



Australian Government

Department of Education, Employment and Workplace Relations

TDMMH1607A DETERMINE POSITION OF THE VESSEL

Revision Number: 1

TDMMH1607A DETERMINE POSITION OF THE VESSEL

Modification History

Not applicable.

Unit Descriptor

UNIT DESCRIPTOR:

This unit involves the skills and knowledge required to determine the position of a commercial vessel using terrestrial, celestial and electronic method.

This is a new unit that incorporates the position fixing functions covered by the previous unit TDMMH401A *Plan and conduct a passage and determine position*. The passage planning functions covered by the previous unit have been incorporated in a new unit TDMMH1906A *Plan a passage*.

Application of the Unit

Application of the unit	The unit has applications in qualifications for a Watchkeeper (Deck), Master (Less than 500 GT) and Master 3, i.e. Diploma of Transport&Distribution(Maritime Operations - Deck Watchkeeper) and Diploma of Transport&Distribution(Coastal Maritime Operations - Master Class 3).
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Licensing/Regulatory Information

Licensing/legislative requirements	The unit is consistent with the relevant maritime regulations describing mandatory minimum requirements for both a Watchkeeper and Master 3/Skipper 1. This includes applicable sections of AMSA Marine Orders and State/Territory maritime licensing and regulatory requirements and the National Standard for Commercial Vessels (NSCV) and the USL Code.
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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
<p>1 Select an appropriate position fixing method</p>	<ul style="list-style-type: none"> a Primary position fixing method is selected in accordance with prevailing conditions b Time interval between fixes is appropriate to the prevailing navigational conditions c Verification of primary position fixing is regularly carried out using appropriate methods d Position of vessel is recorded on a navigational chart (paper or electronic) in accordance with company procedures and regulatory requirements
ELEMENT	PERFORMANCE CRITERIA
<p>2 Fix the vessel's position from terrestrial observations</p>	<ul style="list-style-type: none"> a Magnetic and gyro compass error is determined using terrestrial observations b Sufficient visual or radar conspicuous features are selected for position fixing taking into account the geometry of the resultant position lines

ELEMENT	PERFORMANCE CRITERIA
	<ul style="list-style-type: none"> c Where less than three objects are available for terrestrial observation appropriate alternative position estimation techniques are employed d Observations are made, corrected for compass errors and plotted onto a navigational chart using appropriate symbols e The resultant fix is assessed for accuracy
3 Fix the vessel's position from celestial observations	<ul style="list-style-type: none"> a Magnetic and gyro compass error is determined using celestial observations b Vessel's position is determined and plotted from a series of observations of the altitude of the sun on and off the meridian c The time of meridian passage of the sun is determined d The most appropriate time range for stellar observations at twilight is determined e Suitable stars are selected for position fixing purposes, and their approximate altitude and azimuth determined f Vessel's position is determined and plotted from a series of observations of the altitudes of stars g The accuracy of celestial observations is assessed to determine fix reliability
4 Fix the vessel's position using a radio navigation aids	<ul style="list-style-type: none"> a Position information is transposed from an electronic navigation aid onto a chart b Position line information is transposed from an electronic navigation aid onto a chart c Position line and fix information is transposed onto an electronic chart display d The accuracy of position is assessed to determine fix reliability

ELEMENT	PERFORMANCE CRITERIA
5 Determine the appropriate action to take with respect to a plotted position	<ul style="list-style-type: none"> a An assessment of the set, drift and leeway being experienced by the vessel is made b Course is adjusted to maintain or resume the planned route where the position indicates a deviation has occurred

ELEMENT	PERFORMANCE CRITERIA
5 Determine the appropriate action to take with respect to a plotted position (continued)	<ul style="list-style-type: none"> c A dead reckoning (DR) and/or estimated position (EP) is projected along the planned route in accordance with the course made good between previously observed positions

Required Skills and Knowledge

REQUIRED KNOWLEDGE

This describes the knowledge required for this unit.

- 1 Maritime regulations related to the determination of a vessel's position
- 2 Principles and procedures for position fixing:
 - a methods used to approximate to the shape of the earth
 - b marine coordinate and distance measuring systems
 - c marine chart projections and their uses and limitations
 - d relationship between true, magnetic, compass and gyro courses
 - e causes of variation, deviation and gyro compass error

REQUIRED KNOWLEDGE

- f factors affecting the accuracy of position lines obtained from various sources
 - g standard chartwork symbols
- 2 Principles and procedures for position fixing (continued):
- h common methods of time measurement
 - i the correlation between arc and time
 - j elements of the celestial coordinate systems and spherical triangles
 - k concepts of hour angle
 - l procedures for preparing for stellar observations
 - m concepts of intercept
 - n special techniques required for navigation in high latitudes

REQUIRED SKILLS

This describes the basic skills required for this unit.

- 1 Communicate effectively with other personnel when determining the position of a vessel
- 2 Interpret and apply procedures and techniques for determining the position of a vessel
- 3 Recognise problems in determining the position of a vessel and take appropriate courses of action and solutions
- 4 Carry out calculations required when determining the position of a vessel
- 5 Adapt to variations in equipment and related procedures that may occur from one vessel to another used when determining the position of a vessel
- 6 Apply position lines or fixes onto a nautical chart:, including:
 - a determining variation, deviation, magnetic and gyro compass error by terrestrial and celestial methods
 - b observing visual bearings

REQUIRED SKILLS

- c determining the bearing and range of a radar conspicuous target
 - d determining the rising and dipping distance of a lighthouse
 - e plotting true bearings on a chart
 - f plotting radar ranges on a chart
 - g plotting a running fix on a chart allowing for set, drift and leeway
 - h plotting the vessel's position using horizontal angles
 - i assessing a fix for accuracy with respect to the size of the 'cocked hat'
 - j extracting data from the Nautical Almanac
- 7 Determine the times of astronomical events, including the times of rising and setting of the sun, and meridian passage of the sun
 - 8 Determine the time period in which stellar observations can be made
 - 9 Select suitable stars when planning a stellar fix
 - 10 Determine and plot the position of the vessel using sun-run-sun procedures
 - 11 Determine and plot the position of the vessel from a stellar observations at twilight
 - 12 Transpose a position or position line from an radio navigation aid to a chart (paper and electronic)
 - 13 Determine the set drift and leeway experienced between position fixes
 - 14 Determine the course and speed made good between positions
 - 15 Determine the course to steer to regain the planned route or arrive at a waypoint
 - 16 Project the DR and EP along a planned route

Evidence Guide

Evidence Guide

TDMMH1607A DETERMINE POSITION OF THE VESSEL

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.

<p>1 Critical aspects of evidence required to demonstrate competency in this unit</p>	<p>Assessment must confirm appropriate knowledge and skills to:</p> <ul style="list-style-type: none"> a Fix the position of a commercial vessel using all relevant sources of position fixing data b Access, use and maintain navigational charts, nautical publications and related documentation c Communicate effectively with others conducting fixing the position of a vessel
<p>2 Evidence required for demonstration of consistent performance:</p>	<ul style="list-style-type: none"> a Performance is demonstrated consistently over a period of time and in a suitable range of contexts b Applies underpinning knowledge and skills when: <ul style="list-style-type: none"> 1 identifying and evaluating navigation problems and determining appropriate navigational solutions 2 identifying and implementing improvements to navigation procedures 3 interpreting and applying information derived from navigational equipment and systems 4 applying required precautions relevant to navigation 5 fixing the position of the vessel c Shows evidence of application of relevant workplace procedures, including: <ul style="list-style-type: none"> 1 relevant sections of applicable maritime regulations 2 vessel's safety management system and related procedures

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- 3 navigational regulations and hazard prevention policies and procedures
- 4 job procedures and navigational instructions
- d Action is taken promptly to report and/or rectify accidents and incidents in accordance with statutory requirements and company procedures
- 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 and communication with others

Evidence Guide (continued)**TDMMH1607A DETERMINE POSITION OF THE VESSEL****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 Specific resources required for

- Access is required to opportunities to:
- a obtain and plot fix data using an appropriate vessel or

Evidence Guide (continued)**TDMMH1607A DETERMINE POSITION OF THE VESSEL****assessment**

approved marine simulator over an appropriate range of latitudes and navigational circumstances

- b perform celestial observations in a location where the horizon can be viewed

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 mandatory rules and regulations and IMO Conventions and Codes, including the relevant sections of the AMSA Marine Orders and ensuring that applicable codes, guidelines and standards recommended by IMO, the classification societies and maritime industry organisations are taken into account
b Work is performed:	1 as a member or leader of a bridge team under broad operational requirements, with accountability and responsibility for self and others in achieving the prescribed outcomes

<p>c Work involves: .</p>	<p>1 the application of a significant range of fundamental navigational principles and procedures across a wide variety of navigational contexts, including navigation at high latitudes. Contribution to the development of a plan for a voyage is required as a member of a bridge team with appropriate allowance for possible contingencies</p>
<p>d Work requires: .</p>	<p>1 judgement and teamwork in planning, technical and operational functions related to fixing of the position of a commercial vessel of 500 GT or more</p>

2. WORKSITE ENVIRONMENT

<p>a Vessel may include:</p>	<p>1 a commercial vessel within the limits of responsibility of Watchkeeper on a vessel of more than 500 GT operating in international waters and Master 3/Skipper 1 operating a vessel (a) less than 35 metres in length for unlimited domestic operations, (b) less than 80 metres in length for ACMW operations (within 600 nm) or (c) that is both less than 3,000 GT and less than 100 metres in length, for ACMW operations (within 600 nm)</p>
<p>b Position fixing may occur in conditions of:</p>	<p>1 clear visibility using visual and celestial navigational techniques</p> <p>2 restricted visibility using radar or electronic aids to navigation</p> <p>3 clear visibility using a combination of visual and electronic techniques</p>

Range Statement (continued)**TDMMH1607A DETERMINE POSITION OF THE VESSEL**

VARIABLE	SCOPE
c Instrumentation and equipment used for navigation and fixing a vessel's position may include:	<ol style="list-style-type: none"> 1 automatic radar plotting aid (ARPA) 2 Loran C navigation system 3 GPS and DGPS satellite navigation systems 4 ECS and ECDIS systems (Note: ECDIS systems are considered to be included under the term 'charts' under the IMO STCW Convention and Code) 5 integrated navigation systems 6 magnetic compasses 7 gyro compasses and repeaters 8 gyro repeaters 9 chronometers 10 sextants 11 azimuth mirrors 12 azimuth vanes 13 pelorus 14 doppler and electromagnetic logs
d Position fixing techniques may include:	<ol style="list-style-type: none"> 1 visual 2 radar 3 celestial

	4	electronic position fixing systems
e Documentation and records may include:	1	safety management system plans, procedures, checklists and instructions
	2	operational orders and company procedures
	3	navigational charts
	4	nautical tables
	5	publications on radio signals, light lists, sailing directions and tide tables
	6	navigational warning records
	7	vessel manufacturer's instructions and recommended procedures
	8	instructions of relevant maritime authorities
	9	pilot instructions where relevant
	10	relevant Australian and international standards

Range Statement (continued)**TDMMH1607A DETERMINE POSITION OF THE VESSEL**

VARIABLE	SCOPE	
f Applicable legislation, regulations and codes may include:	1	relevant sections of IMO STCW 95 Code, AMSA Marine Orders, State/Territory maritime regulations, NSCV and USL Code
	2	relevant international, Commonwealth, State and Territory OH&S legislation

Unit Sector(s)

Not applicable.

Field

Field MH Navigation

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.
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