



Australian Government

MARH025 Apply knowledge of dynamic positioning fundamentals

Release: 1

MARH025 Apply knowledge of dynamic positioning fundamentals

Modification History

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 apply knowledge of the fundamentals of dynamic positioning control systems.

This unit includes explaining dynamic positioning rules, regulations and guidelines, applying dynamic positioning principles and dynamic positioning system principles.

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

- Dynamic Positioning Operator.

Work is performed under limited supervision and applies to those responsible for operating dynamic positioning control systems in the work environment and who are responsible for their own work.

Before undertaking this unit, seafarers will need to hold or be working towards the achievement of one of the following:

- Chief engineer officers and second engineer officers on ships powered by main propulsion machinery of 3,000 kW propulsion power or more
- Chief engineer officers and second engineer officers on ships powered by main propulsion machinery of between 750 kW and 3,000 kW propulsion power
- Electro-technical officer
- Master or chief mate on ships of 3,000 Gross Tonnage (GT) or more
- Officers in charge of a navigation watch on ships of 500 GT or more
- Officers in charge of a navigational watch and Masters on ships of less than 500 GT
- Officers in charge of an engineering watch in a manned engine room or designated duty engineers in a periodically unmanned engine room.

Licensing/Regulatory Information

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Not Applicable

Competency Field

H - Navigation

Unit Sector

Maritime Sector

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Explain dynamic positioning rules, regulations and guidelines

PERFORMANCE CRITERIA

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

- 1.1** Statutory requirements, international regulations and guidelines used during dynamic positioning operations are confirmed
- 1.2** Relationship between international regulations, rules and guidelines are outlined
- 1.3** Equipment classes and their application to International Maritime Organization (IMO) Guidelines for Vessels with dynamic positioning systems are identified
- 1.4** Principles and requirements of dynamic positioning redundancy are outlined for different dynamic positioning classes
- 1.5** Documentation used during dynamic positioning operations is identified and confirmed

2 Apply dynamic positioning principles

- 2.1** Dynamic positioning principle are defined
- 2.2** Six freedoms of movement of a vessel are applied
- 2.3** Main components of dynamic positioning systems are described
- 2.4** Mathematical modelling is described, including advantages and disadvantages of each technique
- 2.5** Method by which the dynamic positioning systems determines the residual error is described
- 2.6** Reasons for discrepancy between the displayed value for

- dynamic positioning current/sea force on the dynamic positioning system and the true current/tide are described
- 2.7 Control systems associated with a dynamic positioning system are described
 - 2.8 Position reference systems associated with dynamic positioning installations are described
 - 2.9 Sensor systems associated with dynamic positioning installations are described
- 3 Apply dynamic positioning system principles**
- 3.1 Dynamic positioning modes of operation and common specialist functions are identified and applied
 - 3.2 Dynamic positioning gain and its application in a dynamic positioning system is explained
 - 3.3 Centre of rotation and provision of alternative centres of rotation are outlined and explained
 - 3.4 Controls used to manoeuvre the vessel and to bring it to a stop in accordance with vessel procedures are explained

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.

Non-essential conditions may be found in the MAR Training Package Companion Volume Implementation Guide.

Unit Mapping Information

This is a new unit. No equivalent unit.

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 MARH025 Apply knowledge of dynamic positioning fundamentals

Modification History

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

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:

- describing dynamic positioning gain and its application in a dynamic positioning system
- describing position and heading change manoeuvres when using both automatic and manual dynamic positioning facilities
- describing setting up the dynamic positioning system in both the manual and automatic modes in accordance with workplace procedures
- describing the concept of centre of rotation, and the provision of alternative centres of rotation
- describing the six freedoms of movement of a vessel
- describing the various modes of dynamic positioning operation, including manual control, semi-automatic control and automatic control
- describing the following common specialist functions, including:
 - follow target
 - minimum power (weathervane)
 - remotely operated vehicle (ROV) follow (follow sub)
 - track follow (autotrack)
- determining various providers of statutory requirements, rules, regulations and guidelines
- outlining main components of a dynamic positioning system.

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:

- dynamic positioning principles, including:
 - concept of centre of rotation, and the provision of alternative centres of rotation
 - concept of mathematical modelling, including the advantages and disadvantages of this technique
 - control system associated with a dynamic positioning system
 - definition of dynamic positioning
 - main components of a dynamic positioning system

- method by which the dynamic positioning system determines the residual error resulting from unmeasured errors and forces acting on the vessel (dynamic positioning current/sea force)
- position and heading change manoeuvres, using both automatic and manual dynamic positioning facilities
- power requirements of a dynamic positioning vessel system, and typical power supply installations
- reasons for a discrepancy between the displayed value for dynamic positioning current/sea force on the dynamic positioning systems and the true current/tide
- six freedoms of movement of a vessel, including:
 - freedoms of movement controlled under dynamic positioning
 - freedoms of movement which are monitored
- various position reference systems commonly associated with dynamic positioning installations
- various propulsion systems commonly fitted to dynamic positioning vessels
- various sensor systems associated with dynamic positioning installations
- dynamic positioning operations conducted by the following vessel types:
 - anchor-handling and platform supply vessels
 - cable lay and repair vessels
 - crane barges and construction vessels
 - cruise ships and luxury yachts
 - diving and underwater support vessels
 - drilling ships and semi-submersibles
 - flotel (accommodation) vessels
 - pipe lay vessels
 - rock dumping and dredging vessels
 - shuttle tanker and floating production storage and offloading (FPSO)/ vessels floating production storage operations (FSO)
- dynamic positioning rules, regulations and guidelines, including:
 - International Maritime Organization (IMO) (dynamic positioning) equipment classes and their application with reference to the IMO Guidelines for Vessels with dynamic positioning systems
 - principals of redundancy on dynamic positioning vessels
 - principle IMO documents – MSC645 / 1580 / 728
 - purpose of documentation associated with dynamic positioning operations, such as dynamic positioning operations manuals, failure modes and effects analysis (FMEA) and capability plots, activity specific operating guidelines (ASOG), task appropriate mode (TAM) and critical activity mode of operation (CAMO)
 - relationship between the various rules/regulations and guidelines
 - requirements for dynamic positioning redundancy within different dynamic positioning equipment classes
 - various providers of documentation containing statutory requirements and guidelines

- relating to dynamic positioning operations, including IMO/classification societies/International Maritime Contractors Association (IMCA)/Marine Technology Society (MTS)
- operating a dynamic positioning system, including:
 - concept of centre of rotation, and the provision of alternative centres of rotation
 - dynamic positioning gain and its application in a dynamic positioning system
 - joystick and using joystick to manoeuvre vessel
 - modes of dynamic positioning operation, including common specialist functions:
 - follow target
 - manual control
 - minimum power (weathervane)
 - ROV follow (follow sub)
 - semiautomatic control and automatic control
 - track follow (autotrack)
 - position and heading change manoeuvres, using both automatic and manual dynamic positioning facilities
 - procedure for setting up the dynamic positioning system in both the manual and automatic modes.

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 must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that replicate workplace conditions.

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.

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and dynamic positioning operational manuals, FMEA, capability plots, ASOG, TAM and CAMO
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

Links

Companion Volume Implementation Guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>