Australian Government

Department of Education, Employment and Workplace Relations

TDMMA1207B MANAGE STRESS AND DYNAMIC FACTORS AFFECTING A SMALL VESSEL'S STABILITY

Release: 1

TDMMA1207B MANAGE STRESS AND DYNAMIC FACTORS AFFECTING A SMALL VESSEL'S STABILITY

Modification History

Not applicable.

Unit Descriptor

UNIT DESCRIPTOR: **This unit involves the skills and knowledge required to manage the stress and dynamic factors affecting the stability of a small commercial vessel using basic stability criteria**. **This includes interpreting basic stability criteria**, **carrying out required stability calculations**, **correlating and interpreting calculated stability data**, **managing stability and stress conditions within safety parameters and communicating the stability information t others as required**.

Application of the Unit

Application of the unit	The unit has applications in qualifications for a Master 4 and Skipper 2 operating a vessel of less than 80 metres in length within inshore limits (15 nm) and less than 35 metres within ACMW (600 nm), i.e. Certificate IV in Transport&Distribution (Coastal Maritime Operations - Master Class 4). This includes but is not limited to the manoeuvring of passenger vessels, ferries, charter vessels, tourist craft, fishing vessels, harbour service vessels, salvage vessels, tugs, etc.

Licensing/Regulatory Information

Licensing/legislative requirements	The unit is consistent with the relevant maritime regulations describing mandatory minimum requirements for a Master 4/Skipper 2. This includes applicable sections of State/Territory maritime licensing and regulatory requirements and the National Standard for Commercial Vessels (NSCV).and the USL Code.

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
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1 Interpret basic stability criteria	a Vessel stability data book is located, accessed and interpreted in accordance with established procedures b Stability data for the vessel is interpreted and applied in the management of vessel to ensure it is operated within the safety parameters set by marine regulations
2 Calculate, correlate and interpret basic stability data	a Basic stability calculations are accurately carried out in accordance with procedures and regulations b Calculated stability data is correlated with the basic stability criteria set out in the vessel's approved stability book

ELEMENT	PERFORMANCE CRITERIA
2 Calculate, correlate and interpret basic stability data (continued)	c Vessel's stability is maintained within design operating limits d Unsafe or false information from stability analysis is promptly recognised and recalculated or checked
3 Take action to manage stress and dynamic factors affecting vessel stability	a The monitoring of stability and stress conditions of vessel is at a frequency and scope relevant to the nature and speed of vessel's operations and anticipated weather and sea conditions, or in an emergency and is sufficient to enable stress and stability to be maintained within acceptable limits at all times b Appropriate action is taken promptly where stress and stability factors have or could exceed acceptable safety limits and in anticipation of environmental changes that may affect stresses and stability of the vessel c Appropriate precautions are taken where vessel operations may affect the stress and stability conditions of the vessel d Prompt and appropriate action is taken where weight distribution is compromising vessel safety e Action taken in emergency situations is appropriate to the significance of the situation and designed to maintain stresses and stability of vessel within safe limits f Instructions to others are clear, concise, appropriate and timely

ELEMENT	PERFORMANCE CRITERIA
4 Maintain records of stability management	a Appropriate records are kept of all action taken to monitor and manage the stress and dynamic factors affecting a vessel's stability b Relevant information on vessel stability and action to manage stress and dynamic factors affecting vessel stability are correctly communicated to others as required

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 The principal stresses which act on the structure of a small vessel

4 Construction features and stress characteristics for small commercial vessels engaged on coastal voyages

5 Principles of small vessel stability, including appropriate stability criteria required under regulatory requirements for the types of vessel concerned

6 An understanding of the information contained in the typical stability data books supplied to each small vessel and how this information is used to maintain the vessel in a stable condition during operations

7 Procedures for carrying out calculations associated with vessel stability using basic stability criteria calculations, including interpreting and correlating the resultant data

8 Factors which affect the rolling period of a vessel

9 Relationship between light displacement, loaded displacement and deadweight tonnage

10 Conditions of stable, neutral and unstable equilibrium and the effects of disturbing a vessel from the upright

11 Steps involved in bringing an unstable vessel to a stable condition

12 Problems and the stress and dynamic factors affecting the stability of small vessels engaged in coastal voyages and appropriate precautionary/remedial action and solutions

13 Procedures for managing the stress and stability conditions of a vessel in preparation for adverse sea and weather conditions

REQUIRED KNOWLEDGE

14 Procedures for managing the stress and stability conditions of a vessel during emergency situations that may involve flooding and/or damage to the hull and structure of the vessel

15 Effects of density of sea water on the draught and freeboard of a vessel, including the effects on a vessel's draught when moving from fresh to salt water and vice versa

16 Maritime communication techniques

REQUIRED SKILLS

This describes the basic skills required for this unit.

1 Use communication skills required when managing the stress and dynamic factors affecting a small vessel's stability

2 Read, interpret and apply basic instructions relevant to managing the stress and dynamic factors affecting the stability of a small vessel of less than 80 metres

3 Work safely and collaboratively with others when managing the stress and dynamic factors affecting a small vessel's stability

4 Bring an unstable vessel to a stable condition

5 Carry out calculations associated with vessel stability using basic stability criteria calculations, including interpreting and correlating the resultant data

6 Recognise problems and the stress and dynamic factors affecting the stability of small vessels engaged in coastal voyages and take appropriate precautionary/remedial action

7 Manage the stress and stability conditions of a vessel in preparation for adverse sea and weather conditions

8 Manage the stress and stability conditions of a vessel during emergency situations that may involve flooding and/or damage to the hull and structure of the vessel

Evidence Guide

Evidence Guide

EVIDENCE GUIDE

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 Interpret information obtained from a vessel's stability data book b Carry out basic calculations associated with vessel stability using the required stability criteria, including interpreting and correlating the resultant data c Manage the stress and dynamic factors affecting the stability of a small commercial vessel d Communicate effectively with others concerning measures required to control 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 of the stress and dynamic factors affecting the stability of a small commercial vessel engaged on a coastal voyage 2 calculating and interpreting data associated with stability management 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

	4 relevant vessel manufacturer's guidelines relating to the trim, stability and stress limits of the vessel 5 procedures to protect the integrity and security of the vessel's hull 6 environmental protection procedures when pumping ballast water d Action is taken promptly to report and/or rectify out-of-limit trim, stability and stresses of the 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

Evidence Guide (**continued**)

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 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 Specificresource srequired for assessment	Access is required to opportunities to: a participate in a range of exercises, case studies and other simulated practical and knowledge assessments that demonstrate the skills and knowledge to manage the stress and dynamic factors affecting the stability of a small vessel

	in a range of operational situations; and/or
	b assist in the management of the stress and dynamic factors affecting the stability of a small vessel engaged on a coastal voyage in a range of operational situations, either:
	1 using a suitable simulator over an appropriate range of simulated loading and operational situations
	2 in appropriate practical situations on an operational commercial or training vessel possibly during seatime training

Range Statement

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 maritime regulations
b. Work is performed:	1 within a defined range of operations and routine procedures, with responsibility for own outputs and some responsibility for others in achieving the specified quality and quantity of outcomes. It involves the management of the stress and dynamic factors affecting a vessel's stability. Some discretion and judgement is required in anticipating and allowing for possible stress and stability problems, hazards and contingencies and the actions to be taken in these eventualities

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

c. Work involves:	1	the management of the stress and dynamic factors affecting a vessel's stability
d. Work requires:	1	some discretion and judgement in anticipating and allowing for possible stress and stability problems, hazards and contingencies and the actions to be taken in these eventualities

2. WORKSITE ENVIRONMENT

a Vessel may include:	1	any small commercial vessel of less than 80 metres in length within inshore limits (15 nm) and less than 35 metres within ACMW (600 nm)
b Management of the stress and dynamic factors affecting a vessel's stability may be carried out:	1	by day or night in both normal and emergency situations
	2	under any possible conditions of weather and loading
	3	while loading and unloading
	4	while underway
	5	during berthing and unberthing operations
	6	while anchoring or mooring
	7	in anticipation of adverse sea and weather conditions

Range Statement (**continued**)

VARIABLE		SCOPE
c Means of managing the stress and	1	maintaining watertight integrity
	2	taking precautions during vessel operations that potentially

VARIABLE	SCOPE
dynamic factors affecting the stability of a vessel include:	alter the stress and 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, equipment or fish 5 taking action to avoid or minimise cargo shift during a voyage 6 managing the distribution of load on vessel 7 managing ballast 8 damage control measures to maintain, stabilise or restore the watertight integrity of the hull during an emergency
d Factors that may have an adverse effect on 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 fish on deck 6 bilging 7 poor security of cargo stowage 8 movement of heavy items or stores and equipment on board vessel 9 flooding in the event of damage to the hull 10 alterations to the structure/construction of the vessel 11 use and replenishment of consumables during a voyage such as fuel and water, etc.

VARIABLE	SCOPE
e Documentation /records may include:	1 operational orders 2 vessel's stability data book 3 relevant sections of State and Territory maritime regulations, NSCV and USL Code dealing with vessel stability 4 vessel's log

Range Statement (**continued**)

VARIABLE	SCOPE
e Documentation /records may include: (**continued**)	5 vessel manufacturer's instructions and recommended procedures 6 notices and instructions of relevant maritime authorities
f Applicable procedures and codes may include:	1 relevant sections of State and Territory maritime regulations, NSCV and USL Code concerning the stability of small commercial vessels of less than 80 metres 2 relevant Commonwealth, State and Territory OH&S legislation

Unit Sector(s)

Not applicable.

Field

Field MA Handling Vessel and Cargo 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.