



Australian Government

MARM5007A Survey vessel operational systems

Release 1

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Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to undertake a periodic survey of vessel operational systems including propulsion and steering gear systems, deck machinery, pumping systems, power generation, refrigeration plant, liquid petroleum gas (LPG) systems for appliances and navigational systems.

Application of the Unit

This unit applies to people working in the maritime industry as a domestic commercial vessel marine surveyor and may form part of accreditation requirements for surveyors under Australian legislation.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

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|---|---|
| 1 Identify survey requirements | <ul style="list-style-type: none">1.1 Relevant standards for vessel equipment and operational systems are identified, accessed and incorporated into survey plan as required1.2 Survey scope and depth is confirmed against relevant standards and organisational requirements1.3 Operational limits, certificate of operations and previous certificates of survey are reviewed for special conditions or equivalent solutions1.4 Equipment and operational system requirements for survey and range of variations are accurately identified, selected and tested for serviceability |
| 2 Prepare for survey | <ul style="list-style-type: none">2.1 Operational systems to be surveyed for type, size and nature of vessel operations are accurately identified, reviewed and incorporated into survey plan2.2 Relationships between different operational systems are accurately interpreted and items to be surveyed are noted in survey plan2.3 Maintenance records are obtained and reviewed to confirm survey scope |
| 3 Conduct periodic survey of operational systems | <ul style="list-style-type: none">3.1 Survey of operational systems is carried out according to regulatory requirements3.2 Primary and secondary operational systems and their components are surveyed according to survey schedule3.3 Changes to operational equipment or equivalent solutions are identified and examined for fitness both in or out of water as required by survey schedule |
| 4 Report and act on non-compliance | <ul style="list-style-type: none">4.1 Non-compliance is detected, recorded and reported according to regulatory and organisational requirements4.2 Risk arising from non-compliance is detected, reported and communicated to relevant personnel4.3 Relevant provisions of legislation appropriate to level of risk detected are identified and followed4.4 Appropriate reports and documentation related to survey are developed and managed according to regulatory and organisational requirements |

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Accurately interpret relevant codes, standards, rules and regulations for vessel operational systems
- Analyse and evaluate available data and observations to form logical conclusions
- Carry out:
 - engineering measurements and apply metric and imperial conversions
 - inspecting and testing operational systems according to regulatory and organisational requirements
- Communicate effectively verbally and in writing
- Implement principles of work health and safety (WHS)/occupational health and safety (OHS) and marine environment protection measures
- Follow up reports
- Negotiate and resolve conflict
- Question and investigate
- Read and interpret:
 - machinery performance readings and indications
 - plans and drawings
 - technical information
- Recognise faulty equipment
- Select and use appropriate tools and equipment
- Undertake research and analyse reference material and manufacturer data sheets
- Work independently and unsupervised
- Write reports

Required Knowledge:

- Battery types, care and maintenance
- Commercial vessel classifications and survey requirements for various operational systems and their components
- Compatibility and durability of construction materials
- Construction and layout of a typical commercial vessel, including layouts for pipework, tail shaft assembly and installed machinery
- Environmental controls and regulations for primary, secondary or ancillary systems and their components
- Ethical behaviour and industry codes of practice
- Features and characteristics of typical faults and signs of deterioration in operational

systems and components

- Features of different engine types and sizes
- Forms, causes and prevention of corrosion in a marine environment
- Insurance, liability and professional indemnity requirements for self and others
- Interaction of vessel structures and mechanical systems
- Maintaining watertight integrity
- Operational characteristics and performance specifications for different types of marine internal combustion engines and propulsion machinery usually found on vessels of up to 750 kW propulsion power
- Principal features of fittings and machinery found on typical small vessels and characteristics of engine/plant and ancillary equipment
- Procedures for:
 - checking fittings, machinery and components
 - reading and interpreting machinery performance readings and indications
- Purpose and content of safety data sheets (SDS)/material safety data sheets (MSDS)
- Relevant sections of state and territory maritime regulations, National Standard for Commercial Vessels (NSCV) and Uniform Shipping Laws (USL) Code dealing with maintaining small vessels
- Report writing requirements for a range of different survey tasks
- Safety, environmental and hazard control precautions and procedures relevant to checking and basic maintenance of fittings and machinery
- Typical problems related to inspecting and maintaining operational systems
- Typical vessel and machinery specifications, operating manuals and specifications
- WHS/OHS requirements and safe work practices

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- ensuring currency of relevant WHS/OHS skills and knowledge
- providing high quality reports
- developing effective planning documents
- communicating effectively with others as required.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where undertaking survey of vessel operational systems can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate undertaking survey of vessel operational systems
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

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

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- | | |
|---|---|
| Relevant standards may include: | <ul style="list-style-type: none"> • Class rules and approvals • General servicing requirements for operational equipment • Manufacturer guidelines and servicing requirements • Marine orders • National Standard for the Administration of Marine Safety (NSAMS) Section 4 • NSCV and USL Code as applicable • Organisational standards • SDS/MSDS • Safety management systems (SMS) • Safety of life at sea (SOLAS) • Australian/New Zealand Standards (AS/NZS): <ul style="list-style-type: none"> • AS/NZS 3000: Electrical installations • AS/NZS 3004: Electrical installations – verification guidelines • WHS/OHS |
| Survey scope and depth may include: | <ul style="list-style-type: none"> • Class of vessel • Grandfathering conditions • Survey cycle in accordance with NSAMS Chapter 4: <ul style="list-style-type: none"> • change of class survey • damage/repair or condition surveys • equivalent solution or deemed-to-satisfy surveys • periodic survey (either annual or bi-annual) • Survey level of vessel |
| Operational limits may include: | <ul style="list-style-type: none"> • As defined in certificate of operations and/or certificate of survey • Testing requirements for electrical and fire systems |
| Regulatory requirements may include: | <ul style="list-style-type: none"> • Marine Safety (Domestic Commercial Vessel) National Law • NSCV • Regulations and marine orders • USL Code |
| Primary and secondary operational systems must include: | <ul style="list-style-type: none"> • Maintenance and servicing requirements as well as general condition of: <ul style="list-style-type: none"> • ballast • bilge pumping systems |

- communication equipment
- electrical systems
- engines and auxiliaries
- fire and safety systems
- fuel systems
- hydraulic systems
- machinery systems
- navigational systems
- piping and pumping systems
- power generating plants such as hybrid systems, wind and solar generation
- propulsion systems
- refrigeration
- sanitary systems
- steering systems
- tanks

Equivalent solutions may include:

- As noted in certificate of operation or certificate of survey
- As noted in NSCV Part B
- National register of exemptions and equivalent solutions

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying