



Australian Government

MARM4004A Evaluate vessel stability

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 evaluate stability of a commercial vessel for marine survey purposes using available stability information. It covers principles of stability data and calculations, how to calculate stability and role of surveyor in assessing stability information.

Application of the Unit

This unit applies to people working in the maritime industry as a marine surveyor assistant and forms part of requirements for the Certificate IV in Domestic Commercial Vessel Survey.

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 Determine data requirements | 1.1 Effect of <i>basic data</i> , information and vessel stability calculations is identified, reviewed and applied to assessment of stability |
| | 1.2 Basic data requirements for <i>commercial vessels</i> are correctly identified |
| | 1.3 Importance and function of vessel stability book on survey task is accurately explained |
| 2 Evaluate simplified stability data | 2.1 Appropriate stability data and information required for size and type of vessel is identified and assessed for compliance against regulatory requirements |
| | 2.2 Calculated stability data is correlated with the stability criteria set out in stability book and is confirmed as an accurate evaluation of vessel stability condition by surveyor |
| | 2.3 <i>Precautions</i> to rectify operations that may affect stability and watertight integrity of vessel are identified and confirmed with surveyor |
| | 2.4 Actions to ensure weight distribution does not compromise vessel safety are identified, confirmed with surveyor and incorporated into survey task as required |
| | 2.5 Actions to be taken in anticipation of environmental changes that may affect vessel stability are identified, confirmed with surveyor and incorporated into survey task as required |
| | 2.6 Actions to be taken in <i>emergency situations</i> to maintain vessel stability within safe limits are identified, confirmed with and implemented promptly and effectively |
| 3 Carry out reporting requirements | 3.1 Recorded calculations are reviewed by surveyor for accuracy and relevance |
| | 3.2 Draft survey report is developed and reviewed with surveyor for accuracy and compliance |
| | 3.3 Feedback provided on draft survey report is acknowledged and draft report is amended as required |
| | 3.4 Storage and security of information is identified, and records are stored and filed according to organisational and regulatory requirements |

Required Skills and Knowledge

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

Required Skills:

- Carry out calculations associated with vessel stability using basic stability criteria calculations, including interpreting and correlating resultant data
- Interpret measurements and observations required when maintaining vessel stability
- Read and interpret vessel specifications and drawings
- Read, interpret and apply simple instructions for maintaining vessel stability
- Select and use relevant equipment according to instructions
- Work under supervision of a marine surveyor

Required Knowledge:

- Basic stability theory, including:
 - equilibrium
 - impact of design and hull shape on stability
 - principles of stability
 - relationship between weight and buoyancy in relation to floating bodies
 - reserve buoyancy
 - terms and definitions
- Difference between transverse and longitudinal stability, and causes of list and trim
- Effects of density of water on draught and freeboard of vessel
- Effects on vessel stability that has been bilged
- Information contained in basic stability data book supplied to vessel and how this information is used to maintain vessel in a stable condition during operations
- Marine Safety (Domestic Commercial Vessel) National Law
- Principal design features of vessels related to stability and watertight integrity, such as:
 - maintenance and survey requirements necessary to maintain watertight integrity of vessel
 - openings in hull and on main deck of vessel and safe working practices that must be followed to maintain watertight integrity
- Principal factors that affect operational stability of vessel and related measures that can be taken to maintain stability, including:
 - adding and removing weights
 - additions and alterations to vessel structure
 - free surface effect of slack tanks
 - operation of lifting equipment
 - roll period
 - stiff and tender condition

- water on deck
- Recording stability calculations in survey report
- Relationship between lightship, loaded displacement and deadweight
- Relevant work health and safety (WHS)/occupational health and safety (OHS) legislation and policies
- Steps involved in bringing unstable vessel to a stable condition

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:

- analysing, planning and carrying out vessel stability calculation for at least five different types and size of vessels
- performing accurate and reliable calculations
- attention to appropriate level of detail in recordkeeping
- 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 evaluating vessel stability using available information 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 evaluating vessel stability using available information

- 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.

Basic data may include:

- Certificate of survey
- Vessel log
- Vessel plans and drawings
- Vessel stability data book

Commercial vessels must include:

- Vessels defined as commercial vessels in Marine Safety (Domestic Commercial Vessel) National Law

Precautions may include:

- Ballast management
- Closing openings exposed to weather
- Damage control measures to maintain, stabilise or restore watertight integrity of hull during an emergency
- Managing distribution of load on vessel
- Managing position, stowage and lashing of cargo, stores and equipment, and location of passengers
- Taking precautions when using lifting equipment and associated gear

Emergency situations may include:

- Flooding when there is damage to hull
- Inadequate securing of weights on board
- Unplanned movement of heavy items or stores and equipment on board vessel

Unit Sector(s)

Not applicable.

Competency Field

Marine Surveying