



Australian Government

Department of Education, Employment and Workplace Relations

TDMMB3107B ORGANISE MAINTENANCE AND REPAIRS ON A SMALL VESSEL

Revision Number: 1

TDMMB3107B ORGANISE MAINTENANCE AND REPAIRS ON A SMALL VESSEL

Modification History

Not applicable.

Unit Descriptor

UNIT DESCRIPTOR:

This unit involves the skills and knowledge required to organise safe maintenance and repair procedures on a small commercial vessel.

Note: Relevant State/Territory electrical licensing requirements must be fulfilled by persons carrying out installation, maintenance and repair of medium/high voltage electrical circuits and systems.

Application of the Unit

Application of the unit	The unit has applications in the qualification for a Marine Engine Driver Grade 1 (MED 1) as per relevant sections of Part D of the National Standard for Commercial Vessels (NSCV), i.e. Certificate IV in Transport&Distribution (Marine Engine Driving - Grade 1).
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Licensing/Regulatory Information

Licensing/legislative requirements	The unit is consistent with the relevant sections of State and Territory maritime regulations and NSCV/USL Code for a MED 1.
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Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

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 Plan and organise safe maintenance and repair procedures	a Vessel maintenance and repair requirements and goals are identified and defined as per established practice and planned maintenance procedures b Maintenance and repair operations and functions are in accordance with company procedures c Maintenance resources and personnel are coordinated to achieve established maintenance and repair requirements and goals as per company procedures
2 Plan and prepare for statutory machinery surveys	a Statutory surveys, where applicable, are organised and prepared in accordance with regulatory and class and statutory requirements b Inspection, survey repair and maintenance procedures for hull work, propellers and shafting are organised as per regulatory and survey requirements

ELEMENT	PERFORMANCE CRITERIA
3 Monitor the completion of maintenance and repair activities	- a Vessel's preventative maintenance procedures are monitored in accordance with statutory and survey requirements and company procedures - b Work to monitor the condition of the vessel's hull and watertight integrity is coordinated and carried out in accordance with procedures and regulations
ELEMENT	PERFORMANCE CRITERIA
3 Monitor the completion of maintenance and repair activities (continued)	- c Checks of the integrity of the vessel's hull are correctly carried out - d Coverage and frequency of checks on the vessel's hull complies with survey requirements and regulations - e Any deterioration of the vessel's hull or structure is examined and reported and appropriate action is initiated to fix the identified problem - f Appropriate damage control measures are implemented following hull damage to maintain watertight integrity and to control any flooding of the vessel - g Repairs and corrosion control are initiated and coordinated in accordance with established procedures - h Action is taken on reports of faults and damage to the vessel and its equipment are in accordance with procedures
4 Complete maintenance and repair documentation	- a Records are kept of maintenance and repair operations and machinery failure incidents - b All maintenance and repair documentation is completed in accordance with established procedures and regulations

ELEMENT	PERFORMANCE CRITERIA
5 Participate in the development and implementation of safety management and hazard control strategies	- a An appropriate contribution is made to the development of safety management strategies for vessel's maintenance and repair operations - b Maintenance and repair hazards are identified and appropriate strategies established to minimise or eliminate risk to personnel, vessel and the environment - c Implementation of safety, hazard minimisation and pollution control procedures and regulations are monitored in accordance with regulatory requirements and company procedures - d Procedures, precautions and authorisations necessary for entry into confined spaces on a vessel are communicated to relevant maintenance personnel - e Appropriate action is organised in the event of a machinery failure or emergency to secure the machinery and the vessel and maintain the safety of the vessel and personnel involved

Required Skills and Knowledge

REQUIRED KNOWLEDGE

This describes the knowledge required for this unit.

- 1 Relevant sections of State and Territory marine regulations, NSCV and USL Code
- 2 Relevant OH&S and pollution control legislation and codes of practice, policies and procedures
- 3 Established practice for organising the maintenance and repair of marine machinery, hull, structures and equipment
- 4 Functions and responsibilities of personnel for survey, maintenance and repair operations on board a small vessel
- 5 Operational characteristics and performance specifications for the different types of hull, machinery and equipment usually found on a small vessel
- 6 Procedures for carrying out machinery testing, troubleshooting and repair as part of routine maintenance procedures within limits of responsibility of a Marine Engine Driver Grade 1 to ensure compliance with the company and survey requirements and established safety rules and regulations
- 7 Typical vessel and machinery specifications, operational manuals, specifications, and simple electrical and control circuit diagrams
- 8 Purpose and contents of material safety data sheets
- 9 Principal features of vessel construction, including a basic understanding of the properties, characteristics and application of materials and structures typically used in the construction of a small vessel and its associated operational machinery
- 10 The nature and causes of typical machinery/equipment malfunctions and the available methods for their detection and repair, including machinery malfunction fault finding techniques
- 11 Maintenance and repair hazards and problems and appropriate preventative and remedial strategies
- 12 Damage control measures that may be required to maintain the integrity of the hull in a range of typical emergency situations that could occur on a vessel and the specific action to be taken in the event of flooding of a vessel
- 13 Construction, layout and subdivision requirements of a typical vessel,
- 14 Principles and procedures to ensure the watertight integrity of a vessel's hull in

REQUIRED KNOWLEDGE

both normal and emergency situations

- 15 Safety and environmental management strategies applicable to maintenance and repair operations on a small vessel
- 16 Basic principles of operation of:
 - 17 a air-conditioning and refrigeration systems
 - 18 b machinery lubrication
- 19 Types of maintenance and repair records that must be maintained on a vessel to meet the requirements of the company, survey requirements and regulatory authorities
- 20 Maritime communication techniques needed during maintenance and repair operations

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REQUIRED KNOWLEDGE

REQUIRED SKILLS

This describes the basic skills required for this unit.

- 1 Use verbal communication skills required when organising maintenance and repairs on a small vessel
- 2 Read and interpret maintenance and service manuals and instructions and equipment specifications and drawings for equipment and machinery, including all required OH&S procedures and precautions
- 3 Read and interpret material safety data sheets
- 4 Read and interpret machinery performance readings and indications
- 5 Complete any required operational and maintenance records
- 6 Provide leadership to other crew members when organising maintenance and repairs on a small vessel
- 7 Work safely and collaboratively with others when organising maintenance and repairs on a small vessel
- 8 Plan and organise maintenance and repair activities on a small vessel
- 9 Monitor the selection and use of relevant tools and equipment as per instructions
- 10 Recognise faulty equipment and take appropriate action as per operating instructions
- 11 Recognise routine problems when organising maintenance and repairs on a small vessel and take appropriate action
- 12 Adapt to differences in vessels, equipment and machinery and operating and servicing procedures
- 13 Monitor that all safety precautions and procedures are followed when organising maintenance and repairs on a small vessel

Evidence Guide

Evidence Guide

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SMALL VESSEL**

Evidence Guide

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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.

1 Critical aspects of evidence required to demonstrate competency in this unit	Assessment must confirm appropriate knowledge and skills to: - a Organise survey, maintenance and repair operations on a vessel up to 1,500 kW propulsion power - b Monitor the implementation of a safety management strategy for maintenance and repair operations on a vessel of up to 1,500 kW propulsion power - c Identify typical machinery maintenance and repair problems and hazards and initiate appropriate action - d Communicate effectively with others during the organisation of maintenance and repair operations
2 Evidence required for demonstration of consistent performance	- a Performance is demonstrated consistently over a period of time and in a suitable range of contexts - b Consistently applies underpinning knowledge and skills when: 1 organising survey, maintenance and repair operations 2 checking operational capability of vessel's hull, fittings, machinery and equipment 3 identifying vessel's machinery malfunctions and faulty plant and equipment and initiating appropriate action to minimise any damage and pollution that could be caused 4 identifying and implementing improvements to mechanical and electrical machinery and equipment checking, maintenance and repair procedures 5 contributing to the establishment of safety management strategies relevant to maintenance and repair operations

Evidence Guide

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- 6 completing machinery maintenance and repair documentation and records
- c Shows evidence of application of relevant workplace procedures, including:
 - 1 relevant sections of State and Territory marine regulations, NSCV/ USL Code
 - 2 OH&S regulations and hazard prevention policies and procedures
 - 3 issue resolution procedures
 - 4 managing waste, pollution and recycling management processes

Evidence Guide (continued)

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2 Evidence required for demonstration of consistent performance (continued)	- d Action is taken promptly to report and/or rectify faults or damage to the hull or machinery - e Work is completed systematically with required attention to detail - f Recognises and adapts appropriately to cultural differences in the workplace, including modes of behaviour and interactions among crew and others
3 Context of assessment	- a Assessment of competency must comply with the assessment requirements of the relevant maritime regulations - b Assessment of this unit must be undertaken within relevant marine authority approved and audited arrangements by a registered training organisation: 1 As a minimum, assessment of knowledge must be conducted through appropriate written/oral examinations, and

Evidence Guide (continued)**TDMMB3107B ORGANISE MAINTENANCE AND REPAIRS ON A SMALL VESSEL**

	2 Appropriate practical assessment must occur: - i at the registered training organisation; and/or - ii on an appropriate working or training vessel
4 Specific resources required for assessment	Access is required to opportunities to: - a participate in a range of practical and theoretical assignments, exercises, case studies and other assessments that demonstrate the skills and knowledge to organise the maintenance and repair of the hull, structures, machinery and equipment typically found on a vessel up to 1,500 kW propulsion power; and/or - b organise surveys, maintenance and repair operations in a range of operational situations on a commercial or training vessel up to 1,500 kW propulsion power

Range Statement**Range Statement****TDMMB3107B ORGANISE MAINTENANCE AND REPAIRS ON A SMALL VESSEL**

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

VARIABLE**SCOPE****1. GENERAL CONTEXT**

Range Statement

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a. Work must be carried out:	1 in compliance with the relevant sections of the State and Territory marine regulations, the National Standard for Commercial Vessels and USL Code
b. Work is performed:	1 within broad operational requirements, with responsibility for own outputs in relation to specified quality standards and limited responsibility for others in achieving the specified quality and quantity of outcomes
c. Work involves:	1 the organisation of maintenance operations on a vessel and the application of solutions to a defined range of maintenance problems

2. WORKSITE ENVIRONMENT

a The hull, structures, machinery and equipment to be maintained may include:	1 that typically found on any small commercial vessel up to 1,500 kW propulsion power
b Maintenance operations may include:	1 visual inspection of equipment and systems for faults 2 routine checks of equipment and systems in accordance with manufacturer's instructions 3 identification of faults 4 carrying out basic fault finding and troubleshooting within limits of responsibility of a Marine Engine Driver Grade 1 5 carrying out basic repairs within limits of responsibility of a Marine Engine Driver Grade 1 6 reporting identified faults

Range Statement

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7 assisting contractors

Range Statement (continued)

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VARIABLE	SCOPE
c Maintenance may be carried out on:	1 hull and fittings 2 propulsion systems and controls 3 electrical systems and controls 4 batteries, transformers, switchboard, lighting systems 5 steering gear, stabilisers, bow thrusters, rudders 6 deck machinery 7 pumps and pumping systems 8 auxiliary systems and controls
d Organisation of maintenance and repair operations may be carried out	1 by day or night in both normal and emergency situations 2 under any permissible conditions of weather 3 while underway 4 during berthing and unberthing operations 5 while anchored or moored 6 during slipping

Range Statement (continued)**TDMMB3107B ORGANISE MAINTENANCE AND REPAIRS ON A SMALL VESSEL**

e Coordination of maintenance and repair operations may include:	1 preparation of maintenance and repair schemes 2 checks on completion of a voyage 3 checks in anticipation of a change in sea and weather conditions 4 organisation of statutory surveys 5 investigating and troubleshooting identified faults 6 completion of basic repair operations within limits of responsibility of a Marine Engine Driver Grade 1 7 assistance to maintenance contractors carrying out repair and replacement activities 8 checks during an emergency which may have caused damage or changes to the seaworthiness of the vessel 9 completion of running logs and maintenance reports
f Propulsion plant configurations may include:	1 low speed, medium and high speed diesel propulsion

Range Statement (continued)**TDMMB3107B ORGANISE MAINTENANCE AND REPAIRS ON A SMALL VESSEL**

VARIABLE	SCOPE
f Propulsion plant configurations may include:	2 stern tube bearing 3 CPP 4 direct drive shaft

Range Statement (continued)**TDMMB3107B ORGANISE MAINTENANCE AND REPAIRS ON A SMALL VESSEL**

(continued)	5 diesel electric 6 steam 7 gas turbine 8 reduction gears 9 thrust blocks, detuners and shaft bearings
g Damage to the hull of a vessel may occur through:	1 collision with another vessel 2 running aground 3 excessive stress on a vessel's hull structure 4 effects of heavy seas and weather conditions 5 deterioration or corrosion of vessel's hull and structure 6 explosion on board the vessel 7 fire on board the vessel
h Damage control measures in a flooding emergency may include:	1 use of softwood wedges and plugs to reduce water ingress 2 erection and application of vertical shoring 3 construction and fitting of a leak stopping mat 4 temporary repair of a ruptured pressurised pipe 5 operation of a portable salvage pump
i Emergencies may include:	1 loss of propulsion 2 loss of electrical power 3 loss of steering

Range Statement (continued)

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- 4 flooding
- 5 fire or explosion
- 6 loss of refrigeration

Range Statement (continued)

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VARIABLE	SCOPE
i Emergencies may include: (continued)	7 leaks of fuel oil, lubrication oil, steam and gas 8 overheating and overspeed of machinery, governors, emergency trips
j Maintenance and repair hazards may include:	1 moving heavy loads in an unsafe environment 2 unsecured machinery, components or repair equipment 3 slippery deck 4 welding equipment 5 tools and implements 6 moving and rotating machinery 7 flammable liquids, vapours and fuel 8 faulty machinery equipment handling equipment and lifting gear 9 using equipment beyond safe working limits 10 poor housekeeping procedures

Range Statement (continued)**TDMMB3107B ORGANISE MAINTENANCE AND REPAIRS ON A SMALL VESSEL**

	11 non-compliance with safe working procedures 12 electrical wiring and systems 13 faulty earthing on systems and equipment 14 working at heights
k Maintenance records may include:	1 maintenance log 2 running sheets 3 computer database of running information and maintenance information
l Documentation and records may include:	1 vessel's planned maintenance system, repair procedures and instructions 2 machinery and vessel manufacturer's specifications, instructions and recommended procedures 3 maintenance records 4 vessel's survey procedures and instructions as they relate to vessel's hull and machinery 5 vessel's safety and emergency contingency plans and procedures 6 relevant material safety data sheets

Range Statement (continued)**TDMMB3107B ORGANISE MAINTENANCE AND REPAIRS ON A SMALL VESSEL**

VARIABLE	SCOPE
l Documentation and records may include: (continued)	7 machinery and vessel manufacturer's specifications, instructions and recommended procedures 8 relevant sections of the State and Territory marine regulations, the National Standard for Commercial Vessels and USL Code
m Applicable legislation, regulations and codes may include:	1 State and Territory marine regulations related to the operation of small vessels 2 National Standard for Commercial Vessels and USL Code 3 relevant Commonwealth, State and Territory OH&S and pollution control legislation

Unit Sector(s)

Not applicable.

Field

Field B Equipment Checking and Maintenance

Relationship to other units

Relationship to other units	The unit may be assessed in conjunction with other units that relate to the functions of the occupation(s) concerned.
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