SIRCA 8001:2003 • the organisation's risk management policies and practices • codes of conduct/codes of ethics • AS/NZS ISO 31000:2009 Risk management - Principles and Guidelines • HB 436:2004 (Guidelines to AS/NZS 4360:2004) Risk Management Guidelines Companion to AS/NZS 4360:2004 • ISO Guide 73:2009 Risk Management, Vocabulary • professional standards for risk management, for example certified practising risk manager (CPRM) • jurisdictional policies, guidelines and web sites, for example www.riskmanagement.qld.gov.au
Risk management:	<ul style="list-style-type: none"> • is a logical and systematic process of identifying, analysing, evaluating, treating and monitoring risks related to any strategy, plan, process, program or procedure that will enable the organisation to minimise losses and maximise opportunities. • may be considered in relation to an organisation's: <ul style="list-style-type: none"> • people • assets and physical environment • reputation and image • legal issues • business continuity • finances • may include written procedures to ensure staff know: <ul style="list-style-type: none"> • what • how • when, and

	<ul style="list-style-type: none"> • by whom, action is to be taken to treat risks in the organisation
Methods for identifying risks may include:	<ul style="list-style-type: none"> • analysis of past records • personal, local or overseas experience • interviews/discussions with stakeholders • surveys/questionnaires • audits and physical inspections • observation of activity • analysis of scenarios • research of external sources • using industry experts/consultants
Risks may include:	<ul style="list-style-type: none"> • physical injury or death • failure of machinery or equipment • breaches of security • fraud • litigation • client dissatisfaction • unfavourable publicity
Risks may be:	<ul style="list-style-type: none"> • internal • external • random • real • perceived
Sources of risk may include:	<ul style="list-style-type: none"> • human behaviour • technology/technical issues • occupational health and safety • legal • political • property/equipment • environmental • financial/market • natural events
Risk events are:	<ul style="list-style-type: none"> • what can happen, as opposed to the source (how a risk may arise) and the impact (what is the implication if it happens)
Probability of identified risk may be:	<ul style="list-style-type: none"> • almost certain • likely • possible • unlikely • rare
Consequences of	<ul style="list-style-type: none"> • insignificant • minor

<i>identified risk</i> may be:	<ul style="list-style-type: none"> • moderate • major • catastrophic
<i>Control measures</i> may:	<ul style="list-style-type: none"> • reduce the probability of the risk occurring, the consequences of the risk, or both • include: <ul style="list-style-type: none"> • training • supervision • minimising/restricting exposure • physical barriers • relocation
<i>Level of risk</i> may be:	<ul style="list-style-type: none"> • low - treated with routine procedures • moderate - with specific responsibility allocated for the risk, and monitoring and response procedures implemented • high - requiring action, as it has potential to be damaging to the organisation • extreme - requiring immediate action, as the potential could be devastating to the organisation
<i>Documentation of analysis</i> may include:	<ul style="list-style-type: none"> • table showing all risks, any existing controls, probability of occurring, consequences and subsequent level of risk
<i>Acceptable risks</i> are:	<ul style="list-style-type: none"> • those which an organisation has determined have the least potential for harm • not necessarily insignificant
<i>Risks may be acceptable</i> because:	<ul style="list-style-type: none"> • the risk level is so low that it does not warrant spending time and money to treat it • the risk is low and the benefits outweigh the cost of treating it • the opportunities presented are much greater than the threat
<i>Unacceptable risks</i> are:	<ul style="list-style-type: none"> • those which an organisation has determined have the most potential for harm
<i>Options for treating risks</i> may include:	<ul style="list-style-type: none"> • avoiding the risk, for example, by terminating the activity or conducting it in another way (these actions may have different risks attached) • controlling the risk, by reducing the probability of the risk occurring, the consequences of the risk, or both • transferring the risk, for example, by arranging insurance, contracting some or all of the activity to another organisation or person, etc • retaining the risk, and making contingency plans/funds allocation for covering any loss or other negative effect from the risk
<i>Risk treatment plan</i> may	<ul style="list-style-type: none"> • sources of risk and risk events • analysis of risks - probability, consequences and risk levels

include:	<ul style="list-style-type: none"> • prioritised list of unacceptable risks • treatment options selected • person/s responsible for implementing treatment options • resources required • performance measures • timeframe for implementation • timetable for review of plan
<i>Resources</i> may include:	<ul style="list-style-type: none"> • physical - equipment, motor vehicles, furniture • human - management, employees, volunteers • financial - funding, budget allocation, sponsorship • resources that are part of the risk treatment, not just implementation of the treatment plan • training and briefing sessions • changes to the organisation's operating structure
<i>Changes</i> may mean that:	<ul style="list-style-type: none"> • new risks are created • existing risks are increased or decreased • risks no longer exist • the priority order of risks changes • risk treatment strategies are no longer effective

Unit Sector(s)

Not applicable.

Competency field

Working in Government.

PSPGOV421A Exercise delegations

Modification History

Release	TP Version	Comments
3	PSP12V1	Unit descriptor edited.
2	PSP04V4.2	Layout adjusted. No changes to content.
1	PSP04V4.1	Primary release.

Unit Descriptor

This unit covers the exercise of delegations in the public sector. It includes confirming the delegation, applying other interacting legislation, policy and guidelines, and exercising delegations.

In practice, exercising delegations may overlap with other generalist or specialist public sector work activities such as acting ethically, complying with legislation, applying government processes, gathering and analysing information, using resources, etc.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication

Application of the Unit

Not applicable.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements are the essential outcomes of the unit of competency. Together, performance criteria specify the requirements for competent performance. Text in *bold italics* is explained in the Range Statement following.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Confirm delegation	<p>1.1 Current information relating to <i>enabling legislation, standards, instructions</i> and delegated authority is accessed and used to maintain up-to-date knowledge of requirements.</p> <p>1.2 <i>Delegation</i> provided under legislation and the boundaries of that authority are confirmed.</p> <p>1.3 Rights, responsibilities and accountabilities under the delegation are identified and confirmed.</p> <p>1.4 All levels of authority under the delegation are confirmed with management and staff to ensure referrals as limits of authority are reached.</p>
2. Apply other legislation, policies and instructions	<p>2.1 <i>Other legislation, policies or instructions</i> that impact on authority under a delegation are identified and these requirements confirmed.</p> <p>2.2 Apparently conflicting legislative directions are resolved or referred in accordance with organisational policy and procedures.</p>
3. Exercise delegations	<p>3.1 Exercise of delegations is consistent with organisational processes and the boundaries and authority contained in legislation, policies and instructions.</p> <p>3.2 Decisions are documented and records kept in accordance with organisational policy and procedures to provide audit information of delegated authority exercised.</p> <p>3.3 Circumstances requiring the exercise of delegations that are outside own limits are identified and approvals are obtained in accordance with organisational policy and procedures.</p> <p>3.4 Risks associated with the exercise of delegations are identified and strategies to manage risks are identified in accordance with the organisation's risk management strategy.</p>

Required Skills and Knowledge

This section describes the essential skills and knowledge and their level, required for this unit.

Skill requirements

Look for evidence that confirms skills in:

- applying legislation, regulations and policies relating to delegations
- using information technology to access relevant legislation and procedures
- reading complex written materials such as legislation, instructions, and standards and applying them to work practices
- scanning techniques to locate main ideas in legislation, policy documents and instructions
- using questioning strategies to clarify understanding
- using communication strategies involving exchanges of often complex oral information
- responding to diversity, including gender and disability
- applying procedures relating to occupational health and safety and environment in the context of exercising delegations

Knowledge requirements

Look for evidence that confirms knowledge and understanding of:

- legislation, regulations, policies, procedures and guidelines relating to delegations
- the range of delegations applicable in the public sector
- instructions and standards relating to delegations
- organisational structure and levels of authority/delegations
- equal employment opportunity, equity and diversity principles
- public sector legislation such as occupational health and safety and environment in the context of delegations

Evidence Guide

The Evidence Guide specifies the evidence required to demonstrate achievement in the unit of competency as a whole. It must be read in conjunction with the Unit descriptor, Performance Criteria, the Range Statement and the Assessment Guidelines for the Public Sector Training Package.

Units to be assessed together

- *Pre-requisite* units that must be achieved prior to this unit: *Nil*
- *Co-requisite* units that must be assessed with this unit: *Nil*
- *Co-assessed units* that may be assessed with this unit to

increase the efficiency and realism of the assessment process include, but are not limited to:

- PSPETHC401A Uphold and support the values and principles of public service
- PSPFIN401A Use public sector financial processes
- PSPGOV403B Use resources to achieve work unit goals
- PSPGOV406B Gather and analyse information
- PSPGOV422A Apply government processes
- PSPHR402A Administer human resource processes
- PSPLEGN401A Encourage compliance with legislation in the public sector
- PSPPROC405B Dispose of assets
- PSPPROC406A Procure goods and services

Overview of evidence requirements

In addition to integrated demonstration of the elements and their related performance criteria, look for evidence that confirms:

- the knowledge requirements of this unit
- the skill requirements of this unit
- exercising delegations in a range of (3 or more) contexts (or occasions, over time).

Resources required to carry out assessment

These resources include:

- legislation, policy, standards, instructions and procedures relating to delegations
- case studies and workplace scenarios to capture the range of situations likely to be encountered when exercising delegations

Where and how to assess evidence

Valid assessment of this unit requires:

- a workplace environment or one that closely resembles normal work practice and replicates the range of conditions likely to be encountered when exercising delegations, including coping with difficulties, irregularities and breakdowns in routine
- exercising delegations in a range of (3 or more) contexts (or occasions, over time).

Assessment methods should reflect workplace demands, such as literacy, and the needs of particular groups, such as:

- people with disabilities
- people from culturally and linguistically diverse backgrounds
- Aboriginal and Torres Strait Islander people
- women
- young people
- older people
- people in rural and remote locations.

Assessment methods suitable for valid and reliable assessment of this competency may include, but are not limited to, a combination of 2 or more of:

- case studies
- portfolios
- questioning
- scenarios
- authenticated evidence from the workplace and/or training courses

For consistency of assessment

Evidence must be gathered over time in a range of contexts to ensure the person can achieve the unit outcome and apply the competency in different situations or environments

Range Statement

<p>The Range Statement provides information about the context in which the unit of competency is carried out. The variables cater for differences between States and Territories and the Commonwealth, and between organisations and workplaces. They allow for different work requirements, work practices and knowledge. The Range Statement also provides a focus for assessment. It relates to the unit as a whole. Text in <i>bold italics</i> in the Performance Criteria is explained here.</p>	
<p><i>Enabling legislation</i> may include:</p>	<ul style="list-style-type: none"> • State/Territory and Commonwealth legislation related to: • public sector management, financial management, auditor general • customs and excise, quarantine, fisheries, agriculture, land management, conservation, coastal management, environmental protection, workers' compensation, workplace relations, legal administration, planning, construction, transport, energy, mining, communications, education and children's services, employment, vocational education and training. • audit, equal employment opportunity and anti-discrimination, occupational health and safety, environment
<p><i>Standards</i> may include:</p>	<ul style="list-style-type: none"> • public sector standards, such as human resource management standards • government security standards • fraud control standards
<p><i>Instructions</i> may include:</p>	<ul style="list-style-type: none"> • public service Commissioner's instructions • chief executive officer's instructions
<p><i>Delegations</i> are:</p>	<ul style="list-style-type: none"> • functions or powers (under an act) assigned (by the Minister) to others • made to specified limits

	<ul style="list-style-type: none"> made to persons in specified positions (i.e. made to the position rather than the individual)
<i>Delegations</i> may include:	<ul style="list-style-type: none"> financial human resources purchasing contracting industrial relations licensing regulatory powers legislation
<i>Other legislation, policies and instructions</i> may include:	<ul style="list-style-type: none"> aspects of common law contract law administrative law industrial relations law financial management acts public service acts

Unit Sector(s)

Not applicable.

Competency field

Working in Government.

PSPREG201A Carry out inspections and monitoring under guidance

Modification History

Release	TP Version	Comments
3	PSP12V1	Unit descriptor edited.
2	PSP04V4.2.	Layout adjusted. No changes to content.
1	PSP04V4.1	Primary release.

Unit Descriptor

This unit covers the requirements to carry out inspections and monitoring activities in accordance with relevant legislation and regulations, working under guidance. It includes confirming and preparing for inspections and monitoring activities, carrying out inspections and monitoring activities, acting on routine non-compliance and providing reports.

In practice, carrying out inspections and monitoring under guidance may overlap with other public sector work activities such as handling workplace information, communicating, using technology, working in a public sector environment, working safely, etc.

This unit is one of five units in the *Regulatory* Competency field that deal with inspection and monitoring. Related units are:

- PSPREG301A Undertake routine inspections and monitoring
- PSPREG413A Undertake inspections and monitoring
- PSPREG503A Supervise and carry out complex inspections and monitoring
- PSPREG603A Manage and lead inspection

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Not applicable.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements are the essential outcomes of the unit of competency. Together, performance criteria specify the requirements for competent performance. Text in ***bold italics*** is explained in the Range Statement following.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Confirm and prepare for inspections and monitoring activities	1.1 <i>Tasks</i> are clarified and confirmed with <i>other staff members</i> in accordance with organisational requirements.
	1.2 <i>Procedures</i> , timeframes, resources and equipment requirements are confirmed in accordance with organisational and task requirements.
	1.3 Legislative requirements, risk management practices and occupational health and safety requirements are confirmed with senior staff.
	1.4 Communication strategies and development opportunities to make clients aware of their obligations under relevant <i>legislation</i> are identified with assistance from other staff members.
	1.5 <i>Resources/equipment</i> are obtained and prepared in accordance with organisational and task requirements.
2. Carry out inspections and monitoring activities	2.1 <i>Inspections and monitoring</i> activities are carried out under guidance in accordance with organisational and legislative requirements, including occupational health and safety.
	2.2 <i>Risk management</i> strategies are implemented as required in accordance with set procedures and timelines.
	2.3 Resources/equipment are used and maintained in accordance

ELEMENT	PERFORMANCE CRITERIA
	with organisational and task requirements.
3. Act on routine non-compliance	<p>3.1 Information/education is provided to achieve client compliance in accordance with organisational guidelines and legislative requirements relating to the seriousness of the possible breach.</p> <p>3.2 Further action as a result of failure to achieve compliance is taken in accordance with organisational guidelines and legislative requirements relating to the seriousness of the possible breach.</p> <p>3.3 Guidance is obtained to interpret legislation/regulations, and contraventions accompanied by recommended action are reported in accordance with organisational policy and procedures.</p> <p>3.4 Serious or complex situations are referred for advice or resolution in accordance with organisational policy and procedures.</p> <p>3.5 Assistance is obtained to determine the elements of offences to be prosecuted under relevant legislation, and information/evidence is collected and provided in accordance with legislation, procedures and rules of evidence.</p> <p>3.6 When required, court attendance and conduct requirements are fulfilled in compliance with organisational guidelines.</p>
4. Provide reports	<p>4.1 Records are maintained in accordance with organisational requirements.</p> <p>4.2 Reports are provided in a timely manner and meet organisational requirements for format and content.</p>

Required Skills and Knowledge

This section describes the essential skills and knowledge and their level, required for this unit.

Skill requirements

Look for evidence that confirms skills in:

- undertaking observation and analysis
- communicating with a diverse range of clients and staff
- responding to diversity, including gender and disability
- writing reports using standard formats
- using computers for word processing and recording of statistical data
- operating workplace equipment
- applying public sector legislation such as occupational health and safety and

environment in the context of inspection and monitoring

Knowledge requirements

Look for evidence that confirms knowledge and understanding of:

- enabling legislation and other public sector legislation including occupational health and safety, environment, privacy
- organisational policy and procedures
- inspection/examination procedures
- monitoring procedures
- elements of an offence
- responses to routine non-compliance
- risk management practices
- equity and diversity principles
- workplace and industry environment

Evidence Guide

The Evidence Guide specifies the evidence required to demonstrate achievement in the unit of competency as a whole. It must be read in conjunction with the Unit descriptor, Performance Criteria, the Range Statement and the Assessment Guidelines for the Public Sector Training Package.

Units to be assessed together

- *Pre-requisite* units that must be achieved prior to this unit: *Nil*
- *Co-requisite* units that must be assessed with this unit: *Nil*
- *Co-assessed units* that may be assessed with this unit to increase the efficiency and realism of the assessment process include, but are not limited to:
 - PSPGOV201B Work in a public sector environment
 - PSPGOV202B Use routine workplace communication techniques
 - PSPGOV203B Deliver a service to clients
 - PSPGOV204B Access and use resources
 - PSPGOV206B Handle workplace information
 - PSPGOV207B Use technology in the workplace
 - PSPGOV208A Write routine workplace materials
 - PSPOHS201B Follow workplace safety procedures

Overview of evidence requirements

In addition to integrated demonstration of the elements and their related performance criteria, look for evidence that confirms:

- the knowledge requirements of this unit

- the skill requirements of this unit
- application of the Employability Skills as they relate to this unit (see Employability Summaries in Qualifications Framework)
- inspections and monitoring undertaken under guidance in a range of (3 or more) contexts (or occasions, over time)

Resources required to carry out assessment

These resources include:

- legislation, policy, procedures and protocols relating to inspection and monitoring
- case studies and workplace scenarios to capture the range of inspection and monitoring situations likely to be encountered

Where and how to assess evidence

Valid assessment of this unit requires:

- a workplace environment or one that closely resembles normal work practice and replicates the range of conditions likely to be encountered when carrying out inspections and monitoring, including coping with difficulties, irregularities and breakdowns in routine
- inspections and monitoring undertaken under guidance in a range of (3 or more) contexts (or occasions, over time)

Assessment methods should reflect workplace demands, such as literacy, and the needs of particular groups, such as:

- people with disabilities
- people from culturally and linguistically diverse backgrounds
- Aboriginal and Torres Strait Islander people
- women
- young people
- older people
- people in rural and remote locations

Assessment methods suitable for valid and reliable assessment of this competency may include, but are not limited to, a combination of 2 or more of:

- case studies
- demonstration
- observation
- portfolios
- questioning
- scenarios
- simulation or role plays
- authenticated evidence from the workplace and/or training

courses

For consistency of assessment

Evidence must be gathered over time in a range of contexts to ensure the person can achieve the unit outcome and apply the competency in different situations or environments

Range Statement

The Range Statement provides information about the context in which the unit of competency is carried out. The variables cater for differences between States and Territories and the Commonwealth, and between organisations and workplaces. They allow for different work requirements, work practices and knowledge. The Range Statement also provides a focus for assessment. It relates to the unit as a whole. Text in ***bold italics*** in the Performance Criteria is explained here.

Tasks may include:

- inspections/examinations
- monitoring
- surveillance
- basic audit activities
- other compliance assurance activities

Other staff members may include:

- supervisors
- senior policy officers
- senior inspectors
- line managers
- project managers
- program managers
- inspection specialists

Procedures may include:

- observation procedures
- recording, such as surveillance forms, databases
- handling procedures
- sampling procedures
- rejection procedures
- storage procedures
- disinfection procedures
- treatment procedures
- work instructions
- organisational guidelines and code of conduct
- incident reporting procedures
- safety procedures
- emergency procedures

Legislation may include:

- evacuation procedures
- Commonwealth legislation and regulations, for example:
- Commonwealth Quarantine Act 1908, proclamations and regulations
- Crimes Act 1914 and Criminal Code Act 1995
- Customs Act 1901 and regulations
- Wildlife Protection Act 1982
- Export Control Act 1982
- Imported Foods Act 1996
- Occupational Health and Safety Act 1988
- State/Territory and Local Government legislation and regulations, such as those relating to:
 - agriculture
 - horticulture
 - conservation and land management
 - fisheries
 - environmental protection
 - building
 - water
 - emergencies
 - international legislation/codes of behaviour

Resources and equipment may include:

- inspection equipment
- maps, plans
- satellite imagery
- aerial photographs
- survey plans
- spatial data and information
- cameras
- personal protective equipment - respirators, gloves, overalls, boots, hearing protection, goggles, masks etc
- test kit equipment
- recording equipment
- measuring equipment
- storage equipment/facilities
- entry authority/warrant
- Global Positioning System (GPS) equipment
- compass
- communication equipment
- computers
- vehicles - 2 or 4 wheel drive

Inspections and

monitoring may relate to:

- aircraft
- airfreight
- animal products
- animals
- cargo
- cereals
- collection of biological specimens
- disposal of organic waste
- fresh produce
- goods
- land condition, such as:
 - topography
 - salinity
 - erosion
 - weed infestation
 - vermin infestation
 - fire hazard
 - over grazing
- land improvements, such as:
 - fences
 - buildings
 - sporting or playground equipment
 - irrigation infrastructure
 - sewerage infrastructure
 - waterfront occupations
 - community structures
- land usage
- leases and other tenures, to ensure compliance with conditions
- licence/permit compliance (e.g. vegetation clearing)
- live fish
- livestock
- mail
- mineral samples
- passenger baggage
- people
- pests
- plant products
- plants

- premises
 - properties
 - reserves and their use/s
 - survey activities to maintain readiness for district emergency plans
 - vector monitoring
 - vessels
- Risk management strategies*** may include:
- monitoring
 - treatment
 - containment
 - control
 - eradication
 - destruction
 - biosecurity strategies
- Action on non-compliance*** may include:
- advice
 - warning
 - formal notification of intent
 - infringement notices
 - on-the-spot fines
 - court prosecution
- Collection of evidence*** may include:
- observation
 - interviewing
 - seizure
 - sampling
 - specimen collection
 - recording
 - photographing
 - diagrammatic evidence
 - notes
 - maintenance of case files
 - determination of land ownership
- Records*** may include:
- notes
 - case files
 - statistics
 - forms (application forms, disease notification forms, etc)
 - notices (seizure notice, infringement notice, etc)
 - invoices
 - receipts
 - commercial documentation such as bills of lading, airway

bills

Unit Sector(s)

Not applicable.

Competency field

Regulatory.

PSPREG401C Exercise regulatory powers

Modification History

Release	TP Version	Comments
3	PSP12V1	Unit descriptor edited.
2	PSP04V4.2.	Layout adjusted. No changes to content.
1	PSP04V4.1	Primary release.

Unit Descriptor

This unit covers the exercise of powers under the organisation's enabling legislation, and other relevant legislation for regulation, monitoring, inspection and investigation. It includes establishing regulatory powers, applying enabling legislation, utilising other legislation and standards, and working with other organisations.

In practice, exercising regulatory powers occurs in the context of other specialist and generalist public sector work activities such as acting ethically, promoting client compliance, assessing compliance, conducting investigations, making arrests, conducting search and seizure, interviewing, gathering evidence, etc.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Not applicable.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements are the essential outcomes of the unit of competency. Together, performance criteria specify the requirements for competent performance. Text in ***bold italics*** is explained in the Range Statement following.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Establish regulatory powers	1.1 Current information relating to enabling <i>legislation</i> and regulations is accessed and used to maintain up-to-date knowledge of requirements.
	1.2 Powers provided under the legislation and the boundaries of those powers are confirmed.
	1.3 Compliance requirements of the legislation, related regulations, standards, codes of practice and policy are identified and confirmed.
	1.4 Acts and omissions that comprise non-compliance/offences under the legislation are identified and confirmed.
2. Apply enabling legislation	2.1 Circumstances where regulatory powers will be exercised are identified and analysed to determine <i>response/s or measures</i> to apply, in accordance with the legislation and organisational policy and procedures.
	2.2 Circumstances requiring the exercise of regulatory powers that are outside own limits are identified and referral to others is made in accordance with organisational policy and procedures.
	2.3 <i>Risks associated with the exercise of regulatory powers</i> are identified and strategies to manage risks are identified in accordance with the organisation's risk management strategy.
	2.4 Enabling legislation is applied consistent with the boundaries and powers contained therein and organisational policy and procedures.
3. Utilise other legislation and standards	3.1 <i>Other legislation</i> and <i>standards</i> which impact on powers are identified and their requirements confirmed.
	3.2 Apparently conflicting legislative directions are resolved or referred in accordance with organisational policy and procedures.

ELEMENT**PERFORMANCE CRITERIA****4. Work with other organisations**

- 4.1 Organisations that have jurisdictions which may overlap are identified and *relationships* are established and maintained in accordance with organisational policy and procedures.
- 4.2 Organisations available to provide assistance and advice or take referrals are identified and relationships are established for mutual benefit.
- 4.3 Organisational protocols and procedures are followed when working with *other organisations*.
- 4.4 Compliance matters are referred to other organisations for action when required in accordance with organisational policy and procedures.
- 4.5 Lead agency protocols/lines of authority are followed during operations involving more than one organisation.

Required Skills and Knowledge

This section describes the essential skills and knowledge and their level, required for this unit.

Skill requirements

Look for evidence that confirms skills in:

- undertaking research and analysis
- using information technology to access relevant legislation and procedures
- reading complex written materials such as legislation, regulations, codes of practice and legal precedents and applying them to work practices
- using scanning techniques to locate main ideas in legislation, guidelines and policy documents
- engaging in discussion involving exchanges of often complex oral information
- communicating with a range of people from diverse backgrounds
- responding to diversity, including gender and disability
- choosing regulatory responses/measures to fit the circumstances and justifying those responses against legislation, guidelines, policy and regulations
- networking, building relationships and working with others
- applying occupational health and safety and environment procedures relating to the exercise of regulatory powers

Knowledge requirements

Look for evidence that confirms knowledge and understanding of:

- full range of regulatory powers and the limits to those powers
- enabling legislation
- offences under the legislation
- aspects of criminal law, administrative law, industrial law, contract law
- statutory time limits
- applicable standards
- terminology used in legislation and procedures
- organisational policies, guidelines and regulations
- equity and diversity principles
- public sector legislation such as occupational health and safety and environment relating to the exercise of regulatory powers

Evidence Guide

The Evidence Guide specifies the evidence required to demonstrate achievement in the unit of competency as a whole. It must be read in conjunction with the Unit descriptor, Performance Criteria, the Range Statement and the Assessment Guidelines for the Public Sector Training Package.

Units to be assessed together

- *Pre-requisite* units that must be achieved prior to this unit: *Nil*
- *Co-requisite* units that must be assessed with this unit: *Nil*
- *Co-assessed units* that may be assessed with this unit to increase the efficiency and realism of the assessment process include, but are not limited to:
 - PSPCART401B Carry out court orderly functions
 - PSPCART402B Manage witnesses
 - PSPCART403B Handle exhibits and documents tendered
 - PSPCART404B Serve process
 - PSPCART405B Handle monies received in satisfaction of warrants or orders
 - PSPCART406B Compile and use official notes
 - PSPETHC401A Uphold and support the values and principles of public service
 - PSPGOV422A Apply government processes
 - PSPLEGN401A Encourage compliance with legislation in the public sector
 - PSPREG402C Promote client compliance
 - PSPREG403B Assess compliance
 - PSPREG404C Investigate non-compliance
 - PSPREG405B Act on non-compliance

- PSPREG406C Make arrests
- PSPREG407B Produce formal record of interview
- PSPREG408C Conduct search and seizure
- PSPREG409B Prepare a brief of evidence
- PSPREG411A Gather information through interviews

Overview of evidence requirements

In addition to integrated demonstration of the elements and their related performance criteria, look for evidence that confirms:

- the knowledge requirements of this unit
- the skill requirements of this unit
- application of the Employability Skills as they relate to this unit (see Employability Summaries in Qualifications Framework)
- the exercise of regulatory powers in a range of (3 or more) contexts (or occasions, over time)

Resources required to carry out assessment

These resources include:

- legislation, regulations, policy, guidelines and standards
- public sector values and codes of conduct
- case studies and workplace scenarios to capture the range of regulatory situations likely to be encountered

Where and how to assess evidence

Valid assessment of this unit requires:

- a workplace environment or one that closely resembles normal work practice and replicates the range of conditions likely to be encountered when exercising regulatory powers, including coping with difficulties, irregularities and breakdowns in routine
- the exercise of regulatory powers in a range of (3 or more) contexts (or occasions, over time)

Assessment methods should reflect workplace demands, such as literacy, and the needs of particular target groups, such as:

- people with disabilities
- people from culturally and linguistically diverse backgrounds
- Aboriginal and Torres Strait Islander people
- women
- young people
- older people
- people in rural and remote locations

Assessment methods suitable for valid and reliable assessment of this competency may include, but are not limited to, 2 or more of:

- case studies
- demonstration
- observation
- portfolios
- projects
- questioning
- scenarios
- simulation or role plays
- authenticated evidence from the workplace and/or training courses

For consistency of assessment

Evidence must be gathered over time in a range of contexts to ensure the person can achieve the unit outcome and apply the competency in different situations or environments

Range Statement

The Range Statement provides information about the context in which the unit of competency is carried out. The variables cater for differences between States and Territories and the Commonwealth, and between organisations and workplaces. They allow for different work requirements, work practices and knowledge. The Range Statement also provides a focus for assessment. It relates to the unit as a whole. Text in *bold italics* in the Performance Criteria is explained here.

Legislation may include:

- State/Territory and Commonwealth legislation related to:
 - public sector management, financial management
 - auditor general
 - audit, customs and excise, quarantine, fisheries, agriculture, land management, conservation, coastal management, environmental protection, environment, insurance, legal administration (sheriffs, young offenders), workers compensation, occupational safety and health, workplace relations
 - planning, construction, transport, energy, mining, resource management, communications
 - education and children's services, employment, vocational education and training, equal employment opportunity and anti-discrimination

Regulatory responses or measures may include:

- audit
- caution
- clearance
- community protection

- control
- encouragement to comply
- entry
- impoundment
- initiation of proceedings that may lead to prosecution
- inspection
- investigation
- issue of notices
- on-the-spot fines
- possession
- referral to another agency/jurisdiction
- search
- seizure
- surveillance
- warning

Risks associated with the exercise of regulatory powers may result from:

- workplace hazards
- environmental hazards
- equipment failure
- people engaged in illegal activities
- movement into and out of Australia of:
 - aircraft
 - cargo
 - people
 - postal articles
 - vessels
- client cultural background
- client literacy levels

Other legislation may include:

- aspects of common law
- aspects of Crimes Act 1914 and Criminal Code Act 1995
- contract law
- administrative law
- industrial relations law
- financial management Acts
- public service Acts

Standards may include:

- public sector standards
- government security standards
- fraud control standards

Relationships may include:

- informal
- formal

Other organisations may include:

- memoranda of understanding (MOUs)
- administrative appeals tribunals
- Coroner's office
- emergency services
- federal police
- fire and rescue
- industrial inspectors
- Local Government law enforcement officers
- legal advisers
- military police
- security services
- State/Territory police and special units
- other State/Territory/Commonwealth departments/agencies
- State/Territory/Commonwealth prosecution agencies

Unit Sector(s)

Not applicable.

Competency field

Regulatory.

PUALAW003B Give evidence in a judicial or quasi-judicial setting

Modification History

Release	TP version	Comments
2	PUA12 V1	Layout adjusted. Application revised.
1	PUA00 V8.1	Primary release on TGA.

Unit Descriptor

This unit covers the competency to prepare evidence, present evidence and follow up on the outcomes of proceedings.

Application of the Unit

This unit applies to workers who are called to present evidence as an expert witness in relation to specific incidents. This may include detailing incident events in relation to operational and organisational procedures. It does not apply to workers who have a specific and ongoing role in regards to the presentation of evidence.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a Unit of Competency.

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT

PERFORMANCE CRITERIA

- | | |
|---|--|
| 1. Prepare for proceedings | 1.1 <i>Arrangements, role and involvement</i> in proceedings are confirmed. |
| | 1.2 <i>Documentation and exhibits</i> are prepared in accordance with legislative requirements and <i>organisation's policies and procedures</i> . |
| 2. Present evidence | 2.1 <i>Proceedings</i> and <i>protocols</i> relevant to the jurisdiction involved are adhered to throughout the proceedings. |
| | 2.2 Rules of evidence relevant to the jurisdiction are adhered to. |
| | 2.3 Evidence is presented in a clear, concise and articulate manner. |
| | 2.4 Considered expert evidence is provided on request in accordance with organisation's policy and consistent with qualifications and expertise. |
| 3. Follow up outcomes of proceedings | 3.1 The outcomes of the proceedings are noted and filed, and reports completed where required according to organisation requirements. |
| | 3.2 Any required actions are implemented in accordance with organisation policies and procedures. |

Required Skills and Knowledge

This describes the essential skills and knowledge and their level, required for this unit.

Required Skills

- presenting evidence clearly and concisely
- taking notes

- word-processing
- writing reports

Required Knowledge

- appeals systems
- exemptions and defences
- general principles of criminal liability
- legislative requirements of presenting evidence
- organisation policies and procedures relating to preparation of documents and evidence and providing expert opinion
- procedures and protocols in different judicial/quasi-judicial systems
- role of legal personnel in judicial/quasi-judicial systems
- types of evidence admissible in judicial/quasi-judicial systems
- types of offences
- use of notes in court/tribunal/commission

Evidence Guide

Critical aspects for assessment and evidence required to demonstrate competency in this unit

All documentation and evidence at hand.

Accurate and articulate presentation of evidence.

Consistency in performance

Evidence should be gathered over a period of time in a range of actual or simulated workplace environments.

Context of and specific resources for assessment

Context of assessment

On the job or in a simulated environment. Written or verbal tests may be used as supporting evidence.

Specific resources for assessment

No special requirements.

Range Statement

The Range Statement relates to the Unit of Competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording in the Performance Criteria is detailed below.

- Documentation and exhibits***
- reports
 - photographs

may include:

- items of evidence
- media footage
- reports of incidents
- radio/telephone records
- logs

Witnesses may include:

- those directly involved
- bystanders and experts

Court protocols:

- voice clarity
- language
- impartiality
- respect for people and offices held
- standards of dress
- forms of address

Organisation's policy and procedures may vary between sectors and organisations and may include:

- legislation relevant to the proceedings
- legislation relevant to the organisation
- operational performance standards
- organisational personnel practices and guidelines
- organisational quality standards

Proceeding may include:

- rules of court
- judicial and quasi judicial tribunals

Arrangements, role and involvement may include:

- confirmation of time
- date and location of proceedings
- confirmation of evidence required to be presented

Unit Sector(s)

Not applicable.

SITHCCC001B Organise and prepare food

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit describes the performance outcomes, skills and knowledge required to organise and prepare a variety of foods within the kitchen of a hospitality or catering operation. It requires the ability to use general food preparation techniques, contribute to the organisation's profitability through effective resource use and to minimise negative environmental impacts by reusing resources, recycling and using safe methods for disposing of kitchen waste.

The term 'organising and preparing food' is also referred to as 'mise en place' and includes basic preparation prior to serving food, which may involve cooking components of a dish but does not include the actual presentation.

This unit underpins effective performance in commercial cookery.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit

This unit applies to hospitality and catering operations where food is prepared and served and may include the preparation of any food type, ingredients, style or cuisine inclusive of Asian cuisine and patisserie products.

This unit describes a key function for cooks and chefs working at any level. Their role may be operational, supervisory or managerial. Job roles include breakfast cook, short order cook, fast food cook, cook, chef, chef de partie, sous chef, executive chef, caterer, patissier and chef patissier.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units This unit must be assessed after the following prerequisite unit:
SITXOHS002A Follow workplace hygiene procedures.

Employability Skills Information

Employability skills The required outcomes described in this unit of competency contain applicable facets of employability skills. The Employability Skills Summary of the qualification in which this unit is packaged will assist in identifying employability skills requirements.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
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ELEMENT	PERFORMANCE CRITERIA
1 Select, prepare and use equipment.	1.1 Select <i>knives and equipment</i> of the correct type and size for the job, and ensure that it is clean, safely assembled and ready before use. 1.2 Use equipment correctly, safely and hygienically.
2 Assemble ingredients for menu items.	2.1 Identify and obtain ingredients according to standard recipes, recipe cards or enterprise requirements. 2.2 Assemble ingredients according to the correct quantity, type and quality required.
3 Prepare food items	3.1 Prepare <i>food items</i> required for menus according to correct weight, amount and number of portions. 3.2 Clean, peel and prepare vegetables and fruit as required for menu items. 3.3 Prepare dairy products required for menu items, ensuring they are correctly handled. 3.4 Measure, sift where appropriate, and use dry goods as required for menu items. 3.5 Correctly handle all food items according to food safety procedures and the handling requirements for particular types of food. 3.6 Prepare food items in the required form and timeframe.
4 Portion food ingredients.	4.1 Select and use suitable knives and equipment for food portioning. 4.2 Portion <i>food ingredients</i> accurately, according to size, weight and required menu items. 4.3 Store prepared and portioned foodstuffs according to food safety procedures and the storage requirements for particular types of food.
5 Contribute to profitability.	5.1 Use the designated quantity, weight and portions of ingredients to minimise wastage and maximise profitability of meals prepared.

ELEMENT	PERFORMANCE CRITERIA
	5.2 Prepare the correct amount of food items according to expected numbers of customers to minimise wastage and maximise profitability of meals prepared.
6 Reduce food preparation costs and negative environmental impacts.	<p>6.1 Use energy and water resources efficiently when cleaning equipment and organising and preparing food to reduce costs and negative environmental impacts.</p> <p>6.2 Save reusable by-products of food preparation for future cooking activities.</p> <p>6.3 Use recyclable products during food preparation and dispose of them in designated recycling bins.</p> <p>6.4 Safely dispose of all kitchen waste and hazardous substances to minimise negative environmental impacts.</p>

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the essential skills and knowledge and their level, required for this unit.

The following skills must be assessed as part of this unit:

- logical and time-efficient work flow
- knife handling techniques
- cutting techniques for foods as required for menu items
- hygienic handling of food and equipment according to local, state or territory and national regulatory requirements
- safe work practices according to OHS principles and procedures, particularly with regard to using knives
- cleaning techniques for kitchen equipment
- problem-solving skills to deal with minor problems, such as shortages of ingredients
- literacy skills to read recipes, menus, instructions and orders
- numeracy skills to calculate portions, and weigh and measure quantities of ingredients.

The following knowledge must be assessed as part of this unit:

- the key characteristics and uses of the main categories of food items and those that are

REQUIRED SKILLS AND KNOWLEDGE

particularly used in the organisation

- menu and recipe requirements for the particular style, products and cuisine being served
- expected numbers of customers to be served
- full details of food safety procedures used in kitchen operations and the particular food safety regime for the organisation
- correct handling and storage requirements for different types of food
- applications of different types of cleaning products
- the essential features of and safe practices for using common hazardous substances used within kitchens and in particular substances used by the organisation e.g. cleaning products
- the environmental impacts of cleaning equipment and preparing food and minimal impact practices to reduce these especially those that relate to reusable resources, water and energy use
- correct and environmentally sound disposal methods for kitchen waste and hazardous substances.

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency

Evidence of the following is essential:

- ability to organise efficient, resource effective preparation of a variety of foods according to expected numbers of customers and to maximise profitability and minimise negative environmental impacts
- ability to use a range of cookery and preparation methods appropriate to the cuisine
- ability to undertake duties according to organisational hygiene, health and safety practices
- knowledge of food safety procedures and correct handling and storage requirements for different types of food
- knowledge of correct and environmentally sound disposal methods for kitchen waste and in particular for hazardous substances
- ability to organise and prepare a wide variety of general food items within the timeframe required by a

EVIDENCE GUIDE

commercial kitchen..

Context of and specific resources for assessment

Assessment must ensure:

- demonstration of skills within normal operating conditions of a fully equipped commercial kitchen including industry-current equipment
- industry-realistic ratios of kitchen staff to customers.

Methods of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation of the candidate preparing food
- inspection of food items prepared by the candidate
- written or oral questions to assess knowledge of preparation techniques, handling and storage requirements for various food types, hazardous substances and efficient resource use
- review of portfolios of evidence and third-party workplace reports of on-the-job performance by the candidate.

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:

- any Asian Cookery unit
- any Commercial Cookery and Catering unit
- any Patisserie unit.

Assessing employability skills

Employability skills are integral to effective performance in the workplace and are broadly consistent across industry sectors. How these skills are applied varies between occupations and qualifications due to the different work functions and contexts.

Employability skills embedded in this unit should be assessed holistically with other relevant units that make up the skill set or qualification and in the context of the job role.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the performance criteria is detailed below.

Knives and equipment may be mechanical or power driven and:

- must include the use of:
 - knives, cleavers and utensils such as butcher and boning knives, filleting knives, butter spreading knives, vegetable peeler or knives, slicers
 - knife sharpening equipment
 - graters
 - commercial mixers food processors, blenders and attachments
 - scales
 - measures
 - whisks
 - thermometers
- may include the use of:
 - saws and meat cleavers
 - meat bats
 - meat hooks
 - larding needles
 - mincers
 - bowl choppers
 - slicing machines
 - grills or salamanders

Knives and equipment may be mechanical or power driven and:

- fryers
- large fixed equipment, such as bains marie and fridges
- patisserie cutting implements
- cutting implements for nuts and fruits
- beaters
- spatulas
- wooden spoons
- piping bags and attachments
- moulds, shapes and cutters
- cake tins.

RANGE STATEMENT

Food items to be prepared:

- must include the use of:
 - dairy products, including milk, yoghurt, cheeses and alternatives, e.g. soy products
 - dry goods, such as flours, sugars, pastas and rice
 - standard fruit and vegetables
- general food items such as sauces, condiments and flavourings, garnishes, coatings and batters may include the use of:
 - meat, seafood and poultry that may be fresh, frozen, preserved or pre-prepared
 - meat products such as standard cuts, sausages, hams and salami.

Food ingredients to be portioned may include:

- meat
- seafood
- poultry
- pastry
- dough
- fruit
- vegetables.

Reusable by-products may include:

- meat and fish offcuts
- bones and trimmings
- fruit peelings and offcuts
- vegetable peelings and offcuts
- unused portions of:
 - fruits
 - vegetables
 - seafood, meat and poultry
 - flowers
 - garnishes
 - accompaniments
 - batter
 - dough
 - pastry
 - fillings
 - sauces and dips

RANGE STATEMENT

- eggs
- coconut cream and flesh.
- combined spices
- pastes.

Recyclable products may include:

- glass bottles and jars
- plastics
- paper and cardboard
- tin or aluminium containers
- fruit and vegetable matter.

Kitchen waste and hazardous substances may include:

- Any used or out of date ingredient or food item such as:
 - cooking oils
 - animal fat
 - ghee
 - dairy products, including milk, yoghurt, cheeses and soy products
 - dry goods, such as flours, sugars, pastas and rice
 - fruit and vegetables
 - general food items such as sauces, condiments and flavourings, garnishes, coatings and batters
 - meat, seafood and poultry
 - meat products such as standard cuts, sausages, hams and salami.
- Any cleaning agent or chemicals.

Unit Sector(s)

Sector

Hospitality

Competency field

Competency field

Commercial Cookery and Catering

SITHCCC002A Present food

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit describes the performance outcomes, skills and knowledge required to efficiently and professionally plate, present and serve food in a commercial kitchen or catering operation. It may include the presentation of food for Asian cuisines.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit

This unit applies to all establishments where food is prepared and served. Those undertaking this role would work under supervision and usually as part of a team.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units

This unit must be assessed after the following prerequisite unit:
SITXOHS002A Follow workplace hygiene procedures.

Employability Skills Information

Employability skills The required outcomes described in this unit of competency contain applicable facets of employability skills. The Employability Skills Summary of the qualification in which this unit is packaged will assist in identifying employability skills requirements.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare food for service.	1.1 Identify <i>foods</i> for menu items. 1.2 Arrange sauces and garnishes to enterprise requirements for specific dishes.
2 Portion and plate food.	2.1 Ensure that sufficient supplies of clean, undamaged crockery are available at temperatures appropriate to food being served. 2.2 Portion food according to enterprise policies and standard recipes. 2.3 Plate food and present neatly and attractively, without drips or spills, to the enterprise requirements for the specified dish, taking into consideration eye appeal, colour and contrast, temperature of food, <i>service equipment</i> , and classical and innovative arrangement styles.

ELEMENT	PERFORMANCE CRITERIA
	2.4 Serve food to be displayed in public areas in appropriate serveware at the correct temperature, in an attractive manner, without drips or spills and giving attention to colour.
3 Work in a team.	3.1 Demonstrate good teamwork with all kitchen and food service staff to ensure timely, quality service of food.
	3.2 Organise and follow a kitchen routine for food service to maximise food quality and minimise delays.
	3.3 Maintain a high standard of personal and work-related hygiene practices.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the essential skills and knowledge and their level, required for this unit.

The following skills must be assessed as part of this unit:

- logical and time-efficient work flow
- safe work practices according to OHS principles and procedures
- hygienic handling of food and equipment according to regulatory requirements
- waste minimisation techniques and environmental considerations in relation to food presentation
- problem-solving skills to deal with minor problems such as shortages of ingredients, spillages and mistakes
- literacy skills to read menus and orders
- numeracy skills to calculate portions and plate menu items uniformly.

The following knowledge must be assessed as part of this unit:

- use and characteristics of basic food products and types of menus as required
- classical and innovative styles of food presentation for major food groups.

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency

Evidence of the following is essential:

- application of hygiene and safety principles and procedures
- ability to plate, present and serve a general range of foods efficiently and within realistic workplace time constraints
- ability to work as part of a team in a positive and courteous manner.

Context of and specific resources for assessment

Assessment must ensure:

- demonstration of skills within a fully equipped operational commercial kitchen, including industry-current equipment, as defined in the Assessment Guidelines
- access to a range of equipment for presenting food, including:
 - appropriate crockery and utensils for service
 - food and beverage trays
 - buffet table or unit (if displaying as buffet)
 - buffet display items, such as platters
 - display boards
- use of authentic menu items.

Methods of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation of the candidate working as a member of a team and plating and presenting food
- written or oral questions to assess knowledge of presentation techniques for different food items
- review of portfolios of evidence, such as photographs, and third-party workplace reports of on-the-job performance by the candidate.

Holistic assessment with other units relevant to the

EVIDENCE GUIDE

industry sector, workplace and job role is recommended, for example:

SITHCCC001B Organise and prepare food.

Assessing employability skills

Employability skills are integral to effective performance in the workplace and are broadly consistent across industry sectors. How these skills are applied varies between occupations and qualifications due to the different work functions and contexts.

Employability skills embedded in this unit should be assessed holistically with other relevant units that make up the skill set or qualification and in the context of the job role.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the performance criteria is detailed below.

A variety of ***foods*** must be plated, presented and served, including:

- entrees
- main courses
- desserts
- soups
- sandwiches
- breakfast items
- canapés and appetisers.

Service equipment may include:

- food and beverage trays
- buffet or suitable table
- dishes and platters
- buffet and smorgasbord display items.

Unit Sector(s)

Sector Hospitality

Competency field

Competency field Commercial Cookery and Catering

SITHCCC003B Receive and store kitchen supplies

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit describes the performance outcomes, skills and knowledge required to receive and store supplies in commercial cookery or catering operations. It focuses on the general stock handling procedures required for food and kitchen-related goods.

Supplies refer to all perishable and non-perishable goods received from both internal and external suppliers and maintained within a stock control system.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit

This unit applies to all hospitality and catering enterprises where kitchen supplies are received and stored, such as restaurants, hotels, clubs, cafeterias and other catering operations. Those undertaking this role would work under supervision and would usually be part of a team.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units This unit must be assessed after the following prerequisite unit:
SITXOHS002A Follow workplace hygiene procedures.

Employability Skills Information

Employability skills The required outcomes described in this unit of competency contain applicable facets of employability skills. The Employability Skills Summary of the qualification in which this unit is packaged will assist in identifying employability skills requirements.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Take delivery of supplies.	<p>1.1 Check all incoming <i>supplies</i> against specifications, orders and delivery documentation taking into account quantity, size, weight, quality and freshness, according to enterprise procedures and regulatory requirements.</p> <p>1.2 Identify and record information about the supplier, any <i>temperature checks</i> undertaken, any <i>variations and discrepancies</i> and report them to the appropriate person.</p> <p>1.3 Inspect supplied items for damage, quality, use-by dates, breakages or discrepancies and record details</p>

ELEMENT	PERFORMANCE CRITERIA
	according to enterprise policy and <i>regulatory requirements</i> .
	1.4 Manage excess stock appropriately, according to enterprise policy.
2 Store supplies.	2.1 Transport supplies to appropriate storage area promptly, ensuring that stock is protected from loss, contamination, spoilage, temperature abuse and pests according to OHS and food safety procedures.
	2.2 Store supplies in appropriate <i>storage</i> area, ensuring compliance with enterprise procedures, food safety program, and regulatory requirements for temperature, ventilation and sanitation.
	2.3 Record supply levels accurately and promptly according to enterprise procedures and regulatory requirements.
	2.4 Label supplies according to enterprise procedures.
3 Rotate and maintain supplies.	3.1 Rotate supplies according to enterprise policy.
	3.2 Move and shift supplies according to safety and hygiene requirements.
	3.3 Check the quality of supplies and complete reports as required.
	3.4 Dispose of damaged or spoiled supplies according to enterprise and regulatory requirements.
	3.5 Safely dispose of all excess or spoilt stock and waste, especially hazardous substances, to minimise negative environmental impacts.
	3.6 Identify and report any problems promptly.
	3.7 Maintain storage areas in optimum condition, ensuring that they are clean, at required temperature, free from vermin or infestation and free from defects.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

REQUIRED SKILLS AND KNOWLEDGE

This section describes the essential skills and knowledge and their level, required for this unit.

The following skills must be assessed as part of this unit:

- ability to use a thermometer correctly to undertake temperature checks using a thermometer for a range of foods at different temperatures
- logical and time-efficient work flow
- safe work practices, particularly in relation to lifting and handling, and stacking and transporting goods
- waste minimisation techniques and environmental considerations in relation to receipt and storage of kitchen supplies.
- problem-solving skills to deal with minor problems such as shortages, variations and errors
- literacy skills to read and check delivery documentation against order requirements and complete records relating to deliveries
- numeracy skills to count and check quantities of stock.

The following knowledge must be assessed as part of this unit:

- principles of stock control, including:
 - rotation
 - correct storage procedures for specific goods
 - food segregation
 - checking for slow moving items
- common examples of stock control documentation and systems
- enterprise requirements and procedures related to the Australia New Zealand Food Standards Code and food safety programs
- suitable storage for the various types of food
- basic supplies and commodities
- hygiene procedures related to stock handling and storage
- correct and environmentally sound disposal methods for waste and in particular for hazardous substances.

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the

EVIDENCE GUIDE

performance criteria, required skills and knowledge, the range statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency

Evidence of the following is essential:

- ability to receive, handle and store kitchen supplies safely and efficiently
- knowledge of the OHS and hygiene issues related to receipt, handling and storage of supplies.

Context of and specific resources for assessment

Assessment must ensure:

- access to a range of perishable and non-perishable supplies
- demonstration of skills within a fully equipped kitchen storage area as defined in the Assessment Guidelines.

Methods of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation of the candidate receiving and storing supplies for an operational commercial kitchen
- written or oral questions to test knowledge of stock procedures for different food items
- review of workplace reports and records related to stock control, prepared by the candidate
- review of portfolios of evidence and third-party workplace reports of on-the-job performance by the candidate.

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

Assessing employability skills

Employability skills are integral to effective performance in the workplace and are broadly consistent across industry sectors. How these skills are applied varies between occupations and qualifications due to the different work functions and contexts.

Employability skills embedded in this unit should be assessed holistically with other relevant units that make up

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the skill set or qualification and in the context of the job role.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the performance criteria is detailed below.

Supplies:

- must include:
 - food, including dry goods, dairy products, meat and seafood, poultry, fruit and vegetables and frozen goods
- may include:
 - beverages
 - utensils and equipment for food preparation
 - cleaning materials and equipment
 - linen, such as tea towels, serviettes, tablecloths and aprons
 - stationery, vouchers and tickets.

Temperature checks may be taken for a range of foods at different temperatures, including:

- raw foods
- ingredients
- cold, frozen or reheated foods or ingredients.

Variations and discrepancies must include:

- rejection of food that is likely to be contaminated, for example, it is at the incorrect temperature (food that is intended to be frozen but has thawed, or cold food that is in the temperature danger zone)
- packaged food that is exposed through damaged packaging
- incorrect quantities, amounts or weights
- wrong product.

RANGE STATEMENT

Regulatory requirements
include:

- Australia New Zealand Food Standards Code
- local, state or territory food safety regulations.

Storage may include:

- refrigeration
- freezers
- coolrooms
- dry stores.

Unit Sector(s)

Sector

Hospitality

Competency field

Competency field

Commercial Cookery and Catering

SITHCCC004B Clean and maintain kitchen premises

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit describes the performance outcomes, skills and knowledge required to clean and maintain kitchens, and food preparation and storage areas in commercial cookery or catering operations. It requires the ability to set up cleaning equipment and to safely clean premises and equipment using resources efficiently to reduce negative environmental impacts.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit

This unit applies to all enterprises with kitchen premises and equipment, such as restaurants, hotels, clubs, cafeterias and other catering operations. Those undertaking this role work under supervision, usually as part of a team such as kitchen attendants and cooks.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units

This unit must be assessed after the following prerequisite unit:
SITXOHS002A Follow workplace hygiene procedures.

Prerequisite units

This unit must be assessed after the following prerequisite unit:
SITXOHS002A Follow workplace hygiene procedures.

Employability Skills Information**Employability skills**

The required outcomes described in this unit of competency contain applicable facets of employability skills. The Employability Skills Summary of the qualification in which this unit is packaged will assist in identifying employability skills requirements.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria**ELEMENT****PERFORMANCE CRITERIA**

- | | | | |
|---|--------------------------------------|-----|---|
| 1 | Clean, sanitise and store equipment. | 1.1 | Select and prepare suitable wet and dry cleaning agents and chemicals according to relevant manufacturer and <i>OHS and environmental requirements</i> |
| | | 1.2 | Clean and sanitise <i>equipment</i> and utensils according to manufacturer instructions and without causing damage. |
| | | 1.3 | Store or stack cleaned equipment and utensils safely and in the designated place. |

ELEMENT	PERFORMANCE CRITERIA
	1.4 Use <i>cleaning equipment</i> safely and according to manufacturer instructions.
	1.5 Assemble and disassemble cleaning equipment in a safe manner.
	1.6 Store cleaning equipment safely and correctly in the designated position and area.
2 Clean and sanitise premises.	2.1 Follow cleaning schedules correctly.
	2.2 Use chemicals and equipment correctly and safely to clean and sanitise walls, floors, shelves and other <i>surfaces</i> .
	2.3 Clean and sanitise walls, floors, shelves and working surfaces without causing damage to health or property.
	2.4 Follow <i>procedures in the event of a chemical accident</i> according to enterprise policy and procedures.
	2.5 Sort <i>linen</i> and safely remove it according to enterprise procedures.
3 Reduce negative environmental impacts.	3.1 Use energy, water and other resources efficiently when cleaning premises to reduce negative environmental impacts.
	3.2 Safely dispose of all waste, especially hazardous substances, to minimise negative environmental impacts.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the essential skills and knowledge and their level, required for this unit.

The following skills must be assessed as part of this unit:

- correct use of personal protective equipment
- cleaning techniques for premises and equipment
- correct and safe usage and storage of cleaning materials and chemicals
- safe work practices, particularly in relation to bending, lifting, carrying and using equipment
- logical and time-efficient work flow

REQUIRED SKILLS AND KNOWLEDGE

- problem-solving skills to deal with difficult or unusual stains and soiling
- literacy skills to read instructions and labels on equipment and cleaning chemicals
- numeracy skills to calculate the dilution requirements of chemical and cleaning products.

The following knowledge must be assessed as part of this unit:

- sanitising and disinfecting methods and procedures and the importance and purpose of each
- hygiene and cross-contamination issues for kitchens
- cleaning procedures for various surfaces and equipment, including wet and dry
- correct cleaning chemicals, equipment and procedures for cleaning various surfaces and materials
- enterprise procedures and standards in relation to presentation of premises
- safe work practices relating to use of cleaning equipment, bending and manual handling
- applications of different types of cleaning products
- the essential features of and safe practices for using common hazardous substances used to clean commercial kitchens and in particular substances used by the organisation e.g. cleaning products and chemicals
- the environmental impacts of cleaning commercial kitchens and equipment and minimal impact practices to reduce these especially those that relate to resource, water and energy use
- correct and environmentally sound disposal methods for kitchen waste and in particular for hazardous substances.

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency

Evidence of the following is essential:

- ability to select and use relevant equipment and cleaning agents safely, efficiently and according to acceptable enterprise cleaning routines and timeframes
- ability to organise resource effective cleaning of both wet and dry areas and large and small equipment and

EVIDENCE GUIDE

utensils commonly found in a commercial kitchen

- ability to undertake duties according to organisational food safety, health and safety practices
- knowledge of correct and environmentally sound disposal methods for waste and in particular for hazardous substances
- ability to complete cleaning tasks within the timeframe required by a within commercially realistic timeframes.

Context of and specific resources for assessment

Assessment must ensure:

- demonstration of skills within a fully equipped operational commercial kitchen and kitchen storage area as defined in the Assessment Guidelines
- access to:
 - various surfaces for cleaning
 - appropriate chemicals and material safety data sheets (MSDS)
 - pest control products
 - mops, brooms and brushes
 - cloths, swabs and plastic bucket
 - personal protective equipment, such as gloves, goggles, face masks and rubber aprons
 - waste sink for mops
- use of appropriate cleaning materials and equipment for kitchen areas.

Methods of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation of the candidate cleaning a fully equipped commercial kitchen and storage areas
- inspection of areas cleaned by the candidate
- oral or written questioning to assess knowledge of cleaning and maintenance procedures, materials equipment and hazardous substances, efficient resource use and safety and hygiene issues
- review of portfolios of evidence and third-party workplace reports of on-the-job performance by the candidate.

EVIDENCE GUIDE

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

Assessing employability skills

Employability skills are integral to effective performance in the workplace and are broadly consistent across industry sectors. How these skills are applied varies between occupations and qualifications due to the different work functions and contexts.

Employability skills embedded in this unit should be assessed holistically with other relevant units that make up the skill set or qualification and in the context of the job role.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the performance criteria is detailed below.

OHS and environmental requirements may include:

- enterprise policies and procedures related to cleaning operations and disposal of used chemicals
- general workplace safety procedures
- correct use of manual handling techniques
- use of hazardous substances and storage requirements
- enterprise security procedures.

Equipment to be cleaned and sanitised must include:

- crockery
- glassware
- cutlery
- utensils
- pots, pans and dishes
- containers
- chopping boards
- garbage bins.

RANGE STATEMENT

Cleaning equipment may include:

- dishwashers
- floor scrubbers or polishers
- mops
- cleaning cloths
- brooms and dustpans
- pressurised steam and water cleaners.

Surfaces to be cleaned must include:

- walls
- floors
- shelves
- benches and working surfaces
- ovens, stoves, cooking equipment and appliances
- fridges, freezers and coolrooms
- storerooms and cupboards
- extraction fans.

Procedures in the event of a chemical accident may include:

- following first aid procedures within scope of individual responsibility
- ensuring contaminated food is destroyed
- ensuring food preparation area, surfaces and equipment are treated according to enterprise procedures to avoid any risk to food.

Linen may include:

- napkins
- tablecloths
- serving cloths
- tea towels
- clothing
- cleaning cloths.

Unit Sector(s)

Sector

Hospitality

Competency field

Competency field

Commercial Cookery and Catering

SITHCCC005A Use basic methods of cookery

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit describes the performance outcomes, skills and knowledge required to use a range of basic cookery methods to prepare menu items for the kitchen of a hospitality or catering operation. The unit underpins effective performance in all other cookery units.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit

This unit applies to hospitality and catering enterprises where food is prepared and served such as restaurants, hotels, clubs, cafeterias and other catering operations. It applies to cooks who usually work as part of a team and under supervision.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units

This unit must be assessed after the following prerequisite units:

SITHCCC001B Organise and prepare food

SITHCCC002A Present food

SITXOHS002A Follow workplace hygiene procedures.

Employability Skills Information

Employability skills

The required outcomes described in this unit of competency contain applicable facets of employability skills. The Employability Skills Summary of the qualification in which this unit is packaged will assist in identifying employability skills requirements.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT

PERFORMANCE CRITERIA

- | | | | |
|---|--|-----|---|
| 1 | Select and use cooking equipment and technology. | 1.1 | Select appropriate <i>equipment and technology</i> for particular cooking methods. |
| | | 1.2 | Use equipment hygienically, safely and according to manufacturer instructions. |

ELEMENT	PERFORMANCE CRITERIA
2 Prepare and cook food using basic methods of cookery.	<p>2.1 Use various <i>cookery methods</i> to prepare dishes to enterprise standard.</p> <p>2.2 Calculate correct quantities and ratios of <i>commodities</i> for specific cookery methods.</p> <p>2.3 Complete cooking process in a logical and safe manner.</p> <p>2.4 Identify problems with the cooking process promptly and take corrective action.</p> <p>2.5 Prepare dishes using a range of methods and current technology within acceptable enterprise and customer timeframes.</p> <p>2.6 Work cooperatively with kitchen and front-of-house colleagues to ensure timely preparation of dishes.</p>

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the essential skills and knowledge and their level, required for this unit.

The following skills must be assessed as part of this unit:

- logical and time-efficient work flow
- use and characteristics of a range of equipment used for the required methods of cookery
- safe work practices, particularly in relation to bending and lifting, and using cutting implements, appliances, heated surfaces and other equipment that carries a risk of burns
- waste minimisation techniques and environmental considerations in relation to different cookery methods
- problem-solving skills to deal with problems such as shortages of food items, mistakes or problems in commodities or meals produced, and equipment failure
- literacy skills to read menus, orders and instructions
- numeracy skills to calculate quantities and portions against orders.

The following knowledge must be assessed as part of this unit:

- food classification for the major food groups
- characteristics of different foods and appropriate cookery methods

REQUIRED SKILLS AND KNOWLEDGE

- underlying principles of all basic methods of cookery
- culinary terms commonly used in association with the required methods of cookery
- effects of different cookery methods on the nutritional value of food
- principles and practices of personal and professional hygiene related to working in a kitchen, including appropriate uniform and personal protective equipment.

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency

Evidence of the following is essential:

- ability to prepare dishes on more than one occasion within realistic workplace time constraints using a range of cookery methods
- knowledge of major food groups, culinary terminology and equipment as they relate to the required methods of cookery
- application of hygiene and safety principles and procedures during the cooking process.

Context of and specific resources for assessment

Assessment must ensure:

- demonstration of skills within a fully equipped operational commercial kitchen, including industry-current equipment, as defined in the Assessment Guidelines
- demonstration of cookery methods with commodities from the major food groups, including different menus and food items
- access to appropriate utensils, cutlery and equipment to undertake the full range of basic cookery methods, including poaching, stewing, braising, roasting, deep and shallow frying, boiling, atmospheric and pressure

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- steaming, grilling and baking
- use of authentic ingredients.

Methods of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation of the candidate using the required cookery methods
- sampling of dishes prepared by the candidate
- written or oral questions to test knowledge on suitable cookery methods for particular food items, safety issues and food quality indicators
- review of portfolios of evidence and third-party workplace reports of on-the-job performance by the candidate, such as menus and photographs.

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:

SITXFSA001A Implement food safety procedures.

Assessing employability skills

Employability skills are integral to effective performance in the workplace and are broadly consistent across industry sectors. How these skills are applied varies between occupations and qualifications due to the different work functions and contexts.

Employability skills embedded in this unit should be assessed holistically with other relevant units that make up the skill set or qualification and in the context of the job role.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the performance criteria is detailed below.

RANGE STATEMENT

Equipment and technology may include:

- electric, gas or induction ranges
- ovens, including combi ovens
- microwaves
- grills and griddles
- deep-fryers
- salamanders
- food processors
- blenders
- mixers
- slicers
- tilting frypan and bratt pan
- steamers
- utensils
- cutlery.

Cookery methods may include any used within an enterprise but must include the following:

- boiling
- poaching
- steaming
- stewing
- braising
- roasting
- baking
- grilling
- shallow frying
- deep-frying
- stir-frying
- pan-frying.

Dishes to be prepared must use a range of commonly-found *commodities* including:

- dairy products, such as milk, butter, yoghurt, cheeses and alternatives
- dry goods, such as flours, sugars, pastas and rice
- standard fruit and vegetables
- eggs
- meat, seafood and poultry, which may be fresh, frozen, preserved or pre-prepared, and may also include meat products such as standard cuts, sausages, hams, salami and other meat products
- general food items, such as oils, sauces, condiments

RANGE STATEMENT

and flavourings, garnishes, coatings and batters.

Unit Sector(s)

Sector Hospitality

Competency field

Competency field Commercial Cookery and Catering

SITHCCC027A Prepare, cook and serve food for food service

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit describes the performance outcomes, skills and knowledge required to prepare, cook and serve food items for a food service. It incorporates aspects of preparing, cooking and serving a variety of food items for a service period in a hospitality enterprise, using a range of basic cooking methods and working as part of a team. The unit integrates key technical and organisational skills required by a short order cook or caterer. It brings together the skills and knowledge covered in individual units and focuses on the way these must be applied in a commercial kitchen. This unit underpins the more advanced integrated unit SITHCCC028A Prepare, cook and serve food for menus.

Food service periods may be breakfast, lunch, dinner, supper or special functions and events.

Styles of menus may be classical, contemporary or ethnic and may be formal or informal according to enterprise requirements.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit

This unit applies to hospitality and catering operations where food is prepared and served.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units This unit must be assessed after the following prerequisite units:

- SITHCCC001B Organise and prepare food
- SITHCCC002A Present food
- SITHCCC003B Receive and store kitchen supplies
- SITHCCC005A Use basic methods of cookery
- SITXOHS002A Follow workplace hygiene procedures.

Employability Skills Information

Employability skills The required outcomes described in this unit of competency contain applicable facets of employability skills. The Employability Skills Summary of the qualification in which this unit is packaged will assist in identifying employability skills requirements.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
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ELEMENT	PERFORMANCE CRITERIA
1 Organise and prepare for food service.	<p>1.1 Calculate commodity quantities for a dish and determine requirements for quality and style according to recipes and specifications.</p> <p>1.2 Prepare a jobs checklist for food that is clear, complete and appropriate to the situation.</p> <p>1.3 Liaise with other team members about menu requirements and job roles.</p> <p>1.4 Follow a work schedule to maximise efficiency, taking into consideration roles and responsibilities of other team members.</p> <p>1.5 Organise and prepare food items in correct quantities and according to requirements.</p> <p>1.6 Store food items appropriately in readiness for service.</p>
2 Cook and serve menu items for food service.	<p>2.1 Identify and use appropriate commercial equipment to produce menu items.</p> <p>2.2 Cook and serve menu items according to menu type and service style, using appropriate cookery methods.</p> <p>2.3 Meet special requests or dietary requirements of customers under direction.</p> <p>2.4 Work cooperatively as part of a kitchen team.</p> <p>2.5 Follow workplace safety and hygiene procedures according to enterprise and legislative requirements.</p>
3 Complete end of service requirements.	<p>3.1 Carry out end of service procedures according to enterprise practices and regulatory requirements.</p> <p>3.2 Store food items appropriately to minimise food spoilage, contamination and wastage, and label them according to enterprise procedures.</p> <p>3.3 Participate in post-service debrief.</p>

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

REQUIRED SKILLS AND KNOWLEDGE

This section describes the essential skills and knowledge and their level, required for this unit.

The following skills must be assessed as part of this unit:

- food presentation techniques
- portion control and waste minimisation
- teamwork and communication
- safe work practices, particularly in relation to bending and lifting, and using cutting implements, appliances, heated surfaces and other equipment that carries a risk of burns
- problem-solving skills to deal with problems such as shortages of food items, over or undercooked food, pressure of work and kitchen conditions
- literacy skills to read menus, recipes and task sheets
- numeracy skills to weigh and measure quantities of ingredients.

The following knowledge must be assessed as part of this unit:

- characteristics of different foods from all main food categories served in the enterprise and appropriate cookery methods
- standard recipes
- mise en place procedures
- basic principles and methods of cookery
- principles and practices of planning and organising work
- principles and practices related to food safety
- nutrition in relation to meeting specific dietary requirements under direction
- culinary terms commonly used in the industry and enterprise.

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency

Evidence of the following is essential:

- collection of direct, indirect and supplementary evidence showing preparation and service of multiple

EVIDENCE GUIDE

items for a minimum of 12 complete food service periods to ensure integration of skills and consistency of performance in different circumstances

- use of a range of cookery methods appropriate to menu items
- production of a range of menu items to industry and enterprise standards of quality
- safe food hygiene and work practices
- ability to multi-task and respond to multiple demands and requests simultaneously
- ability to work as part of a team in a positive and courteous manner
- preparation of dishes for customers within the typical workplace time constraints of a busy commercial kitchen.

Context of and specific resources for assessment

Assessment must ensure:

- use of a wide range of suitable ingredients for preparing, cooking and serving food items for food service
- demonstration of skills within normal operating conditions of a fully equipped commercial kitchen, including industry-current equipment, as defined in the Assessment Guidelines
- industry-realistic ratios of kitchen staff to customers.

Methods of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation of the candidate working as part of a kitchen team
- sampling of menu items produced by the candidate
- evaluation of customer feedback about menu items and speed and timing of service
- written or oral questions to test knowledge about commodities, cookery techniques, equipment and food hygiene
- review of portfolios of evidence and third-party workplace reports of on-the-job performance by the candidate.

EVIDENCE GUIDE

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. For example, it is expected that candidates will have completed a selection of other units dealing with basic cookery skills. These must be selected according to enterprise requirements and reflect the knowledge and skills required to cook a range of menu items for a food service period in a commercial kitchen.

Assessing employability skills

Employability skills are integral to effective performance in the workplace and are broadly consistent across industry sectors. How these skills are applied varies between occupations and qualifications due to the different work functions and contexts.

Employability skills embedded in this unit should be assessed holistically with other relevant units that make up the skill set or qualification and in the context of the job role.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the performance criteria is detailed below.

Organising and preparing food items (mise en place) includes as required:

- cleaning and preparing vegetables and other commodities
- preparing and portioning meat, poultry and seafood
- preparing stocks, sauces and dressings
- preparing garnishes
- cooking soups and other precooked items
- preparing or cooking desserts
- selecting and using serveware and equipment.

Appropriate commercial

- electric, gas or induction ranges

RANGE STATEMENT

equipment may include:

- ovens, including combi ovens
- microwaves
- grills and griddles
- deep-fryers
- salamanders
- food processors
- blenders
- mixers
- slicers
- tilting frypan and bratt pan
- steamers
- bains marie.

Menu type will vary according to the enterprise and occasion and may include:

- à la carte
- set menu (table d'hôte)
- function or buffet.

Cookery methods may include:

- boiling
- poaching
- steaming
- stewing
- braising
- roasting
- baking
- grilling
- shallow frying
- deep-frying
- stir-frying
- pan-frying.

Special requests or dietary requirements of customers may include:

- cultural needs and restrictions
- specific dietary requirements related to medical requirements, such as food exclusions for allergies and medications, and diabetic or other diets
- preferences for particular ingredients and cooking methods, such as vegetarian.

RANGE STATEMENT

End of service procedures may include:

- safe storage of food items
- cleaning procedures related to kitchen and equipment
- debriefing sessions
- quality reviews
- restocking
- preparations for the next food service period.

Unit Sector(s)

Sector Hospitality

Competency field

Competency field Commercial Cookery and Catering

SITXCOM001A Work with colleagues and customers

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit describes the performance outcomes, interpersonal, communication and customer service skills and knowledge required to work in the service industries. This is a core unit underpinning all other units involving interaction with colleagues and customers.

Key required skills and knowledge for this role include meeting personal presentation standards, establishing rapport with customers, determining and addressing customer needs and expectations, dealing with complaints, working in teams and using appropriate communication techniques and mediums.

Application of the Unit

Application of the unit

This unit applies across the service industries to all job roles and levels and in particular to the full range of tourism and hospitality industry sectors and environments. It applies to those who deal directly with customers as well as back-of-house staff or those working in reception areas; in an office; and on tour or on site, such as food and beverage attendants, housekeeping attendants, porters and concierge staff, guides, front office personnel, tour coordinators, event coordinators and retail travel consultants.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units Nil

Employability Skills Information

Employability skills The required outcomes described in this unit of competency contain applicable facets of employability skills. The Employability Skills Summary of the qualification in which this unit is packaged will assist in identifying employability skills requirements.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Communicate with customers.	<p>1.1 Conduct <i>communication</i> with <i>customers and colleagues</i> in a polite, professional and friendly manner.</p> <p>1.2 Use language and tone appropriate to a given situation in both written and spoken communication.</p> <p>1.3 Source relevant information about products and services and provide information clearly to customers.</p> <p>1.4 Use appropriate <i>non-verbal communication</i> in all situations.</p>

ELEMENT	PERFORMANCE CRITERIA
	<p>1.5 Observe and take into consideration non-verbal communication of colleagues and customers.</p> <p>1.6 Show sensitivity to <i>cultural and social differences</i>.</p> <p>1.7 Use active listening and questioning to facilitate effective two-way communication.</p> <p>1.8 Select an appropriate <i>medium of communication</i> for the particular audience, purpose and situation, taking into consideration the characteristics of each medium and the relevant <i>factors</i> involved.</p> <p>1.9 Use communication medium correctly and according to standard <i>protocols and organisation procedures</i>.</p>
2 Maintain personal presentation standards.	2.1 Practise high standards of <i>personal presentation</i> according to organisation requirements, work location, impacts on different types of customers and specific requirements for particular work functions.
3 Provide service to colleagues and customers.	<p>3.1 Identify colleague and customer needs and expectations correctly, including <i>customers with special needs</i>, and provide appropriate products, services or information.</p> <p>3.2 Meet all reasonable colleague and customer needs and requests within acceptable organisation timeframes.</p> <p>3.3 Identify and take all opportunities to enhance service quality.</p>
4 Respond to conflicts and customer complaints.	<p>4.1 Identify potential and existing conflicts and seek solutions in conjunction with parties involved.</p> <p>4.2 Recognise customer dissatisfaction promptly and take action to resolve the situation according to individual level of responsibility and organisation procedures.</p> <p>4.3 Respond to <i>customer complaints</i> positively, sensitively and politely and in consultation with the customer.</p> <p>4.4 Refer escalated complaints to the appropriate person according to individual level of responsibility and organisation policy and procedures.</p> <p>4.5 Maintain a positive and cooperative manner at all times.</p>

ELEMENT	PERFORMANCE CRITERIA
5 Work in a team.	<p>5.1 Demonstrate trust, support and respect towards team members in day-to-day work activities.</p> <p>5.2 Recognise and accommodate cultural differences within the team.</p> <p>5.3 Identify work-team goals jointly with colleagues and relevant others.</p> <p>5.4 Identify, prioritise and complete individual tasks within designated timeframes.</p> <p>5.5 Seek assistance from other team members, supervisors and managers when required.</p> <p>5.6 Offer assistance to colleagues when required to ensure designated work goals are met.</p> <p>5.7 Acknowledge and respond to feedback and information from other team members.</p> <p>5.8 Negotiate changes to individual responsibilities to meet reviewed work goals.</p>

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the essential skills and knowledge and their level, required for this unit.

The following skills must be assessed as part of this unit:

- communication skills in relation to listening, questioning and non-verbal communication
- basic written communication skills, including writing clear and concise messages, notes, emails and faxes
- basic literacy skills to read messages, notes, emails and faxes
- basic telephone skills
- identifying and responding to different cultural, language and special needs and expectations
- meeting personal presentation standards according to organisation requirements
- identifying and dealing with conflict situations, complaints and misunderstandings within scope of responsibility
- customer service skills, including meeting customer requirements, handling customer complaints and requests, developing rapport and promoting suitable products and services.

REQUIRED SKILLS AND KNOWLEDGE

The following knowledge must be assessed as part of this unit:

- protocol and service rituals of the industry, sector and organisation
- ethics of professional hospitality and tourism behaviour
- characteristics, uses and conventions of different types of communication mediums
- teamwork principles.

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Evidence of the following is essential:

- ability to communicate effectively with customers and colleagues (including those with special needs) within a range of situations required for the relevant job role
- ability to work effectively in a team
- ability to respond effectively to a range of customer service situations
- understanding of communication and customer service and its importance in a tourism or hospitality context.

Context of and specific resources for assessment

Assessment must ensure:

- demonstration of communication skills through interaction with others
- project or work activities that allow the candidate to respond to multiple and varying customer service and communication situations relevant to the job role; for those undertaking generic pre-employment training, project activities must cover a range of industry contexts to allow for a broad range of vocational outcomes.

EVIDENCE GUIDE

Methods of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation of the candidate carrying out work tasks involving dealing with customers and colleagues
- role-plays about communication situations and dealing with complaints and misunderstandings
- review of simple messages written by the candidate for various situations
- questions about effective communication and personal presentation
- review of portfolios of evidence and third-party workplace reports of on-the-job performance by the candidate.

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:

- SITXCOM002A Work in a socially diverse environment
- SITXCOM003A Deal with conflict situations.

Assessing employability skills

Employability skills are integral to effective performance in the workplace and are broadly consistent across industry sectors. How these skills are applied varies between occupations and qualifications due to the different work functions and contexts.

Employability skills embedded in this unit should be assessed holistically with other relevant units that make up the skill set or qualification and in the context of the job role.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the performance criteria is detailed below.

Communication may be:

- verbal
- written format, such as electronic (e.g. email) or hard copy (e.g. letter)
- by telephone
- in languages other than English, including Australian Indigenous languages
- visual, such as sign language
- via an interpreter.

Customers and colleagues may be:

- workmates and colleagues
- external customers and clients
- members of other tourism and hospitality industry sectors
- individuals or groups, such as consultants and committees
- government or other organisations
- visitors
- media.

Non-verbal communication may include:

- body language
- dress and accessories
- gestures and mannerisms
- voice tonality and volume
- use of space
- culturally specific communication customs and practices.

Cultural and social differences may include:

- modes of greeting, farewelling and conversation
- body language, including use of body gestures
- formality of language.

RANGE STATEMENT

Medium of communication may include:

- fax
- email or other electronic communication
- simple written messages, such as restaurant bookings or phone messages
- face-to-face
- telephone
- two-way communication systems
- standard forms and pro formas
- assistive technology, e.g. telephone typewriter (TTY)
- through interpreters.

Factors affecting the selection of appropriate medium may include:

- technical and operational features
- access of the sender and receiver to necessary equipment
- technical skills required to use the medium
- required format
- degree of formality required
- urgency and timeframes.

Protocols and organisation procedures may include:

- modes of greeting and farewelling
- addressing the person by name
- timeframe for required response
- style manual requirements
- standard letters and pro formas.

Personal presentation may include:

- dress
- hair and grooming
- hands and nails
- jewellery.

Customers with special needs may include:

- those with a disability
- those with special cultural or language needs
- unaccompanied children
- parents with young children
- pregnant women
- aged people.

RANGE STATEMENT

- Customer complaints* may relate to:
- problems with the service, such as delays or wrong orders
 - problems with the product
 - communication barriers or misunderstandings.

Unit Sector(s)

Sector Cross-Sector

Competency field

Competency field Communication and Teamwork

SITXINV002A Control and order stock

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit describes the performance outcomes, skills and knowledge required to control and order stock. It requires the ability to process stock orders, maintain stock levels, minimise stock losses, manage stocktakes and maintain all documents that relate to the administration of stock.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

The skills required by managers to establish and monitor cost-effective order and supply arrangements are covered in SITXINV003A Manage and purchase stock.

Application of the Unit

Application of the unit

This unit describes a fundamental administrative function for the tourism and hospitality industries and applies to the full range of industry sectors and environments.

Stock control systems might be manual, but increasingly stock control is computerised. This unit covers the administrative control of any type of stock.

Supervisory personnel who operate with a considerable level of autonomy or under limited guidance from others would be responsible for controlling and ordering stock. They would be largely responsible for making decisions on the overall administration of stock and would be the contact person for operational staff referring any stock discrepancies.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units

This unit must be assessed after one of the following prerequisite units:

- SITXINV001A Receive and store stock
- SITHCCC003B Receive and store kitchen supplies.

Employability Skills Information

Employability skills

The required outcomes described in this unit of competency contain applicable facets of employability skills. The Employability Skills Summary of the qualification in which this unit is packaged will assist in identifying employability skills requirements.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT

PERFORMANCE CRITERIA

- | | |
|--------------------------------------|---|
| 1 Maintain stock levels and records. | 1.1 Use <i>stock control systems</i> to administer all stock control and ordering processes fully and efficiently. |
|--------------------------------------|---|

ELEMENT	PERFORMANCE CRITERIA
	<ul style="list-style-type: none"> 1.2 Monitor and maintain <i>stock</i> levels to organisation requirements. 1.3 Monitor stock security and adjust systems as required. 1.4 Monitor and adjust stock reorder cycles as required. 1.5 Inform colleagues of their individual responsibilities in regard to the reordering of stock. 1.6 Maintain records of stock storage and movement according to organisation procedures. 1.7 Monitor stock performance, and identify and report fast or slow-selling items according to organisation procedures.
2 Process stock orders.	<ul style="list-style-type: none"> 2.1 Process orders for stock according to organisation procedures. 2.2 Maintain and record stock levels ensuring information is complete, correct and current. 2.3 Check incoming stock records against purchase and supply agreements and record all necessary details.
3 Minimise stock losses.	<ul style="list-style-type: none"> 3.1 Identify and record <i>stock losses</i> according to organisation procedures. 3.2 Report losses according to organisation procedures. 3.3 Identify avoidable losses and establish reasons for them. 3.4 Recommend solutions to loss situations and implement related procedures to prevent future avoidable losses.
4 Follow up orders.	<ul style="list-style-type: none"> 4.1 Monitor the delivery process to ensure agreed deadlines are met. 4.2 Liaise with colleagues and suppliers to ensure continuity of supply. 4.3 Follow up on routine supply problems or refer problems to appropriate person according to organisation policy. 4.4 Distribute stock to agreed allocations ensuring that it is protected from loss, contamination, spoilage, temperature abuse and pests, and is in line with relevant OHS and food safety procedures.

ELEMENT	PERFORMANCE CRITERIA
5 Organise and administer stocktakes.	5.1 Organise stocktakes at appropriate intervals according to organisation policy and procedures. 5.2 Allocate stocktaking responsibilities to staff. 5.3 Produce accurate stocktake reports within designated timelines.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the essential skills and knowledge and their level, required for this unit.

The following skills must be assessed as part of this unit:

- literacy skills to process all stock order documents and reconcile incoming stock records against purchase orders
- writing skills to record and maintain all stock records and produce complex stocktake reports
- high-level communication skills to inform colleagues on their individual stock ordering and stocktake responsibilities and liaise with suppliers about deliveries and discrepancies
- critical thinking skills to allow for the analysis of stock records to determine stock losses and to make appropriate recommendations for improvements
- numeracy skills to perform complex calculations involving reconciling stock orders and levels.

The following knowledge must be assessed as part of this unit:

- stock ordering procedures
- stock level maintenance techniques appropriate to industry sector
- stocktake procedures appropriate to industry sector
- stock recording systems
- stock security systems and procedures
- types of stock control documentation and systems
- reasons for stock loss and damage and methods used to control these.

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Evidence of the following is essential:

- ordering, control and overall administration of continuous stock supply within a specific tourism and hospitality industry environment
- ability to meet accuracy and speed requirements for completion and maintenance of stock records
- project or work activities conducted over a commercially realistic period of time so that the stock control and maintenance aspects of this unit can be assessed.

Context of and specific resources for assessment

Assessment must ensure:

- ordering, control and overall administration of stock within an operationally realistic tourism or hospitality stock control environment
- use of current technology, equipment, stock documentation and real stock items
- access to stock security and stocktake procedures
- involvement of internal and external suppliers.

Methods of assessment

A range of assessment methods should be used to assess the practical skills and knowledge required to control and order stock. The following examples are appropriate for this unit:

- review of project activities undertaken by the candidate to control stock for a given period of time for a specific outlet
- review of stock control activities undertaken as part of industry placement or training with an industry operator
- written and oral questioning or interview to test knowledge of security and stocktake procedures
- case studies to assess ability to solve problems related

EVIDENCE GUIDE

to stock control, stock loss or security

- review of workplace reports and records prepared by the candidate related to stock control
- review of portfolios of evidence and third-party workplace reports of on-the-job performance by the candidate.

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:

- SITXADM001A Perform office procedures
- SITXMGT001A Monitor work operations
- SITXINV003A Manage and purchase stock.

Assessing employability skills

Employability skills are integral to effective performance in the workplace and are broadly consistent across industry sectors. How these skills are applied varies between occupations and qualifications due to the different work functions and contexts.

Employability skills embedded in this unit should be assessed holistically with other relevant units that make up the skill set or qualification and in the context of the job role.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the performance criteria is detailed below.

Stock control systems may be:

- manual
- computerised.

Stock may include:

- food and beverages
- equipment, such as office equipment and maintenance

RANGE STATEMENT

and cleaning equipment

- linen
- stationery
- brochures and promotional material
- cleaning supplies and chemicals
- vouchers and tickets
- souvenirs and other retail products.

Stock losses may relate to:

- lack of rotation leading to product deterioration
- inappropriate storage conditions
- access by pests or vermin
- theft
- overstocking.

Unit Sector(s)

Sector

Cross-Sector

Competency field

Competency field

Inventory

SITXOHS001B Follow health, safety and security procedures

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit describes the performance outcomes, skills and knowledge required to follow predetermined health, safety and security procedures. It requires the ability to incorporate safe work practices into all workplace activities and to participate in the organisation's OHS management practices.

OHS legislation in all Australian states and territories imposes obligations on employees to participate in the management of their own health and safety and that of their colleagues and anyone else in the workplace. They have a duty to cooperate with their employer's initiatives to ensure safety at work.

No occupational licensing or certification requirements apply to this unit at the time of endorsement.

This unit is one of three hierarchical units describing varying levels of participation in OHS management practices:

- SITXOHS001B Follow health, safety and security procedures
- SITXOHS004B Implement and monitor workplace health, safety and security practices
- SITXOHS005A Establish and maintain an OHS system.
- The use of correct hygiene practices is covered in SITXOHS002A Follow workplace hygiene procedures.

The processes necessary to control specific workplace safety risks are covered in SITXOHS003B Identify hazards, and assess and control safety risks.

Application of the Unit

Application of the unit

This unit describes a fundamental workplace skill for those working within the service industries and applies to the full

range of industry sectors and environments.

Frontline operational personnel who work under close supervision and guidance from others are involved in applying safe work practices during the normal course of their daily activities. They would be required to apply little discretion and judgement because they operate within predefined organisational OHS procedures. Safe working practices and following OHS procedures apply to all personnel operating at any level within the service industries.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units Nil

Employability Skills Information

Employability skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Follow workplace procedures for health, safety and security.	<p>1.1 Correctly and consistently follow the organisation's <i>health, safety and security procedures</i> according to relevant legislative requirements.</p> <p>1.2 Incorporate <i>safe work practices</i> into all workplace activities.</p> <p>1.3 Follow the safety directions of supervisors or managers and heed any workplace safety warning signs.</p> <p>1.4 Use any required protective equipment and wear required personal protective clothing.</p> <p>1.5 Identify and promptly report unsafe work practices, <i>issues and breaches of health, safety and security procedures</i>.</p> <p>1.6 Report any suspicious behaviour or unusual occurrences promptly to the designated person.</p>
2 Follow procedures for emergency situations.	<p>2.1 Recognise emergency and potential <i>emergency situations</i> promptly and determine or take required actions within the scope of individual responsibility.</p> <p>2.2 Follow the organisation's emergency procedures correctly.</p> <p>2.3 Seek assistance promptly from colleagues or other authorities where appropriate.</p> <p>2.4 Report details of emergency situations accurately according to organisation procedures.</p>
3 Participate in the organisation's OHS practices.	<p>3.1 <i>Participate in OHS management practices</i> developed by the organisation to ensure a safe workplace.</p> <p>3.2 Actively participate in the OHS <i>consultation</i> processes and identify and report safety and procedural issues requiring attention.</p> <p>3.3 Ensure immediate work area is free from hazards, participate in scheduled hazard identification activities and report hazards on an ongoing basis.</p> <p>3.4 Participate in risk assessments and suggest appropriate ways of controlling risk.</p> <p>3.5 Raise OHS issues and concerns with designated persons</p>

ELEMENT

PERFORMANCE CRITERIA

according to organisation and legislative requirements.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the essential skills and knowledge and their level, required for this unit.

The following skills must be assessed as part of this unit:

- literacy skills to read and interpret workplace safety signs, procedures, emergency evacuation plans, and hazard identification and risk assessment tools and template documents
- communication skills to participate in consultation processes, to clearly report and explain hazards, to contribute to risk assessments and to assertively suggest control methods.

The following knowledge must be assessed as part of this unit:

- individual employee responsibilities in relation to ensuring safety of self, other workers and other people in the workplace
- broad understanding of employer's responsibilities under relevant state or territory OHS legislation
- broad understanding of employee's responsibility to participate in OHS practices under relevant state or territory OHS legislation
- ramifications of failure to observe OHS policies and procedures and legislative requirements
- working knowledge and understanding of the contents of health, safety and security procedures that relate to the individual workplace
- major workplace hazards and associated health, safety and security risks associated with the hazards as relevant to the individual workplace
- safe work practices relevant to individual job roles and responsibilities
- broad understanding of the particular consultation, hazard identification and risk assessment methods used in the particular workplace
- familiarity with hazard identification and risk assessment tools and template documents.

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Evidence of the following is essential:

- project or work activities that show the candidate's ability to follow predetermined health, safety and security procedures, incorporate safe work practices into all workplace activities and participate in consultation, hazard identification and risk assessment activities for a given service industry operation in line with regulatory requirements
- knowledge and understanding of the implications of disregarding those procedures
- knowledge and understanding of the legal requirement to work according to health, safety and security procedures.

Context of and specific resources for assessment

Assessment must ensure:

- project or work activities that show candidate's ability to apply safe working practices within the context of the particular industry sector and job role in which they are working or seeking work; for those undertaking generic pre-employment training, assessment must cover a range of industry contexts to allow for a broad range of vocational outcomes
- use of the current plain English regulatory documents distributed by the local OHS regulatory authority, any codes of practice and standards issued by regulatory authorities or industry groups, and OHS information and business management manuals issued by industry associations or commercial publishers
- use of current commercial policies and procedures and template documents used for the management of OHS practices.

Methods of assessment

A range of assessment methods should be used to assess the practical skills and knowledge required to follow

EVIDENCE GUIDE

health, safety and security procedures. The following examples are appropriate for this unit:

- direct observation of the candidate explaining workplace safety or emergency procedures to a colleague or customer
- direct observation during an integrated assessment of the candidate demonstrating safe work practices for particular job roles
- case studies and problem-solving exercises, role-plays and simulations for emergency situations
- role-plays to assess participation in consultation meetings
- activities, case studies and problem-solving exercises to assess participation in hazard identification and risk assessment
- written and oral questions or interview to test knowledge of legislation and individual requirements relating to workplace safety and security
- written and oral questioning or interview to test knowledge of appropriate protective equipment and clothing for particular jobs and situations
- review of portfolios of evidence and third-party workplace reports of on-the-job performance by the candidate.

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example, SITXOHS002A Follow workplace hygiene procedures and any operative skills that would allow integration of safe work practices.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording in the performance criteria is detailed below.

RANGE STATEMENT

Health, safety and security procedures may involve:

- emergency, fire and accident
- incident and accident reporting
- consultation
- hazard identification
- risk assessment
- risk control
- security, including:
 - documents
 - cash
 - equipment
 - people
 - key control systems.

Safe work practices may include:

- use of personal protective clothing and equipment
- safe posture and movements, including sitting, standing and bending
- using safe manual handling techniques for such things as lifting and transferring
- taking designated breaks
- rotating tasks
- using knives and equipment and handling hot surfaces
- taking account of the dangers associated with inert gases used in beverage dispensing systems
- using computers and electronic equipment
- safe handling of chemicals, poisons and dangerous materials
- using ergonomically sound furniture and workstations
- clearing any hazards from immediate work area
- paying attention to safety signage.

Issues and breaches of health, safety and security procedures may include:

- loss of keys
- strange or suspicious persons
- broken or malfunctioning equipment
- loss of property, goods or materials
- damaged property or fittings
- lack of suitable signage when required
- lack of training on health and safety issues.

RANGE STATEMENT

Emergency situations may include:

- bomb threats
- irrational customers
- accidents
- robberies or armed hold-ups
- fires
- floods
- earthquakes
- power failure.

Participation in OHS management practices may involve:

- active participation in OHS induction training and safe work practice training
- involvement in hazard identifications
- involvement in risk assessments
- involvement in suggesting methods for and making joint decisions on how to eliminate or control risks
- involvement in writing parts of OHS policies and procedures.

Consultation processes may involve:

- OHS discussions with all employees during the course of each business day
- a diary, whiteboard or suggestion box used by staff to report issues of concern
- regular staff meetings that involve OHS discussions
- special staff meetings or workshops to specifically address OHS issues
- surveys or questionnaires that invite feedback on OHS issues
- informal meetings with notes
- formal meetings with agendas, minutes and action plans
- discussions with and reports to formal OHS representatives and committee members.

Unit Sector(s)

Sector

Cross Sector - Occupational Health and Safety

Competency field

Competency field

Occupational Health and Safety

SITXOHS002A Follow workplace hygiene procedures

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit describes the performance outcomes, skills and knowledge required to apply good hygiene practices within a range of service industry operations. It requires the ability to follow predetermined procedures, identify and control simple hazards and take particular hygiene measures to ensure the non-contamination of food and other items that might put customers, colleagues and self at a health risk.

This unit is one of three hierarchical units describing varying levels of participation in food safety processes:

- SITXOHS002A Follow workplace hygiene procedures
- SITXFSA001A Implement food safety procedures
- SITXFSA002A Develop and implement a food safety program.

Food safety is nationally legislated by the Food Standards Australia New Zealand Act 1991 which provides for the operation of a statutory authority known as Food Standards Australia New Zealand. The Australia New Zealand Food Standards Code (the Code) developed by this authority contains an individual standard for food safety practices. A large component of that standard deals with the health and hygiene of food handlers. This unit of competency complies with the legislative requirements for food safety and hygiene practices as outlined in the Code.

The legislative requirement for a business to comply with the national standard for food safety practices, along with training and certification requirements, differs between state and territory governments.

In some cases food handlers, especially designated food safety supervisors, may be required to formally achieve competence in hygiene practices through a registered training organisation that may use this unit as the basis for their training.

Application of the Unit

Application of the unit	<p>Personal hygiene practices underpin a range of service industry activities. They are particularly important within a food safety regime, but can also apply to housekeeping activities and anywhere where poor hygiene could provide a contamination risk. Poor hygiene practices can risk the health of customers, colleagues and self.</p> <p>For the purposes of food safety, this unit only has application to hospitality, commercial catering and retail venues where food is stored, prepared, displayed and served. It will apply to any venue that operates a permanent or temporary kitchen or smaller food preparation area, such as restaurants, cafes, clubs, hotels, attractions, events and conference venues, fast food restaurants, retail food outlets such as sandwich shops and food court outlets. It would apply to tour operators involved in the preparation and service of food at temporary sites.</p> <p>Other industries will need to access industry-specific food safety units of competency.</p> <p>This unit applies to frontline operational personnel who work under close supervision and guidance from others during the normal course of their daily activities. They would be required to apply little discretion and judgement because they operate within predefined organisational hygiene procedures. Personal hygiene practices apply to all personnel operating at all levels within the service industries, such as kitchen hands, cooks, chefs, catering staff, food and beverage attendants, housekeeping and, laundry staff, sandwich hands, cafe and fast food outlet cooking crew and sales people and owner-operators of small business catering operations or retail food outlets.</p>
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	Nil
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Prerequisite units Nil

Employability Skills Information

Employability skills The required outcomes described in this unit of competency contain applicable facets of employability skills. The Employability Skills Summary of the qualification in which this unit is packaged will assist in identifying employability skills requirements.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Follow hygiene procedures and identify hygiene hazards.	<p>1.1 Access and follow <i>hygiene procedures and policies</i> correctly and consistently according to organisation and legal requirements to ensure health and safety of customers and colleagues.</p> <p>1.2 Identify and report <i>poor organisation practices</i> that are inconsistent with hygiene procedures.</p> <p>1.3 Identify <i>hygiene hazards</i> that may affect the health and safety of customers, colleagues and self.</p> <p>1.4 Take action to remove or minimise the hazards within scope of individual responsibility and according to</p>

ELEMENT	PERFORMANCE CRITERIA
	<p>organisation and legal requirements.</p> <p>1.5 Promptly report hygiene hazards to appropriate person for follow up where control of hazard is beyond the scope of individual responsibility.</p>
2 Report any personal health issues.	<p>2.1 Report any personal <i>health issues</i> that are likely to cause a hygiene risk.</p> <p>2.2 Report incidents of food contamination that have resulted from the personal health issue.</p> <p>2.3 Do not participate in food handling activities where there is a risk of food contamination as a result of the health issue.</p>
3 Prevent food and <i>other item</i> contamination.	<p>3.1 Maintain clean clothes, wear required personal protective clothing and only use organisation-approved bandages and dressings to prevent contamination to food.</p> <p>3.2 Ensure that no clothing or <i>other items worn</i> contaminate food.</p> <p>3.3 Prevent unnecessary direct contact with ready to eat food.</p> <p>3.4 Do not allow food to become contaminated with any body fluids or tobacco product from sneezing, coughing, blowing nose, spitting, smoking or eating over food or food preparation surfaces.</p> <p>3.5 Maintain the use of clean materials and clothes and safe and hygienic practices to ensure that no <i>cross-contamination of other items in the workplace occurs</i>.</p>
4 Prevent cross-contamination by washing hands.	<p>4.1 <i>Wash hands at appropriate times</i> and follow hand washing procedures correctly and consistently according to organisation and legal requirements.</p> <p>4.2 Wash hands using <i>appropriate facilities</i>.</p>

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

REQUIRED SKILLS AND KNOWLEDGE

This section describes the essential skills and knowledge and their level, required for this unit.

The following skills must be assessed as part of this unit:

- communication skills to verbally report hygiene hazards and poor organisation practice
- literacy skills to read and interpret relevant organisation policies, procedures and diagrams that identify good hygiene practices.

The following knowledge must be assessed as part of this unit:

- very basic understanding of federal, and state or territory food safety legislative compliance requirements, contents of national codes and standards that underpin regulatory requirements, and local government food safety regulations
- working knowledge of organisation personal hygiene policies and procedures
- ramifications of failure to observe hygiene policies and procedures
- broad understanding of the general hazards in handling food, linen, laundry and garbage, including major causes of contamination and cross-infection
- sources and effects of microbiological contamination of food and other items that would require protection in the industry sector and business
- basic understanding of the choice and application of cleaning and sanitising equipment and materials.

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Evidence of the following is essential:

- ability to access and interpret hygiene procedures and consistently apply these during day-to-day activities
- understanding of the importance of following hygiene procedures and of the potential implications of disregarding those procedures
- project or work activities that show the candidate's

EVIDENCE GUIDE

ability to apply good hygiene practices on multiple occasions in a range of different operational circumstances to ensure consistency in the application of hygiene procedures.

Context of and specific resources for assessment

Assessment must ensure:

- access to current regulatory documents distributed by key federal, state or territory, and local government agencies such as plain English legislative publications, codes and standards outlining food safety requirements
- access to hygiene policies and procedures
- project or work activities that show candidates' ability to apply good hygiene practices within the context of the particular industry sector in which they are working or seeking work; for those undertaking generic pre-employment training, assessment must cover a range of industry contexts to allow for a broad range of vocational outcomes
- use of real products, materials and equipment.

Methods of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation of the candidate carrying out work tasks that involve following hygiene procedures
- oral and written questions about hygiene principles and practices, policies and procedures
- oral or written questions to assess knowledge of food hygiene legislative requirements
- case studies to assess ability to react to a range of incidents where hygiene hazards exist
- review of portfolios of evidence and third-party workplace reports of on-the-job performance by the candidate.

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:

- SITHACS005A Prepare rooms for guests
- SITHACS007A Launder linen and guest clothes
- SITXFSA001A Implement food safety procedures.

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Assessing employability skills Employability skills are integral to effective performance in the workplace and are broadly consistent across industry sectors. How these skills are applied varies between occupations and qualifications due to the different work functions and contexts.

Employability skills embedded in this unit should be assessed holistically with other relevant units that make up the skill set or qualification and in the context of the job role.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the performance criteria is detailed below.

Hygiene procedures may relate to:

- personal hygiene
- safe and hygienic handling of food and beverages
- regular hand washing
- correct food storage
- suitable dress and personal protective equipment and clothing
- avoidance of cross-contamination
- hygienic cleaning practices to avoid cross-contamination
- use of cleaning equipment, clothes and materials to avoid cross-contamination
- safe handling and disposal of linen and laundry
- appropriate handling and disposal of garbage
- cleaning and sanitising
- procedures documented in the organisation food safety program
- procedures covered by staff training programs
- procedures required by the national food safety code.

RANGE STATEMENT

- Poor organisation practices*** may include:
- poor personal hygiene practices
 - poor food handling practices that may result in the contamination of food
 - poor cleaning practices that may result in cross-contamination of food and other items
 - practices inconsistent with the organisation's food safety program
 - outdated practices not in keeping with current organisation activities.

- Hygiene hazards*** may include:
- contaminated food
 - vermin
 - airborne dust
 - items such as linen, tea towels and towels that may be contaminated with human waste, such as blood and body secretions
 - dirty equipment and utensils
 - contaminated garbage
 - use of practices not in keeping with current organisation activities
 - colleagues without appropriate training or understanding of good hygiene practices, policies and procedures
 - equipment not working correctly, such as fridge and temperature probes.

- Health issues*** may relate to:
- food-borne diseases
 - airborne diseases
 - infectious diseases.

- Other items worn*** may include:
- hair accessories
 - jewellery
 - watches
 - bandages.

- Cross-contamination of other items in the workplace*** may
- infected linen
 - items such as linen, tea towels and towels that may be

RANGE STATEMENT

involve:

contaminated with human waste, such as blood and body secretions

- dirty equipment and utensils
- spreading bacteria from bathroom or bedroom areas to kitchen areas in an accommodation facility.

Washing hands at appropriate times might include:

- immediately before working with food
- immediately after handling raw food
- before commencing or recommencing work with food
- immediately after using the toilet
- immediately after smoking, coughing, sneezing, blowing the nose, eating, drinking, and touching the hair, scalp or any wound.

Appropriate facilities for hand washing may include:

- warm running water
- soap
- single use towels
- designated hand washing sink.

Unit Sector(s)

Sector

Cross-Sector

Competency field

Competency field

Occupational Health and Safety

TLID1001A Shift materials safely using manual handling methods

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor

This unit involves the skills and knowledge required to shift loads using manual handling methods, including assessing the risks associated with relocating the load, planning the relocation process and carrying out the relocation in accordance with the plan. Licensing, legislative, regulatory or certification requirements are applicable to this unit.

Application of the Unit

Application of the Unit

Work must be carried out in compliance with the relevant OH&S regulations concerning the manual handling and movement of loads.

Work is performed under some supervision generally within a team environment.

Work involves the application of the basic principles for the safe manual handling techniques and movement of loads when shifting materials using manual handling methods as part of day-to-day work.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Not Applicable

Employability Skills Information

Employability Skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT

PERFORMANCE CRITERIA

1 Assess risks associated with the relocation of the load

- 1.1 Products, goods or materials to be relocated are identified and assessed for the appropriate method of relocation
- 1.2 Locations for storage are determined and potential routes to be followed are identified
- 1.3 Effect of load relocation on original load base is predicted
- 1.4 Points of balance are estimated
- 1.5 Required clearances are compared to available space and adjustments are made
- 1.6 Effects of moving contents which may be loose, liquid, dangerous or hazardous are considered
- 1.7 Potential risks in route(s) which may be followed are considered
- 1.8 Risks to self are identified arising from the required lifting, load carrying, set down or movement of the goods
- 1.9 Manual handling procedures for lifting, lowering and carrying, pushing and pulling are identified
- 1.10 Team lifting processes are considered for application
- 1.11 Appropriate personal protective equipment is worn
- 1.12 Size to weight ratio of items to be manually handled are identified

2 Plan load relocation

- 2.1 Relocation of the load is planned consistent with the code of practice for manual handling
- 2.2 Process for relocating load is proposed including predicting and planning for potential difficulties
- 2.3 Proposed process is checked against code of practice and workplace procedures for compliance

ELEMENT**PERFORMANCE CRITERIA****3 Relocate load**

- 3.1 Actions for lifting, lowering and carrying, pulling and pushing a load are in accordance with workplace procedures and OH&S requirements
- 3.2 Applications appropriate for team relocation of load are identified
- 3.3 Team lifting tasks are coordinated
- 3.4 Planned process and route are followed
- 3.5 Relocated materials are set down without damage to goods, personnel or equipment and checked for stability
- 3.6 Relocation is checked to see that it meets work requirements, with any variance(s) reported

Required Skills and Knowledge

REQUIRED KNOWLEDGE AND SKILLS

This describes the essential knowledge and skills and their level required for this unit.

Required knowledge:

- Relevant OH&S procedures and guidelines concerning the manual lifting and movement of loads
- Risks when manually lifting and handling materials and goods and related precautions to control the risk, including: the load on the spine during lifting; controlled actions on a movement during lifting; rotation and side movement of the spine during lifting; postures and positions during lifting; work layout; the type, weight and position of the load; frequency of shifting operations; distance over which load is to be shifted; and time allowed for the shifting of the load
- Workplace procedures and policies for manual handling
- Housekeeping standards procedures required in the workplace
- Site layout and obstacles

Required skills:

- Communicate effectively with others when manually lifting and handling materials and goods
- Read and interpret instructions, procedures and information relevant to the manual lifting and handling of materials and goods
- Interpret and follow operational instructions and prioritise work
- Work collaboratively with others when manually lifting and handling materials and goods

Required skills:

- Adapt appropriately to cultural differences in the workplace, including modes of behaviour and interactions with others
- Promptly report and/or rectify any identified problems that may arise when manually lifting and handling materials and goods in accordance with regulatory requirements and workplace procedures
- Implement contingency plans for unexpected situations that may occur when manually lifting and handling materials and goods
- Apply precautions and required action to minimise, control or eliminate risks that may exist when manually lifting and handling materials and goods
- Monitor work activities in terms of planned schedule
- Modify activities depending on differing operational contingencies, risk situations and environments
- Apply fatigue management knowledge and techniques
- Work systematically with required attention to detail without injury to self or others, or damage to goods or equipment
- Operate and adapt to differences in loads and materials in accordance with standard operating procedures
- Select and use required personal protective equipment conforming to industry and OH&S standards

Evidence Guide**EVIDENCE GUIDE**

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills, the range statement and the assessment guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

- The evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria of this unit and include demonstration of:
 - applying the underpinning knowledge and skills
 - interpreting manual handling risks
 - using correct manual handling practices
 - applying relevant legislation and workplace procedures

Context of and specific resources for assessment

- Performance is demonstrated consistently over a period of time and in a suitable range of contexts

EVIDENCE GUIDE

- Resources for assessment include:
 - a range of relevant exercises, case studies and/or other simulated practical and knowledge assessment, and/or
 - access to an appropriate range of relevant operational situations in the workplace
- In both real and simulated environments, access is required to:
 - relevant and appropriate materials and equipment, and
 - applicable documentation including workplace procedures, regulations, codes of practice and operation manuals

Method of assessment

- As a minimum, assessment of knowledge must be conducted through appropriate assessments using written/practical/oral assessments
- Practical assessment must occur:
 - through activities in an appropriately simulated environment, and/or
 - in an appropriate range of situations in the workplace

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

The shifting operations may be conducted:

- in a range of work environments
- by day or night

Customers may be:

- internal or external

Workplaces may comprise:

- large, medium or small worksites

Work may be conducted in:

- restricted spaces
- exposed conditions
- controlled or open environments

Materials to be shifted may include:

- goods
- large luggage items
- baggage items

RANGE STATEMENT

- equipment and tools
 - cleaning materials
 - components and parts of vehicles and equipment such as tyres, batteries, lifting gear, etc.
 - materials used in the course of work such as drums of fuel, raw materials, packaging, etc.
- Loads to be shifted may be:
- irregularly shaped
 - packaged or unpackaged
 - labelled or unlabelled
- Hazards in the work area may include exposure to:
- chemicals
 - dangerous or hazardous substances
 - movements of equipment, goods and materials
 - weight of items being handled
- Personnel in the work area may include:
- workplace personnel
 - site visitors
 - contractors
 - official representatives
- Communication in the work area may include:
- phone
 - electronic data interchange
 - fax
 - email
 - internet
 - radio
 - oral, aural or signed communications
- Depending on the type of organisation concerned and the local terminology used, workplace procedures may include:
- company procedures
 - enterprise procedures
 - organisational procedures
 - established procedures
- Personal protective equipment may include:
- gloves
 - safety headwear and footwear
 - safety glasses
 - two-way radios
 - high visibility clothing
- Information/documents may include:
- goods identification numbers and codes
 - manifests, bar codes, goods and container identification
 - manufacturers specifications for equipment/tools
 - workplace procedures and policies
 - supplier and/or client instructions
 - material safety data sheets
 - codes of practice including the National Standards for

RANGE STATEMENT

Applicable regulations and legislation may include:

- Manual Handling and the Industry Safety Code
- relevant legislation, regulations and related documentation
 - award, enterprise bargaining agreement, other industrial arrangements
 - standards and certification requirements
 - quality assurance procedures
 - emergency procedures
 - relevant state/territory OH&S legislation
 - relevant state/territory environmental protection legislation
 - workplace relations regulations
 - workers compensation regulations
 - licence, patent or copyright arrangements
 - dangerous goods and air freight regulations
 - export/import/quarantine/bond requirements
 - marine orders

Unit Sector(s)

Not Applicable

Competency Field

Competency Field

D - Load Handling