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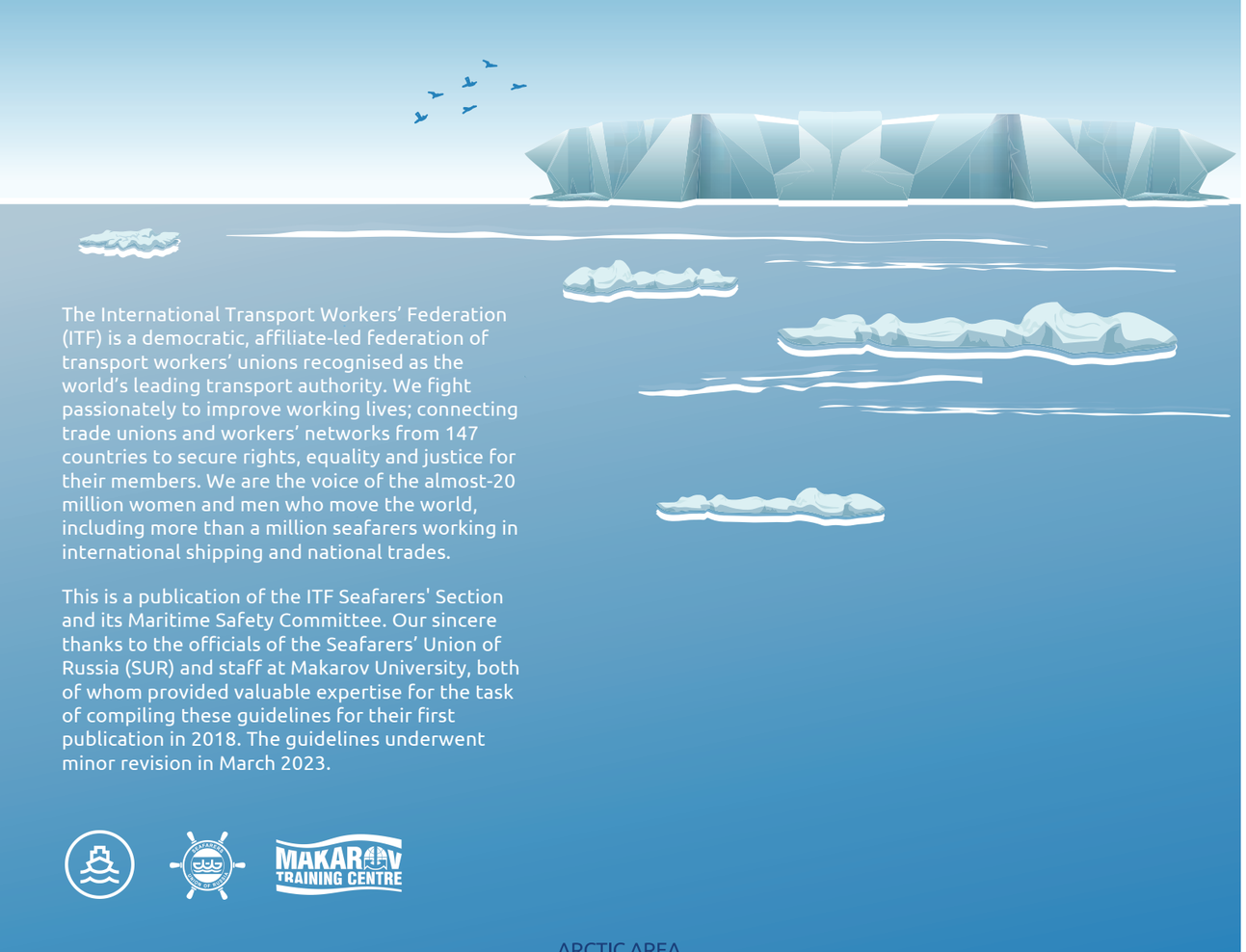
INTERNATIONAL TRANSPORT WORKERS' FEDERATION

INTERNATIONAL POLAR CODE

ARE YOU PREPARED?



The International Transport Workers' Federation (ITF) is a democratic, affiliate-led federation of transport workers' unions recognised as the world's leading transport authority. We fight passionately to improve working lives; connecting trade unions and workers' networks from 147 countries to secure rights, equality and justice for their members. We are the voice of the almost-20 million women and men who move the world, including more than a million seafarers working in international shipping and national trades.

This is a publication of the ITF Seafarers' Section and its Maritime Safety Committee. Our sincere thanks to the officials of the Seafarers' Union of Russia (SUR) and staff at Makarov University, both of whom provided valuable expertise for the task of compiling these guidelines for their first publication in 2018. The guidelines underwent minor revision in March 2023.

ARCTIC AREA

The waters north of latitude 60°N, with deviations to include waters around the southern exposure of Greenland, but excluding those around Iceland, the Norwegian mainland, Russia's Kola Peninsula, the White Sea, the Sea of Okhotsk and Alaska's Prince William Sound.

The waypoint coordinates on the Arctic area map are:

68°38.29'N, 43°23.0'E (Cap Kanin Nos)

73°31.6'N, 19°01'E (Bjørnøya)

70°49.56'N, 8°59.61'W (Jan Mayen)

67°03.9'N, 26°33.4'W

64°37'N, 35°27'W

58°N, 42°W

60°N, 56°37.1'W

Arctic and Antarctic polar waters areas

The international maritime organization (IMO) has adopted a mandatory Polar Code to provide for safe ship operation and environmental protection in the Polar Regions. If you are onboard a ship in Arctic or Antarctic waters, then your ship and you should comply with all or part of the Polar Code.

In this leaflet, you will find information on how the Polar Code applies to you and your vessel, what you need to do, and how to prepare for polar waters operation.

WHAT IS THE PURPOSE OF THE POLAR CODE?

The International Code for Ships Operating in Polar Waters (the Polar Code) is a new code adopted by the IMO. The Code acknowledges that polar waters may impose additional requirements on ships beyond those normally encountered. It provides a mandatory framework for ships operating in polar waters.

The main requirements are related to safety, protection of the environment, and seafarer competence, and it is implemented through amendments to SOLAS, MARPOL and the STCW as appropriate.

WHERE DOES IT APPLY?

The Polar Code applies to certain ships that will operate on domestic or international voyages in Arctic or Antarctic waters (see picture with areas).

Breaking ice fields

WHO DOES IT APPLY TO?

Part I safety requirements and Part I manning and training requirements apply to ships certified in accordance with SOLAS (more than GT 500) and which operate in polar waters.

Part II environmental protection requirements apply to ships that must comply with MARPOL (regardless of tonnage) and which operate in polar waters.

For non-SOLAS ships that are required to hold a MARPOL certificate (such as fishing vessels), only the Part II environmental protection requirements of the Polar Code apply.

When does it come into force?

The Polar Code has several different implementation dates.

PART I (SOLAS) Safety requirements are phased in for new ship (ships built on or after 1 January 2017) must comply with Part I upon delivery. Existing ships (ships built before 1 January 2017) must comply with Part I by their first intermediate or renewal survey after 1 January 2018.

Manning and training requirements of PART I (STCW) came into force for both new and existing ships on 1 July 2018.

Environmental protection requirements came into force for new and existing ships on 1 January 2017.

HOW TO COMPLY WITH THE POLAR CODE?

To comply with the Polar Code, a ship and her crew must be prepared for operations in polar waters. When in polar waters, the ship must be operated within the limitations stated on its Polar Ship Certificate and follow the operational requirements in the Code.

THE POLAR SHIP CERTIFICATE

SOLAS ships operating in polar waters will require a Polar Ship Certificate. This is a new statutory certificate issued by a vessel's flag administration or its authorized representatives.

The Polar Ship Certificate attests that the ship complies with the ship safety requirements in Part I-A of the Polar Code. To obtain a Polar Ship Certificate, the shipowner should:

- conduct an operational risk assessment of the ship and its intended operations in polar waters;
- prepare a Polar Water Operational Manual (PWOM) specific to the ship, its arrangement and its intended operation in polar waters;
- have the ship surveyed to verify its compliance with the relevant requirements of the Polar Code; and
- apply to its flag administration or recognised organisation for the Polar Ship Certificate.

CREW CERTIFICATION

Part I-A Chapter 12 Manning and Training of the Polar Code requires a ship owner to ensure that deck officers on SOLAS ships operating in polar waters have completed special training and have the necessary competence to carry out their duties.

The new STCW amendments require masters, chief mates and officers in charge of a navigational watch to obtain a new certificate of proficiency. To obtain certificate in basic training for ships operating in polar waters officers on watch (OOW) should complete an approved basic training course which meet the standard of competence in the STCW Code, A-V/4, paragraph 1.

To obtain certificate in advanced training for ships operating in polar waters master and chief mate should meet the requirements for a certificate in basic training, complete approved seagoing service on board a ship operating in polar waters or equivalent seagoing service, in the deck department at the management level or while performing watchkeeping duties in an operational level, and have for a period of at least 2 months in total during the preceding 5 years completing an approved advanced training course which meet the standard of competence in the STCW Code, A-V/4, paragraph 2.

According to Polar code every crew member on board shall be made familiar with the procedures and equipment contained or referenced in the PWOM relevant to their assigned duties. Practically that means that everybody should be aware of personal and group survival kit contents and how to use it in emergency.

A ship stack in the ice

POLAR SHIP CATEGORIES

MARPOL CERTIFICATES

On-board documentation concerning pollution prevention needs to be updated to take operation in polar waters into account, including requirements from MARPOL Annexes I, II, IV and V. An entry into the Supplement to the International Oil Pollution Prevention (IOPP) Certificate is required for a new Category A and B ship to certify that they comply with the additional structural requirements on tank protection in Part II-A §1.2 of the Polar Code.

No structural modifications are required of Category C ships or of existing Category A or B ships, therefore no entries in the IOPP Certificate are required.
No other MARPOL certificates are affected by the Polar Code.

OPERATIONAL COMPLIANCE – SAFETY

The Polar Code includes certain acts and prohibitions for ships while operating in polar waters. SOLAS ships must comply with all operational safety requirements in Part I-A of the Polar Code, including:

- conducting a proper voyage plan;
- operating the vessel within the capabilities and limitations stated on its Polar Ship Certificate;
- monitoring snow and ice accumulation on the ship and taking appropriate measures to ensure it does not exceed stability values;
- keeping safety equipment, escape routes and survival craft clear of snow and ice accumulation;
- instructing passengers in the use of survival equipment and the actions to take in an emergency;
- training the crew in the use of personal and group survival equipment;
- and training each crew member in the procedures and equipment described in the Polar Water Operational Manual relevant to their assigned duties.

OPERATIONAL COMPLIANCE - ENVIRONMENTAL PROTECTION

MARPOL ships must comply with operational environmental protection requirements in Part II-A of the Polar Code:

- Any discharge of oil, oily mixtures or noxious liquid substances in polar waters is prohibited.
- Discharge of sewage and garbage in polar waters is only allowed in line with the additional restrictions.
- Operation in polar waters in the relevant record books, manuals, placards, and emergency and management plans must be noted as required by MARPOL.

The Polar Code divides ships into three categories: Category A, B or C.

	CATEGORY	ICE CLASS	OPERATING CAPABILITY
A	Category A ship means a ship designed for operation in polar waters in at least medium first- year ice, which may include old ice inclusions. This corresponds to vessels built to the IACS Polar ice classes PC1 to PC5.	PC1	Year-round operation in all polar waters
		PC2	Year-round operation in moderate multi-year ice
		PC3	Year-round operation in second-year ice, which may include multi-year inclusions
		PC4	Year-round operation in thick first-year ice, which may include old ice inclusions
		PC5	Year-round operation in medium first-year ice, which may include old ice inclusions
B	Category B ship means a ship not included in Category A, designed for operation in polar waters in at least thin first-year ice, which may include old ice inclusions. This corresponds to vessels built to the IACS Polar ice classes PC6 and PC7.	PC6	Summer/autumn operation in medium first-year ice, which may include old ice inclusions
		PC7	Summer/autumn operation in thin first-year ice, which may include old ice inclusions
C	Category C ship means a ship designed to operate in open water or in ice conditions less severe than those included in Categories A and B. **This corresponds to ships of any Baltic ice class or with no ice strengthening at all**	A, B, C, D, E	From no ice strengthening to first-year ice to 1.0 m

Vessels with other ice class notations must be evaluated on a case-by-case basis to determine their equivalent polar ship category.

The Polar Code is a functional and goal-based code. It applies to ships differently, depending on how a ship is constructed and how it will be operated in polar waters.

Low air temperature adversely affects human and equipment performance, survival time and material properties. The Polar Code divides ships into two categories with respect to air temperature: those intended to operate in low air temperature, and those which are not.

Dangerous iceberg near Greenland

MAXIMUM EXPECTED TIME OF RESCUE

Remoteness and the lack of infrastructure in the Polar Regions affect the availability and timeliness of rescue and assistance to ships in distress.

Ships operating in remote polar waters must be prepared to wait for some days before search and rescue (SAR) resources arrive on scene.

The Polar Code requires a ship owner to determine the maximum expected time of rescue for their intended operations in polar waters. This determines the type and amount of survival equipment the ship must carry on board.

The Code requires that this must be at **least five days**. When operating in some remote areas, it may be considerably more than five days.

OPERATION IN HIGH LATITUDES

Operating in high latitudes limits the performance and availability of standard navigation and communication systems, and may affect the quality of ice imagery information.
The Polar Code requires additional communications and navigation equipment for vessels proceeding to high latitudes.

The list of important items mentioned in the code is as follows:

SUBDIVISION AND STABILITY

The goal of this chapter of the Polar Code is to ensure ships have adequate stability in both intact and damaged conditions. It has two principal requirements:

- All ships must have sufficient stability in intact conditions when subject to ice accretion
- That new Category A and B ships must have sufficient residual stability to sustain ice-related damage

WATERTIGHT AND WEATHERTIGHT INTEGRITY

The goal of Chapter 5 of the Polar Code is to ensure a ship can maintain its water-and-weather-tight integrity while in a polar environment. It has three requirements.

For all ships:

- The ship shall have effective means for preventing or removing ice and snow accumulation around hatches and doors.

For ships intended to operate in low air temperature:

- Means shall be provided to prevent freezing or excessive viscosity of liquids to hydraulically operated hatches and doors.
- Outside hatches and doors shall be designed to be operated by personnel wearing heavy winter clothing including thick mittens. In practice, this means door handles and operating controls must be large enough to allow operation without requiring the operator to remove their mittens.

Ice breaking convoy in the Arctic

MACHINERY INSTALLATIONS

The goal of Chapter 6 of the Polar Code is to ensure a ship's essential machinery systems maintain the functions necessary for safety when operating in a polar environment.
Its requirements are divided into three groups: those for all ships, those for ships intended for operations in cold air temperature, and those for ships with ice strengthening.

For all ships, essential machinery installations shall be protected from the adverse effects of:

- ice and snow accumulation,
- ice ingestion at seawater inlets,
- snow ingestion at ventilation intakes,
- seawater intake temperature, and
- freezing and increased viscosity of liquids, gases and other essential substances.

For ships intended to operate in low air temperatures, exposed essential machinery shall function at the ship's Polar Service Temperature (PST). Essential machinery installations shall also consider:

- the effects of cold and dense inlet air,
- loss of performance of batteries or other stored-energy devices, and
- materials for exposed machinery and their foundations, which shall be suitable for the PST.

For ice-strengthened ships, essential machinery installations shall also consider loads imposed directly by the ship's interaction with ice.

FIRE SAFETY AND PROTECTION

The goal of Chapter 7 of the Polar Code is to ensure that fire-fighting systems and appliances remain operable and effective under polar environmental conditions. This chapter sets requirements for all ships and additional requirements for ships intended to operate in low air temperature.

For all ships:

- Fire-fighting equipment and system components (including hydrants, hoses, nozzles, monitors, controls, isolating valves, pressure/vacuum valves, etc.) shall always be accessible and be protected from freezing, snow and icing.
- Fire mains and fire-fighting system piping shall be protected from freezing and arranged so that exposed sections can be isolated and drained.
- Fire pumps shall be in heated compartments, and sea suctions serving them shall be arranged to allow the clearing of ice accumulation. Extinguishing media shall be suitable for the intended operating environment.
- Fire-fighting accesses shall be provided anti-icing or de-icing protection.

For ships intended to operate in low air temperature:

- All fire safety systems and appliances shall be fully functional at the Polar Service Temperature (PST).
- Exposed fire safety system components shall be made of materials suitable for the PST.
- All two-way portable radio communication equipment shall be operable at the PST.
- Fire extinguishers shall be protected from freezing or certified for operation to the PST.

Polar Survival Kits Elements

LIFE-SAVING APPLIANCES AND ARRANGEMENTS

The goal of Chapter 8 of the Polar Code is to provide for safe escape, evacuation and survival in polar environments. This chapter sets requirements for all ships, with additional requirements for new ships and ships intended to operate in extended periods of darkness.

To ensure safe and immediate escape

- All ships must have means to prevent or remove ice and snow from escape routes, muster and embarkation areas, survival craft and their launching appliances.
- New ships must arrange escape routes so as not to hinder passage by persons wearing polar clothing.

To ensure safe evacuation off the ship

- All ships must have the means to safely evacuate people and deploy survival craft and equipment when operating in ice-covered waters.
- All ships must be able to operate life-saving appliances independently of the ship's main source of power.

To enable survival after abandoning ship

- All ships shall provide adequate resources to support survival after abandoning ship, whether to sea, to ice or to land, for the maximum expected time of rescue. These resources shall provide a ventilated environment that will protect against hypothermia, sufficient food and water to sustain life, and the ability to communicate with rescue assets.
- Everyone aboard shall be provided thermal protection and personal survival equipment that adequately maintains core body temperature and prevents frostbite of extremities.
- Survival craft and group survival equipment shall provide effective protection against direct wind chill for all persons aboard.
- Lifeboats must be partially or totally enclosed. Group survival equipment is required if there is a potential for abandonment onto the ice or to land.
- Where required, personal and group survival equipment will be provided for 110% of the persons aboard, stowed in easily accessible locations in or near the survival craft.
Containers for group survival equipment shall be floatable and easily movable over the ice.
For ships operating in extended periods of darkness, lifeboats shall be equipped with searchlights for detecting and identifying ice.

Makarov training in Cold climate survival, Subic Bay, Philippines

SAFETY OF NAVIGATION

The goal of Chapter 9 of the Polar Code is to provide for safe navigation in different polar environmental conditions, including when operating in ice, darkness, high latitudes or with icebreaker escort.
The navigational equipment and systems shall be designed, constructed and installed to retain their functionality under the expected environmental conditions in the area of operation.
All ships operating in polar waters must have means to receive up-to-date nautical and ice information and the ability to visually detect ice. The Code requires all ships to have:

- the means of receiving and displaying information on ice conditions in its area of operation;
- a clear view astern;
- and two remotely rotatable, narrow-beam search lights controllable from the bridge to visually detect ice.

To ensure safe navigation under polar environmental conditions

- All ships shall have means to prevent the accumulation of ice on antennas required for navigation and communication.
- All ships shall have two non-magnetic means to determine and display their heading. Both means shall be independent and shall be connected to the ship's main and emergency source of power.
- Ships operating in high latitudes (over 80°) shall be fitted with at least one GNSS compass or equivalent, which shall be connected to the ship's main and emergency source of power.
- New ice-strengthened ships shall have either two independent echo-sounding devices or one echo sounding device with two separate, independent transducers.
- New Category A and B ships shall have enclosed bridge wings to protect navigation equipment and personnel.

When operating in a convoy, a ship must be able to indicate when it is stopped to avoid being overrun by a following vessel.

- Ships involved in operations with an icebreaker escort must be equipped with a manually controlled flashing red light visible from astern to indicate when the ship is stopped.
- This light shall have a range of visibility of at least two nautical miles, with the same arcs of visibility as a stern light.

Simulator training in safety of ice navigation at Makarov training centre, St.Petersburg, Russia

COMMUNICATION

The goal of Chapter 10 of the Polar Code is to provide for effective communications for ships and survival craft during normal operation and in emergency situations. This chapter contains three groups of requirements.

For all ships, the Polar Code requires equipment intended for:

- ship-to-shore voice and/or data communications
- tele-medical assistance services, and for receiving ice and meteorological information
- ship-to-ship voice and/or data communications
- both maritime and aeronautical two-way voice on-scene and search and rescue coordination communications

The limitations of communications systems in high latitudes and the anticipated low temperature that is available at all points along the intended operating routes must be considered for the above systems.

For ships intended to operate in low air temperature: The Polar Code requires additional communications equipment for survival craft.

Rescue boats and lifeboats, when released for evacuation, shall each carry:

- a device for transmitting ship-to-shore alerts. This could be complied with by a dedicated manual EPIRB for all rescue boats and lifeboats (in addition to the EPIRBs required by SOLAS Ch. IV).
- a device for transmitting signals for location, such as SART or AIS-SART for all rescue boats and lifeboats. Compliance with this requirement implies compliance with SOLAS Regs. III/6.2.2 and IV/7.1.3.
- on-scene radio communication device such as dedicated two-way VHF apparatuses for all rescue boats and lifeboats. These apparatuses can also be used for compliance with SOLAS Regs. III/6.2.1 and IV/4 if clearly addressed in written procedures.

Life rafts shall each carry:

- a device for transmitting signals for location, such as dedicated SART or AIS-SART for all rafts.
- on-scene radio communication device such as dedicated two-way VHF apparatuses for all rafts.

Icebreakers that provide escort services shall have a sound signalling system (horn) that faces astern to indicate manoeuvres to following ships.

Training on Ship-To-Ship Radio communications, Cyprus

POLAR WATER OPERATIONAL MANUAL

WHAT IS THE PURPOSE OF THE PWOM?

The Polar Water Operational Manual (PWOM) is a ship-specific reference document that describes in detail how the ship shall be operated in polar waters. The procedures address operations under both normal and emergency conditions.

If you operate a SOLAS-certified ship in polar waters, then you must have a PWOM and it must be carried aboard the ship.

The goal of the PWOM is to inform the master and crew about the ship's capabilities, limitations and essential operating procedures when in polar waters. It is intended to help them take sound operational decisions and actions to protect the ship, its crew and passengers, and the polar environment.

WHAT SHALL BE IN THE MANUAL?

The Manual must address each hazard identified as relevant in the ship's Polar Code operational risk assessment. This might include sea ice, cold temperatures, topside icing and high latitudes.

Where equipment is used to mitigate a hazard, the PWOM must explain how to operate it. Where procedures are used, the PWOM must spell them out.

The Manual must include (or refer to) specific procedures that the crew shall follow under the following conditions:

- during normal operations, to avoid encountering conditions that exceed the ship's capabilities;
- in the event the ship encounters conditions that exceed its capabilities and limitations;
- in the event of an incident in polar waters;
- when operating in ice, either independently or with an icebreaker escort (if ice-capable).

WHAT TYPES OF PROCEDURES MUST IT CONTAIN?

The requirements for the PWOM are found in Part I-A § 2 of the Polar Code. Among others, the PWOM must contain procedures for the following:

- voyage planning in polar waters;
- how to assess ice conditions and determine whether it is safe for the ship to proceed;
- how to receive and use ice forecasts;
- how to operate equipment and maintain system functions during freezing temperatures, topside icing and sea ice;
- what to do if the ship encounters ice or cold temperatures that exceed its design capability;
- what to do in case of an emergency, including how to contact emergency response providers.

WHAT DOES AN APPROVED MANUAL LOOK LIKE?

Many different types of ships operate in the Polar Regions. They differ widely in their design and ability to operate in ice and cold temperature. Some can operate year-round in multi-year ice, while others do not operate in ice at all. Because the PWOM must be tailored to each ship, its arrangement and its intended operation, there is no single example or template for an acceptable Manual.

Appendix 2 to the Polar Code contains a model table of contents for a PWOM. This can be used as a beginning point in organizing a Manual for your ship.

WHO IS RESPONSIBLE FOR THE MANUAL?

The owner is responsible for providing a PWOM. Ideally, the Manual should be prepared by those who best know the ship and its crew, its operations in polar waters, and the company's safety management system.

Ice class vessel operating in the ice covered waters

MANNING AND TRAINING

Part I-A Chapter 12 Manning and Training of the Polar Code requires a ship owner to ensure that deck officers on SOLAS ships operating in polar waters have completed special training and have the necessary competence to carry out their duties as follows:

	TANKERS	PASSENGER SHIPS	OTHER SHIPS
In ice-free waters	None	None	None
In open waters (ice concentration less than 1/10)	Certificate in basic training for master, chief mate and officers in charge of a navigational watch	Certificate in basic training for master, chief mate and officers in charge of a navigational watch	None
In other ice- covered waters (ice concentration more than 1/10)	Certificate in advanced training for master and chief mate Certificate in basic training for officers in charge of a navigational watch	Certificate in advanced training for master and chief mate Certificate in basic training for officers in charge of a navigational watch	Certificate in advanced training for master and chief mate Certificate in basic training for officers in charge of a navigational watch

Special polar water training requirements given in chapter V of the STCW Code, Regulation V/4 “Mandatory minimum requirements for the training and qualifications of masters and deck officers on ships operating in polar waters”.

- Every candidate for a certificate in basic training for ships operating in polar waters shall have completed an approved basic training for ships operating in polar waters and meet the standard of competence specified in section A-V/4, paragraph 1, of the STCW Code.

- Every candidate for a certificate in advanced training for ships operating in polar waters shall: meet the requirements for certification in basic training for ships in polar waters;
have at least 2 months of approved seagoing service in the deck department, at management level or while performing watchkeeping duties at the operational level, within polar waters or other equivalent approved seagoing service; and have completed approved advanced training for ships operating in polar waters and meet the standard of competence specified in section A-V/4, paragraph 2 of the STCW Code.

TRANSITIONAL PROVISIONS

Until 1 July 2020, seafarers who commenced approved seagoing service in polar waters prior to 1 July 2018 shall be able to establish that they meet the requirements for basic training by:

- having completed approved seagoing service on board a ship operating in polar waters or equivalent approved seagoing service, performing duties in the deck department at the operational or management level, for a period of at least 3 months in total during the preceding 5 years;

- or having successfully completed a training course meeting the training guidance established by the Organization for ships operating in polar waters.

For advanced training by:

- having completed approved seagoing service on board a ship operating in polar waters or equivalent approved seagoing service, performing duties in the deck department at management level, for a period of at least 3 months in total during the preceding 5 years;

- or having successfully completed a training course meeting the training guidance established by the Organization for ships operating in polar waters and having completed approved seagoing service on board a ship operating in polar waters or equivalent approved seagoing service, performing duties in the deck department at the management level, for a period of at least 2 months in total during the preceding 5 years.

SOME RECOMMENDATIONS ON UNASSISTED OPERATIONS IN ICE

Prior to ice navigation the ship should be adequately prepared well before approaching the ice edge.
The ship bound to the port should arrive at nominated point of convoy (NPC) unassisted, therefore passage planning is essential.

The master should take into account position of NPC, local and ice conditions, and inform the Agent about expected time of arrival (ETA) accordingly.

The track from open water to NPC is normally passed unassisted therefore it is recommended if possible to plot the course through the areas of open water, friendly ice, trying to avoid forcing drifting ice floes and areas of ice compacting.

When selecting the track in the ice the Master should always observe the following rules:

- if necessary the ship must be able to return to the initial point and must always have at least minimum steering way. The shortest way in the ice is always off the ice floes.

- In light ice conditions the ship could use established navigational routes, taking into account weather forecast and keeping manoeuvring speed and manoeuvring engine status.

- At the NPC the ship waits for the ice breaker, and further in difficult ice, the ship follows the ice breaker as a part of convoy.

Polar waters advanced training at Makarov training centre, St.Petersburg, Russia

SOME RECOMMENDATIONS ON SAFE MANOEUVRING IN ICE

Rudder and propeller of a ship in ballast and loaded ship are operating in different conditions.

Propeller of a ship in ballast is in constant interaction with the ice - the ship is subject to vibration - answers the helm poorly and has almost no inertia, and could easily be stopped on entering heavy ice.

Rudder and propeller of a loaded ship are fully submerged in water. It decreases their contact with ice, therefore it is easier to handle the ship and as a result it is easier to pass more difficult ice.

While navigating in drifting ice floes, the ship has to avoid rapid change of course and keep her stern part away from the ice edge while turning.

If it is necessary to enter an ice floe, the ship should approach it at a right angle (90 degrees) with minimum steering way (without inertia), later gradually increasing her speed to keep the initial slow speed until the ice floe is broken. If cracks are no longer made the ship should carefully watch for her speed to be able if it is necessary to return to initial point.

Turning in the lead a ship has to keep to the inner side of the lead, trying to avoid contact of her stern part with the ice edge.

It is especially important to protect her rudder and propeller from the ice damage when the ship is moving astern, when the ice broken by the aft part of the ship. In this case the rudder should always be amidships and the propeller should be rotating until the ship is finally stopped in the ice.

For successful breaking out of the lead the ship should use easy part of the lead with damaged edges and turns. Bouncing effect in the lead could also be utilized for the beginning of breaking out.

It is not recommended to enter the ice compacting area if the ship is proceeding without assistance.
If the ship is still in the compacting area all measures for leaving it as soon as possible should be undertaken.

The ship is advised to steer upwind and avoiding navigation hazards in the area return to friendly ice or open water.
If the ship is beset all measures to protect her rudder and propeller from being blocked by ice should be taken, you should continue movement, inform the ice breaker, keep her engine running and constantly watch for changes in the situation.

If the ship is to be left by the ice breaker in the area of compacting, the ice breaker crashes the ice around the ship, creating some kind of cushion from both sides of the ship.

Reliable use of radar for the ice navigation is possible when deck officers have appropriate experience and within distances not exceeding 5 nm. It is possible to select the way between ice floes only at a distance of 2-3 nm, and type of the ice could be determined only in close proximity to the ship. The ice edge as well as separate ice floes are easily detected on the radar screen. Hummocks are seen as a generic noise on the radar screen. Sometimes, even heavy ice could be mistakenly recognized as open water. To obtain experience of radar usage in ice which could be utilized later it is recommended to use radar in good visibility in different ice conditions.

During the night time the ship uses her search light and deck illumination. Search light is used for the ice edge detection. When the ship is proceeding in convoy, it should be remembered that the light from your searchlight could easily blind the ice breaker or the ship ahead of you. It is recommended to use the Suez canal light to illuminate the ice edge right ahead of your ship.

SOME RECOMMENDATIONS ON NAVIGATION IN AREA OF HUMMOCKS

Hummocks are very serious obstacles for merchant ships and if possible should be avoided. It should always be remembered that the major part of the hummock is beneath the water surface. If the ship enters the area of hummocks by stern, it almost always sustains damage to propeller blades or rudder, even if the engine is running and rudder is amidships. Therefore while turning it is very important to watch for the ship stern to be off the hummocks.

When the ship is proceeding in the area of hummocks, even through the ice lead under the ice breaker assistance her speed decreases rapidly. Even the loaded ship touches the ice by propeller, as a result vibration of the hull is significantly increased. If the ship has not sufficient headway to force the hummock the ship gets stuck within the hummock and cannot proceed further without the ice breaker assistance. There is practically no open water lane abaft the ship.

SCF tanker BALTICA following in convoy nuclear power icebreaker

SOME RECOMMENDATIONS ON PORT OPERATIONS

During the winter time port waters are covered by broken and brash ice. Presence of ice makes mooring operations as well as tug assistance more difficult than usual.

For efficient and fast mooring in ice conditions, the berth should be prepared accordingly.

Ice alongside the berth should be broken, approaching lead should be made in advance. The case, when there is a lane of free water alongside the berth, is the best one.

The ship proceeds to the berth at the minimum steering way, using approaching lead. When it is necessary to move the ship's bow from the berth a port tug or a port ice breaker can be used from the outer side of the ship. As soon as the ship approaches the mooring position, tugs are used to wash the ice out between the ship and the berth. It should be remembered that the ice between the ship and the berth would act as fenders and would not allow to make fast tightly right to the berth. If the ice between the ship and the berth is not washed out, rigging of the ladder and cargo operations become more difficult.

Loading SCF arctic tanker in Pechora sea (Prirazlomnaya Oil Rig), Russia

OVERTAKING

Never ever try to overtake the unassisted ship proceeding in the ice lead ahead of you.
However, sometimes during the unassisted passage it is required to overtake the ship in the ice lead. In such as case you should break out of the ice lead well in advance, and overtake the ship at a safe distance. A safe distance here means distance sufficient to prevent the ice between ships from being broken because of the ship's motion.

The most dangerous moment is when the bow of the overtaking vessel is approaching the stern of the vessel being overtaken – at this time it is possible to break the ice between ships.
You can change your course to the ship in the ice lead only when you pass half of her length.

MEETING

Sometimes there is a necessity to pass the ship on the opposite course in the ice lead.
In this case, one of the ships uses the existing lead, and the other has to make a new one. Loaded ship is recommended to break out of the ice lead, while the ship in ballast is recommended to use the existing ice lead.

There are two methods of meeting: 1) when the ship leaving lead stops her engine, and 2) when she does not stop her engine.

In the first case the ship leaves the ice canal in the area of friendly ice and waits for the other ship to pass.
As soon as the ship using the ice lead passes more than a half of the ship waiting outside the lead, the latter runs her engines astern and enters the lead again.

The second case when both meeting ships have way is faster and more dangerous. In this case the ice must let the ship leaving the ice lead proceed without getting stuck. Distance between the ice leads must be sufficient to prevent ice from being broken because of the motion of vessels.

Sometimes, it is possible to stop the ship using the ice canal and pass her when she is stopped. In this case it is recommended to enter the lead only after the waiting ship is finally past and clear. However, the use of this method depends on the local ice conditions as the ship in ballast could not have enough power to resume her voyage.

SHIP IN CONVOY FOLLOWING THE ICE BREAKER

When following the ice breaker, the ship is complying with the ice breaker master's orders and usually has to:

- keep the distance;
- keep the speed;
- keep the engine status.

In case of keeping the distance the ship must control the distance both visually and by radar.

In case of keeping the speed it is necessary to watch for the speed and adjust the engine status as required to maintain the ordered speed.

In case of keeping the engine status it is necessary to keep the engine status (e.g., full ahead) until a new order is received from the ice breaker.

In all circumstances constant radio contact between the ship and the ice breaker is essential, all doubts and questions must be clarified with the ice breaker as soon as they arise.

If another ship is following your ship you should inform her about all changes of your speed, especially if your speed is rapidly decreasing.

SAFETY IN CONVOY

Every ship in convoy has to watch for her position in the convoy and control the depth around. In case of any doubt regarding sufficiency of depth the ice breaker master should be informed immediately.

HOW TO FASTEN THE TOWING LINES

Towing by the ice breaker is used when the engine power of the ship is insufficient for the ice navigation or when navigating in compacting ice. As a rule, close-coupled towing is used. The towing wire is sent through the anchor lead and fastened to the bridle on board the ship. In rare cases towing wire may be fastened directly to bollards.

PROPULSION AND STEERING

In case of close-coupled towing the ship constantly works with her engine and steers by her rudder, trying to keep the ice breaker in line. Constant radio contact with the ice breaker is essential for proper compliance with his orders regarding the engine status, rudder position and in extreme cases for fast release of the towing wire.

While turning in the ice lead the ice breaker may use the vessel being towed as an active rudder. In this case the vessel being towed assists the ice breaker in turning or keeping in the middle of channel by complying with her orders.

PILOT BOARDING IN ICE

Sometimes there is a necessity to take a pilot or other man from the ice on board the ship or disembark crewmembers on the ice for the ship's hull inspection. In this case gangway or pilot ladder is rigged in the most convenient place. Rigging place is selected where there is the easiest accessible place on the even ice, without cracks or hummocks.

More frequently there is a necessity to take a pilot, doctor or someone else from the ice breaker. In this case the ice breaker approaches the ship staying in the ice either by bow or by stern depending on the height of the ship's freeboard. Having taken all her way off at a distance of 20-50 m to the ship, the ice breaker transfers a man to the ship using the landings or pilot ladder prepared in advance, safeguarding the man from the ship's side.

 Loading LNG carrier Grand Aniva, Sakhalin, Russia

Sources:

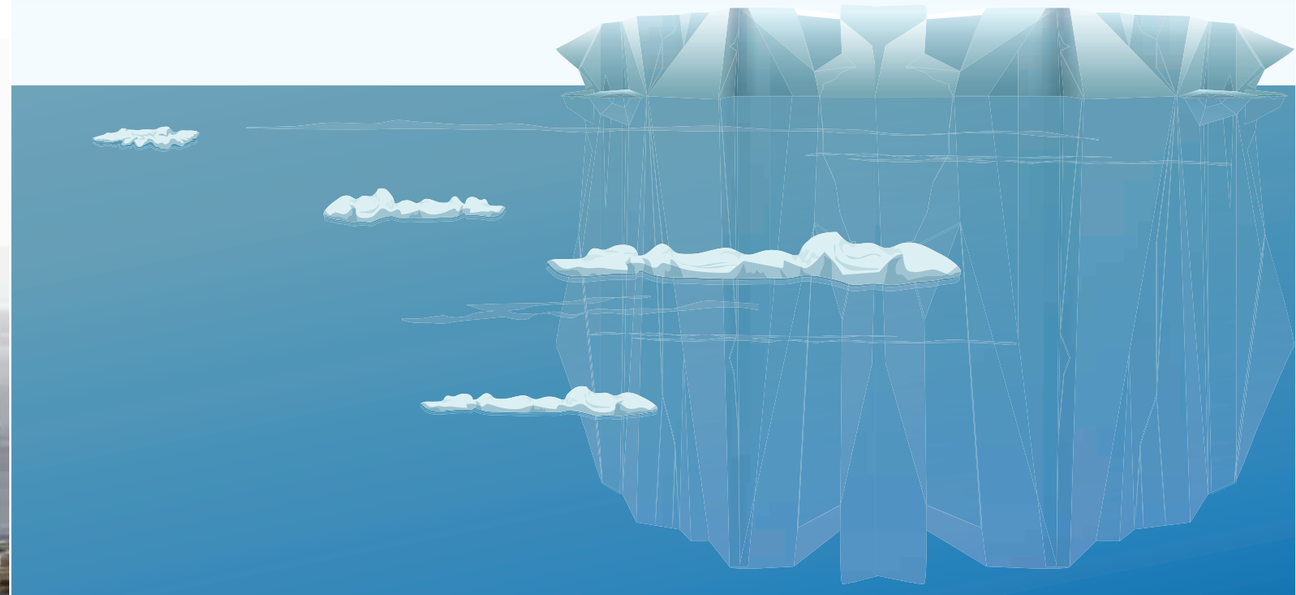
International Convention for the Safety of Life at Sea, 1974, as amended by the 2014 SOLAS amendments, Chapter XIV Safety Measures for Ships Operating in Polar Waters

International Code for Ships Operating in Polar Waters (Polar Code)

DNV GL IMO Polar Code guidance

ICS Training requirements for personnel on ships operating in polar waters

International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended



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