



Australian Government

MARH028 Conduct dynamic positioning operations

Release: 1

MARH028 Conduct dynamic positioning operations

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 conduct dynamic positioning operations.

This unit includes operating a dynamic positioning system. It also includes:

- planning, setting up and monitoring of dynamic positioning operations
- conducting dynamic positioning watchkeeping handover
- responding to emergency situations.

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 and regulatory requirements apply to this unit at the time of publication.

Pre-requisite Unit

MARH025 Apply knowledge of dynamic positioning fundamentals

MARH027 Apply knowledge of dynamic positioning systems

MARH026 Apply knowledge of dynamic positioning operations

Competency Field

N - Navigation

Unit Sector

Maritime Sector

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Plan dynamic positioning operations

PERFORMANCE CRITERIA

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

1.1 Vessel plans, specifications, capability diagrams, related documentation and data are analysed to assess the capability of the vessel to complete and conduct dynamic positioning operations

1.2 Risk assessment is conducted, levels of redundancy are determined and are appropriate for proposed operations

1.3 Contingency plans are developed to address risks of system failure and operational requirements are appropriate

1.4 Dynamic positioning watchkeeping procedures are organised in accordance with workplace procedures and operational plans

1.5 Regulatory and legislative requirements are complied with in accordance with workplace procedures and operational plans

2 Set up dynamic positioning operations

2.1 Vessel is checked to ensure that it is on dynamic positioning in accordance with the vessel's class, vessel's operation manual, procedures and checklists

2.2 Alarms and warning limits are determined and set to meet organisational requirements

2.3 Position reference systems for dynamic positioning operations are determined and selected to meet

operational requirements

- 2.4 Position reference systems are determined and selected in accordance with dynamic positioning class
- 2.5 Thruster allocation is determined and selected to meet operational requirements and weather conditions
- 2.6 Vessel's manoeuvring capability is tested
- 2.7 Safe position and minimum distances are determined to ensure vessel is stabilised in dynamic positioning
- 2.8 Clearance for dynamic positioning operations is obtained
- 2.9 Set-up, location and change of watch checklists and task-specific checklists are completed in accordance with workplace procedures

3 Monitor dynamic positioning operations

- 3.1 Data from dynamic positioning system is monitored to ensure vessel positioning is maintained in accordance with operational plans and procedures
- 3.2 Performance checks of dynamic positioning systems are carried out according to operational procedures
- 3.3 Information obtained from dynamic positioning system is interpreted and analysed taking into account limitations of equipment, prevailing circumstances and conditions
- 3.4 Alarms and warning lights are responded to within required time constraints and dynamic positioning is maintained
- 3.5 Situational awareness of the vessel's status, operation and impact of operating under dynamic positioning is maintained
- 3.6 Lookout and awareness of the external situation, including weather when controlling a vessel close to installations or other objects, is maintained
- 3.7 Vessel positioning manoeuvres and station keeping functions are carried out in accordance with operational plans and procedures
- 3.8 Movement of vessel and changes in the position and heading are monitored and safe excursion limits are maintained

- | | | |
|--|-------------|--|
| | 3.9 | Vessel is transferred from manual joystick to dynamic positioning control in accordance with workplace procedures |
| | 3.10 | Clear communication during dynamic positioning operations is maintained, and clarification is sought from, or given to, other team members when information or instructions are not clearly understood |
| | 3.11 | Logbooks and records are maintained during dynamic positioning operations in accordance with organisational procedures |
| 4 Conduct dynamic positioning watchkeeping handover | 4.1 | Handover and relief of dynamic positioning operator is completed according to organisational procedures and safe working practices |
| | 4.2 | Warning and alarm messages their content and information are communicated clearly and accurately during handover process and evaluated by dynamic positioning operator |
| 5 Respond to emergency situations | 5.1 | Nature of emergency and level of urgency are identified promptly and actions taken in accordance with organisational procedures |
| | 5.2 | Conditions and factors of system failure and degraded operations are determined, evaluated and communicated |
| | 5.3 | Vessel position and heading are stabilised, and actions appropriate to the urgency of the situation and nature of emergency are carried out in accordance with contingency plans |

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 Maritime Industry 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 MARH028 Conduct dynamic positioning operations

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:

- communicating with personnel using closed-loop communications during dynamic positioning operations and task-specific communications in accordance with International Marine Contractors Association (IMCA) 103
- completing 480 hours of supervised Dynamic Positioning Operators 'watchkeeping time' on a DP2 or DP3 system, including completion of a task/record book, signed off by a qualified Dynamic Positioning Operator and validated by the vessel's Master
- communicating clearly and accurately information and content from warnings and alarm messages
- conducting appropriate watch handover procedures, including:
 - completing relevant checklists
 - dynamic positioning status
 - field operations
 - status board
 - vessel operations
 - vessel status
 - weather forecasts
- conducting dynamic positioning watch in a formal and clear manner
- determining limitations of vessel movement when having equipment or divers deployed
- determining the dynamic positioning status and recent occurrences which may have an effect on the dynamic positioning operation during the watch
- developing contingency plans to include escape routes, position reference failures, sensors, weather, power, propulsion and worst case failure
- effective completion of set-up/location and change of watch checklists and task-specific checklists as required
- evaluating the consequences of each alarm and possibility to continue the operation
- evaluating the various factors to be taken into account subsequent to any system failure, determining and carrying out appropriate actions, including:
 - changing dynamic positioning status
 - communicating with personnel

- monitoring stability of position and heading
 - when to terminate work
- interpreting visual indicators and indicating conditions which may result in malfunction of dynamic positioning
- maintaining logbooks and records, including:
 - fault logs
 - IMCA incident report form
 - position reference systems logs
- making appropriate decisions and taking actions relating to the continuance or abandonment of the operation
- monitoring changes in distance/heading between object and own vessel
- monitoring movement of object, installation or target
- monitoring vessel movement when having equipment or divers deployed
- operating position reference systems, sensors and peripheral equipment associated with the dynamic positioning system
- organising dynamic positioning watchkeeping procedures to ensure manning of dynamic positioning console, maintaining lookout, using internal and external communications, and observing safe working practices
- organising manning of dynamic positioning console, maintaining lookout, using internal and external communications and observing safe working practices
- recognising the conditions with thrusters, sensors, position references, power, environment and miscellaneous that degrade operational or emergency status
- recognising the warnings and alarms associated with degrading operational or emergency status
- setting up and operating the dynamic positioning system under various control modes to carry out manual, mixed manual and automatic, and fully automatic manoeuvres
- stabilising the vessel position and heading subsequent to a variety of system failures
- updating the ongoing operation and planned operational activities during handover
- using critical activity mode of operation (CAMO) and task appropriate mode (TAM) table to determine which mode dynamic positioning system is operating in as part of risk assessment
- using dynamic positioning alert table or activity specific operating guidelines (ASOG) to trigger a change of status and action to determine level of redundancy
- using failure modes and effective analysis (FMEA) to evaluate a vessel's capability to carry out a given operation
- using procedures to transfer from manual joystick to dynamic positioning control taking into consideration speed, distance, drift test, location of surface and sub-sea structures, drift-on/drift-off, testing manual control, independent joystick control, current/tide changes, weather forecasts, worst case failure testing and testing of dynamic positioning alert status system
- verifying vessel's position or movement and status during handover.

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:

- ASOG
- closed-loop communications during dynamic positioning operations and task-specific communications in accordance with IMCA 103
- conditions that will cause degraded operational status and emergency status, including the impact of:
 - environmental conditions
 - position referencing
 - power
 - sensors
 - thrusters
- contingency planning, including:
 - escape routes
 - positioning reference failures
 - propulsion
 - sensors
 - weather
 - worst case failure
- corrective actions to be taken when responding to a system failure, including:
 - changing dynamic positioning status
 - communication with team members and escalation of communication to Bridge Master
 - monitoring stability of position and heading
 - terminating work
- documentation and records for dynamic positioning operations, including:
 - annual trials reports
 - ASOG
 - CAMO
 - capability plots
 - capability plots (paper and electronic)
 - dynamic positioning manuals
 - FMEA
 - footprint plots
 - logbooks for all dynamic positioning operations, failures and incidents
 - operation, maintenance and repairs of dynamic positioning equipment and ancillary equipment
 - TAM
 - worksite diagrams
- environmental conditions, including:
 - changes to environmental conditions

- impact of changes in environmental conditions on operations
- factors to be taken into consideration in the event of system failure
- factors to be taken into consideration when transferring from manual/joystick to dynamic positioning control, including:
 - current/tide changes
 - distance
 - drift test
 - drift-on/drift-off
 - independent joystick control
 - location of surface and sub-sea structures
 - speed
 - testing manual control
 - testing of the dynamic positioning alert status system
 - weather forecasts
 - worst case failure testing
- failure modes of position reference systems, including:
 - Artemis
 - differential global navigation satellite system (DGNSS)
 - frequency-modulated continuous wave (FMCW) radar and laser-based systems
 - hydro-acoustic
 - inertial navigation system (INS) and taut wire
- failure modes of sensors, including:
 - draught input sensor
 - gyro compass
 - motion reference unit
 - vertical reference sensor/unit
 - wind sensor (anemometer)
- planning dynamic positioning operations, including:
 - ASOG
 - CAMO
 - contingency situations
 - emergency situations
 - TAM
- position reference systems commonly associated with dynamic positioning installations, including:
 - Artemis
 - DGNSS
 - FMCW radar
 - hydro acoustic
 - INS and taut wire

- laser-based systems
- procedures to stabilise the vessel position and heading subsequent to a variety of system failures, including:
 - loss of all position reference system, entering move into dynamic positioning system when in dead reckoning (DR) mode
 - movement of position reference systems
 - setpoint/feedback offset
 - thruster fail to max pitch
 - worst case failure
- risk assessments and levels of redundancy
- use of operational plans to conduct vessel positioning manoeuvres and station keeping functions
- vessel plans and specifications, capability diagrams and data
- vessel limitations, including:
 - scope of operations
 - vessel class
 - vessel movement when equipment or divers are deployed
- warnings and alarms, including:
 - alarms and warnings associated with the impact of:
 - environmental conditions
 - position referencing
 - power
 - sensors
 - thrusters
 - alarm messages
 - consequence analysis alarm
 - content and information of warning and alarm messages
 - escalation of response to alarms and warnings to Bridge Master and other personnel
 - time constraints
 - warnings and alarms associated with:
 - catastrophic failure
 - incorrect operation of the dynamic positioning system and maintaining position
- workplace procedures.

Assessment Conditions

Assessors must hold dynamic positioning certification and 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 a dynamic positioning operational situation that replicates workplace conditions of a DP2 or DP3 vessel system.

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:

- a DP2 or DP3 vessel and/or a simulator that replicates a redundant dynamic positioning system
- 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>