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	<b>Marine Safety</b>	<b>Approved by: AMSP</b>	<b>Revision No: 04</b>	<b>Page: 1 of 10</b>
<b>TP 2293 E</b>		<b><i>THE EXAMINATION AND CERTIFICATION OF SEAFARERS</i></b>		

**CHAPTER 12 - FIRST MATE, INTERMEDIATE VOYAGE, AND FIRST MATE,  
LOCAL VOYAGE  
PART I - GENERAL REQUIREMENTS OF APPLICANTS**

- 12.1 (1) Every applicant for a certificate as First Mate, Intermediate Voyage, or First Mate, Local Voyage, shall:
- (a) either
    - (i) obtain:
      - (A) a certificate of completion for the three-year course set out in TP 5562 from a school listed in TP 10655; and
      - (B) a minimum of six months service when approval for graduation is granted to First Mate, Intermediate Voyage, as officer in charge of the watch after obtaining a Watchkeeping Mate, Ship, certificate on ships of at least 25 tons gross tonnage making voyages extending beyond partially smooth waters;
    - or
    - (ii) obtain a minimum of 12 months service as an officer in charge of the deck watch on a ship of not less than 25 tons gross tonnage while holding a certificate as a Watchkeeping Mate, Ship, or a Restricted Watchkeeping Mate, Ship, on voyages extending beyond partially smooth waters;
  - (b) obtain a medical certificate prescribed by the Crewing Regulations;
  - (c) obtain a certificate of completion for each of the following courses from a school or organization listed in TP 10655:
    - (i) Marine Emergency Duties Courses, Basic Safety (A1), Survival Craft (B1), Marine Fire Fighting (B2), for Officers (C) and Senior Officer (D), as set out in TP 4957;
    - (ii) Simulated Electronic Navigation Level I, as set out in TP 4958;
    - (iii) Marine First Aid Advanced Course, as set out in TP 13008;
  - (d) pass a written examination in each of the following subjects:
    - (i) Ship Management; and
    - (ii) Ship Construction and Cargo;
  - (e) pass a practical examination in Simulated Electronic Navigation Level I; and
  - (f) pass an oral examination in General Seamanship.
- (2) Every applicant for a certificate as First Mate, Intermediate Voyage, shall:
- (a) complete the requirements of paragraphs (1) (a) to (f); and
  - (b) pass a written examination in each of the following subjects:
    - (i) Astro-navigation;

- (ii) Engineering Knowledge; and
  - (iii) Ship Stability.
- (3) Every applicant for a certificate as First Mate, Local Voyage, shall:
- (a) complete the requirements of paragraphs (1) (a) to (f);
  - (b) pass a written examination in Ship Stability; and
  - (c) pass a written examination in Ship Construction and Engineering knowledge.
- (4) The holder of a certificate of competency as Second Mate, Foreign-Going; First Mate, Home-Trade; or First Mate, Inland Waters, may be accepted for examination without further proof of service.
- (5) Service while holding a Master, Home-Trade, 350 Tons, or a Master, Inland Waters, 350 Tons, certificate will be accepted in lieu of service with a Watchkeeping Mate certificate for the First Mate, Intermediate Voyage, and First Mate, Local Voyage, certificates. In all other respects, the service must fully comply with the requirements of subsection (1)(a)(ii).
- (6) A period of three years in an approved co-operative cadet training scheme is acceptable (refer to section 3.19).

## PART II - EXAMINATIONS

12.2 (1) The following table indicates the examinations for the First Mate, Intermediate voyage and First Mate, Local voyage certificates, the qualifying watchkeeping service required before each may be attempted, and other requirements.


A. Required for both First Mate, Intermediate Voyage, and First Mate, Local Voyage, certificates.

Examination	Watchkeeping Qualifying Service	Other Requirements
091 Ship Management	Nil	WKMSR or WKMS Certificate
113 Ship Stability	Nil	WKMSR or WKMS Certificate
122 Ship Construction and Cargo	Nil	WKMSR or WKMS Certificate
162 General Seamanship	12 months	All credits obtained before attempting this examination.
132 Engineering Knowledge.	Nil	WKMSR or WKMS Certificate

B. Additional examinations for First Mate, Intermediate Voyage, certificate.

051 Astro-Navigation	Nil	Must have completed 18 months service at sea.
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- (2) Whenever the above table requires an applicant to hold a Watchkeeping Mate, Ship, or Restricted Watchkeeping Mate, Ship, certificate, the provisions of subsections 12.1 (4) and 12.1 (5) may be substituted.
- (3) Except in the case of Second Mate, Foreign-Going; First Mate, Home-Trade; and Second Mate, Home-Trade, these special cases will be required to pass an examination on the calculation of azimuth to determine compass deviation.

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- (4) When an applicant transfers an application between intermediate and local voyage streams, 113 Stability will be credited as a pass in 112 Stability. Applicants opting for 113 Stability instead of 112 Stability at the First Mate, Local Voyage, level who either hold or are eligible to receive that certificate of competency, when applying for the First Mate, Intermediate Voyage, examination will be credited a pass in 113 Stability.

### **PART III - VALIDITY OF CERTIFICATES**

- 12.3 (1) The First Mate, Intermediate Voyage, Certificate has validity as:
- (a) second mate of a foreign-going vessel;
  - (b) first mate of an intermediate or local voyage vessel; and
  - (c) first mate of a minor waters vessel.
- (2) The First Mate, Local Voyage, Certificate has validity as:
- (a) first mate of a local voyage vessel; and
  - (b) first mate of a minor waters vessel.

## PART IV - SYLLABUSES OF EXAMINATIONS

### 12.4 Ship Management Examination number 091

ITEM	COLUMN
1.	Tackle Regulations Knowledge of the regulations and associated documentation, including inspection and testing of machinery and gear; maintenance of machinery register; test certificates.
2.	Safe Working Practices Regulations Knowledge of the regulations, including recognition and correction of unsafe practices.
3.	Lifting Machinery and Cranes Knowledge of safe operation of lifting machinery and cranes, including stresses in the various parts of a single boom and union rig; knowledge and practical use of hand signals.
4.	Documentation and Record Keeping Knowledge of procedure and process of documentation and record keeping relating to navigation and safety equipment; oil transfer; medical treatment/controlled drugs; incident investigation and analysis; technical reports; damage reports and repair specifications.
5.	Code of Safe Working Practices for Self-Unloading Vessels Knowledge of inspection process and documenting procedures, including safe working practices and emergency duties as contained in TP 1269.
6.	Grain Loading Regulations Knowledge of the regulations and rules; role of Agriculture Canada regarding the carriage of grain.
7.	Safety Codes and Associated Practices Operational knowledge of the Canadian Code of Safe Practice for Ships Carrying Timber Deck Cargoes; Code of Safe Practices for Solid Bulk Cargoes; Deck Cargo Safety Code; Safe Container Convention Regulations; Dangerous Goods Shipping Regulations.
8.	Quarantine Regulations Knowledge of regulations; vessel fumigation requirements and precautions to be observed for vessels under fumigation.
9.	Oil Pollution Prevention Regulations Knowledge of the regulations including appreciation of MARPOL and a complete knowledge of the ship's responsibilities under these regulations.
10.	Emergencies and Drills Knowledge of the organization and training of crews for emergencies and related drills; emergency procedure plans and station bills for tankers, passenger and cargo vessels.
11.	Carriage of Goods Knowledge of the process associated with the <i>Marine Liability Act</i> and provisions under the Act to facilitate electronic documentation; charter parties/contracts for affreightment; bills of lading and acceptable/unacceptable goods; waybills and bills of lading; disputes, claims, arrests, liens; on-hire/off-hire procedures; contracts for repair, support services, supplies; despatch, demurrage and laytime.
12.	Organizational Management Knowledge of the concepts, theories and practices of leadership, decision making, communications, goal setting, general management of personnel, cargo and vessel; systematic approaches to maintenance; systematic approaches to safety and environmental protection; standard practices and procedure for documentation.
13.	Transportation Safety Board Knowledge of the mandate and role of the board in the promotion of marine safety.
14.	<i>Worker's Compensation Act</i> Knowledge of the Act and the documentation and protocol associated with the reporting process.
15.	Safety, Health, Labour Relations and Disciplinary Procedure Knowledge of the regulations for Marine Occupation Safety and Health; <i>Canada Labour Code</i> ; International Labour Organization (ILO); collective bargaining process, associations, unions.
16.	IMO, SOLAS Awareness of the role of these organizations in the establishment of uniform standards.

17.	Controlled Substance Legislation Awareness of the legislation, including employee assistance program, testing and conditions of employment.
18.	IMO and STCW Knowledge of the International Maritime Organization (IMO) and the role of marine safety in the implementation of national requirements.
19.	Marine Insurance Understanding of marine insurance and related processes, including: pollution policies; function of classification societies; survey procedure; mutual insurance (P & I policies); financial responsibility certificates; documentation and record keeping; incident reports and survey certificates.
20.	<i>Canada Shipping Act</i> Knowledge of CSA with respect to grades and classes of certificates of competency, rights of holders of certificates, offences relating to certificates, loss of certificates and maintenance of discipline.
21.	Logbooks Knowledge of official logbook and other ship's logbooks, including entries made under all conditions.
22.	Passengers Knowledge of safety requirements for vessels carrying passengers.
23.	Port State Control Knowledge of the functions of the Port State Control; right of national administrations to detain vessels for non-compliance.
24.	Vessel Operations and Maintenance Practical knowledge of organization and training of the crew for routine operations and maintenance.
25.	Ship's Responsibilities Knowledge of ship's responsibilities under the following regulations: Boat and Fire Drill Regulations; Crewing Regulations; Life Saving Equipment Regulations; Fire Detection and Extinguishing Regulations; Charts and Publication Regulations.

Note: The examination consists of a multiple-choice test, calculations and descriptive questions.

Duration is three hours.

The following open-book resources will be allowed in the examination room:

- Tackle Regulations
- Safe Working Practices Regulations
- Code of Safe Working Practices for Self-Unloading Bulk Carriers
- Grain Loading Regulations
- Quarantine Regulations
- Oil Pollution Prevention Regulations
- Canadian Code of Safe Practice for Ships Carrying Timber Deck Cargo
- Code of Safe Practice for Solid Bulk Cargoes
- Deck Cargo Safety Code
- Safe Container Convention Regulations
- Dangerous Goods Shipping Regulations
- Boat and Fire Drill Regulations
- Crewing Regulations
- Life-Saving Equipment Regulations
- Fire Detection and Extinguishing Equipment Regulations
- Charts and Publication Regulations

## 12.5 Ship Construction and Cargo

### Examination number 122

Companion to Section 16.11

ITEM	COLUMN
1.	Ship Stresses Stresses to which a ship is subject, structural strengthening to compensate for them, and where to anticipate structural failure.
2.	Reports Compile reports of defects and damage sustained by ship.
3.	Repairs and Tests Superintend minor repairs and tests of tanks and other watertight work; emergency repairs to maintain watertightness; maintenance of watertightness and fire integrity on ferries and ro-ro vessels.
4.	Construction Midship section and the basic construction of the principal ship types; bilge and ballast pumping arrangements; welding and riveting, their advantages and shortcomings; construction and members of bow and stern sections, rudders and steering gear, propeller shafts, stern tubes, thrust units, deck hatches, and side, bow and stern doors; read and interpret ships' plans; construction of masts, sampson posts, derricks, cranes and conveyors.
5.	Inspections Preparation of vessels for statutory surveys and inspections; classification societies, purposes and advantages of classification; dry-docking and dry-dock procedure.
6.	Regulations Use of Loan Line Regulations, IMO Dangerous Goods Code, and Deck Cargo Safety Code.
7.	Cargo Practices in loading, carrying and discharging cargo with reference to general cargo, bulk carriers, oil tankers, ro-ro (vehicle and rail-car) vessels, self-unloading and package freighters; ventilation and ventilation systems; preparation and care of refrigeration systems; preparation and use of cargo plans; stowage of cargo with respect to ease of discharge, space occupied, damage, contamination and ventilation; palletization of cargo; responsibilities of cargo officer; document and arrange for repair of stevedore damage with heavy equipment.

Note: Regulations and necessary data will be provide for item 6.  
The examination consists of a section of descriptive, calculation and simple drawing exercises and a section of multiple-choice questions.  
Duration is three hours.

## 12.6 Not in use

## 12.7 Astro Navigation

### Examination Number 051

Companion to Section 13.11

ITEM	COLUMN
1.	Basic Basic nautical astronomy, shape of the earth, poles, latitude, longitude; celestial sphere; solar system, including relative movement of bodies; hour angles; time; rising and setting of bodies and their true bearing at these times.
2.	Calculations Correction of sextant altitudes; geographical position of a body, including circle of position line.
3.	Charts Principles of construction of Mercator, polyconic and gnomonic charts, and their use.
4.	Time-Keeping
5.	Plane and Mercator Sailing

6.	<b>Astro-Sights</b> Latitude by meridian altitude of any body (sun, moon, planets and star, including Polaris); use of one or more observations of heavenly bodies, in or out of the meridian, simultaneous or otherwise; combination of celestial and terrestrial observations; finding the true bearing of any body.
7.	<b>Tracks</b> Determining great circle tracks on gnomonic charts and transferring to relevant Mercator charts, including composite great circle; determination of great circle distances; tidal phenomenon, varying effects of the influences of the sun and moon.

Note: The examination consists of a multiple-choice test on basic principles and practical navigation calculations:  
Duration is three hours.

### 12.8 Stability Examination number 113

ITEM	COLUMN
1.	<b>Ship's Draft</b> Draft, including effect of water density and fresh water allowance; use of displacement and ton per inch/tonne per centimetre (TPI/TPC) scales to determine displacement from draft and vice versa; statutory freeboard and loadlines; general loadline rules and loadline rules for lakes and rivers.
2.	<b>Terms</b> Meaning of block coefficient, displacement and deadweight; buoyancy, centre of buoyancy (B) and its movement, reserve buoyancy; centre of gravity (G), including the effect of adding, removing and transferring weights; righting lever (GZ) when the vessel is heeled, metacentre (M), metacentric height (GM) as an indication of initial stability, danger of slack tanks; centre of flotation (F) and trim, and existence of trimming moment created by G longitudinal (GL) and B longitudinal (BL).
3.	<b>Stability Data</b> Use of stability data supplied to typical bulk-oil and oil-and-ore carriers, general cargo vessels and package freighters to perform these operations, allowing for effect of water density on draft and displacement; interpreting curves of statical stability, achieving satisfactory transverse stability, achieving desired trim, loading and discharging problems, list created during loading or discharging, counteracting trim and list together, allowing for free surface effect of tanks, change of stability during voyage.
4.	<b>Mensuration</b> Areas and volumes of common figures, squares, rectangles, triangles, cubes, cones, wedges, cylinders, spheres; centre of gravity of common areas and volume; Simpson's rules to calculate area, volumes, moments of inertia.
5.	<b>Stability Data</b> Data for container stability data and bulk-grain stability data.
6.	<b>Flooding</b> Effect of flooding compartments intentionally, including permeability; effect of bilging compartments, including permeability.

Note: The examination consist of multiple-choice questions and practical calculations based on ships' stability data booklet.  
Duration is three hours.

**12.9 Engineering Knowledge**  
**Examination Number 132**  
Companion to Section 11.16

ITEM	COLUMN
1.	Ship Piping Systems Knowledge of bilge system, ballast system, cargo piping system, and oily-water separator.
2.	Steering Arrangements and Controls Knowledge of steering gear rules and design, rudder types, hydraulic steering gears, electro-hydraulic steering gears, duplex steering arrangement, quadrant and tiller system, emergency steering, hydraulic rotary-vane steering gears, automatic steering systems, auto pilot system, and steering gear testing.
3.	Deck Machinery Knowledge of general arrangement of deck machinery, main drivers used on deck auxiliaries, anchor handling equipment, windlass arrangement, mooring equipment, automatic and manual mooring winches; cargo handling arrangements including derrick rig systems, heavy lifting system, deck cranes, cargo cranes, grabbing cranes, self-unloading systems, hatches (including types of mechanically- operated hatch covers); and lifeboat davits.
4.	Fire Detection and Extinguishing Systems Knowledge of smoke and heat detectors; fire extinguishing systems; inert-gas smothering system; self-contained inert-gas generator; inert-gas system taken from boiler uptake; CO <sub>2</sub> as a fire smothering agent, rules and regulations for operation of CO <sub>2</sub> system, CO <sub>2</sub> flooding system for cargo holds, CO <sub>2</sub> total flooding system for machinery space, CO <sub>2</sub> activation alarm system, bulk CO <sub>2</sub> system under refrigeration; fire extinguishing mediums, when and how to use them; fire alarms, manually operated, fire alarm switches, shut off machinery spaces, remote stations; emergency shut-off device on fuel tanks; vaporizing fluids, halon 1301 and 1211; main fire pump, emergency fire pump; fire mains, valve used on a hydrant; purpose of international shore connection; hydrants and hoses; why hoses are tested.
5.	Control Systems Knowledge of local and remote-control systems; alarm systems, bilge-level alarm, main engines, pneumatic controls; controllable-pitch propeller; remote starting-up and shutting off; manoeuvring of single- and multi-engines; thrust units; hydraulic control system; panel instruments; computer control of pumping systems.
6.	Depth Measuring Instruments Knowledge of pneumercator gauge, float tank gauge, distant-reading tank float gauge; effects of trim and heel; limitations of each gauge when measuring tank depth or draught.
7.	Emergency Batteries Knowledge of lead acid batteries on ship; installation procedure for series and parallel operation; rating of batteries; function of a hydrometer; causes of battery failure; reasons for slow charging; safety precautions and maintenance required; visual inspection procedure.
8.	Main Engines Precautions taken before starting a direct drive propulsion unit in lubricating oil, fuel oil, jacket water, starting air systems.
9.	Pumps Knowledge of centrifugal pumps, single-stage pump; multi-stage pump; rotary displacement pump; gear pump; screw displacement pump; double-acting piston pump; piston displacement pump.
10.	Uninterruptable Power Supply (UPS) Knowledge of UPS for computer and control system, operation; preventative maintenance.
11.	DC and AC Propulsion Systems Knowledge of characteristics, major differences in circuits; advantages and disadvantages of electric-drive propulsion systems; difference in drives in terms of required components for turbo-electric drive and diesel-electric drive, respectively.
12.	Self-Unloading Vessels Knowledge of cargo handling tunnels; gate structure types; self-unloading booms; advantages and disadvantages of each type; belt/bucket system; attachments to booms, precautions for safe operation.

Note: The examination consists of multiple-choice questions, calculations and simple drawing questions. Duration is two hours.



**12.10 General Seamanship**  
**Examination number 162**  
Companion to Section 16.13

ITEM	COLUMN
1.	<b>Deck Machinery</b> Practical use and care in the use of: electric, hydraulic and steam winches, ordinary and self-tensioning; windlasses and capstans; main and emergency steering gears; electric control and telemotor systems; electric derrick-topping lift winches; electric and hydraulic deck cranes; elevators and hatch opening systems; telegraphs.
2.	<b>Ship Handling</b> Conning ship; manoeuvring single and twin-screw ships in open and narrow waters with or without wind, tide or current; preparations for getting underway and proceeding to sea; making harbour and entering a dock, lock or canal in any type of vessel; passing another vessel closely in any circumstances; coming alongside or securing to a buoy with or without wind, tide or current, and the use of an anchor under similar conditions; turning short round twin-screw and single-screw vessels, with or without the use of an anchor; letting go bow or stern anchors in emergencies in shallow or deep water; the use of an anchor buoy; towing and being towed in ships of all types; search and rescue procedures referred to in MERSAR, CANMERSAR and Transport Canada publications.
3.	<b>Anchor and Mooring</b> Manoeuvring and cable handling involved in the use of ground tackle and ancillary equipment including: the use of anchor buoys, anchoring to two anchors and handling two cables simultaneously, mooring by running, ordinary, standing or dropping moors, clearing a foul anchor, clearing a foul hawser (cross, elbow or round turn), hanging off an anchor, mooring to a buoy with anchor cable, weighing anchor with and without a windlass, housing a tripped anchor snubbing round, forming a lee while at anchor, securing anchor gear in preparation for sea passage, use of ground tackle when aground, use of anchors in emergency to take way off, anchor and cable stowage, fittings and cable markings.
4.	<b>Mooring Lines</b> Use, care and stowage of mooring lines, types of line used for mooring and their characteristics; names of the various mooring lines and orders; making fast on-shore bollards being used by another ship; use of moorings on the bight and doubling up; use, handling and securing of towing wires; use, handling and securing of insurance wires; use of lines in securing a vessel and in warping alongside a berth, lock or lay-by; use of mooring wire-rope reels; types of fairlead, their construction, naming and use; use of rat guards.
5.	<b>Working General Cargo</b> Practical working of general cargo, mate's responsibilities when preparing the ship for work, and working general and dry bulk cargo; inspections of holds before loading; testing suction and drainage arrangements before loading; inspection of refrigerated compartments before loading; derrick riggings, types and uses for loading and/or discharging; arrangements and working of heavy lifts by ship or shore equipment, and lifts that cannot be handled by a single runner; overhaul and regular inspections of cargo handling gear.
6.	<b>Working Liquid Cargo</b> Working of liquid bulk cargoes, mate's duties and responsibilities when preparing the ship for working, and when working liquid bulk cargoes; inspections and testing of tanks, valves and lines before loading, discharging or transferring liquid bulk cargoes; handling cargo hoses at shore-side or sea-line terminals; cleaning and gas-freeing tanks and lines (Butterworth and Sellers equipment); use of explosimeters; purpose and operation of pressure vacuum valves and flame traps; pressure-testing of lines, valves and heating coils; methods of and need for grounding/earthing the vessel; precautions for manifold quick release, securing fire wires for emergency tow-off.

7.	<b>Ship Routines and Organization</b> Practical knowledge of shipboard routine and organization, mate's executive and organizational duties when relating to officers and the various crew members, crew watches and the direction of the crew on day work; drawing up emergency muster lists with appropriate duties for crew members; organizational duties for working of cargo, fuelling, storing or ballasting in all conditions; cleaning and maintaining the ship and its gear; mate's duties concerning the official logbook, entries in the deck log and owners' or charterers' records, duties in dry-dock or when repairs, alterations or maintenance work is being carried out; duties when preparing the vessels for sea; duties and responsibilities on joining a vessel; necessary paperwork or documentation to encompass the foregoing items, where applicable.
8.	<b>Emergency Duties</b> Emergency duties and responsibilities for equipment, organization, frequency and routing of fire patrols under routine and exceptional conditions at sea and in port; recognition and assessment of fire hazards; organization of realistic fire drills, training of crew in use of firefighting equipment; taking charge of firefighting operations at sea and in port; inspections, testing and maintenance of portable and fixed firefighting equipment; organization of realistic boat and life-saving appliance drills, training of crew in use of life-saving appliances; stowage, inspections, testing and maintenance of lifeboats, rigid and inflatable liferafts and their equipment, lifejackets, lifebuoys, self-igniting lights and distress signals; taking charge of the launching of boats and rafts; assessing damage and flooding in cases of collision or stranding.
9.	<b>Certificates</b> Practical knowledge of the rights and privileges of the various certificates of competency and documentation required on board ship and issued by Transport Canada.
10.	<b>For First Mate, Intermediate Voyage, Applicants Only</b> Correctly make the three basic adjustments to a sextant, using heavenly body or the horizon, and know the principles of position fixing by means of vertical and horizontal angles.

Note: The examination is oral.  
Duration as necessary.