The Polar Code and the Standard of Seaworthiness in Polar Navigation

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Abstract: the International Code for Ships Operating in Polar Waters (the "Polar Code") came into force on 1 January 2017. The Polar Code introduces the mandatory rules of navigation safety measures and Polar environment protection covering the full range of ship's design and construction, equipment, operation and manning as well as environment protection on the discharge of oil, invasive species, sewage, garbage and chemicals into Polar waters. The Code has a higher standard of seaworthiness of ships operating in Polar regions. Shipowners taking adventures in Polar area are obliged to meet requirements of the Code ensuring that their ships are Polarworthy.

Keywords: the Polar Code, Seaworthy, Polarworthy.

Introduction

In the recent 30 years, the Arctic has witnessed the increasing number of marine activities in the area, which is mainly attributable to three factors. First, the temperature of Arctic area has been keeping on the rise and the sea ice in the summer has been keeping on the decrease, creating navigation conditions for merchant ships to operate in Arctic waters. Secondly, the abundant natural resources in Arctic area have driven the development of marine activities in the area. Thirdly, compared with the existing three Asia Europe trade routes (via the Strait of Malacca, the Suez Canal and the Strait of Gibraltar, via the Panama Canal and detouring around the Cape of Good Hope), navigating Arctic waters can shorten the voyage time between European and Far Eastern ports for about 9 to 10 days. Shipowners can therefore save bunker oil costs and the Suez Canal and the Panama Canal tariffs, and also avoid the risk of encountering pirates in Southeastern Asia and Somali regions. In January 2018, Chinese government promulgated the Polar Silk Road Initiative, calling for the active commercial

development and utilization of Arctic passage. [1] It is expected that there would be more Chinese merchant ships taking adventure in Arctic waters in the future. However, harsh climatic conditions in the remote and vulnerable Arctic area always have impact on the structural safety and stability of a ship, the normal operation of machine and equipment in engine room and the safety of seafarers and cargoes aboard a ship. From the technical perspective, navigating Arctic waters is still very difficult and challenging. To address the navigation safety and environment protection in Arctic and Antarctic regions, IMO, after above 20 years' efforts, adopted the International Code for Ships Operating in Polar Waters (the "Polar Code") which entered into force on 1 January 2017. The Polar Code introduces the mandatory rules of the navigation safety in Polar waters covering the full range of the ship's design and construction, equipment, operation and manning as well as environment protection on the discharge of oil, invasive species, sewage, garbage and chemicals into Polar waters. The Polar Code establishes the higher seaworthiness standard of ships operating in Polar waters. The shipowner is obliged to meet the requirement of the Polar Code ensuring that its ship is Polarworthy. This Article will analyze the navigation safety rules of the Polar Code, discuss the seaworthiness standard of ships navigating Polar waters and propose suggestions to the shipowner on fulfilling the Polarworthiness obligation.

Overview of the Polar Code

Being aware of the particular importance of the safety of ships operating in Polar waters and protection of Polar environment, IMO Maritime Safety Committee ("MSC") and Marine Environment Protection Committee ("MEPC") have developed relevant requirements, provisions and recommendations over the years. In November 2014 and May 2015, MSC and MEPC respectively adopted the Polar Code. The Code introduces mandatory provisions and recommendations on safety measures and protection of environment. It covers the full range of design, construction, equipment, operational, training, search and rescue and environmental protection matters relevant to ships operating in Polar waters.

[1] The Information Office of the State Council, *China's Arctic Policy*, 26 January 2018

The aim of the Code is to provide for safe ship operation and the protection of Polar environment by addressing risks present in Polar waters and not adequately mitigated by the SOLAS, MARPOL and STCW. The provisions of the Polar Code are respectively incorporated into the International Convention on the Safety of Life at Sea ("SOLAS") as its new Chapter XIV Safety Measures for Ships Operating in Polar Waters[2] and the International Convention for the Prevention of Pollution From Ships ("MARPOL") of its annex I, II, IV and V.

The Code applies to all ships of 500GT and over that operate on international or domestic voyages within the IMO-defined boundaries of Arctic and Antarctic waters.[3] New ships constructed after 1 January 2017 shall comply with the Code, and existing ships shall until their first intermediate or renewal survey after 1 January 2018 to comply.[4]

Mechanism and Structure of the Code

The Code does not provide a one-size-fits-all solution.[5] The regulations of the Code are invoked based on the intended voyage and the risks associated with such voyage. Shipowners shall define the operating profile of the intended Polar voyage and assess the operational risks associated with such profile. Then, it can be determined which part of the Code shall apply to the ship and intended voyage. The operating profile can be defined by reference to where, when and how a ship will operate in Polar regions and what conditions it will likely encounter in the voyage.

Critical elements of determining the application of the Code include operating in ice, ship categories, operating in low air temperature, operating in high latitude and maximum

[2] Chapter XIV of SOLAS applies to ships operating in polar waters, certified in accordance with Chapter 1. It includes all ships carrying a SOLAS Certificate as defined in Regulation 1/12 and engaged on international voyages.
[3] The regulations in chapter XIV of SOLAS are not applicable to non-SOLAS ships, e.g. fishing ships.
[4] 'Ship constructed' means a ship the keel of which is laid or which is at a similar stage of construction. At a similar stage of construction means the state at which construction identifiable with a specific ship begins, and assembly of that ship has commenced comprising at least 50 tones or 1% of the estimated mass of all structural material, whichever is less. See Chapter XIV regulation 1.5 and 1.6 of SLOAS.
[5] 'IMO Polar Code', < https://www.dnvgl.com/maritime/polar/services.html>

expected time of rescue.[6] For example, the Code divides ships into A, B and C Category respectively linking to different ice classes depending on ice conditions of Polar waters. The requirements of the ship structure, subdivision and stability and machinery installations apply to the three categories of ships differently. Generally, the more severe operating conditions are, the higher and more extensive requirements of the elements are stipulated.

The Code divides the regulations of safety measures into following twelve elements:

- General provisions on certification, performance standards and operational assessment
- Polar Waters Operational Manual
- Ship Structure
- Subdivision and Stability
- Watertight and Weathertight Integrity
- Machinery Installations
- Fire Safety/Protection
- Life-saving Appliances
- Safety of Navigation
- Communication
- Voyage Planning
- Manning and Training

The above elements are all in relation to the seaworthiness standard of ships operating in Polar waters. The specific requirements of those elements will be discussed in detail in the later parts of this Article.

Seaworthiness at Large

According to the Hague-Visby Rules and PRC Maritime Code, the carrier shall be bound before and at the beginning of the voyage to exercise due diligence to make the ship seaworthy, to properly man, equip and supply the ship and to make the holds, refrigerating

[6] American Bureau of Shipping, *IMO Polar Code Advisory*, January 2016

and cool chambers, and all other parts of the ship in which the goods are carried, fit and safe for the reception, carriage and preservation.

The test of seaworthiness may be described that the ship should be in a condition to encounter whatever perils of the sea a ship of that kind, laden in that way, may be fairly expected to encounter.[7] The seaworthiness obligation is not absolute but a lesser obligation to exercise due diligence to make a ship seaworthy.[8] Whether a carrier has exercised due diligence is the criteria of fulfilling such obligation. In practice, due diligence means the exercise of reasonable care and skill, and the lack of it constitute negligence.[9] The reasonableness is one of fact depending on numerous factors, such as the nature of the vessel, the state of knowledge and the standards prevailing at the material time, the provisions of regulatory codes such the ISM codes or P & I Club rules, class requirements and so on.[10] The test of due diligence is objective. Whilst trade practice cannot be conclusive as to the objective standards of a prudent owner, it may be relevant.[11]

The seaworthiness of a ship covers elements ranging from its physical characteristic such as structure, equipment, machinery and the crew to the documentation for the intended voyage. Seaworthiness also includes "cargoworthiness". The ship must be reasonably fit to carry the cargo in question. A seaworthy ship shall have a sufficient, efficient and competent crew. The deficiency in the crew and manning of a ship may include that the master is disablingly want of skill or knowledge and the incompetence of crew deriving from an inherent lack of ability, adequate training or instruction, knowledge about a particular ship or its system and the disinclination to perform the job properly as well as physical or mental disability or incapacity.[12] Meanwhile, a seaworthy ship shall be fully documented with navigational charts and certificates bearing on seaworthiness.

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[7] *Steel v State Lines SS. Co.* (1877) 3 App. Cas. 72, 77
[8] Richard Aikens, Richard Lord and Michael Bools, *Bills of Lading*, (2nd Edition 2015 Informa) 10.135
[9] *The Amstelslot* [1963] 2 Lloyd's Rep. 223, *The Fjord Wind* [2000] 2 Lloyd's Rep. 191, 200, *The Kapitan Sakharov* [2000] 2 Lloyd's Rep. 255, 266.
[10] Richard Aikens, Richard Lord and Michael Bools, *Bills of Lading*, (2nd Edition 2015 Informa) 10.135
[11] *The Westerdok* [1962] 1 Lloyd's Rep. 180, 186, *The Gudermes* [1991] 1 Lloyd's Rep. 456
[12] *The Eurasian Dream*, [2002] 1 Lloyd's Rep. 719

Standard of Seaworthiness in Polar Operating Context

The Polar Code provides a higher standard of seaworthiness for the ship navigating Polar waters. Some experts in the industry propose that such standard be called Polarworthy.[13] The standard is specifically targeted at the inherent hazards of Polar regions that Polar operating ship may encounter. The Code identifies the adverse impact brought about by the ice, low temperature, high latitude, remoteness and possible lack of accurate and complete hydrographic data and information on the hull structure, the stability characteristic, the functioning of the machinery and navigation systems and human performance as well as the potential lack of ship crew experience in Polar operations.

Shipowners taking adventure in Polar waters shall be up to the standard of the Code to fulfill its seaworthiness obligations. As discussed above, the Code introduces the mandatory provisions on the safety measures, covering the full range of documentation, structure, machinery installations, navigation equipment, communication and manning and training. Those provisions, however, don't indistinguishably apply to all Polar voyages. In general, the scope of the application mainly depends on such operational and environmental condition as ice-covered waters, low air temperatures, ice accretion or snow accumulation, extended periods of darkness or daylight, high latitude and operating in remote waters.

The flow path of the compliance with the regulations of the Code may be summarized that performing operational assessment of the ship and its equipment and analyzing the risks associated with the intended voyage by the shipowner in order to assess the ship's compatibilities and limitation, compiling the polar water operational manual by the shipowner, reviewing the polar compliance by the flag state government or the authorized classification society and at the last state, issuing the polar ship certificate by the flag state government.

The starting point of the compliance is to perform the operational assessment. At this stage,

[13] Peter J. Cullen, 'Polarworthiness: A new standard of seaworthiness in the polar context?' Polar Shipping and Arctic Development Symposium, 42nd International Conference of the CMI, New York, May 5, 2016

shipowners need to be firstly aware of the operating profile, i.e. where, when and how the ship will operate and what environmental conditions the ship would encounter. Then, to analyze the risks associated with the intended voyage. The outcome of the operational assessment mainly include the ice class selection, the likelihood of ice accretion, snow accumulation, slush ice or ice ingestion and freezing temperature, whether operating in low air temperature and/or at high latitude and/or during extended periods of darkness and daylight and whether operating with icebreaker escort.

Shipowners are responsible for using reasonably skill and care to assess the operating profile of a ship and the likelihood of various hazards to be encountered. Shipowners need to notice that the flag state government and class society is not responsible for the approval of the assessment. Any wrong assessment of operating profile or risks analysis may render the improper application of the requirements of the Code to the ship, resulting in the ship being unseaworthy. While the representatives from the designer, class society and risk expert may participate in the assessment and analysis, the shipowner cannot cast off its obligation of seaworthiness on ground of the misconduct of others because the duty of due diligence is non-delegable. [14]

Specific Requirements Relating to Seaworthiness Standard under the Polar Code

The Important Concepts as Defined by the Code

The following concepts are of critical importance to the proper application of the requirements of the Code:

- ***Ice Class*** - the notation assigned to the ship by the ship's flag nation administration or by the classification society authorized by the ship's flag nation showing that the ship has been designed for navigation in sea-ice conditions.
- ***Polar Class*** - the ice class assigned to the ship by the ship's flag nation administration or

[14] The *Muncaster Castle* [1961] A.C. 807

by the classification society authorized by the ship's flag nation based upon IACS Unified Requirements.

- ***Polar Service Temperature*** - a temperature specified for a ship which is intended to operate in low air temperature, which shall be set at least 10 C below the lowest MDLT for the intended area and season of operation in polar waters.
- ***Ship intended to operate in low air temperature*** - a ship which is intended to undertake voyages to or through areas where the lowest Mean Daily Low Temperature is below -10 °C.
- ***Mean Daily Low Temperature (MDLT)*** - the mean value of the daily low temperature for each day of the year over a minimum 10 year period.
- ***Sea Ice –*** any form of ice found at sea which has originated from the freezing water.
- ***Ice free waters –*** no ice present. If ice of any kind is present this term shall not be used.
- ***Open water –*** a large area of freely navigable water in which sea ice is present in concentrations less than 1/10. No ice of land origin is present.
- ***Category A ship*** – a ship designed for operation in polar waters in at least medium first-year ice, which may include old ice inclusions.
- ***Category B ship –*** 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.
- ***Category C ship*** – a ship designed to operate in open water or in ice conditions less severe than those included in categories A and B.
- ***First-year ice*** – sea ice of not more than one winter growth developing from young ice with thickness from 0.3 m to 2.0 m.
- ***Old ice*** – sea ice which has survived at least one summer's melt; typical thickness up to 3 m or more. It is subdivided into residual first-year ice, second-year ice and multi-year ice.

To equip the ship with Polar Ship Certificate (PSC)

The PSC is a statutory document issued by the flag state government after survey to certify that the structure, equipment, fittings, radio station arrangements, and materials of the ship and the condition thereof are in all respects satisfactory and that the ship complies with the

regulations of the safety related part of the Polar Code. A ship shall have the PSC on board when entering Polar waters. The survey under the Code does not form a separate survey and should be added to the exiting survey under SOLAS. The validity of the PSC does not affect the validity of other certificates under SOLAS.[15]

The PSC includes the following key components:

- Ship category and ice class information
- Other thresholds for applicable regulations (Ship type, ice operations, low air temperature)
- Provisions for alternative design and arrangement
- Operational limitation (ice conditions, temperature, high latitudes)

Some Category C ships may be exempted from the survey for the PSC if assessment shows that no additional equipment or structural modification is required to comply with the Code. The PSC may be issued based upon documented verification that the ship complies with all relevant requirements of the Code. It usually happens to those Category C ships which undertakes one-off polar voyages in Artic Waters on occasional basis where there is no ice or limited ice presence. [16]

To equip the ship with Polar Water Operational Manual (PWOM)

PWOM is similar to safety management documentation as required by IMO ISM Code. It is to provide the crew, guidance on how to safely operate the ship in polar waters within the design limitation. Each category of ships including Category C ship shall keep a PWOM on board while navigating Polar waters. PWOM shall include a collection of risk based operational procedures to be followed and specific to the Polar environment. The operation procedures in the PWOM shall cover:

- Operations in ice

[15] Bureau Veritas, *Guidelines for Existing Ships Operating in Polar Waters*, May 2018
[16] American Bureau of Shipping, *IMO Polar Code Advisory*, January 2016

- Operations in low temperatures
- Measures to be taken if ice or temperature conditions exceed ship design capabilities
- Communication and navigation capabilities in high latitudes
- Voyage duration
- Voyage planning to avoid ice or temperatures that exceeds the ship's design capabilities or limitations
- Arrangements for receiving forecasts of environmental conditions
- Means of addressing limitations of hydrographic, meteorological, and navigation information
- Special measures to maintain equipment & system functionality under low temperatures, icing, and sea ice in applicable
- Contacting emergency response service providers for intended operational areas
- Life support and ship integrity in the event of prolonged entrapment by ice
- Escort operation or icebreaker assistance, where appropriate

The scope of a PWOM vary among different ships. For example, cruise ships may very specific procedures associated with passenger safety while a Category C cargo ship operating in summertime Arctic waters may not require such extensive procedures for very low probability situations. [17]

China Classification Society ("CCS") and COSCO Shipping jointly drafted the Guideline of Compiling the Polar Water Operation Manual in the year of 2017 (the "Guideline"). The Guideline is specific to the navigation in the Baltic Sea, the Northeast Sea Passage and Northwest Sea Route. [18] The Guidelines will assist Polar operating shipowners in compiling PWOM.

To make the operational assessment in order to establish operational limitation

[17] American Bureau of Shipping, *IMO Polar Code Advisory*, January 2016
[18] CCS, *Guidelines for Polar Water Operational Manual (2017)*, December 2016

The Code requires that shipowners carry out the operation assessment which shall be submitted to the flag state government for a verification of the consistency between the intended operations, the operational limitation on the PSC and the procedures in the PWOM. [19] The outcomes of the assessment are linked to the regulations of the Code. It helps define the operational limitations and capabilities of the ship. The operational assessment shall cover at least the items of operations in low air temperature, ice conditions and high latitude, the potential for abandonment on ice or land and hazards identified by the Code and any additional identified hazards.

The PSC specifically provide for three sets of operational limitations: ice conditions, temperature and high latitude for a ship operating in Polar waters. The ice conditions are linked to the structural risks of a ship. Masters shall make the voyage plan according to the ice conditions. The limitation of high latitude is connected to the normal functioning of some communications and navigation equipment. High latitude limitations should be listed on the PSC. Operating at temperatures below the certified Polar Service Temperature may not result in any immediate catastrophic failure but rather a progressive degradation of performance of factors of safety. If extreme low temperature are encountered, in most cases, it would trigger a progressive response to increasing levels of risks rather than an immediate suspension of all operations.[20]

To comply with the ice-class requirements of ship structure for operating in low air temperature

For ships intended to operate in low air temperature, materials of exposed structures shall be approved by the flag state or its authorized classification society against the Polar Services Temperatures which is assigned to these ships and stated in the PSC. Meanwhile, the ice strengthening of those ships shall comply with the relevant standards of the International Association Classification Society ("IACS") Unified Requirements ("IACS UR") or other

[19] Bureau Veritas, *Guidelines for Existing Ships Operating in Polar Waters*, May 2018
[20] American Bureau of Shipping, *IMO Polar Code Advisory*, January 2016

standards offering an equivalent level of safety.

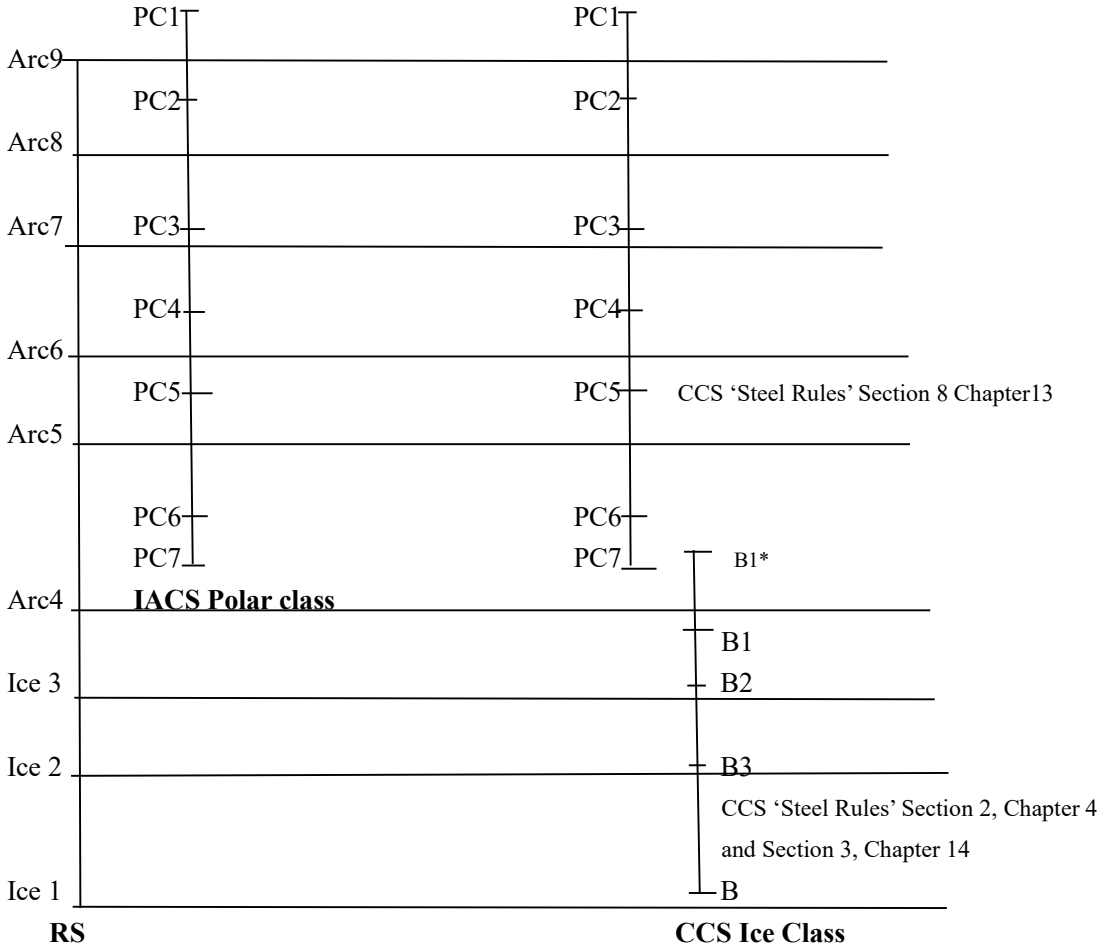
IACS UR S6 – Use of Steel Grades for Various Hull Members provides for the selection criteria for minimum steel grade requirements of ships operating in low air temperature environments. The minimum steel grades are prescribed on basis of the ship's deign temperature.

IACS UR divides the polar ice class into 7 classes. IACS PC 1- PC 5 is linked to Category A ship, and IACS PC 6 - PC7 is linked to Category B ship. The Polar Code does not impose an ice-class requirement on Category C ship. It is recognized that many ships currently in operation are capable of operating safely in and around light ice conditions without any ice strengthening and certainly within open water and even in Polar areas. IMO believe that it would be unjustifiably conservative to require ice strengthening for every ship in Polar waters.[21] Instead, it is generally required that scantlings of strengthened Category C ship shall be approved by the flag state taking into account acceptable standards adequate for the ice conditions. Meanwhile, if the ship's structure is adequate for its intended operation, a Category C ship need not be ice strengthened.

IACS Polar Class Rues are relatively new standard of ice class rules. The majority existing ice-classed ships were constructed not in compliance with the IACS Polar Class Rules. Recognizing this situation, the Polar Code permits the equivalent standard of ice class to be used instead of IACS Polar Class. The flag state shall assess the class equivalency of a ship. To assist in such assessment, the Polar Code offered guidance for a "simplified equivalency assessment".

The following chart indicates the rough equivalency of ice class between IACS, Russian Maritime Register of Shipping ("RS") and CCS.[22]

[21] *ibid*
[22] CCS, *Guidelines for Polar Ships*, March 2016



To meet requirements of Subdivision & Stability, Watertight & Weathertight Integrity

Ice accretion may bring about risks to the stability of a ship operating in Polar waters. The Code prescribes specific allowance levels of ice accretion on exposed weather decks, gangways and lateral projected areas.

For ships operating in ice accretion areas, means must be provided to either remove or prevent ice and snow accretion around the hatches and doors. For ships intended to operate in low air temperatures, means must be provided to prevent freezing or excessive viscosity of hydraulic liquids used in hydraulically-operated doors and hatches, and external hatches and closing devices are designed to be operated by personnel wearing heavy winter clothing including thick mittens.

To comply with requirements of machinery installations

The Code requires machinery installations and associated equipment be protected against the effect of ice accretion and/or snow accumulation, ice ingestion from sea water, freezing and increased viscosity of liquids, seawater intake temperature and snow ingestion. The examples of applicable machinery include deck winches, anchor windlasses and mooring fittings. Owners may also elect to protect other deck machinery, such as cargo handling gear.

For ships intended to operate in low temperature (i.e. Lowest MDLT below -10 C), the exposed machinery and electronic installation and appliance must be capable of safe operation at the specified Polar Service Temperature. The materials of exposed machinery and foundations shall be approved by flag state government. The IACS UR S6 standard is referenced as a basis for material selection. For ice-strengthened ships, the Code requires propulsion line machinery to be appropriately strengthened with applicable requirements for the category and ice class.

To meet requirements of the safe navigation & effective communication systems

The remoteness of Polar regions and proximity to the magnetic Poles can have an effect on the charts and the navigation instruments. It is required by the Code that ships shall have means of receiving and displaying current ice conditions such as ice charts. Ships are also required to be able to detect the conditions around them. For such purpose, ships shall equip the navigation systems as required by the Code depending upon the category of the ship.

To secure the effective communication during operation in Polar waters, shipowners shall make available on board the two-way communications, i.e. voice and/or data for ship-to-shore and ship-to-ship and ship-to-air. The ship-to-shore regulations stipulate that consideration be given to the communication networks available at high latitudes as well as in low temperatures. Ship-to-ship regulations are primarily concerned with sound signaling. Ships shall have two-way on-scene and SAR coordination communication capabilities. For ships

operating in low air temperature, additional regulations are imposed for rescue boats and lifeboats where each must carry the required devices.

To prepare voyage plan and properly man adequately qualified, trained and experienced personnel

The voyage plan shall take into account the potential hazards of the intended voyage. The master shall consider a route through Polar waters, taking into account the factors of any limitation of hydrographic information and aids to navigation available, in formation of ice and temperatures, place of refuge, information and measures to be taken when encountering marine mammals, information on relevant ship's routing systems, speed recommendations and vessel traffic services, national and international designated protected areas along the route, operation in areas remote from search and rescue capabilities and the procedures required by the PWOM.

The masters, chief mates and officers in charge of a navigational watch shall be qualified in accordance with chapter V of the STCW Convention and the STCW Code.[23] For such purpose, masters, chief mates and officers must complete certain training curriculums depending upon the ship type and anticipated ice conditions. There are two levels of the training requirements, basic training and advanced training. For ships operating in ice free waters, no training is required. For ships operating in open waters, basic training is required for tankers and passengers only. For ships operating in the waters other than ice free and open waters, advanced training is required of master and chief mate for all types of ships while the officer in charge of a navigational watch shall be trained basically. As an alternative to the training requirements, an ice navigator can be used subject to the conditions that the ice navigator is certified under STCW Convention and that there are enough qualified personnel available to cover all watches with minimum hours of rest requirements satisfied.

[23] Chapter V of STCW: Special Training Requirements for Personnel on Certain Types of Ships (Tanker Cargo)

Navigation Control in North Sea Route (NSR) by Russia NSR Administration

Geographic boundary of Northeast Passage and North Sea Route

The Northeast Passage (the "NEP") is the shortest sea passage linking the ports between the Atlantic and Pacific, becoming the most attractive and practicable commercial routes in the Arctic. The following table compares the time period of voyages by normal routes and NEP:[24]

Departure Port	**Destination Port**	**By Normal Route**		**By Northest Passage**		**Saved days**
		Miles	Days	Miles	Days	
Murmansk	Ningbo	11848	35.8	6577	19.9	15.9
	Busan	12266	37	6097	18.4	18.6
	Kobe	12291	37.1	6010	18.3	19
Rotterdam	Ningbo	10336	31.2	8177	24.7	6.5
	Busan	10754	32.5	7697	23.2	9.3
	Kobe	10969	33.1	7610	23	10.1

The NEP is a collective of sea routes starting from the Northwest of Europe near the north point of Norway, traversing the Barents Sea, Kara Sea, Laptev Sea, East Siberian Sea, Chukchi Sea and crossing over the Bering Strait to the Pacific. The routes other than that crossing the pole shall cross the Northern Sea Route ("NSR") that is controlled by Russia NSR Administration. NSR spans from the eastern costline of Novaya Zemlya archipelago and western entrances of the Novaya Zemlya straits to the Bering Strait and the line separating Russian and America sectors of Arctic. The NSR has a significant overlap over the majority of the NEP, and therefore sometimes the NSR term has been used to refer to the entirety of the NEP.

[24] CCS, *Guidelines for Polar Ships*, March 2016

NSR source: NSR Administration

NSR Navigation Rules

The Ministry of Transport of Russian Federation promulgated the Rules of Navigation in the Water Areas of the North Sea Route dated 17 January in 2013 (the "NSR Navigation Rules"), controlling and regulating the safe regulation in NSR area. NSR Administration is in charge of the ship management in NSR. The NSR Navigation Rules include navigation permission, icebreaker assistance, pilot ice assistance, assistance of ships on seaways, navigational-hydrographic and hydrometeorologic support, radio communication in the water area of the NRS, and ships pertaining to the safety of navigation and protection of marine environment.

Navigation Control

Ships are allowed to navigate in NSR only when navigation permission has been granted by the NSR Administration. The Navigation Rules of NSR provides the criteria of the admission of ships to the NSR water being in compliance with category of their ice strengthening. The ship that is permitted to operate in NSR waters shall be assigned with the ice class as defined by Russian Maritime Register of Shipping ("RS") or the equivalent ice class. RS divides the ice class into 9 levels, being Ice 1, Ice 2, Ice 3 and from Arc 4 to Arc 9. The rough equivalency of ice class between RS, IACS and CCS may be referred to the ice class

equivalency chart as listed above. The navigation control is by reference to the elements of the ice class of the ship, the waters areas and the navigation season as well as the mode of ice navigation, i.e. whether the ship is allowed to navigate independently or with the assistance of icebreaker. [25]

The Polar Code and NSR Navigation Rules

For those shipowners intending to navigate NSR waters, they are obliged to comply with both the requirements of the Code and NSR Navigation Rules. As discussed above, the Code provides for a comprehensive mandatory rules on the safety navigation in Polar regions inclusive of the NSR waters. Where the Polar Code has a higher requirement than the NSR Navigation Rules, the shipowners shall comply with the requirements of the Code.

Conclusions and Suggestions

For shipowners who intend to take adventure in Polar regions, they are obliged to exercise due diligence to ensure their ships to be up to the Polarworthy standard as provided in the Polar Code. As the Polar Code has come into effect just over one year, it will take time for shipowners to digest the standard of seaworthiness and take measures to catch up with the rules. The critical parts of the compliance that shipowners shall follow include defining the polar operating file of the intended voyage, identifying the hazards to be encountered during the intended voyage and determining what relevant requirements of the Code to apply to the ship accordingly. Some requirements must be met by ship design measures while some other requirements can be satisfied by operational procedures.[26]

It is the shipowner's responsibility to assess the nature and characteristic of the intended voyage and accordingly identify the risks associated with the voyage. Any negligence in the assessment and analysis may render the ship to be unseaworthy. Shipowners shall be very

[25] Rules of Navigation in the Water Area of the Northern Sea Route approved by the order of the Ministry of Transport of Russia dated January 17, 2013, <www.nsra.ru>
[26] 'IMO Polar Code', < https://www.dnvgl.com/maritime/polar/services.html>

cautious about the process.

For new-built ships to be trading in the Polar waters, shipowners shall from the very beginning of the design stage to involve the expert on Polar rules in the project. For the existing ships, classification societies have developed the guidelines for surveys and certification as required by the Code. Moreover, classification societies also render the help to the shipowners in defining the polar operating profile, conducting the operation assessment, determining which parts of the Code to apply the ship and how the rules shall apply, and evaluating alternative design and operational measures to comply with the requirements of the Code.

It is suggested that shipowners seek for the guidance, advice and confirmation from classification society and P & I Club before making the decision to take the adventure in Polar waters. It, however, needs to bear in mind that it is shipowners' primary obligation to make their vessels seaworthy and such duty is non-delegable. Shipowners contemplating whether newly to operate in Polar regions should conduct a thorough risk assessment as required by the Polar Code and should also contact the P & I Club to confirm the position in relation to P & I cover. Whether or not P & I Clubs agree to insure P & I risks arising from Arctic trading and specialist exploration vessels in Antarctic voyages will depend on, among others, the experience and expertise of the fleet that enable shipowners to manage the additional risks of navigation in the Arctic and Antarctic waters.[27] Meanwhile, Clubs require shipowners to comply with the recommendation and requirement of classification society and certain statutory requirements of ships' flag state. Some Clubs would expect shipowners to have the confirmation from classification society and flag society that the ship is suitable for the intended voyage. P & I Clubs would reduce the recovery of a claim if the Club's Directors consider the voyage from which the claim arises is unsafe and imprudent.[28]

[27] 'Arctic Shipping: P & I Insurance FAQs'
<https://www.ukpandi.com/knowledge-publications/article/arctic-shipping-p-i-insurance >
[28] *ibid*