



Australian Government

Department of Education, Employment and Workplace Relations

TDMMH507B USE RADAR AND OTHER BRIDGE EQUIPMENT TO MAINTAIN SAFE NAVIGATION

Revision Number: 1

TDMMH507B USE RADAR AND OTHER BRIDGE EQUIPMENT TO MAINTAIN SAFE NAVIGATION

Modification History

Not applicable.

Unit Descriptor

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 navigational aids, including automatic radar plotting aids (ARPA). This includes initialisation and operation of radar and other modern navigational systems, interpreting all available navigational data and using it for avoiding collisions and ensuring the safe navigation of the vessel.

This unit has been retitled but still covers the same functions of the previous unit TDMMH501A *Use radar and other electronic aids to maintain safe navigation.*

Application of the Unit

Application of the unit	The unit has application in for Watchkeeper on a vessel of 500 gross tonnage or more operating in international waters, a Master (Less than 500 GT) and a Master 3, i.e. Diploma of Transport&Distribution (Maritime Operations - Deck Watchkeeper).and Diploma of Transport&Distribution (Coastal Maritime Operations - Master Class 3)
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Licensing/Regulatory Information

Licensing/legislative requirements	The unit is consistent with the relevant sections of: • STCW 95 and Marine Orders under the Australian Navigation Act 1912, describing requirements for an Watchkeeper on a vessel of 500 gross tonnage or more operating in international waters, or a Master (Less than 500 GT). • State/Territory maritime licensing and regulatory requirements and the National Standard for Commercial Vessels (NSCV) and the USL Code.
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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 Set up radar and use a radar and ARPA	- a Radar and ARPA equipment is initialised and used as per procedures and manufacturer's instructions to assist in the safe navigation of the vessel - b Operational performance and accuracy of the radar and ARPA are confirmed and appropriate action taken where performance is out of limits - c Misrepresentations and false echoes are detected and discounted - d A radar plot is constructed on a radar plotting sheet using

ELEMENT	PERFORMANCE CRITERIA
	systematic radar observations
ELEMENT	PERFORMANCE CRITERIA
2 Set up and use electronic position fixing systems	- a Electronic position fixing systems are initialised and operated in accordance with manufacturer's instructions to produce data on the position of the vessel - b Data produced by the electronic navigational aid is interpreted and used to assist navigational decisions, taking into account known limitations and errors associated with each type of aid - c Position data from an electronic position fixing system is analysed with respect to fix accuracy by comparison with alternative fixing methods
3 Set up and use electronic charting and automatic identification systems	- a An electronic charting system is initialised in accordance with standard operating procedures and manufacturer's instructions - b Features of an electronic charting system are utilised to assist in passage planning and the conduct of navigation - c Corrections are applied to an electronic navigational chart - d An AIS system is initialised and programmed with own vessel data - e An AIS system is utilised to establish data from a nearby vessel
4 Measure vertical angles using a marine sextant	- a A sextant is corrected for variable errors and residual index error established - b A sextant is employed to measure the vertical angle from the horizon to a celestial body or a terrestrial feature - c A sextant is maintained in accordance with manufacturer's

ELEMENT	PERFORMANCE CRITERIA
	instructions
5 Set up and use bridge equipment to maintain safe navigation	- a Items of bridge equipment are initialised, tested maintained and operated in accordance with manufacturer's instructions and company procedures - b Items of bridge equipment are monitored with respect to performance and accuracy
6 Maintain navigational records	a Records are maintained in the Deck Logbook of the times and results of routine tests of radars, electronic navigational aids and other items of bridge equipment

Required Skills and Knowledge

REQUIRED KNOWLEDGE

This describes the knowledge required for this unit.

- 1 Relevant maritime regulations
- 2 Terminology and principles of operation of electronic navigational aids typically used on vessels
- 3 The different types of electronic navigational aids and bridge equipment used on a vessel, including their features, key applications and operational characteristics
- 4 Procedures for the initialisation and operation of radar, ARPA and various other types of electronic navigational aids and bridge equipment
- 5 Techniques for the use of relevant electronic navigation systems
- 6 Principles of how a marine sextant works and the causes of sextant errors
- 7 The limitations and potential errors associated with each type of electronic navigational aid
- 8 Methods for the interpretation and analysis of navigational data produced by radar, ARPA, electronic navigation aids and bridge equipment, including due allowance for the limitations and potential errors associated with each type
- 9 Typical problems in the use of electronic navigation aids and bridge equipment and appropriate courses of action and solutions

REQUIRED SKILLS

This describes the basic skills required for this unit.

- 1 Initialise and operate radar, ARPA, electronic navigation aids and bridge equipment
- 2 Use radar, other electronic aids and bridge equipment in accordance with manufacturer's instructions, including:
 - a radar
 - b ARPA
 - c Loran C navigation systems
 - d GPS and DGPS satellite systems as applied to navigation problems

REQUIRED SKILLS

- e ECS and ECDIS systems
 - f automatic identification systems
 - g integrated navigation systems
 - h voyage data recorders
 - i sextant
 - j chronometer
 - k autopilot
 - l echo sounder
 - m doppler and electro-magnetic speed logs
 - n magnetic and gyro compasses
 - o azimuth mirrors and other bearing measurement devices
 - p bridge alarm systems
 - q navigation light systems
 - r signalling devices
- 3 Communicate effectively with other personnel when using radar, other electronic aids and bridge equipment
 - 4 Interpret and apply procedures and techniques for initialisation and use of radar, other electronic navigational aids and bridge equipment
 - 5 Recognise problems in the use of radar, electronic navigation systems and other bridge equipment and take appropriate courses of action and solutions
 - 6 Carry out calculations required when using radar, other electronic aids and bridge equipment
 - 7 Adapt to variations in radar, other electronic navigational aids and bridge equipment and related procedures that may occur from one vessel to another

Evidence Guide

Evidence Guide

TDMMH507B USE RADAR AND OTHER BRIDGE EQUIPMENT TO MAINTAIN SAFE NAVIGATION

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 Initialise and operate radar electronic navigation aids and bridge equipment - b Identify operational status of radar, electronic navigation aids and bridge equipment - c Identify typical problems in the use of radar electronic navigation aids and bridge equipment and take appropriate action - d Communicate effectively with others when using radar electronic navigation aids and bridge equipment to assist in the safe navigation of the vessel
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 using radar electronic navigation aids and bridge equipment to assist in the safe navigation of the vessel 2 identifying and evaluating problems in the use of radar electronic navigation aids and bridge equipment and the navigational data they produce and determining appropriate courses of action 3 identifying and implementing improvements to procedures for the use of radar electronic navigation aids and bridge equipment 4 assessing operational capability of various types of radar electronic navigation aids and bridge equipment

Evidence Guide

TDMMH507B USE RADAR AND OTHER BRIDGE EQUIPMENT TO MAINTAIN SAFE NAVIGATION

- c Shows evidence of application of relevant workplace procedures, including:
 - 1 relevant maritime regulations
 - 2 ISM Code and associated vessel's safety management system and procedures (where applicable)
 - 3 OH&S regulations and hazard prevention policies and procedures
 - 4 standard operating procedures and work instructions
 - 5 relevant manufacturer's guidelines relating to the use of radar electronic navigation aids and bridge equipment
 - 6 security procedures when using radar, electronic navigation aids and bridge equipment

Evidence Guide (continued)

TDMMH507B USE RADAR AND OTHER BRIDGE EQUIPMENT TO MAINTAIN SAFE NAVIGATION

Evidence 2 required for demonstration of consistent performance (continued)	- d Action is taken promptly to report and/or rectify problems in the use of electronic navigational aids and bridge equipment in accordance with statutory requirements and company procedures - 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

Evidence Guide (continued)

TDMMH507B USE RADAR AND OTHER BRIDGE EQUIPMENT TO MAINTAIN SAFE NAVIGATION

	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 demonstrate the ability to initialise and employ items of bridge equipment using an appropriate bridge simulator over a representative range of navigational conditions; or b use radar electronic navigation aids and bridge equipment to maintain safe navigation during sea time on the voyage of a commercial or training vessel

Range Statement

Range Statement

TDMMH507B USE RADAR AND OTHER ELECTRONIC AIDS TO MAINTAIN SAFE NAVIGATION

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

a. Work must be carried out:	1 in compliance with relevant maritime regulations
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Range Statement

TDMMH507B USE RADAR AND OTHER ELECTRONIC AIDS TO MAINTAIN SAFE NAVIGATION

b. Work is performed:	1 relatively independently under broad operational requirements, with limited accountability and responsibility for self and others in achieving the prescribed outcomes
c. Work involves:	1 the use of radar and other electronic aids to assist the safe navigation of a vessel across a wide and often unpredictable variety of navigational situations. Implementation of operational strategies and procedures for the use of radar and other electronic navigational aids to maintain the safe navigation of the vessel is required
d. Work requires:	1 judgement in operational functions related to the use of electronic navigational aids to maintain the safe navigation of a commercial vessel

2. WORKSITE ENVIRONMENT

a Vessel may include:	1 any Australian or international commercial vessel
b Electronic navigational aids may be operated to support command navigational decisions:	1 by day or night in both normal and emergency situations 2 under any possible conditions of weather and loading 3 while underway 4 during berthing and unberthing operations 5 while anchoring or mooring

Range Statement (continued)
TDMMH507B USE RADAR AND OTHER BRIDGE EQUIPMENT TO MAINTAIN SAFE NAVIGATION

VARIABLE	SCOPE
c Electronic navigational aids may include:	1 radar 2 automatic radar plotting aid (ARPA) 3 hyperbolic navigation systems 4 Loran C navigation system 5 GPS and DGPS satellite systems as applied to navigation problems 6 ECS and ECDIS systems 7 automatic identification systems 8 voyage data recorders 9 integrated navigation systems
d The use of electronic navigational aids may include:	1 avoidance of collision with another vessel 2 fixing the position of the vessel 3 tracking of other vessels 4 assistance in making of command navigational decisions 5 navigating during search and rescue operations
e The use of bridge equipment may include:	1 sextants 2 chronometers 3 autopilot 4 echo sounder

Range Statement (continued)

TDMMH507B USE RADAR AND OTHER BRIDGE EQUIPMENT TO MAINTAIN SAFE NAVIGATION

	5	doppler and electro-magnetic speed logs
	6	magnetic and gyro compass
	7	azimuth mirrors and other bearing devices
	8	bridge alarm systems
	9	navigation light systems
	10	signalling devices
f Documentation and records may include:	1	relevant maritime regulations
	2	operational orders and company procedures

Range Statement (continued)

TDMMH507B USE RADAR AND OTHER BRIDGE EQUIPMENT TO MAINTAIN SAFE NAVIGATION

VARIABLE	SCOPE	
f Documentation and records may include: (continued)	3	navigational charts
	4	radar plotting charts
	5	International Regulations for Preventing Collisions at Sea
	6	ISM Code, safety management system plans, procedures, checklists and instructions
	7	vessel's log
	8	company procedures for the use of navigational aids
	9	instructions of relevant maritime authorities
	10	relevant Australian and international standards

Range Statement (continued)**TDMMH507B USE RADAR AND OTHER BRIDGE EQUIPMENT TO MAINTAIN SAFE NAVIGATION**

g Applicable legislation, regulations and codes may include:	1	relevant sections of AMSA Marine Orders and IMO STCW 95 Convention and Code
	2	relevant sections of State and Territory marine regulations, NSCV/USL Code
	3	regulations for preventing collisions at sea

Unit Sector(s)

Not applicable.

Field

Field MH Navigation

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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