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	<b>Marine Safety</b>	<b>Approved by:</b> AMSP	<b>Revision No: 04</b>	<b>Page:</b> 1 of 7
<b>TP 2293 E</b>		<b><i>THE EXAMINATION AND CERTIFICATION OF SEAFARERS</i></b>		

## CHAPTER 59 - BARGE SUPERVISOR, MODU/INLAND

### PART I - GENERAL REQUIREMENTS OF APPLICANTS

- 59.1 Every applicant for a certificate as Inland Barge Supervisor, MODU/Inland, shall:
- (a) subject to subsection 59.2, complete:
    - (i) a minimum of 12 months service as driller, watchkeeping mate or maintenance supervisor on a MODU; and
    - (ii) the service referred to in paragraph (i) shall include:
      - (A) assisting in at least 10 cargo-transfer operations at sea between a MODU and a supply vessel of which not less than two or more than five shall have been observed from the supply vessel; and
      - (B) assisting in at least two complete relocation moves of a MODU;
  - (b) obtain a medical certificate prescribed in the Crewing Regulations;
  - (c) obtain a certificate of completion for each of the following courses from a school set out in TP 10655:
    - (i) Marine Emergency Duties Courses, set out in TP 4957:
      - (A) Survival Craft (B1);
      - (B) Marine Fire Fighting (B2);
      - (C) Officer Certification (C); and
      - (D) Senior Officer (D);
    - (ii) Marine First Aid Advanced Course, set out in TP 13008;
    - (iii) Simulated Electronic Navigation Level I, set out in TP 4958;
    - (iv) Mobile Offshore Drilling Unit Courses, set out in TP 10937:
      - (A) Basic Drilling;
      - (B) Second Line Supervisor functions, Offshore Well Control; and
      - (C) Basic Offshore Survival;
  - (d) pass an examination in each of the following:
    - (i) Meteorology;
    - (ii) Rig Construction; and
    - (iii) Stability and Ballast Control;
  - (e) pass an examination in Simulated Electronic Navigation; and
  - (f) pass an oral examination in General Seamanship.
- 59.2 Not in use.

## PART II - EXAMINATIONS

59.3 The following table indicates the examinations for the Barge Supervisor, MODU/Inland, Certificate, the qualifying sea service required before each may be attempted, and other requirements.

Examination	Qualifying Service	Other Requirements
072 Meteorology	NIL	
114 M MODU Stability and Ballast Control	NIL	
125 M Rig Construction	NIL	
165 B General Seamanship	12 months	All other exams must have been passed.

59.4 The applicant must have successfully completed approved Basic Drilling, Second-Line Supervisor, Offshore Well Control, Stability, SEN 1 and Basic Offshore Survival courses.

## PART III - VALIDITY OF CERTIFICATE

59.5 The validity of a Barge Supervisor, MODU/Inland, Certificate is restricted to service on MODU/surface or self-elevating units while engaged in drilling within the inland waters of Canada.

## PART IV - SYLLABUSES OF EXAMINATIONS

### 59.6 Meteorology Examination number 072

ITEM	COLUMN
1.	Chemical Composition of the Atmosphere Water vapour, nitrogen, oxygen, argon, carbon dioxide, krypton, xenon, ozone; dust and hygroscopic particles, dust, smoke, salt particles; micro-organisms (such as bacteria used as nuclei for artificial snow).
2.	Vertical Structure of the Atmosphere Troposphere and stratosphere.
3.	Transfer of Heat Radiation, conduction, convection, turbulence.
4.	Temperature Related to the atmosphere and the earth; calorie, specific heat of water and earth; perpendicular and oblique radiation; selective absorption of radiation by the atmosphere; isotherm; temperature and distance of the sun.
5.	Atmospheric Moisture and Changes of State Heat of fusion, vaporization and sublimation; latent heat; relative and absolute humidity, saturation, supersaturation and supercooling, dew point; lapse rates, adiabatic cooling, dry and saturated lapse rates.
6.	Atmospheric Stability Stability, instability, conditional instability, potential instability; causes of inversions, radiative cooling, turbulence or convection, subsidence; effects of inversions, fog and low-lying cloud, smog, accumulation of smoke, causes of subsidence.

7.	Fog Definition, formation; season, locality and frequency of occurrence; major types, advection, radiation, frontal, sea smoke; anomalous propagation of sound in fog, mist, haze, smog.
8.	Clouds Formation, convection, turbulence, frontal, convergence, orographic; types, stratus, cumulus, stratocumulus, nimbostratus, cumulonimbus, altostratus, altocumulus, cirrus, cirrostratus, cirrocumulus.
9.	Precipitation Theories explaining the formation of precipitation; relative sizes of condensation nuclei, cloud droplets, drizzle drops and rain drops; types, convectional, frontal, orographic; forms of precipitation, dew, frost, rain, snow, sleet, hail, snow pellets, snow grains, ice pellets, diamond dust, rime.
10.	Pressure and Pressure Systems Definition; Coriolis effect; convergence and divergence; highs and lows, standard atmosphere (1013.25 mbar); isobar, isobaric patterns and pressure gradients, pressure gradient, terminology, deepening or filling low, weakening or filling high, shallow (weak) pressure gradients, steep (strong) pressure gradients; patterns, troughs, ridges, cols; types of depression, polar front low, thermal depression, vertical instability depression (e.g., tropical revolving storm); straight isobars, effect of straight isobars on wind, on weather.
11.	Winds Definition, speed (knots and Beaufort scale); direction, veering and backing, calculation of pressure gradient, geostrophic wind, gradient wind, centrifugal force, Buys Ballot's law, cyclostrophic wind, effect of latitude and friction on wind speed, effect of latitude on geostrophic wind scale, absence of surface friction above 2000 feet, angle of indraught (15° at sea, 30° over the land); special wind effects, land and sea breezes, anabatic and katabatic winds, Fohn effect (chinook), gusts and squalls.
12.	Air Masses Definition; source regions; identification; characteristics; modification; seasonal movement (North America and offshore); types, continental arctic, continental polar, continental tropical, maritime arctic, maritime polar, maritime tropical, equatorial.
13.	Fronts Definition; types, stationary, cold, warm, occluded; movement; sequence of weather associated with fronts, pressure, wind, temperature, cloud, weather, visibility; squall lines, definition, association with cold fronts, weather experienced with squall lines, pressure, wind, temperature, cloud, weather, visibility; areas of occurrence; local names (e.g., pampero, southerly buster).
14.	Families of Depressions or Extra-tropical Cyclones Formation between two air masses, life cycle and movement cross-section, associated weather, frontogenesis, frontolysis, secondary depressions.
15.	Waves and Swells Difference between seas and swells, definitions of period, height, length, speed, steepness, fetch; wave groups, waves in shallow water, ground swell, breakers and surf; swells in forecasting tropical revolving storms; effects of coast, currents, tide; storm surge; effect of ice on waves, ice crystals, pack ice; tsunamis and tidal waves, description, epicentre, dangers, tsunami warning system, true tidal waves and tidal bores.
16.	Oceanic Currents and Effect on the Climate Definition of set and drift, wind-drift currents, gradient currents, complex currents (including stream currents), Coriolis effect and Ekman's spiral, upwelling, permanent currents, seasonal currents; general surface circulation and offshoots in North American waters, geographical limits, seasonal variations, direction, strength; effect of currents on climate, warm, cold.
17.	Tropical Revolving Storms Definition of path, track, vertex or cod, vortex or eye, trough line, angle of indraught, dangerous semi-circle, dangerous quadrant, navigable semi-circle; features distinguishing it from extra-tropical cyclone, small diameter, steeper pressure gradient, winds tangent to central isobars, eye absence of fronts; warnings, radio messages, projected track, unusual swell, appearance of the sky, unusual changes in wind strength and direction, corrected drop in barometric pressure; weather associated with tropical revolving storms; sources of energy; seasonal distribution; practical rules for avoidance; hurricane and typhoon anchorages; mandatory reporting.

18.	Ice Formation and Decay Freezing of fresh water and saltwater; formation of land ice; Greenland and Antarctic ice caps, glaciers; ice types and egg code; types of ice, new, frazil, grease, slush, shuga, nilas, pancake, young, grey, grey-white, first-year, second-year, multi-year, fast ice, pack ice, ice of land origin, forms of floating ice (floe sizes); ice fields and their movement, icebergs and drift, iceberg routes, limits, seasons, reasons for variation in numbers, difference between northern and southern hemisphere icebergs, presence of icebergs in North Pacific, North Atlantic lane routes, International Ice Patrol; icing of superstructures, causes, fog, freezing drizzle, freezing rain, freezing spray, serious accumulation above 04; avoidance, shelter, warmer water, alteration of course and speed; mandatory reporting, freezing temperatures, high winds.
19.	Ice Detection and Reporting, Ice blink, absence of sea swell, problems associated with radar, limitations due to poor visibility, liaison with shore reporting stations; receipt of ice advisory broadcasts, ice advisory service, shipping support service, Interpretation of ice charts; <i>Ice Navigation in Canadian Waters and Manice</i> , ice climatology and ice operations; instrumentation, thermometers, dry bulb, wet bulb, marine screen, psychrometer, seawater temperature bucket; barometer, units, corrections, diurnal variations; barograph; wind-measuring instruments; observations and weather reports, auxiliary ship, selected ship; climatology and forecasting, purpose, avoiding damage from storms, improving passage time, holding course in fine weather.
20.	Weather Messages and Codes Knowledge of services available, <i>Radio Aids to Marine Navigation Atlantic, Great Lakes and Pacific</i> ; ability to locate marine weather forecast areas; understanding weather forecasts for the Great Lakes, ability to use MAFOR code; assorted weatherfax, weather, satellite, sea state, and ice charts; synoptic charts, surface and upper air; recognition of isobaric distribution patterns; comparison with earlier charts; knowledge of information available on weatherfax in Canada and worldwide; understanding of synoptic surface analysis charts; understanding of surface progs; understanding of wave charts, analysis, forecast; understanding of ice charts; ability to forecast the following for 12-24 hours, pressure, wind, sea state, visibility, clouds, weather changes.

Note: The examination consists of a written test comprising multiple-choice and descriptive questions.  
Duration is three hours.

### 59.7 MODU Stability and Ballast Control EXAMINATION NUMBER 114 M

ITEM	COLUMN
1.	Definitions Definitions of general terms (e.g., displacement, draft, trim, heel, freeboard, buoyancy, reserve buoyancy, block coefficient, deadweight, stable, unstable and neutral equilibrium).
2.	Terms Centre of gravity, centre of flotation, centre of buoyancy, reserve buoyancy, position of metacentre, righting lever and its effect on transverse and longitudinal stability; dynamic stability, synchronous rolling and angle of loll.
3.	Theory Theory of moments as applied to stability, including the effects of heavy lifts and movement of liquids in tanks and free-surface effect.
4.	Effect of Weights Effect of adding, removing, shifting weight and calculation of vertical, transverse and longitudinal shift of centre of gravity, danger of slack tanks, loading and unloading problems.
5.	Inclining Experiment Understanding the results of the inclining experiment report and using the results.
6.	Tables Use of hydrostatic curves, deadweight scale, hydrostatic tables and tank-capacity tables; use of curves of statical stability; use of unit manuals.

7.	Stability Criteria Stability criteria for mobile offshore drilling units (e.g., allowable KG, effect of changing GM, righting area ratios and angle of downflooding).
8.	External Effects Effect of dynamically-stationed keeping systems on stability, force of the wind and high seas.
9.	Calculations Stability calculations utilizing concepts 1 to 8 above, and theory and calculations of deck loads and effect on stability; areas, volumes of common figures, squares, rectangles, triangles, cubes, cones, wedges, cylinders and spheres.
10.	Systems Examination of liquid-transfer systems and their limitations and procedures; ballast systems, fuel systems, drilling liquids; zones of reduced stability, asymmetrical ballasting/deballasting.
11.	Response to Damage Damage and damage control procedure (use of pumping system and cross connections); effect of flooding compartments intentionally, including permeability; watertight integrity.
12.	Environmental Effect Environmental conditions and their effect on drilling operations; vessel and environmental limitations and criteria for changing to survival condition.
13.	Structural Stress Importance of load distribution with regard to structural stress; stress caused by location of load; stress in members; importance of bending moments and stress diagrams.
14.	Emergency Procedures Risk analysis of environmental conditions; emergency repairs to structure, damage from collision; shoring and temporary closures; use of cables and winches for securing; preparedness.

The examination will consist of nine questions of which the applicant shall answer six. The examination may include calculations, sketches, and written description and multiple-choice questions. A question may consist of several parts.  
Duration is three and a half hours.

### 59.8 Rig Construction

#### Examination number 125 M

ITEM	COLUMN
1.	Mobile Offshore Drilling Unit Construction Basic construction of principal MODU types, including construction of: columns, drilling derrick, pontoons (footings), tubular, deck houses, main and pipe decks, helicopter deck, ballast tanks, drilling well (moon pool), watertight doors, hatches; pressure vessels; location and extent of watertight bulkheads and flats; stiffening arrangements of watertight and tank-boundary bulkheads, including those made of corrugated plating.
2.	Construction Portfolio Contents, including: general arrangement, inboard and outboard profile, arrangement showing watertight compartments, decks and load-density plans including helicopter deck, transverse section showing scantlings, longitudinal section showing scantlings, framing, shell plating, bulkheads (watertight), structural and tank tanks showing location of air pipes and overflows, watertight doors and hatches, and capacity plans.
3.	Structural Strength Stresses to which a MODU is subjected; minimizing of concentrated stress; structural strengthening to compensate for stress in areas of anticipated failure.
4.	Welding Welding criteria for new construction and repair; acceptable welding procedures and inspecting methods; welding methods and materials, preparation of surfaces, atmospheric and gas-free conditions suitable for welding, sequence used in production welding to minimize shrinkage, types of welds, advantages and shortcomings of various welding types; conditions suitable for welding.


5.	Corrosion Corrosion-control arrangements and their effect on scantlings during construction if provision is not made for effective implementation of such arrangements.
6.	Testing and Inspection Methods of testing of tanks, bulkheads, other watertight or oiltight work, pressure vessels of various types; inspection and repair (major, minor) procedure to maintain a MODU in compliance with regulatory requirements; requirements and preparation for statutory surveys and inspections; classification societies and advantages of classification; docking and inspection procedures, periodic and annual inspection programs; non-destructive testing/inspecting; underwater cleaning techniques; underwater inspection methods and programs; quality assurance and preventative maintenance system.
7.	Documentation Compiling damage and defect reports; IMO Code for the construction and equipment of a MODU and Canadian standard (TP 6472); contents and use of construction portfolio; contents and use of marine operations manual; application of loadline regulations to the principal type of MODUs, surface and column-stabilized.
8.	Watertight Integrity and Damage Control Ballast piping, pumping and control systems, bilge piping, pumping deck and rig floor-draining systems; maintenance of fire integrity on a MODU; definition of various hazardous zones; access and ventilation conditions affecting the extent of hazardous areas.

The examination will consist of nine questions of which the applicant shall answer six. The examination may include calculations, sketches, and written description and multiple-choice questions. A question may consist of several parts.  
Duration is three and a half hours.

### 59.9 General Seamanship

#### Examination number 165 B

ITEM	COLUMN
1.	Machinery Use and care of electric and hydraulic winches, ordinary and self-tensioning; windlasses and capstans; main and emergency steering gears associated with MODUs; electric and hydraulic deck cranes; elevators for personnel, stores and equipment.
2.	Voyage Preparation Manoeuvring a MODU under power; preparations for getting underway; planning for a towed voyage; preparing and inspecting towing equipment; securing towing vessels; the use, handling and securing of towing units; getting underway under tow; communicating with tug masters; authority of OIM when MODU is under tow.
3.	Anchoring Manoeuvres and cable handling involved in the use of ground tackle and ancillary equipment, including the use of anchor buoys; planning an anchor pattern; deployment of anchors with and without anchor-handling vessels; communication with anchor-handling vessels; clearing a foul anchor; hanging off an anchor; securing anchor gear in preparation for sea passage; use of anchors in emergency to take way off; anchor and cable stowage, fittings and cable markings.
4.	Mooring Lines Use, care and stowage of mooring lines, comprising: types of line used for mooring and their characteristics; the names of the various mooring lines; making fast supply vessels; emergency cast-off procedures; the use of mooring wire-rope reels; types of fairlead, their construction, naming and use.
5.	Stowage and Handling Working of stores and equipment, comprising: the mate's responsibilities in transfer of cargo, stores and personnel to and from supply vessel; inspections of holds, decks and spaces to receive goods; preparation and operation of cranes; arrangements and working of heavy lifts by ship equipment and lifts that cannot be handled by a single runner; the overhaul and regular inspections of lifting gear.

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6.	<p><b>Organization</b>  MODU routine and organization, comprising: the barge supervisor's executive and organizational duties; crew watches, direction of work; drawing up emergency muster lists with appropriate duties for crew members; the organizational duties for fuelling, storing or ballasting in all conditions; the barge supervisor's duties concerning the official logbook, entries in the deck log and owner's or charter's records; the barge supervisor's duties when repair, alteration or maintenance work is being carried out; the barge supervisor's duties when preparing a MODU for sea; the barge supervisor's duties and responsibilities on joining a MODU; the necessary paperwork or documentation to encompass the foregoing items, where applicable; control room and deck discipline, organization and routine under all circumstances; steering orders and responses; maintenance of a proper lookout; duties and responsibilities of the barge supervisor, officer of the watch, ballast control and other bridge personnel (jointly and separately); the purposes, necessity and general content of standing orders, night orders, bridge or movement book, ship's logbook and similar material; anchor watch duties and responsibilities; means of assessing a tendency to drag anchors; arrangement and responsibility of departments aboard ship.</p>
7.	<p><b>Pollution-Prevention Management</b>  Duties related to loading, transfer and storage of pollution responsibilities under oil pollution-prevention regulations and MARPOL; response to a pollution incident; identification of pollutants; obligation to prevent pollution.</p>
8.	<p><b>Emergency Response</b>  Emergency duties and responsibilities for equipment, comprising: the organization, frequency and routing of fire patrols under routine and exceptional conditions; recognition and assessment of fire hazards; importance of cleanliness and good housekeeping; organization of realistic fire drills, training of crew for emergencies; taking charge of marine emergencies; inspections, testing and maintenance of portable and fixed firefighting equipment; organization of realistic boat and lifesaving appliance drills, training of crew in use of lifesaving appliances and man-overboard drills; stowage, inspections, testing and maintenance of lifeboats, capsules, rafts and their equipment, lifejackets, immersion suits, lifebuoys, self-igniting lights and distress signals; taking charge of the launching of boats, rafts and capsules; assessing damage and flooding in cases of collision or stranding; search and rescue procedures, including a knowledge of AMVER, MERSAR and TC publications.</p>
9.	<p><b>Personnel Documentation</b>  Rights and privileges of certificates of competency limited to MODUs; certificated personnel required; general manning required to meet safety requirements.</p>
10.	<p><b>Collision Avoidance</b>  Collision Regulations and their intent, ship routing, MODU safety zone; <i>Notices to Mariners</i> concerning MODU locations.</p>
11.	<p><b>MODU Underway</b>  MODU handling in a seaway; transverse thrust and its effect; wind effects on a MODU; how to heave to anchoring in a tide, current, or wind; manoeuvring characteristics of other types of vessels; stern power and its effect; the handling characteristics of tugs and problems of towing vessels; turning and manoeuvring in a channel; docking problems; close-quarters situations at anchor and underway.</p>

The examination is taken from the syllabus for the examinations for Watchkeeping Mate, MODU, and First Mate, MODU.

The applicant is expected to have a deeper understanding of the intent and interpretation of the Collision Regulations as demonstrated by examination 062, which is supplemented here by oral questions and demonstrations.