



Australian Government

Department of Education, Employment and Workplace Relations

TDMMC207B OPERATE REMOTE CONTROLS OF PROPULSION PLANT AND ENGINEERING SYSTEMS

Revision Number: 1

TDMMC207B OPERATE REMOTE CONTROLS OF PROPULSION PLANT AND ENGINEERING SYSTEMS

Modification History

Not applicable.

Unit Descriptor

UNIT DESCRIPTOR:

This unit involves the skills and knowledge required to remotely operate shipboard plant, propulsion systems, auxiliary machinery and equipment in accordance with technical specifications and within safe operating limits at all times.

Application of the Unit

Application of the unit	The unit has application in qualifications for Master (Unlimited) on a vessel operating in international waters, i.e. Advanced Diploma of Transport&Distribution(Maritime Operations - Master Unlimited).
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Licensing/Regulatory Information

Licensing/legislative requirements	The unit is consistent with the relevant sections of STCW 95, the International Ship and Port Facility Security (ISPS) Code and Marine Orders under the Australian Navigation Act 1912, describing requirements for a Master on a vessel of 500 gross tonnage or more operating in international waters.
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Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

<i>Elements describe the essential outcomes of a unit of competency.</i>	<i>Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.</i>
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Operate remote controls of propulsion plant and engineering systems and services	- a Remote controls of propulsion plant, other engineering systems and auxiliary machinery are operated in accordance with company procedures and manufacturer's instructions - b Communication with engine room is clear, concise and acknowledged as per established procedures - c Performance of propulsion plant, other engineering systems and auxiliary machinery and equipment is monitored and evaluated using remote performance indicators - d Appropriate corrective action is taken in conjunction with the Chief Engineer when performance of propulsion plant or other engineering systems is found to be unsatisfactory or outside of specified limits - e The relationship between speed and fuel consumption is monitored and action taken as required in accordance with operational instructions - f Safety and hazard minimisation procedures and regulations related to the control of propulsion plant, other engineering systems and auxiliary machinery are followed to maintain the safety of personnel, propulsion and engineering systems, cargo and the vessel

ELEMENT	PERFORMANCE CRITERIA
2 Coordinate deck and engine room resources	- a Coordination of deck and engine room operations and resources is maintained during the daily operation of the vessel - b Responses are coordinated and appropriate action is taken in the event of any breakdown in the remote control systems for propulsion plant, other engineering systems and auxiliary machinery - c Correct log book entries are made relating to equipment operations and incidents during a voyage
3 Manage emergencies involving the use of remote controls	- a Remote controls of relevant emergency systems and auxiliary machinery and equipment are correctly operated in the event of a shipboard emergency - b Communication is clear, concise and acknowledged at all times during emergency situations

Required Skills and Knowledge

REQUIRED KNOWLEDGE

This describes the knowledge required for this unit.

- 1 Relevant sections of applicable maritime regulations
- 2 Relevant OH&S legislation, codes of practice, policies and procedures
- 3 Methods for remotely controlling the operation of shipboard propulsion plant and other engineering systems, including auxiliary machinery and equipment
- 4 Typical characteristics of propulsion machinery and control systems for vessels of 500 gross tonnage or more, including operational limits, fuel consumption/speed relationships, stopping distances and turning circles at various draughts, speeds and loading
- 5 Relationship between a vessel's speed and fuel consumption, including the meaning of economical RPM and its application
- 6 Procedures for the monitoring and evaluating the performance of propulsion plant, other engineering systems and auxiliary machinery and equipment
- 7 Procedures and precautions for bunkering operations
- 8 Dangers associated with shipboard electrical plants and related hazard prevention strategies
- 9 Sequence of required action when electrical system becomes overloaded
- 10 Basic principles of operation and functions of various systems and controls, including:
 - a pumps and pumping systems
 - b various shipboard emergency systems
 - c hydraulic systems and controls
 - d bridge located engine controls
 - e various auxiliary systems and controls such as cooling water, fuel system, air starting, lubrication system, ballast water and bilge system

REQUIRED KNOWLEDGE

- 11 Requirements for waste management and control systems under the MARPOL Convention
- 12 Procedures for the coordination of deck and engineering resources
- 13 Bridge communication techniques, including issuing of engine room orders
- 14 Typical problems with the remote control of propulsion plant, other engineering systems and auxiliary machinery and equipment, and appropriate preventative and remedial action and solutions

REQUIRED SKILLS

This describes the basic skills required for this unit.

- 1 Communicate effectively with other personnel when operating the remote controls of propulsion plant and engineering systems
- 2 Interpret and follow standard operating procedures for the operation of the remote controls of propulsion plant and engineering systems
- 3 Read and interpret equipment performance readings and instrumentation
- 4 Read and interpret material safety data sheets
- 5 Read and interpret vessel and machinery specifications, machinery design drawings, machine drawings, operational manuals, specifications and electrical and control circuit diagrams
- 6 Work collaboratively with other shipboard personnel when operating the remote controls of propulsion plant and engineering systems
- 7 Identify problems that can occur during the operation of the remote controls of propulsion plant and engineering systems
- 8 Adapt to differences in vessels, propulsion plant, remote controls, engineering systems and related standard operating procedures
- 9 Select and use equipment required for the operation of the remote controls of propulsion plant and engineering systems

Evidence Guide

Evidence Guide
TDMMC207B OPERATE REMOTE CONTROLS OF PROPULSION PLANT AND ENGINEERING SYSTEMS

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 Operate the remote controls of a vessel: 1 safely in both normal and emergency situations 2 in normal and adverse weather conditions 3 in berthing and unberthing operations 4 when anchoring or mooring - b Monitor and evaluate the performance of vessel's propulsion plant, other engineering systems, and auxiliary machinery and equipment using remote performance indicators - c Exercise required safety and hazard control procedures when operating the remote controls of the vessel - d Identify typical problems when remotely controlling shipboard plant and equipment and take appropriate action in conjunction with the chief engineer - e Communicate effectively with engineering personnel others when remotely controlling shipboard plant and equipment
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 completing propulsion and engineering control operations 2 identifying and evaluating engineering control problems and determining appropriate courses of action

Evidence Guide

TDMMC207B OPERATE REMOTE CONTROLS OF PROPULSION PLANT AND ENGINEERING SYSTEMS

- 3 identifying and implementing improvements to engineering control procedures
- 4 applying safety precautions relevant to engineering control operations
- 5 assessing operational capability and performance of propulsion and other engineering plant and auxiliary equipment
- c Shows evidence of application of relevant workplace procedures, including:
 - 1 relevant sections of applicable maritime regulations
 - 2 vessel's safety management system and procedures
 - 3 OH&S regulations and hazard prevention policies and procedures

Evidence Guide (continued)

TDMMC207B OPERATE REMOTE CONTROLS OF PROPULSION PLANT AND ENGINEERING SYSTEMS

Evidence 2 required for demonstration of consistent performance (continued)

- 4 job procedures and work instructions
- 5 relevant manufacturer's guidelines relating to the use of machinery, including instructions on equipment performance, capability and limitations
- 6 security procedures
- 7 following on-board housekeeping processes
- 8 waste, pollution and recycling management processes and systems
- d Action is taken promptly to report and/or rectify accidents and incidents in accordance with statutory requirements and company procedures
- e Work is completed systematically with required attention to detail

Evidence Guide (continued)

TDMMC207B OPERATE REMOTE CONTROLS OF PROPULSION PLANT AND ENGINEERING SYSTEMS

	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 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 remotely control the propulsion plant and auxiliary equipment of a vessel of 500 gross tonnage or more in an appropriate range of situations, weather and loading conditions; and/or b operate an integrated vessel simulator, meeting the requirements of Section A I/12 of the IMO STCW 95 Code, over an appropriate range of simulated normal and emergency propulsion and engineering control situations

Range Statement

Range Statement TDMMC207B OPERATE REMOTE CONTROLS OF PROPULSION PLANT AND ENGINEERING SYSTEMS
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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
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1. GENERAL CONTEXT

a. Work must be carried out:	1 in compliance with relevant sections of applicable maritime regulations
b. Work is performed:	1 relatively independently under broad operational requirements, with accountability and responsibility for self and others in achieving the prescribed outcomes
c. Work involves:	1 the application of a significant range of fundamental engineering principles and equipment control techniques across a wide and often unpredictable variety of operational contexts. Contribution to the development of a broad plan or strategy for shipboard engineering operations is required and accountability and responsibility for self and others in achieving the outcomes is involved
d. Work requires:	1 significant judgement in planning, technical and leadership functions related to equipment control operations and procedures for vessels of 500 gross tonnage or more

2. WORKSITE ENVIRONMENT

a Vessel may include:	1 any Australian or international commercial vessel of 500 gross tonnage or more

Range Statement

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b Remote control of engineering systems may be carried out	1	by day or night in both normal and emergency situations
	2	under normal and adverse conditions of weather and loading
	3	while underway
	4	during berthing and unberthing operations
	5	while anchoring or mooring

Range Statement (continued)

TDMMC207B OPERATE REMOTE CONTROLS OF PROPULSION PLANT AND ENGINEERING SYSTEMS

VARIABLE	SCOPE
c Engineering plant and systems that may be remotely controlled or monitored include:	- propulsion systems and controls - electrical systems and controls - engineering plant performance indicators - indicators of speed and fuel consumption - steering gear - hydraulic systems and controls - pumps and pumping systems - bridge controls and UMS (unmanned machinery spaces) systems - auxiliary systems and controls
d Propulsion plant configurations	- CPP - direct drive shaft

Range Statement (continued)
TDMMC207B OPERATE REMOTE CONTROLS OF PROPULSION PLANT AND ENGINEERING SYSTEMS

	3 electric diesel 4 steam 5 reduction gear
e Auxiliary systems and controls may include:	1 cooling water 2 fuel 3 air starting 4 lubrication 5 ballast water 6 bilge 7 waste management and pollution control systems
f Emergencies may include:	1 loss of propulsion 2 loss of electrical power 3 loss of steering 4 flooding of engine room 5 fire or explosion in engine room

Range Statement (continued)
TDMMC207B OPERATE REMOTE CONTROLS OF PROPULSION PLANT AND ENGINEERING SYSTEMS

VARIABLE	SCOPE

Range Statement (continued)

TDMMC207B OPERATE REMOTE CONTROLS OF PROPULSION PLANT AND ENGINEERING SYSTEMS

g Documentation and records may include:	1 ISM Code safety management system plans, procedures, checklists and instructions 2 operational orders 3 MO STCW Convention and Code 4 AMSA Marine Orders 5 vessel's log 6 company procedures for the remote control of propulsion plant and other engineering systems 7 plant and equipment manufacturer's instructions and recommended procedures 8 instructions of relevant maritime authorities 9 relevant Australian and international standards
h Applicable legislation, regulations and codes may include:	1 relevant sections of IMO STCW Convention and Code 2 relevant sections of AMSA Marine Orders 3 relevant international, Commonwealth, State and Territory OH&S legislation 4 MARPOL Convention on waste management and control systems

Unit Sector(s)

Not applicable.

Field

Field MC Manoeuvring Vessel

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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