Table A-II/2
Specification of minimum standard of competence for masters and chief mates
on ships of 500 gross tonnage or more

Function: Navigation at the management level

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<th>Column 1</th>
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<tbody>
<tr>
<td>Competence</td>
<td>Knowledge, understanding and proficiency</td>
<td>Methods for demonstrating competence</td>
<td>Criteria for evaluating competence</td>
</tr>
<tr>
<td>Plan a voyage and conduct navigation</td>
<td>Voyage planning and navigation for all conditions by acceptable methods of plotting ocean tracks, taking into account, e.g.:</td>
<td>Examination and assessment of evidence obtained from one or more of the following:</td>
<td>The equipment, charts and nautical publications required for the voyage are enumerated and appropriate to the safe conduct of the voyage</td>
</tr>
<tr>
<td></td>
<td>.1 restricted waters</td>
<td>.1 approved in-service experience</td>
<td>The reasons for the planned route are supported by facts and statistical data obtained from relevant sources and publications</td>
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<td></td>
<td>.2 meteorological conditions</td>
<td>.2 approved simulator training, where appropriate</td>
<td>Positions, courses, distances and time calculations are correct within accepted accuracy standards for navigational equipment</td>
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<tr>
<td></td>
<td>.3 ice</td>
<td>.3 approved laboratory equipment training</td>
<td>All potential navigational hazards are accurately identified</td>
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<td>.4 restricted visibility</td>
<td>Using: chart catalogues, charts, nautical publications and ship particulars</td>
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<td>.5 traffic separation schemes</td>
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<td>.6 vessel traffic service (VTS) areas</td>
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<td>.7 areas of extensive tidal effects</td>
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<td>Routeing in accordance with the General Provisions on Ships’ Routing</td>
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<td>Reporting in accordance with the General principles for Ship Reporting Systems and with VTS procedures</td>
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<tr>
<td>Determine position and the accuracy of resultant position fix by any means</td>
<td>Position determination in all conditions:</td>
<td>Examination and assessment of evidence obtained from one or more of the following:</td>
<td>The primary method chosen for fixing the ship’s position is the most appropriate to the prevailing circumstances and conditions</td>
</tr>
<tr>
<td></td>
<td>.1 by celestial observations</td>
<td>.1 approved in-service experience</td>
<td>The fix obtained by celestial observations is within accepted accuracy levels</td>
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<tr>
<td></td>
<td>.2 by terrestrial observations, including the ability to use appropriate charts, notices to mariners and other publications to assess the accuracy of the resulting position fix</td>
<td>.2 approved simulator training, where appropriate</td>
<td>The fix obtained by terrestrial observations is</td>
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<td>.3 using modern electronic</td>
<td>.3 approved laboratory equipment training</td>
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<td>Methods for demonstrating competence</td>
<td>Criteria for evaluating competence</td>
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<tr>
<td></td>
<td>navigational aids, with specific knowledge of their operating principles, limitations, sources of error, detection of misrepresentation of information and methods of correction to obtain accurate position fixing</td>
<td>using:</td>
<td>within accepted accuracy levels</td>
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<td></td>
<td></td>
<td>.1 charts, nautical almanac, plotting sheets, chronometer, sextant and a calculator</td>
<td>The accuracy of the resulting fix is properly assessed</td>
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<td></td>
<td></td>
<td>.2 charts, nautical publications and navigational instruments (azimuth mirror, sextant, log, sounding equipment, compass) and manufacturers’ manuals</td>
<td>The fix obtained by the use of electronic navigational aids is within the accuracy standards of the systems in use. The possible errors affecting the accuracy of the resulting position are stated and methods of minimizing the effects of system errors on the resulting position are properly applied</td>
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<td>.3 radar, terrestrial electronic position-fixing systems, satellite navigation systems and appropriate nautical charts and publications</td>
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</tr>
<tr>
<td>Determine and allow for compass errors</td>
<td>Ability to determine and allow for errors of the magnetic and gyro-compasses</td>
<td>Examination and assessment of evidence obtained from one or more of the following:</td>
<td>The method and frequency of checks for errors of magnetic and gyro-compasses ensures accuracy of information</td>
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<tr>
<td></td>
<td>Knowledge of the principles of magnetic and gyro-compasses</td>
<td>.1 approved in-service experience</td>
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<td></td>
<td>An understanding of systems under the control of the master gyro and a knowledge of the operation and care of the main types of gyro-compass</td>
<td>.2 approved simulator training, where appropriate</td>
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<td></td>
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<td>.3 approved laboratory equipment training using: celestial observations, terrestrial bearings and comparison between magnetic and gyro-compasses</td>
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<tr>
<td>Coordinate search and rescue operations</td>
<td>A thorough knowledge of and ability to apply the procedures contained in the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual</td>
<td>Examination and assessment of evidence obtained from one or more of the following:</td>
<td>The plan for coordinating search and rescue operations is in accordance with international guidelines and standards</td>
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<td>.1 approved in-service experience</td>
<td>Radiocommunications are established and correct communication procedures are followed at all stages of the search and rescue operations</td>
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<td>.2 approved simulator training, where appropriate</td>
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<td>.3 approved laboratory equipment training using: relevant publications, charts, meteorological data, particulars of ships involved, radiocommunication equipment and other available facilities and one or more of the following:</td>
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<td>.1 approved SAR training course</td>
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<td>.2 approved simulator training, where appropriate</td>
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<td>.3 approved laboratory equipment training</td>
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<tr>
<td>Establish watchkeeping arrangements and procedures</td>
<td>Thorough knowledge of content, application and intent of the International Regulations for Preventing Collisions at Sea, 1972, as amended</td>
<td>Examination and assessment of evidence obtained from one or more of the following:</td>
<td>Watchkeeping arrangements and procedures are established and maintained in compliance with international regulations and guidelines so as to ensure the safety of navigation, protection of the marine environment and safety of the ship and persons on board</td>
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<td>Thorough knowledge of the content, application and intent of the Principles to be observed in keeping a navigational watch</td>
<td>.1 approved in-service experience</td>
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<td>.2 approved simulator training, where appropriate</td>
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<tr>
<td>Maintain safe navigation through the use of information from navigation equipment and systems to assist command decision making</td>
<td>An appreciation of system errors and thorough understanding of the operational aspects of navigational systems</td>
<td>Examination and assessment of evidence obtained from approved ARPA simulator and one or more of the following:</td>
<td>Information obtained from navigation equipment and systems is correctly interpreted and analysed, taking into account the limitations of the equipment and prevailing circumstances and conditions</td>
</tr>
<tr>
<td><em>Note:</em> Training and assessment in the use of ARPA is not required for those who serve exclusively on ships not fitted with ARPA. This limitation shall be reflected in the endorsement issued to the seafarer concerned</td>
<td>Blind pilotage planning</td>
<td>.1 approved in-service experience</td>
<td>Action taken to avoid a close encounter or collision with another vessel is in accordance with the International Regulations for Preventing Collisions at Sea, 1972, as amended</td>
</tr>
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<td>Evaluation of navigational information derived from all sources, including radar and ARPA, in order to make and implement command decisions for collision avoidance and for directing the safe navigation of the ship</td>
<td>.2 approved simulator training, where appropriate</td>
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<td>The interrelationship and optimum use of all navigational data available for conducting navigation</td>
<td>.3 approved laboratory equipment training</td>
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<tr>
<td>Maintain the safety of navigation through the use of ECDIS and associated navigation systems to assist command decision making</td>
<td>Management of operational procedures, system files and data, including:</td>
<td>Assessment of evidence obtained from one of the following:</td>
<td>Operational procedures for using ECDIS are established, applied, and monitored</td>
</tr>
<tr>
<td><em>Note:</em> Training and assessment in the use of ECDIS is not required for those who serve exclusively on ships not fitted with ECDIS. This limitation shall be reflected in the endorsement issued to the seafarer concerned</td>
<td>.1 manage procurement, licensing and updating of chart data and system software to conform to established procedures</td>
<td>.1 approved in-service experience</td>
<td>Actions taken to minimize risk to safety of navigation</td>
</tr>
<tr>
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<td>.2 system and information updating, including the ability to update ECDIS system version in accordance with vendor’s product development</td>
<td>.2 approved training ship experience</td>
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<td>.3 create and maintain system configuration and backup files</td>
<td>.3 approved ECDIS simulator training</td>
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<td>.4 create and maintain log files in accordance with established procedures</td>
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<td>.5 create and maintain route plan files in accordance with established procedures</td>
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<td>.6 use ECDIS log-book and track history functions for inspection of system functions, alarm settings and user responses</td>
<td>Use ECDIS playback functionality for passage review, route planning and review of system functions</td>
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<td></td>
<td>Forecast weather and oceanographic conditions</td>
<td>Examination and assessment of evidence obtained from one or more of the following:</td>
<td>The likely weather conditions predicted for a determined period are based on all available information</td>
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<td>Ability to understand and interpret a synoptic chart and to forecast area weather, taking into account local weather conditions and information received by weather fax</td>
<td>.1 approved in-service experience</td>
<td>Actions taken to maintain safety of navigation minimize any risk to safety of the ship</td>
</tr>
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<td></td>
<td>Knowledge of the characteristics of various weather systems, including tropical revolving storms and avoidance of storm centres and the dangerous quadrants</td>
<td>.2 approved laboratory equipment training</td>
<td>Reasons for intended action are backed by statistical data and observations of the actual weather conditions</td>
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<td>Knowledge of ocean current systems</td>
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<td>Ability to calculate tidal conditions</td>
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<td>Use all appropriate nautical publications on tides and currents</td>
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<td>Respond to navigational emergencies</td>
<td>Precautions when beaching a ship</td>
<td>Examination and assessment of evidence obtained from practical instruction, in-service experience and practical drills in emergency procedures</td>
<td>The type and scale of any problem is promptly identified and decisions and actions minimize the effects of any malfunction of the ship’s systems</td>
</tr>
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<td></td>
<td>Action to be taken if grounding is imminent, and after grounding</td>
<td></td>
<td>Communications are effective and comply with established procedures</td>
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<td></td>
<td>Refloating a grounded ship with and without assistance</td>
<td></td>
<td>Decisions and actions maximize safety of persons on board</td>
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<tr>
<td></td>
<td>Action to be taken if collision is imminent and following a collision or impairment of the watertight integrity of the hull by any cause</td>
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<tr>
<td>Assessment of damage control</td>
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<td>Emergency steering</td>
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<tr>
<td>Emergency towing arrangements and towing procedure</td>
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<tr>
<td>Manoeuvre and handle a ship in all conditions</td>
<td>Manoeuvring and handling a ship in all conditions, including:</td>
<td>Examination and assessment of evidence obtained from one or more of the following:</td>
<td>All decisions concerning berthing and anchoring are based on a proper assessment of the ship’s manoeuvring and engine characteristics and the forces to be expected while berthed alongside or lying at anchor</td>
</tr>
<tr>
<td></td>
<td>.1 manoeuvres when approaching pilot stations and embarking or disembarking pilots, with due regard to weather, tide, headreach and stopping distances</td>
<td>.1 approved in-service experience</td>
<td>While under way, a full assessment is made of possible effects of shallow and restricted waters, ice, banks, tidal conditions, passing ships and own ship’s bow and stern wave so that the ship can be safely manoeuvred under various conditions of loading and weather</td>
</tr>
<tr>
<td></td>
<td>.2 handling ship in rivers, estuaries and restricted waters, having regard to the effects of current, wind and restricted water on helm response</td>
<td>.2 approved simulator training, where appropriate</td>
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<td></td>
<td>.3 application of constant-rate-of-turn techniques</td>
<td>.3 approved manned scale ship model, where appropriate</td>
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<td>.4 manoeuvring in shallow water, including the reduction in under-keel clearance caused by squat, rolling and pitching</td>
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<td>.5 interaction between passing ships and between own ship and nearby banks (canal effect)</td>
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<td>.6 berthing and unberthing under various conditions of wind, tide and current with and without tugs</td>
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<td>.7 ship and tug interaction</td>
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<td>.8 use of propulsion and manoeuvring systems</td>
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<td>Criteria for evaluating competence</td>
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<tr>
<td>Manoeuvre and handle a ship in all conditions <em>(continued)</em></td>
<td>.9 choice of anchorage; anchoring with one or two anchors in limited anchorages and factors involved in determining the length of anchor cable to be used</td>
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<td>.10 dragging anchor; clearing fouled anchors</td>
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<td>.11 dry-docking, both with and without damage</td>
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<td>.12 management and handling of ships in heavy weather, including assisting a ship or aircraft in distress; towing operations; means of keeping an unmanageable ship out of trough of the sea, lessening drift and use of oil</td>
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<td>.13 precautions in manoeuvring to launch rescue boats or survival craft in bad weather</td>
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<td>.14 methods of taking on board survivors from rescue boats and survival craft</td>
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<td>.15 ability to determine the manoeuvring and propulsion characteristics of common types of ships, with special reference to stopping distances and turning circles at various draughts and speeds</td>
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<td></td>
<td>.16 importance of navigating at reduced speed to avoid damage caused by own ship’s bow wave and stern wave</td>
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<td>Criteria for evaluating competence</td>
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<tr>
<td>Manoeuvre and handle a ship in all conditions <em>(continued)</em></td>
<td>.17 practical measures to be taken when navigating in or near ice or in conditions of ice accumulation on board</td>
<td>Examination and assessment of evidence obtained from one or more of the following:</td>
<td>Plant, auxiliary machinery and equipment is operated in accordance with technical specifications and within safe operating limits at all times</td>
</tr>
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<td>.18 use of, and manoeuvring in and near, traffic separation schemes and in vessel traffic service (VTS) areas</td>
<td>.1 approved in-service experience</td>
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<tr>
<td>Operate remote controls of propulsion plant and engineering systems and services</td>
<td>Operating principles of marine power plants</td>
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<td>Ships’ auxiliary machinery</td>
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<td>General knowledge of marine engineering terms</td>
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<tr>
<td>Function: Cargo handling and stowage at the management level</td>
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<tr>
<td>Plan and ensure safe loading, stowage, securing, care during the voyage and unloading of cargoes</td>
<td>Knowledge of and ability to apply relevant international regulations, codes and standards concerning the safe handling, stowage, securing and transport of cargoes</td>
<td>Examination and assessment of evidence obtained from one or more of the following:</td>
<td>The frequency and extent of cargo condition monitoring is appropriate to its nature and prevailing conditions</td>
</tr>
<tr>
<td></td>
<td>Knowledge of the effect on trim and stability of cargoes and cargo operations</td>
<td>.1 approved in-service experience</td>
<td>Unacceptable or unforeseen variations in the condition or specification of the cargo are promptly recognized and remedial action is immediately taken and designed to safeguard the safety of the ship and those on board</td>
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<tr>
<td></td>
<td>Use of stability and trim diagrams and stress-calculating equipment, including automatic data-based (ADB) equipment, and knowledge of loading cargoes and ballasting in order to keep hull stress within acceptable limits</td>
<td>.2 approved simulator training, where appropriate using: stability, trim and stress tables, diagrams and stress-calculating equipment</td>
<td>Cargo operations are planned and executed in accordance with</td>
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<tr>
<td>Plan and ensure safe loading, stowage, securing, care during the voyage and unloading of cargoes (continued)</td>
<td>Stowage and securing of cargoes on board ships, including cargo-handling gear and securing and lashing equipment</td>
<td>Loading and unloading operations, with special regard to the transport of cargoes identified in the Code of Safe Practice for Cargo Stowage and Securing</td>
<td>established procedures and legislative requirements</td>
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<tr>
<td></td>
<td>General knowledge of tankers and tanker operations</td>
<td>Knowledge of the operational and design limitations of bulk carriers</td>
<td>Stowage and securing of cargoes ensures that stability and stress conditions remain within safe limits at all times during the voyage</td>
</tr>
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<td></td>
<td>Ability to use all available shipboard data related to loading, care and unloading of bulk cargoes</td>
<td>Ability to establish procedures for safe cargo handling in accordance with the provisions of the relevant instruments such as IMDG Code, IMSBC Code, MARPOL 73/78 Annexes III and V and other relevant information</td>
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<td></td>
<td>Ability to explain the basic principles for establishing effective communications and improving working relationship between ship and terminal personnel</td>
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</tr>
<tr>
<td>Assess reported defects and damage to cargo spaces, hatch covers and ballast tanks and take appropriate action</td>
<td>Knowledge of the limitations on strength of the vital constructional parts of a standard bulk carrier and ability to interpret given figures for bending moments and shear forces Ability to explain how to avoid the detrimental effects on bulk carriers of corrosion, fatigue and inadequate cargo handling</td>
<td>Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved simulator training, where appropriate using: stability, trim and stress tables, diagrams and stress-calculating equipment</td>
<td>Evaluations are based on accepted principles, well-founded arguments and correctly carried out. The decisions taken are acceptable, taking into consideration the safety of the ship and the prevailing conditions</td>
</tr>
<tr>
<td>Carriage of dangerous goods</td>
<td>International regulations, standards, codes and recommendations on the carriage of dangerous cargoes, including the International Maritime Dangerous Goods (IMDG) Code and the International Maritime Solid Bulk Cargoes (IMSBC) Code Carriage of dangerous, hazardous and harmful cargoes; precautions during loading and unloading and care during the voyage</td>
<td>Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved simulator training, where appropriate .3 approved specialist training</td>
<td>Planned distribution of cargo is based on reliable information and is in accordance with established guidelines and legislative requirements Information on dangers, hazards and special requirements is recorded in a format suitable for easy reference in the event of an incident</td>
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</table>
Function: Controlling the operation of the ship and care for persons on board at the management level

<table>
<thead>
<tr>
<th>Competence</th>
<th>Knowledge, understanding and proficiency</th>
<th>Methods for demonstrating competence</th>
<th>Criteria for evaluating competence</th>
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<tbody>
<tr>
<td>Control trim, stability and stress</td>
<td>Understanding of fundamental principles of ship construction and the theories and factors affecting trim and stability and measures necessary to preserve trim and stability</td>
<td>Examination and assessment of evidence obtained from one or more of the following:</td>
<td>Stability and stress conditions are maintained within safe limits at all times</td>
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<td></td>
<td>Knowledge of the effect on trim and stability of a ship in the event of damage to and consequent flooding of a compartment and countermeasures to be taken</td>
<td>.1 approved in-service experience</td>
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<td>Knowledge of IMO recommendations concerning ship stability</td>
<td>.2 approved training ship experience</td>
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<td>.3 approved simulator training, where appropriate</td>
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<td>Monitor and control compliance with legislative</td>
<td>Knowledge of international maritime law embodied in international</td>
<td>Examination and assessment of evidence obtained from one or</td>
<td>Procedures for monitoring operations and maintenance comply with</td>
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<tr>
<td>requirements and measures to ensure safety of life</td>
<td>agreements and conventions.</td>
<td>more of the following:</td>
<td>legislative requirements</td>
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<tr>
<td>at sea, security and the protection of the marine</td>
<td>Regard shall be paid especially to the following subjects:</td>
<td>.1 approved in-service experience</td>
<td>Potential non-compliance is promptly and fully identified</td>
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<td>environment</td>
<td>.1 certificates and other documents required to be carried on board</td>
<td>.2 approved training ship experience</td>
<td>Planned renewal and extension of certificates ensures continued validity</td>
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<td>ships by international conventions, how they may be obtained and</td>
<td>.3 approved simulator training, where appropriate</td>
<td>of surveyed items and equipment</td>
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<td>their period of validity</td>
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<td>.2 responsibilities under the relevant requirements of the International</td>
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<td>Convention on Load Lines, 1966, as amended</td>
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<td>.3 responsibilities under the relevant requirements of the International Convention for the Safety of Life at Sea, 1974, as amended</td>
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<td>.4 responsibilities under the International Convention for the Prevention of Pollution from Ships, as amended</td>
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<td>.5 maritime declarations of health and the requirements of the International Health Regulations</td>
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<td>.6 responsibilities under international instruments affecting the safety of the ship, passengers, crew and cargo</td>
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<td>.7 methods and aids to prevent pollution of the marine environment by ships</td>
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<td>.8 national legislation for implementing international agreements and conventions</td>
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<td>Maintain safety and security of the ship’s crew and passengers and the operational condition of life-saving, fire-fighting and other safety systems</td>
<td>Thorough knowledge of life-saving appliance regulations (International Convention for the Safety of Life at Sea)</td>
<td>Examination and assessment of evidence obtained from practical instruction and approved in-service training and experience</td>
<td>Procedures for monitoring fire-detection and safety systems ensure that all alarms are detected promptly and acted upon in accordance with established emergency procedures</td>
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<td>Organization of fire drills and abandon ship drills</td>
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<td></td>
<td>Maintenance of operational condition of life-saving, fire-fighting and other safety systems</td>
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<td>Actions to be taken to protect and safeguard all persons on board in emergencies</td>
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<td>Actions to limit damage and salve the ship following a fire, explosion, collision or grounding</td>
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<td>Develop emergency and damage control plans and handle emergency situations</td>
<td>Preparation of contingency plans for response to emergencies</td>
<td>Examination and assessment of evidence obtained from approved in-service training and experience</td>
<td>Emergency procedures are in accordance with the established plans for emergency situations</td>
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<td>Ship construction, including damage control</td>
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<td></td>
<td>Methods and aids for fire prevention, detection and extinction</td>
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<td>Functions and use of life-saving appliances</td>
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<td>Use of leadership and managerial skill</td>
<td>Knowledge of shipboard personnel management and training</td>
<td>Assessment of evidence obtained from one or more of the following:</td>
<td>The crew are allocated duties and informed of expected standards of work and behaviour in a manner appropriate to the individuals concerned</td>
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<td>A knowledge of related international maritime conventions and recommendations, and national legislation</td>
<td>.1 approved training</td>
<td>Training objectives and activities are based on assessment of current competence and capabilities and operational requirements</td>
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<td>Ability to apply task and workload management, including:</td>
<td>.2 approved in-service experience</td>
<td>Operations are demonstrated to be in accordance with applicable rules</td>
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<td>.1 planning and co-ordination</td>
<td>.3 approved simulator training</td>
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<td>.2 personnel assignment</td>
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<td>.3 time and resource constraints</td>
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<td>.4 prioritization</td>
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<td>Knowledge and ability to apply effective resource management:</td>
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<td>.1 allocation, assignment, and prioritization of resources</td>
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<td>.2 effective communication on board and ashore</td>
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<td>.3 decisions reflect consideration of team experiences</td>
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<td>.4 assertiveness and leadership, including motivation</td>
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<td>.5 obtaining and maintaining situation awareness</td>
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<td>Knowledge and ability to apply decision-making techniques:</td>
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<td>.1 situation and risk assessment</td>
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<td>.2 identify and generate options</td>
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<td>.3 selecting course of action</td>
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<td>Use of leadership and managerial skill (continued)</td>
<td>.4 evaluation of outcome effectiveness Development, implementation, and oversight of standard operating procedures</td>
<td>operational status and external environment Decisions are most effective for the situation Operations are demonstrated to be effective and in accordance with applicable rules</td>
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<tr>
<td>Organize and manage the provision of medical care on board</td>
<td>A thorough knowledge* of the use and contents of the following publications: .1 International Medical Guide for Ships or equivalent national publications .2 medical section of the International Code of Signals .3 Medical First Aid Guide for Use in Accidents Involving Dangerous Goods</td>
<td>Examination and assessment of evidence obtained from approved training Actions taken and procedures followed correctly apply and make full use of advice available</td>
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</tbody>
</table>

* The relevant IMO Model Course(s) may be of assistance in the preparation of courses.