



Australian Government

MARA005 Maintain vessel stability

Release: 2

MARA005 Maintain vessel stability

Modification History

Release 2. Application, Elements and Performance Criteria and other minor edits were corrected to include relevant information.

Release 1. New unit of competency.

Application

This unit involves the skills and knowledge required to determine the stability and trim of a vessel to ensure that stability conditions of vessel comply with intact stability criteria under all conditions of loading.

This unit applies to the work of a Watchkeeper Deck, Master up to 500 gross tonnage and Master up to 80 metres Near Coastal.

This unit has links to legislative and certification requirements.

Pre-requisite Unit

Not applicable.

Competency Field

A – Handling Cargo and Vessel Stability

Unit Sector

Not applicable.

Elements and Performance Criteria

- | | | |
|------------------------------|------------|--|
| 1 Calculate stability | 1.1 | Vessel stability data book is accessed and checked for endorsement |
| | 1.2 | Data is interpreted to determine vessel safety parameters |
| | 1.3 | Stability is accurately calculated using data extracted from vessel stability data book |
| | 1.4 | Stability calculations are checked to ensure they correlate with data set out in vessel stability book |
| | 1.5 | Spurious or incorrect information is recognised and recalculated |

	1.6	Trim, draughts and list are adjusted as required
	1.7	Stability calculations are conducted at a time, frequency and scope appropriate to voyage
2 Manage weight distribution	2.1	Stability calculations are used to plan weight distribution to ensure assigned load line conditions are not exceeded
	2.2	Weight distribution is controlled to maintain vessel within acceptable stability and stress limits for loading operation and at all stages of voyage
	2.3	Appropriate action is taken when weight distribution is compromising vessel safety
3 Maintain records of stability management	3.1	Data and information related to stability management is accurately recorded
	3.2	Data and information related to stability management is filed and stored according to organisational procedures

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Specifies different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Stability calculations must include:

- calculation of areas under the curve
- changes in draft and trim due to differing water densities
- correction for free surface effect
- draft and trim

	• metacentric height • moment of statical stability at small angles of heel • transverse and longitudinal stability • values for righting levers and construction of the curve of stability
Appropriate action includes one or more of the following:	• amending the vessel loading plan • ballast management • reduction of free surface
Data and information related to stability management includes one or more of the following:	• cargo stowage and loading plan • records of stability calculations • safety management system • stability and trim booklet

Unit Mapping Information

This is a new unit. This unit is equivalent to MARA5001A Maintain vessel stability.

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 MARA005 Maintain vessel stability

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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:

- applying knowledge of stability, trim and stress tables, diagrams and stress calculating equipment
- carrying out calculations required when determining vessel stability and trim
- managing the loading and weight distribution of a vessel to ensure assigned load line conditions are not exceeded
- managing vessel stability in a range of conditions
- reading and interpreting vessel specifications and design drawings
- recognising problems affecting vessel stability and trim.

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:

- calculation of vessels stability using the inclining experiment
- effects of angle of loll
- effects of beam and form coefficient on the stability of a vessel
- effects of density of sea water on the draught and freeboard of a vessel
- effects of free surface on the stability of a vessel
- features of the load-line and draught marks of a vessel and methods for performing related calculations
- fundamental actions to be taken in the event of partial loss of intact buoyancy
- fundamentals of watertight integrity
- principal stresses that act on the structure of a vessel
- principal structural members of a vessel and the proper names for various parts
- problems related to the control of trim, stability and stresses of vessels and appropriate action and solutions
- sections of the International Maritime Organization (IMO), Standards of Training, Certification & Watchkeeping (STCW) and Australian Maritime Safety Authority (AMSA) Marine Orders related to intact stability criteria
- stability, trim and stress tables, diagrams and stress calculating equipment

- theory and calculations of vessel stability and dynamics
- use of computer programs in calculating stability
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

Assessment Conditions

Assessors must satisfy National Vocational Education and Training Regulator (NVR)/Australian Quality Training Framework (AQTF) assessor requirements.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

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:

- tools, equipment, machinery, materials and personal protective equipment currently used in industry
- applicable documentation such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- range of relevant exercises, case studies and/or simulations.

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