



Australian Government

MARB048 Undertake maintenance of machinery, machinery systems and structural components

Release: 2

MARB048 Undertake maintenance of machinery, machinery systems and structural components

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
- Minor statement changes in Assessment Conditions.

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 establish, organise and implement a preventative and reactive maintenance program and capabilities for machinery, machinery systems and structural components to optimise vessel operational performance.

It includes verifying maintenance needs, setting up maintenance systems, planning maintenance activities, supervising tasks, carrying out scheduled maintenance, handling breakdowns promptly, and implementing and reporting on maintenance plans.

This unit of competency applies to people working in the maritime industry in the capacity of Marine Engine Driver Grade 1 Near Coastal.

Licensing/Regulatory Information

Legislative and regulatory requirements are applicable to this unit.

This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Marine Engine Driver Grade 1 Near Coastal as specified in Marine Order 505.

Note: Relevant state/territory training and qualification requirements must be fulfilled by any persons carrying out installation, maintenance and/or repair of refrigeration equipment, especially with regard to preventing the escape of refrigerants into the atmosphere and to electrical work.

Seafarers seeking certification should check with AMSA.

Pre-requisite Unit

Not applicable.

Competency Field

B - Equipment Checking and Maintenance

Unit Sector

Not applicable.

Elements and Performance Criteria

ELEMENTS

PERFORMANCE CRITERIA

Elements describe the essential outcomes.

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

1 Verify maintenance requirements

- 1.1** Maintenance program regulatory and organisational requirements for machinery, machinery systems and structural components are identified and followed
 - 1.2** Technical specifications, service requirements and organisational procedures for machinery, machinery systems and structural components are checked for recommended maintenance requirements
 - 1.3** Special requirements for maintenance of machinery, machinery systems and structural components are separated from normal lubrication, adjustment and day-to-day maintenance schedules
 - 1.4** Maintenance system goals for machinery, machinery systems and structural components are outlined
 - 1.5** Maintenance plan and related work schedule for machinery, machinery systems and structural components are developed
- #### **2 Establish maintenance systems**
- 2.1** Maintenance costs are identified and quantified
 - 2.2** Processes, procedures and delays are documented
 - 2.3** Internal and external maintenance providers are specified
 - 2.4** Maintenance plan is prepared to minimise ship operation costs, waste and harm to the environment
 - 2.5** Approvals for maintenance plan are negotiated and confirmed

3 Organise maintenance

- 3.1** Schedules and rosters are checked to verify time when

activities	maintenance process may be scheduled, including optimal timing for shutdown
	3.2 Agreement with the Master is obtained for timing of maintenance tasks to optimise maintenance process and minimise operational disruptions
	3.3 Detailed work plans are developed in line with schedules, availability of expertise, scheduling of resource availability and environmental requirements
	3.4 Team members with required competencies are allocated to maintenance activities
	3.5 Consumables and equipment are secured to meet work plan requirements
	3.6 Externally sourced equipment, consumables and expertise are located and procured
	3.7 Contingency plans are prepared
	3.8 Maintenance schedules and procedures are effectively communicated to the team
4 Supervise maintenance tasks	4.1 Job specifications and maintenance tasks are communicated effectively to team members
	4.2 Maintenance and repair tasks are monitored to ensure they satisfy technical specifications
	4.3 Work health and safety (WHS)/occupational health and safety (OHS) requirements are monitored and observed at all times
	4.4 Emergency equipment is made available and working order of equipment is ensured
	4.5 Contingencies are managed to ensure quality of work is maintained and work is completed within agreed timeframe
5 Perform planned maintenance activities	5.1 WHS/OHS risk control measures and procedures for carrying out work are followed
	5.2 Preventative maintenance is carried out in compliance with technical specifications
	5.3 Methods for dealing with unexpected situations are selected on the basis of safety and specified work

		outcomes
	5.4	Ongoing quality checks of maintenance work are undertaken according to technical specifications
	5.5	Work is carried out efficiently without waste of materials and damage to equipment, machinery or other services
	5.6	Worksite is made safe according to organisational safety procedures
	5.7	Maintenance work is checked to verify that it conforms with technical specifications
6	Perform breakdown maintenance	
	6.1	Nature of breakdown is ascertained and reported to appropriate personnel or authorities
	6.2	Maintenance records of machinery, machinery systems and structural components related to reported breakdown are reviewed for possible causes
	6.3	Extent of breakdown is evaluated and confirmed using diagnostic and troubleshooting techniques
	6.4	Restrictions are applied to operations, where necessary, and agreed to with the Master
	6.5	Extent of repair work is ascertained from available evidence
	6.6	Limits of repair work that can be carried out are established
	6.7	Machinery and equipment are isolated
	6.8	Repair work is carried out according to technical specifications
	6.9	Master is notified of completed repair work and details are documented
7	Monitor, adjust and report on implementing the maintenance plan	
	7.1	Execution of maintenance tasks is monitored to ensure they are completed according to maintenance plan and statutory survey requirements
	7.2	Machinery, machinery systems and structural components are monitored to ensure achievement of planned outcomes

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| | 7.3 | Costs are monitored and controlled |
| | 7.4 | Adjustments are made to maintenance plan to take into account failure to achieve planned outcomes |
| | 7.5 | Reports are completed according to maintenance plan requirements and organisational procedures |
| | 7.6 | Recommendations to improve maintenance plan safety, efficiency and effectiveness are implemented under regular review of safety management system (SMS) |
| | 7.7 | Machinery, machinery systems and structural components are maintained in a clean and safe operational condition |
| 8 | Carry out damage control procedures | |
| | 8.1 | Damage to vessel hull and watertight integrity is ascertained and monitored according to established procedures and safety regulations |
| | 8.2 | Appropriate damage control measures are implemented to maintain watertight integrity and to control flooding of vessel according to vessel emergency and safety management 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.

Unit Mapping Information

This unit replaces and is equivalent to MARB012 Undertake maintenance of machinery, machinery systems and structural components.

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 MARB048 Undertake maintenance of machinery, machinery systems and structural components

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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:

- completing maintenance records
- developing effective planning documents
- implementing safe and environmentally responsible work practices
- interpreting and applying documentation and instructions, including:
 - lubricating oil and cooling water reports
 - manufacturer instructions, including:
 - safety data sheets (SDS)/material safety data sheets (MSDS)
 - work health and safety (WHS)/occupational health and safety (OHS) requirements
- managing legislative compliance and compliance records
- recognising and rectifying operating faults in accordance with manufacturer specifications and fault-finding procedures
- overhauling and maintaining pumps, bilge and seawater systems
- performing maintenance tasks, including:
 - changing filters and oil
 - cleaning coolers and strainers
 - lubrication and topping up oils
- planning and organising application of control techniques for hull damage
- planning and preparing for maintenance, including isolating equipment
- recognising damage to hull of small vessel and taking appropriate actions according to operating instructions
- repairing pipe work
- scheduled survey inspections
- selecting and using correct tools and equipment for maintenance task
- servicing valves.

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:

- appropriate mathematical procedures for estimating and measuring, including calculating time to complete tasks
- breakdowns, including:
 - cooling water system failure
 - engine failure
 - exhaust systems
 - fuel system failure
 - gearbox failure
 - loss of control systems
 - lubricating systems failure
 - power plant failure
 - propeller and shafting arrangements systems
 - pumping systems failure
 - refrigeration plant and its operation
 - steering gear failure
- causes of vibrations and undue wear in power transmission system
- construction, layout and subdivision requirements of a typical vessel, including freeboard and bulkhead deck, watertight compartments, weather tight compartments and bulkheads of vessel
- costs of material, consumables and labour
- dangers associated with back flooding and methods to prevent back flooding
- environmental risks and hazards; safe disposal of waste material; safe use and storage of flammable/explosive liquids, gases, solids and other materials normally carried on board, including spare fuel, lubricants, liquified petroleum gas (LPG) cooking gas and flares
- function of lubricating oil and grease
- inspections to be undertaken on vessel hull during slipping or dry docking
- maintenance procedures and methodologies for:
 - batteries
 - cooling water systems, including treatment
 - fuel systems, including contamination
 - heat exchangers
 - hull maintenance, including use of sacrificial anodes
 - hydraulic systems
 - lubricating oil systems, including contamination
 - power transmission systems
 - oily water separator
 - steering systems

- starter motors, alternators and associated equipment
- material and stress characteristics in constructing a vessel
- methods of corrosion and how to prevent corrosion
- organisational requirements, policies and procedures for organising maintenance programs
- principal features and structure of a vessel
- procedures for recording and reporting workplace information
- special requirements for maintenance, including:
 - asbestos awareness
 - awareness of confined and restricted space operations
 - dry docking
 - handling refrigerant gas within regulatory requirements
- types of tools and equipment, and procedures for their safe use and maintenance
- valve types and construction.

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 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:

- a commercial vessel with inboard diesel propulsion power of greater than and equal to 375 kW or appropriate engine, propulsion plant and auxiliary system ashore
- tools, equipment, machinery, materials and personal protective equipment (PPE) currently used in industry, including:
 - hydraulic systems
 - pumps and pumping systems
- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals.

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