



Australian Government

MARH024 Use of radar and other bridge equipment to maintain safety of navigation

Release: 2

MARH024 Use of radar and other bridge equipment to maintain safety of navigation

Modification History

Release 2. This is the second release of this unit of competency in the MAR Maritime Training Package.

- Minor statement changes in unit Application.

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

Application

This unit involves the skills and knowledge required to maintain safe navigation of a vessel through the use of radar, automatic radar plotting aids (ARPAs) and other bridge equipment to determine vessel position.

This unit applies to people working in the maritime industry in the capacity of:

- Master Unlimited
- Master up to 100 metres Near Coastal
- Master up to 500 gross tonnage (GT)
- Watchkeeper Deck.

Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

- Regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

Near Coastal Qualifications:

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Master up to 100 metres Near Coastal as specified in Marine Order 505.

Blue Waters Qualifications:

- This unit is one of the requirements to obtain AMSA certification as a Master of a commercial vessel up to 500 gross tonnage (GT), Master Unlimited or Watchkeeper Deck and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

Training providers seeking to offer this unit of competency must gain AMSA approval before the

unit is offered.

Seafarers seeking certification should check with AMSA.

Pre-requisite Unit

Not applicable.

Competency Field

H – Navigation

Unit Sector

Not applicable.

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1. Use radar and ARPA to safely navigate

PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Radar is operated according to manufacturer instructions to produce data on position of vessel, other vessels and fixed objects
- 1.2 Radar plot is constructed on radar plotting sheet and automatic plotting devices are initialised
- 1.3 Systematic radar and/or ARPA observations of vessels in the vicinity are made and risk of collision is determined
- 1.4 Radar data is used to obtain a position fix for vessel using electronic bearing lines and variable range markers
- 1.5 Radar bearings are corrected for vessel heading and compass error, as appropriate
- 1.6 Adjustments are made to vessel course and speed to maintain safety of navigation
- 1.7 Manoeuvring signals are made at appropriate time according to regulations

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| | 1.8 | ARPA information is analysed and interpreted taking into account limitation of equipment and prevailing circumstances and conditions |
| 2 Set up bridge equipment | 2.1 | Bridge equipment is initialised and displays are set up and maintained |
| | 2.2 | Operational performance and accuracy of bridge equipment is confirmed, and appropriate action is taken when performance is out of limits |
| | 2.3 | Bridge navigation watch alarm system (BNWAS) and voyage data recorder are activated according to manufacturer requirements and organisational procedures |
| | 2.4 | Any false echoes and misrepresentations are detected, identified and rejected |
| 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 used and 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 |

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Unit Mapping Information

This unit replaces and is equivalent to MARH010 Use bridge equipment to determine vessel position.

Links

Companion Volume Implementation Guides are found in VETNet -
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>

Assessment Requirements for MARH024 Use of radar and other bridge equipment to maintain safety of navigation

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- communicating clearly and concisely at all times
- correctly interpreting and analysing information obtained from radar and automatic radar plotting aids (ARPAs) taking into account the limitations of equipment and prevailing circumstances and conditions
- correctly interpreting information received from other bridge equipment and applying appropriate corrections
- determining latitude by meridian altitude
- making adjustments to vessel course and speed to maintain safety of navigation
- making decisions to amend course or speed in a timely manner according to accepted navigation practice
- making manoeuvring signals at the appropriate time according to International Regulations for Preventing Collisions at Sea (COLREGs)
- planning and conducting celestial observations using a sextant and plotting a position
- taking actions to avoid close encounter or collision according to COLREGs
- using navigational information to aid in command decisions.

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- ARPA system performance and accuracy, tracking capabilities, limitations and processing delays
- blind pilotage planning
- bridge navigational watch alarm systems (BNWAS), including:
 - alarms
 - carriage requirements

- design
- operational sequences
- purpose
- COLREGs
- 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, racons and search and rescue transponders (SARTs)
- effect of changes in own vessel course and speed or both
- errors of magnetic compass and their function
- 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
- magnetic and gyrocompasses, including rate of turn gyro
- meeting overtaking vessels
- methods of position fixing using celestial observations with a sextant
- methods of target acquisition and their limitations
- misrepresentation including:
 - compass errors
 - false echoes
 - incorrect radar settings for heading marker and range marker
 - incorrect setting up of electronic chart system (ECS) or electronic chart display and information system (ECDIS)
 - incorrect setting up of satellite navigation systems
 - satellite and differential satellite navigation system errors
 - sea and rain clutter returns
- navigational data, including:
 - navigation safety warning
 - recording of courses steered
 - weather and oceanographic reports
- parallel indexing
- plotting techniques and relative and true-motion concepts
- principal types of ARPAs, their display characteristics, performance standards and the consequences of over reliance on ARPAs
- principles of the magnetic compass and their correction
- 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
- voyage data recorder and simplified voyage data recorder, including:
 - authorised access to data by personnel for investigations
 - carriage requirements
 - data items recorded
 - data output interface
 - data security and software
 - design and operation
 - purpose
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

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

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

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