Australian Government
Australian Maritime Safety Authority

Master <45m Near Coastal

Skills and Knowledge Required for Marine Order 505 (Certificates of competency — national law) 2022

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The tables in this document are taken directly from AMSA 730 Skills and Knowledge Required for Marine Order 505 (Certificates of competency — national law) 2022. Only those tables specific to this certificate of competency are included in this document.

TABLE 2 – ELEMENTS OF SHIPBOARD SAFETY

Outcome	Content	Standards for evaluating competence
Elements of Shipboard Safety Safety and emergencies including survival craft	**Meet operational and emergency safety requirements** • Apply basic survival skills in the event of vessel abandonment • Follow procedures to minimise and fight fire on a vessel • Meet workplace health and safety requirements • Survive at sea using survival craft	• Practice survival techniques • Operate lifesaving and survival equipment • Undertake and understand risk management processes including Safety Management System (SMS) operational practices • Follow workplace health and safety procedures and take action • Understand and follow fire minimisation procedures • Respond to and fight fires with portable and other firefighting appliances including correct use of vessel closure and shutdown systems • Identify and respond to risks associated with confined spaces • Practice survival techniques using survival craft

TABLE 3 – FOLLOW SOUND ENVIRONMENTAL WORK PRACTICES

Outcome	Content	Standards for evaluating competence
Environment Ensure crew are able to implement and follow environmental work practices and procedures	**Environmental Responsibilities** • Ensure crew are able to implement and follow environmental work practices and procedures • Contribute to improved environmental work practices • Maintain environmental records • Implement emergency procedures to respond to hazardous events • Maintain and improve vessel environmental management • Precautions to prevent pollution • Sensitive sea and restricted sea areas • MARPOL • Oil spill equipment and its limitations	• Identify safe and environmentally acceptable practices for: - Refuelling - Cleaning up fuel or oil spills - Understanding garbage, sewage, noise, anchoring or marine life and other environmental type maritime responsibilities - Antipollution procedures and equipment

TABLE 8B - COASTAL NAVIGATION

Outcome	Content	Standards for evaluating competence
Outcome 8.9b Plan and conduct a safe passage and determine position	**Chart and Features** • Construction of a navigational chart • Latitude and longitude • Relationship between latitude and longitude • Variation and deviation • Chart scales • Information displayed on a chart or plan • Notices to Mariners	• The information obtained from navigational charts is relevant and applied • The chart symbols and features are identified or selected • That chart corrections are made using Notices to Mariners, are correctly inserted, and deleted as necessary
	Coastal Navigation Techniques • Relationships between true, magnetic, compass, gyro and relative • Variation and deviation • Deviation card • Compass error • Laying off a safe course • Position determined by visual, estimated and radar means • Position estimation by dead reckoning • Coastal features • Publications for safe navigation • Use of electronic aids to navigation • Reporting systems • Navigation Log	• Apply relevant information obtained from current navigational charts and publications • Navigational hazards are identified including ice • Estimated positions are calculated accurately from known data • Vessel position is accurately fixed using visual, radar and a combination of visual and radar information • Plot a GPS derived position • Positions obtained are within acceptable accuracy levels • Fixing interval is appropriate to the proximity of danger • Calculations and measurements from the chart are accurate • Charts selected are appropriate to the area of operation • Use of electronic aids could include but not limited to: GPS, chart plotters, AIS, RADAR, depth sounders, communication systems • Use radar range and bearing to plot the vessels position on a chart. Check the GPS position against the plot • Use parallel indexing to maintain a required distance off a point of land • Maintaining situational awareness • Ship routing information and Traffic Separation Schemes

Outcome	Content	Standards for evaluating competence
Outcome 8.9b continued Plan and conduct a safe passage and determine position	**Instrumentation and Navigation Aids** Basic principles, errors and limitations of: • Compasses • Echo sounders • GPS • Automatic steering systems • Alarm systems • Plotters and electronic charts • Alarms • Interaction of navigation aid and equipment • Basic understanding of ECDIS, ARPA, AIS	• Performance checks and tests on navigational equipment and systems are carried out adhering to manufacturer's recommendations and accepted navigational practices • Operating procedures are in accordance with manufacturer's recommendations • Performance limitations of equipment are considered • Use of electronic aids include but are not limited to: GPS, chart plotters, AIS, RADAR, depth sounders, communication systems • Care and maintenance of navigation aids • Automatic Pilots including use, change over from manual and vice versa • Navigation equipment maintenance, logs and updates
	Tides • Basic tidal theory • Tidal prediction sources • Tide tables, Australian and local	• Relevant information is obtained from tide tables, navigational charts and publications, and applied • The times and heights of high and low water from Australian or local tide tables for any port are accurate • Chart datum and relevance to the height of tide is understood and practical examples applied • The publications used are current • Areas of extensive tidal effects

TABLE 8C – RADAR

Outcome	Content	Standards for evaluating competence
Outcome 8.10c Use radar to maintain safety of navigation and for collision avoidance	**Fundamental Principles** • Fundamental principles and effects on performance • Pulse transmission • Pulse length • Wave length and frequency • Range and bearing measurement • Major components and their siting	• Components are identified as per manufacturer's specification • Demonstrate knowledge of fundamental principles and characteristics on performance of the radar and compensation during use • Setting up and maintaining displays
	Characteristics and Performance • Factors affecting performance • Maximum and minimum range • Bearing and range accuracy • Vertical and horizontal beam width • Range and bearing measurement • Radar horizon	• Factors affecting performance are recognised during use
	Interpretation of Display • Effects of target aspects • Shore and topography targets • Atmospherics • Weather factors • Blind arcs and shadow areas • False echoes • Radar reflectors • Radar beacons and transponder beacons • Radar logs	• Limitation and operating parameters of the radar are identified • Information obtained from radar is interpreted and analysed to assist in navigation and collision avoidance • Interpretation and analysis to be confirmed by alternative means • Misrepresented information is detected • Limitations and accuracy of equipment and information derived in prevailing conditions are identified • Search and Rescue Radio Transponders (SART) and Racons • Identification of critical echoes
	Functions and Adjustment • Function of controls • Symbols for controls • Setting up and maintain display • Shutting down display • Maladjustments • Verification of range and bearing	• Procedures adopted to operate a radar set comply with manufacturer's recommendations • Controls are identified and adjusted to provide maximum performance

Outcome	Content	Standards for evaluating competence
Outcome 8.10c continued Use radar to maintain safety of navigation and for collision avoidance	**Plotting and Collision Avoidance** • Relative and true motion • Radar presentations • Radar plotting • Collision avoidance • International Regulations for the Prevention of Collision at Sea (as amended) • Reporting • Parallel indexing • Basic understanding of ARPA	• Action taken to avoid a close-quarters situation or collision with another vessel is in accordance with the International Regulations for the Prevention of Collision at Sea (as amended) • Radar plots to ascertain target's closest point of approach and time of closest point of approach are actioned to prevent "close quarter" situations developing • Course and speed of other ship • Detecting course changes of other ship • Effects of changes in own ships course and/or speed • Manoeuvring and restricted visibility signals are in accordance with the International Regulations for the Prevention of Collision at Sea (as amended) and used correctly • Course and speed alterations prevent close-quarter situations, comply with International Regulations for Prevention of Collision at Sea (as amended) and avoid navigational hazards

TABLE 9 – VESSEL CONSTRUCTION AND MACHINERY

Outcome	Content	Standards for evaluating competence
Outcome 9.1 Demonstrate knowledge of the principal structural components of a vessel of 80m in length	**Vessel Construction** • Fundamental principles of vessel construction • Principal structural components • Load lines conditions of assignment • Structural arrangements to restrain fires • Design characteristics attributing to watertight integrity • Methods for testing tanks and watertight integrity • Regulatory requisites • Elements of ship's structure crucial to the safety of the ship	• Identify structural components from ship's drawings and plans and locate on a vessel • Demonstrate knowledge of the function of structural components in compliance with conventional maritime design • Identify various construction material and techniques • Demonstrate knowledge of the construction aspects of a vessel related to cargo
Outcome 9.2 Manage a propulsion unit using the appropriate engineering systems and support services	**Engineering Systems** • Marine engineering terms • Management of marine power units • Ancillary equipment • Safety alarm systems	• Operation of propulsion unit, ancillary power units and equipment is in accordance with technical specifications • Machinery is operated within the accepted safety parameters • Monitoring of safety and fire detection systems is in accordance with formulated emergency procedures • Operation of safety and fire-detection/ suppression systems • Adopted safety precautions and procedures are appropriate

TABLE 9A – STABILITY AND STRESS CONDITIONS

Outcome	Content	Standards for evaluating competence
Outcome 9.3a Manage stress and dynamic factors affecting a vessel's stability	**Stability** • Terms and definitions • Forces and moments • Centroids and centre of gravity • Density and specific gravity • Dockwater allowance • Transverse and longitudinal dynamics • Effects of free surface • Loading and discharging weights • Final KG • Bilging and permeability • Change of draught and trim (MCT) • Tonnes per centimetre immersion (TPC) • Freshwater allowance • Virtual loss of GM • Stress conditions including trim and stress tables • Stability curves • Stress calculating equipment	• Information obtained from a vessel's stability data book is interpreted correctly • Calculations associated with basic stability management are accurate • Correlate and interpret calculated stability data • Stability and stress conditions are managed within safety parameters • Information communicated is relevant and correct • Stability diagrams and illustrations are accurate • Actions in the event of partial loss of intact stability

TABLE 9B – NAUTICAL KNOWLEDGE

Outcome	Content	Standards for evaluating competence
Outcome 9.4b Monitor and control compliance with legislative requirements	**Marine Legislation** • Commonwealth, local, State and Territory Act and subordinate legislation • National Standard for Commercial Vessels (NSCV) • International Aeronautical and Maritime Search and Rescue (IAMSAR) • MARPOL 73/78 • Standards of Training, Certification and Watchkeeping (STCW) as amended • Safety of Life at Sea (SOLAS) • Safety management systems (SMS) or plans • International Maritime Organisation (IMO) • Environmental legislation	• Information obtained from International, Commonwealth, local, State and Territory Acts, Legislation, Codes and other publications relating to the safe navigation and operation of a vessel is current and applied • Procedures for monitoring ship's operations and maintenance comply with legislative requirements • Responsibilities under international maritime law embodied in international agreements and conventions are clearly identified, interpreted and applied • Procedures and communications used for coordinating SAR operations are in accordance with IMO requirements • Understand and apply SMS, safety management plans, standards and emergency operating procedures • Understand and comply with the requirements for crew inductions • Determine and understand risk management techniques • Source information on the various State waterways management regulatory requirements, for example: areas of operation, bar crossings and port authority requirements • Sensitive sea areas and restrictions, oil spill equipment and its limitations • Plan for coping with increased volume of garbage, bilge water, sludge and sewage • Consequences of pollution in a cold climate
Outcome 9.5b Predict meteorological and oceanographic conditions	**Meteorology and Oceanography** • Vertical division of atmosphere • Heat exchange process • Cloud classification • Air masses and fronts • Synoptic chart analysis • Tropical meteorology • Instruments • Ocean currents • Sea state	• Weather forecasts for an intended voyage are obtained using all available data and the forecast • Information obtained from observations, reports and instruments is deciphered and applied to ensure safety of the vessel

Outcome	Content	Standards for evaluating competence
Outcome 9.6b Execute appropriate watchkeeping arrangements and procedures	**Watchkeeping** • Content, application and intent of the International Regulations for the Prevention of Collision at Sea (as amended) • Watchkeeping principles • Bridge teamwork procedures • Ship Reporting Systems • VTS procedures • Assessing watchkeepers' skills • Fitness for duty • Fatigue management • Drug and alcohol policy • General provisions on ship routing	• Watchkeeping arrangements and practices comply with STCW as amended, Marine Orders and Regulations • Allocation, assignment and prioritisation of resources • Assertive and leadership is demonstrated • Situational awareness is maintained • Consideration is given to navigational watch teams experience • Watchkeeping arrangements are planned, organised and implemented, including: - Standing Orders and calling the Master - Taking over the watch - Clear weather - Restricted visibility - Hours of darkness - Coastal and congested waters - Navigation with a pilot on board - Ship at anchor and in port - Ship carrying dangerous cargo • The International Regulations for the Prevention of Collision at Sea (as amended) are appropriately applied • Communication and reporting procedures adopted on the bridge are clearly defined, accepted and implemented • Adopted procedures enhance navigational safety, protection of the marine environment and the safety of all on board

Outcome	Content	Standards for evaluating competence
Outcome 9.7b Manoeuvre a vessel in any prevailing conditions	**Vessel Handling and Manoeuvring** • Interaction • Propulsion and manoeuvring systems • Manoeuvring in restricted waters • Squat, shallow water and similar effects • Embarkation and disembarkation of pilots • Anchoring and manoeuvres to approach an anchorage • Management of vessel in heavy weather • Manoeuvres to launch boats or liferafts • Methods for retrieving survivors • Effects of deadweight, draught, trim, speed and under keel clearance on vessel's stopping distance and rate of turn • Berthing manoeuvres	• Decisions made are justified with consideration to the vessel's manoeuvring and propulsion unit's characteristics in the prevailing conditions • In analysing the safe manoeuvring of a vessel, explanation is given to: interaction, tide, current, passing vessels and own vessel's bow and stern wave • Initial responses are concise and appropriate measures taken are adequate • Safe operating limits are not exceeded • Safety precautions followed are relevant • Manoeuvre a vessel: - crossing a bar - in following and quartering seas - berthing and unberthing - coming to and leaving a mooring - steering through an 's' configuration - towing and being towed - to turn short around - to turn across the tide /across the wind - through a Williamson turn
Outcome 9.8b Respond to navigational emergencies	**Emergency Procedures** • Beaching a vessel • Grounding and refloating a vessel • Collision • Damage control • Emergency steering • Emergency towing arrangements and procedures • Salvage arrangements • Musters and drills • Cyclones and heavy weather • Assisting a vessel in distress	• Contingency plans are formulated and adopted for emergency situations • Initial actions, including manoeuvring of the ship, are in accordance with contingency plans, without risk to the vessel or crew safety • Follow-up actions are justified in accordance with marine safety procedures • Equipment utilised is appropriate and safe • Communication and reporting procedures adopted are clearly defined and accepted • Safety precautions and WH&S considerations are followed • Actions to be taken when an emergency arises in port • Distress alerts and procedures • SART • Radio communications • Actions to keep all on board safe in the event of an emergency

Outcome	Content	Standards for evaluating competence
Outcome 9.9b Prepare a cargo plan to ensure safe cargo operations whilst loading, unloading and during a voyage	**Cargo Operations** • Purchases and tackle • Stresses and loads • Safe working loads • Cargo handling and securing equipment • International Maritime Dangerous Goods (IMDG) Code • Bulk Cargo Code • Cargo stowage and securing • Loading and unloading • Ballasting • Documentation • Authorities requisites • 'Enhanced survey regime'	• Information, procedures and documentation relating to the handling of dangerous and harmful cargo are reliable and correctly identified in accordance with the IMDG Code and with awareness of material safety data sheets (MSDS) • Cargo operations and the distribution of cargo are planned using reliable information and in accordance with established guidelines • Emergency procedures for incidents involving dangerous and hazardous cargoes are appropriate • Cargo monitoring procedures are appropriate – including scheduling of inspections to ensure all parts are checked in a given time • Safety precautions and procedures comply with maritime regulations, procedures and WH&S requirements • Monitoring for damage, defects and corrosion including causes and prevention • Considerations in severe weather
Outcome 9.10b Establish and maintain a harmonious workplace environment	**Organisation and Management** • Management and leadership • Leadership style • Group dynamics • Conflict resolution • Organisation skills	• Individual crew members are informed of the expected standards of work and behaviour and allocated appropriate duties • Crew training objectives and activities are based on an assessment of current competence and operational requirements • Initial indications and possible causes of conflict are promptly identified • Propose appropriate strategies to deal with conflict within the workplace • Communication skills used facilitate constructive response to conflict
Outcome 9.11b Organise and manage communications on board to receive information and advice	**Communications** • International code flags and usage of signal books • International Code of Signals (ICS) • Global Maritime Distress Safety System (GMDSS) • Radio • IAMSAR • Morse (SOS)	• Information obtained from ICS and other publications relating to inter-ship communications is current and actioned • Procedures for monitoring ship's communication systems comply with legislative requirements • Communication procedures ensure that marine safety information and inter-ship safety messages are received and acknowledged

Outcome	Content	Standards for evaluating competence
Outcome 9.12b Work safely in enclosed spaces	**Confined space** • Assess confined spaces • Seek permission to enter a confined space • Plan and enter an enclosed space safely • Take emergency action regarding an enclosed space	• Identify and minimise risks associated with enclosed space entry • Seek authorisation or regulatory permission to enter an enclosed space • Prepare a plan for access into an enclosed space • Manage work operations and safety requirements within an enclosed space • Meet regulatory enclosed space requirements; including but not limited to permits, entry and exits, maintenance of equipment
Outcome 9.13b Application of leadership and team working skills	• Working knowledge of shipboard personnel management and training • A knowledge of relevant international maritime conventions and recommendations and national legislation	• Ability to apply task and workload management including: - Planning and coordination - Personnel assignment - Time and resource constraints - Prioritisation • Knowledge and ability to apply effective resource management: - Allocation, assignment and prioritisation of resources - Assertiveness and leadership including motivation - Obtaining and maintaining situational awareness • Knowledge and ability to apply decision making techniques: - Situation and risk assessment - Identify and consider generated options - Selecting course of action - Evaluation of outcome effectiveness • Development, implementation and oversight of standard operating procedures

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