



Australian Government

MARM5006A Survey hull and superstructure of a commercial vessel

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 survey of hull and superstructure of a commercial vessel according to relevant regulations. It includes planning survey, carrying out survey and providing survey report.

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

- | | |
|---|---|
| 1 Plan and prepare for survey task | <p>1.1 Relevant standards for vessel hull and superstructure are accurately identified and accessed to support survey task</p> <p>1.2 Vessel survey regime is identified and relevant regulatory requirements, organisational requirements and procedures for survey scope are accessed and reviewed</p> <p>1.3 Vessel survey regime is confirmed against regulatory and organisational requirements</p> <p>1.4 Survey scope and depth is confirmed against relevant regulatory and organisational requirements</p> <p>1.5 Survey purpose, objectives and variations are identified with relevant personnel</p> <p>1.6 Operational limits, certificate of operations and previous certificates of survey are reviewed to identify and take into consideration any special conditions, equivalent solutions, specific areas of operations and other regulatory limitations, exceptions or conditions that may impact on survey task</p> <p>1.7 Survey equipment and tools to carry out survey are accurately identified and selected prior to survey task</p> |
| 2 Confirm hull type and material construction | <p>2.1 Types of hull common to domestic commercial vessels are accurately identified and regulatory or additional standards are accessed and reviewed for use in survey</p> <p>2.2 Common materials used in hull construction and superstructure are identified and regulatory or additional standards are accessed and reviewed for use in survey</p> <p>2.3 Construction, type of hull and materials are confirmed prior to survey by accessing vessel records</p> |
| 3 Conduct periodic survey of hull and superstructure | <p>3.1 Survey of hull and superstructure is carried out according to regulatory requirements</p> <p>3.2 Changes to operational equipment or equivalent solutions are identified and examined for fitness both in or out of water as required by survey schedule</p> <p>3.3 Watertight openings and skin fittings are inspected for compliance</p> <p>3.4 Deformation and integrity of hull and superstructure are inspected</p> |

for compliance

3.5 **Paint and coatings** are inspected for condition

3.6 Cathodic protection is inspected where applicable

3.7 Superstructure weather tightness is checked for integrity

3.8 **Appendages** are inspected for integrity

4 Report and act on non-compliance

4.1 Non-compliance is detected, recorded and reported according to regulatory and organisational requirements

4.2 **Specialist support services** are identified and sourced as appropriate

4.3 Risks arising from detected non-compliance are reported and communicated to relevant personnel

4.4 Relevant provisions of legislation appropriate to level of risk detected are identified and followed

4.5 **Appropriate reports and documentation** relating to survey are developed and managed according to organisational and regulatory requirements

Required Skills and Knowledge

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

Required Skills:

- Analyse and evaluate available data and observations to form logical conclusions
- Carry out engineering measurements and apply metric and imperial conversions
- Communicate effectively verbally and in writing
- Develop and use research techniques to identify gaps in knowledge and to recognise professional development opportunities
- Disseminate and clarify technical information
- Identify strengths, weaknesses and failure modes of common marine construction materials
- Implement work health and safety (WHS)/occupational health and safety (OHS) principles and protection of the marine environment
- Interpret engineering drawings
- Interpret relevant legislation, regulations, codes of practice, standards and rules
- Manage risks
- Provide customer service
- Recognise own professional limitations
- Undertake research and analysis using relevant reference material
- Use computers
- Work independently and unsupervised
- Write technical reports

Required Knowledge:

- Acoustic and thermal insulation principles and practices
- Awareness of working stresses in vessel under load or in a seaway
- Basic principles of stability, procedures for incline experiments, simple roll test, stable and unstable equilibrium
- Commercial vessel classifications and survey requirements for various areas of operations
- Compatibility and durability of construction materials
- Composite production methods, quality assurance and secondary bonding techniques
- Damage propagation caused by defects, poor engineering practice and/or transmission of dynamic forces

- Documentation and checklists:
 - construction drawings
 - defect list
 - historical records
 - National Standard for the Administration of Marine Safety (NSAMS) Section 4
 - procedural forms
 - safety management systems
 - stability book
 - standard operating procedures
 - Uniform Shipping Laws (USL) Section 14 Appendix 2
 - vessel files
- Elementary ergonomic design principals and methods for reducing harm to crew in a seaway
- Environmental controls and regulations
- Forms, causes and prevention of corrosion in a marine environment
- Galvanic series of common metals used in boat building
- Hull forms and vessel types
- Implications of poor ventilation practice
- Insurance, liability and professional indemnity
- Interaction of vessel structures, mechanical systems and appropriate installation practices
- Maintaining watertight integrity
- Marine craft construction:
 - methods, materials and vessel anatomy
 - terminology and definitions
- Marine-grade adhesives, mechanical fasteners, sealants and caulking materials
- Marine protective coatings, fairing compounds and finishes
- Principles of sheathing
- Repair techniques and maintenance procedures for common marine craft construction materials
- Report writing formats
- Safe working practices and risk assessment procedures
- Suitable structural support for out-of-water vessels to prevent topple, sag, hog and/or damage from local stress concentrations
- Welding techniques, procedures and standards
- 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:

- undertaking survey of hull and superstructure of a commercial vessel in at least three or more contexts
- developing effective planning documents
- communicating effectively with others as required
- providing high quality reports.

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 hull and superstructure of a commercial vessel 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 hull and superstructure of a commercial vessel
- 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 must include:	• Australian/New Zealand Standards (AS/NZS) • Class • Manufacture guidelines • Marine Orders • National Standard for the Administration of Marine Safety (NSAMS) section 4 • National Standard for Commercial Vessels (NSCV) • Safety data sheets (SDS)/material safety data sheets (MSDS) • Safety of life at sea (SOLAS) • Uniform Shipping Law (USL) • WHS/OHS
Survey regime must include:	• Class of vessel • Survey depth and level of vessel
Relevant regulatory requirements may include:	• AS/NZS, in particular: • AS/NZS ISO 9001: 2008 Quality Management Systems - requirements • Marine Safety (Domestic Commercial Vessel) National Law • NSCV • Part B – General Requirements • Part C – Vessel Construction • Part E – Operational Practices • NSAMS Section 4
Survey scope and depth may include:	• Condition • Initial • Modification/further building • Periodic survey (in or out of water) • Repair/damage
Survey equipment and tools may include:	• Communication equipment • Draft survey hydrometer • Drill • Entry authority • Hammer/welder's hammer • Meat piercing thermometer • Mirror • Personal protective equipment such as respirators, gloves,

- overalls, boots, hearing protection, goggles, masks
 - Photographs
 - Plastic sampling bags
 - Pocket calculator
 - Recording equipment:
 - camera
 - dictaphone
 - lap top computer
 - notebook
 - Sampling equipment:
 - silver nitrate test kit for chlorides
 - test kit equipment
 - thermometers
 - water-detecting paste
 - Scraper
 - Screwdriver
 - Small mallet
 - Sounding tapes
 - Storage equipment/facilities
 - Tape measure /measuring wheel
- Types of hull may include:
- Box
 - Catamaran
 - Foils
 - Non water displacement
 - Shallow draft
 - Single
 - Wave piercing
- Domestic commercial vessels may include:
- Vessels defined as commercial vessels in Marine Safety (Domestic Commercial Vessel) National Law
- Materials may include:
- Aluminium
 - Cement
 - Composite
 - Fibreglass
 - Steel
 - Timber
- Survey schedule may include:
- Twelve months
 - Twenty-four months
 - Thirty-months
 - Five year cycle with NSAMS:
 - periodic survey (either annual or bi-annual)

- change of class survey
 - safety equipment only survey
 - damage/repair or condition surveys
 - equivalent solution or deemed-to-satisfy surveys
 - SMS components
 - in water
 - out of water
- Watertight openings and skin fittings may include:
- Cooling water systems
 - Doppler log
 - Drain plugs
 - Hatch
 - Inlet valve
 - Sea chest
 - Stabilisers
- Deformation and integrity may include:
- Blisters
 - Chemical attack
 - Cracking
 - Degradation
 - Distortion
 - Dry rot
 - Isolated damage
 - Leaching
 - Out of trim
 - Structural failure
 - Ultra violet (UV) breakdown
 - Water ingress
 - Weathering
- Paint and coatings may include:
- Anti fouling
 - Copper sheathing
 - Gel based
- Appendages may include:
- Bilge keels
 - Keel coolers
 - Rudders
 - Stabilisers
- Specialist support services may include:
- Analytical laboratories
 - Chemical (sewage systems)
 - Electrical
 - Naval architects
 - Non-destructive evaluation (NDE) services
 - Noise
 - Pressure vessel testing

Appropriate reports and documentation may include:

- Certificate of operation
- Certificate of survey
- Statements of compliance
- Survey report

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying