



Australian Government

Department of Education, Employment and Workplace Relations

TDMMA1107B MAINTAIN THE STABILITY OF A VESSEL USING BASIC STABILITY INFORMATION

Revision Number: 1

TDMMA1107B MAINTAIN THE STABILITY OF A VESSEL USING BASIC STABILITY INFORMATION

Modification History

Not applicable.

Unit Descriptor

UNIT DESCRIPTOR:

This unit involves the skills and knowledge required to maintain the stability of a small commercial vessel of up to 24 metres in length using basic stability information.

Application of the Unit

Application of the unit	The unit has applications in qualifications for Masters of commercial vessels of up to 24 metres in length operating within inshore coastal limits, i.e. Certificate III in Transport&Distribution (Coastal Maritime Operations - Master Class 5).
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Licensing/Regulatory Information

Licensing/legislative requirements	The unit is consistent with the relevant maritime regulations for a Master 5 operating a commercial vessel of up to 24 m in coastal waters. This includes applicable sections of Commonwealth and State/Territory maritime licensing and regulatory requirements and the National Standard for Commercial Vessels.
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Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

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

ELEMENT	PERFORMANCE CRITERIA
1 Interpret basic stability criteria	- a Vessel's stability data book is located, accessed and correctly interpreted - b Interpreted basic stability data for the vessel is applied to maintain the stability of the small vessel in accordance with regulations
2 Manage the stability of a small vessel	- a The stability of the small vessel is monitored appropriately in accordance with the nature and speed of vessel's operations or an emergency situation where it exists - b Information obtained from the vessel's basic stability data book is used to maintain the vessel in a stable condition during operations - c Appropriate and prompt action is taken where stability factors have or could exceed acceptable safety limits - d Special precautions are taken where vessel operations may affect the stability and watertight integrity of the vessel - e Degree of vessel security is appropriate for the anticipated weather and sea conditions and planned vessel operations

ELEMENT	PERFORMANCE CRITERIA
2 Manage the stability of a small vessel (continued)	f Prompt and appropriate action is taken where weight distribution is compromising vessel safety g Timely and appropriate action is taken in anticipation of environmental changes that may affect the stability of the vessel h Appropriate action is taken in emergency situations to maintain the stability of the vessel within safe limits i Instructions to others concerning vessel stability and related action are appropriate, timely, clear and concise

Required Skills and Knowledge

REQUIRED KNOWLEDGE

This describes the knowledge required for this unit.

- 1 Relevant maritime regulations
- 2 Relevant OH&S legislation and policies
- 3 Basic stability theory, including:
 - a principles of stability
 - b terms and definitions
 - c relationship between weight and buoyancy in relation to floating bodies
 - d reserve buoyancy
 - e equilibrium
 - f impact of design and hull shape on stability
- 4 Principal design features of small vessels related to stability and watertight integrity, including:
 - a principal parts of a small vessel and their function in relation to its stability and its structural and watertight integrity

REQUIRED KNOWLEDGE

- b advantages and disadvantages of various materials used in the construction of small vessels
 - c openings in the hull and on the main deck of a small vessel and the safe working practices that must be followed to maintain watertight integrity
 - d maintenance and survey requirements necessary to maintain the watertight integrity of a small vessel
- 5 The principal factors which affect the operational stability of a small vessel and the related measures that can be taken to maintain stability, including:
- a adding and removing weights
 - b water on deck
 - c slack tanks
 - d roll period
 - e stiff and tender vessel
 - f additions and alterations to vessel

REQUIRED KNOWLEDGE

- 6 Information contained in the basic stability data book supplied to each small vessel and how this information is used to maintain the vessel in a stable condition during operations
- 7 Effects of density of sea water on the draught and freeboard of a small vessel
- 8 Factors which affect the rolling period of a small vessel
- 9 Relationship between light displacement, loaded displacement and deadweight tonnage
- 10 Differences between transverse and longitudinal stability and the causes of list and trim
- 11 Conditions of stable, neutral and unstable equilibrium and the effects of disturbing a vessel from the upright
- 12 Steps involved in bringing an unstable vessel to a stable condition
- 13 Actions to be taken to contain flooding in the event of underwater damage to the hull
- 14 Effects on the stability of a small vessel that has been bilged
- 15 Problems that may occur concerning the stability of small vessels up to 24 metres engaged on coastal voyages and appropriate precautionary/remedial action and solutions

REQUIRED SKILLS

This describes the basic skills required for this unit.

- 1 Use basic verbal communication skills required when taking action to maintain the stability of a small vessel using basic stability information
- 2 Read, interpret and apply simple instructions for maintaining the stability of a small vessel using basic stability information
- 3 Read and interpret vessel specifications, drawings and operational manuals
- 4 Interpret measurements and observations required when maintaining the stability of a small vessel using basic stability information
- 5 Complete any required records related to the maintenance of the stability of a vessel

- 11 Conditions of stable, neutral and unstable equilibrium and the effects of disturbing a vessel from the upright
- 6 Work safely and collaboratively with others when taking action to maintain the stability of a small vessel using basic stability information
- 7 Select and use relevant equipment as per instructions
- 8 Recognise routine problems when taking action to maintain the stability of a small vessel using basic stability information and take appropriate action
- 9 Adapt to differences in vessel types
- 10 Follow required work schedule as per company requirements

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.

VARIABLE	SCOPE
1. GENERAL CONTEXT	
a. Work must be carried out:	1 in compliance with the relevant State and Territory maritime regulations
b. Work is performed:	1 within defined operational procedures, with responsibility for own outputs and responsibility for others in maintaining the stability of a small vessel
c. Work involves:	1 the application of basic principles of vessel stability when operating a small vessel within a range of applicable operational and emergency contexts
2. WORKSITE ENVIRONMENT	

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

a Vessel may include:	1 any small commercial vessel up to 24 metres in length engaged on a coastal voyage
b Measures to control the stability of the vessel may be carried out:	1 by day or night 2 in both normal and emergency situations 3 under any possible conditions of weather and loading 4 while underway 5 during berthing and unberthing operations 6 while anchoring or mooring
c Factors that may have an adverse effect on small vessel stability which require special precautions and stability management include:	1 effects of suspended weights when using cargo or fishing gear to load and discharge heavy weights 2 dangers on board a fishing vessel when clearing a net which is caught fast on an underwater obstruction 3 free surface effects 4 water on the deck 5 poor security of cargo stowage

Evidence Guide

Evidence Guide

TDMMA1107B MAINTAIN THE STABILITY OF A VESSEL USING BASIC STABILITY INFORMATION

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

1 Critical aspects of evidence required to demonstrate competency in this unit	Assessment must confirm appropriate knowledge and skills to: - a Manage the stability of a small vessel: 1 safely in both normal and emergency situations 2 in normal and adverse weather conditions 3 when loading and unloading 4 when underway 5 in berthing and unberthing operations 6 when anchoring or mooring - b Communicate effectively with others concerning operations to maintain the stability of the vessel
2 Evidence required for demonstration of consistent performance	- a Performance is demonstrated consistently over a period of time and in a suitable range of contexts - b Applies underpinning knowledge and skills when: 1 managing the stability and stresses of a small vessel 2 identifying and stability problems and determining appropriate courses of action 3 identifying and implementing improvements to procedures for the management of the stability of a vessel 4 applying safety precautions relevant to the maintenance of the stability of a small vessel 5 assessing the stability of a vessel in both normal and

Evidence Guide

TDMMA1107B MAINTAIN THE STABILITY OF A VESSEL USING BASIC STABILITY INFORMATION

- emergency situations using basic stability data
- c Shows evidence of application of relevant workplace procedures, including:
 - 1 relevant maritime regulations
 - 2 OH&S regulations and hazard prevention policies and procedures
 - 3 job procedures and work instructions

Evidence Guide (continued)

TDMMA1107B MAINTAIN THE STABILITY OF A VESSEL USING BASIC STABILITY INFORMATION

Evidence 2 required for demonstration of consistent performance (continued)	4 relevant vessel manufacturer's guidelines relating to the stability of the small vessel 5 procedures to protect the integrity and security of the vessel's hull 6 environmental protection procedures when pumping ballast and bilge water - d Action is taken promptly to report and/or rectify factors adversely affecting the stability of the small vessel - e Work is completed systematically with required attention to detail - f Recognises and adapts appropriately to cultural differences in the workplace, including modes of behaviour and interactions among crew and others
3 Context of assessment	- a Assessment of competency must comply with the assessment requirements of the relevant maritime regulations - b Assessment of this unit must be undertaken within relevant marine authority approved and audited arrangements by a registered training organisation: 1 As a minimum, assessment of knowledge must be

Evidence Guide (continued)

TDMMA1107B MAINTAIN THE STABILITY OF A VESSEL USING BASIC STABILITY INFORMATION

	conducted through appropriate written/oral examinations, and 2 Appropriate practical assessment must occur: i at the registered training organisation; and/or ii on an appropriate working or training vessel
4 Specific resources required for assessment	Access is required to opportunities to: a Access is required to opportunities to: b participate in a range of exercises, case studies and other simulated practical and knowledge assessments that demonstrate the skills and knowledge to maintain stability of a small vessel in a range of operational situations; and/or i maintain the stability of a small vessel in a range of operational situations either: ii using an appropriate small vessel simulator over an appropriate range of simulated stability situations iii in appropriate practical situations during seetime on an operational commercial or training small vessel

Range Statement

Range Statement (continued)

TDMMA1107B MAINTAIN THE STABILITY OF A VESSEL USING BASIC STABILITY INFORMATION

VARIABLE	SCOPE
c Factors that may have an adverse effect on small vessel	6 movement of heavy items or stores and equipment on board vessel 7 flooding in the event of damage to the hull

Range Statement (continued)

**TDMMA1107B MAINTAIN THE STABILITY OF A VESSEL
USING BASIC STABILITY INFORMATION**

stability which require special precautions and stability management include: (continued)	8 alterations to the structure/construction of the vessel 9 use and replenishment of consumables during a voyage such as fuel and food
d Means of managing the stability of a small vessel include:	1 closing openings 2 taking precautions during vessel operations to reduce the stress and maintain the stability conditions of the vessel 3 taking precautions when using lifting equipment and associated gear 4 managing the position, stowage and lashing of cargo, stores and equipment and the location of passengers 5 action to avoid or minimise cargo shift during a voyage 6 managing the distribution of load on vessel 7 ballast management 8 damage control measures to maintain, stabilise or restore the watertight integrity of the hull during an emergency
e Documentation and records may include:	1 operational orders 2 vessel's stability data book 3 relevant maritime regulations 4 vessel's log 5 small vessel manufacturer's instructions and recommended procedures 6 vessel's plans and drawings 7 instructions of relevant maritime authorities

Range Statement (continued)

**TDMMA1107B MAINTAIN THE STABILITY OF A VESSEL
USING BASIC STABILITY INFORMATION**

f Applicable legislation, regulations and codes may include:	1 sections of relevant State and Territory maritime regulations and the national Standard for Commercial Vessels dealing with small vessel stability 2 relevant Commonwealth, State and Territory OH&S legislation
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Unit Sector(s)

Not applicable.

Field

Field MA Handling Cargo and Vessel Stability

Relationship to other units

Relationship to other units

The unit may be assessed in conjunction with other units that relate to the functions of the occupation(s) concerned.