



Australian Government

MARA4002A Manage vessel stability

Release 1

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Modification History

Release 1

This is the first release of this unit.

This unit replaces and is equivalent to TDMMA1207B Manage stress and dynamic factors affecting a small vessel's stability.

Unit Descriptor

This unit involves the skills and knowledge required to manage the dynamic factors affecting the stability of a vessel up to 80 metres.

Application of the Unit

This unit applies to those working in the capacity of Master on a range of vessels up to 80 metres.

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 Calculate stability | <ul style="list-style-type: none">1.1 Vessel stability data book is made available and checked for endorsement1.2 Data is interpreted to determine safety parameters for vessel1.3 Stability is accurately calculated using data extracted from vessel stability data book1.4 Stability calculations are checked to ensure they correlate with data set out in vessel stability book1.5 Miscalculations or unsafe conditions are recognised and recalculated or checked1.6 Calculated stability data is recorded using appropriate units and correct number of significant figures |
| 2 Control vessel stress and stability | <ul style="list-style-type: none">2.1 Information from vessel stability information is used to determine loading limits and displacement from draft2.2 Vessel weight distribution is managed to maintain stability condition within safe limits at all times and regulatory requirements are complied with under all conditions of loading2.3 Relevant stability information is correctly communicated to others as required2.4 Stability conditions of vessel are managed in adverse weather conditions2.5 Emergencies that may jeopardise vessel stability are recognised and appropriate action is taken |
| 3 Maintain records of stability management | <ul style="list-style-type: none">3.1 Data and information related to stability management is accurately recorded3.2 Data and information related to stability management is filed and stored according to organisational procedures |

Required Skills and Knowledge

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

Required Skills:

- Carry out basic calculations associated with maintaining vessel stability
- Manage loading and weight distribution of vessel to ensure assigned load line conditions are not exceeded
- Manage stability of vessel in a range of conditions
- Recognise problems affecting vessel stability

Required Knowledge:

- Bilging and permeability
- Centroids and centre of gravity
- Change of draught and trim (MCT)
- Conditions of stable, neutral and unstable equilibrium and effects of disturbing vessel from upright
- Construction features and stress characteristics for vessels
- Density and specific gravity
- Dockwater and freshwater allowance
- Effects of free surface of liquids
- Factors that affect the rolling period of vessel
- Forces and moments
- Information contained in stability data books
- Loading and discharging weights
- Principal stresses that act on the structure of a vessel
- Principles of vessel stability
- Procedures for carrying out basic calculations associated with vessel stability
- Relationship between light displacement, loaded displacement and deadweight tonnage
- Stability curves
- Steps involved in bring an unstable vessel to a stable condition
- Tonnes per centimetre immersion (TPC)
- Transverse and longitudinal dynamics
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and 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:

- attention to appropriate level of detail in recordkeeping
- producing reliable documentation.

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 or simulation where managing stability of a vessel up to 80 metres may be demonstrated
- 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 managing stability of vessel up to 80 metres
- 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.

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|--------------------------------------|--|
| Stability calculations must include: | <ul style="list-style-type: none">• Correlation against stability book data• Draft• Final KG• Trim |
| Loading limits may include: | <ul style="list-style-type: none">• Not exceeding allowable passenger carrying capacity and distribution• Not exceeding vessel designed cargo carrying capacity• Understanding the effect of fuel, fresh water and ballast on cargo capacity |
| Emergencies may include: | <ul style="list-style-type: none">• Cargo shift• Damaged hull• Flooding of cargo spaces |

Unit Sector(s)

Not applicable.

Competency Field

Handling Cargo and Vessel Stability