EXPLORING THE NORTHERN DIMENSION

Northern Dimension

Northern Dimension Institute | Background paper 2 – December 2020

Polar Code and other measures to improve safety of shipping in the Arctic

Summary: The International Code for Ships Operating in Polar Waters, better known as the "Polar Code", came into force on 1 January 2017 to improve safety for ship operations in remote waters of the polar regions. It was developed by the International Maritime Organization (IMO) as a legally binding international framework that builds on existing mandatory regulations set by IMO in the International Convention for the Safety of Life at Sea (SOLAS) and the International Convention for the Prevention of Pollution from Ships (MARPOL). The goal for implementing the Polar Code is "to provide for safe ship operation and the protection of the polar environment by addressing risks present in polar waters and not adequately mitigated by other instruments of the Organization" [10].

This paper gives an overview of how the regulations have contributed to enhancing the safety of ship operations and mitigating environmental risks in the Arctic. At the time of writing (November 2020), the Polar Code has been in force for more than three years, so it is timely to assess how its implementation has affected safety of shipping and how it takes environmental issues into account. We identify a number of issues that hamper the effective implementation of the Polar Code, including inadequate maritime infrastructure in the Arctic, discrepancy between national requirements and those of the Polar Code, and too descriptive requirements concerning, for example, survival equipment and resources. Other areas that need improvement relate to the training of ship crews, and to the bringing the environmental regulation for marine traffic in the Arctic to the same level as in the Antarctic waters. We further examine additional ways of ensuring the safety of polar shipping and protecting polar waters in the era of increasing marine operations, taking into account the on-going work of IMO.

Svetlana Kuznetsova | Northern Arctic Federal University, Arkhangelsk, Russia | s.kuznecova@narfu.ru |

What is the Polar Code about?

The accident with the oil tanker Exxon Valdez, ran aground near of the coast of Alaska in 1989, became one of history's largest environmental disasters and raised public awareness. As a consequence, the International Maritime Organisation (IMO) initiated an international process to establish and agree upon international regulations and guidelines for ship traffic in polar waters [7].

In 2017, the Polar Code (Guidelines for Ships Operating in Polar Waters) came into force. The Polar Code is based on existing IMO regulations and standards for safety, environmental protection and training, and its legal framework is the United Nations Convention on the Law of the Sea (UNCLOS) for polar waters. Countries such as Russia, Canada and the Nordic countries also contributed their knowhow and experience on ice navigation and regulatory regimes to the development of the Code. [7; 11].

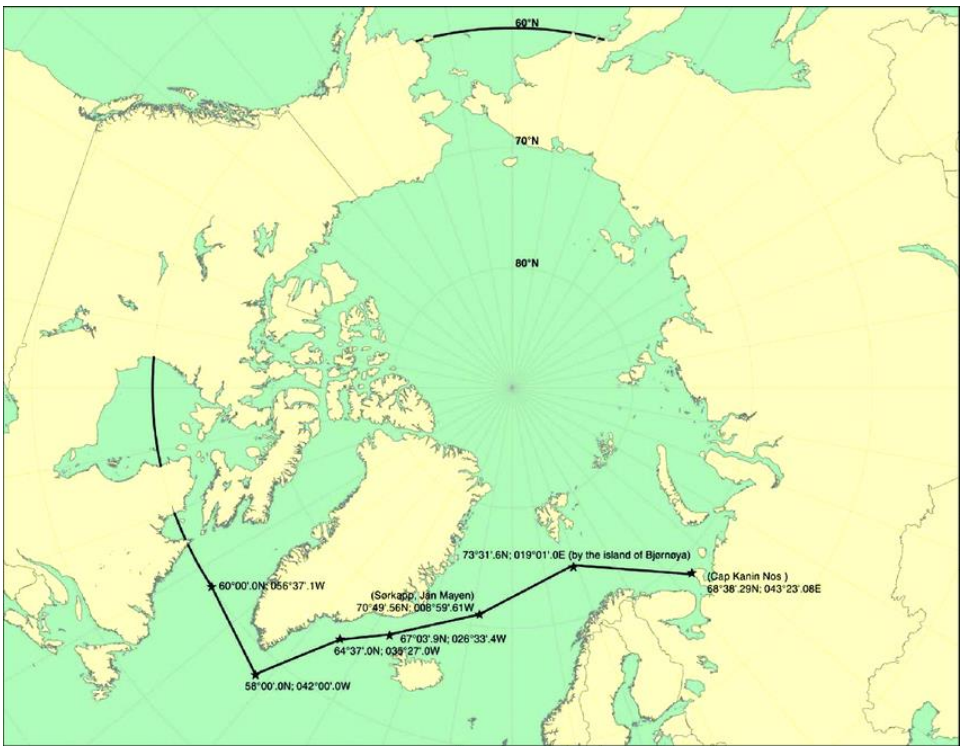

Figure 1. Maximum geographical extent of the Polar Code's area of application in the Arctic [7].

The Polar Code consists of two parts. Part I contains provisions on safety measures which are made mandatory under the International Convention for the Safety of Life at Sea (SOLAS). Part II focuses on measures to prevent pollution which are made

mandatory under the International Convention for the Prevention of Pollution from Ships (MARPOL).

Furthermore, Parts I and II are divided into two parts: Part A includes the mandatory regulatory requirements, and Part B consists of guidelines and recommendations to the mandatory provisions.

The Polar Code applies to passenger ships carrying more than twelve passengers and to cargo ships with a gross tonnage of 500 or more, engaged in international voyages. Every ship to which the Code applies must have a valid Polar Ship Certificate (PSC) that certifies that a vessel is safe for Polar Waters. While the Polar Code is mandatory under SOLAS, this generally excludes fishing vessels, pleasure yachts, smaller ships under 500 gross tons and vessels on domestic voyages [7; 11].

Trends in the Arctic Marine Traffic

Shipping statistics from the Polar Code's geographical area of application in the Arctic, from 2013 to 2019, show an increase in traffic both in terms of the number of ships (up 25 percent) and as to the nautical distance sailed (up 75 percent) [1].

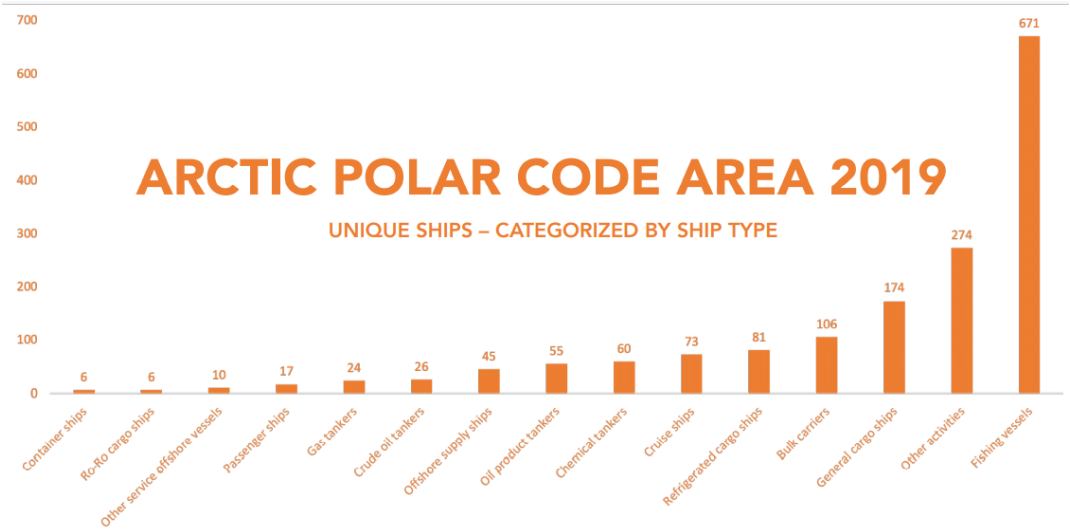

Figure 2. Ships categorized by type in the Polar Code area in 2019 [1].

As shown in Figure 2, fishing vessels dominate the traffic, representing 41 percent of all ships in the Arctic area, and 45 percent of the total distance sailed by all vessels in the Arctic. The Russian fishing fleet is considered to be especially old and worn out, and often with more than 20 years maintenance period. According to the statistics of the Murmansk Maritime Rescue Coordination Center, 43 percent of emergency calls are received from fishing vessels due to machinery damage / failure [3]. However, fishing

vessels are neither subject to the SOLAS Convention, nor any other international safety regulations including the Polar Code.

Passenger-ship traffic in the northern areas is also increasing due to decreasing sea ice. Almost 80 polar ships are already carrying passengers in the polar waters and 28 new vessels are expected to be launched by 2022 [7]. Moreover, the extraction of natural resources in the Arctic is expanding, which contributed to a 160 per cent increase in the bulk carrier traffic in the Polar Code area between 2013 and 2019 [1].

Challenges in the Polar Code Implementation

At the time of writing (September 2020), the Polar Code has been in force for more than three years, and the effects of its implementation are starting to appear.

Researchers from Russia and other countries consider the Arctic maritime infrastructure as insufficient in the most parts of the Polar Code area to comply with the new provisions of the Code. Also, a major infrastructural challenge is the inadequacy of existing Arctic port and reception facilities, including the lack of equipment for ballast and grey water treatment and for oil intake [2].

Russian researchers further state that the procedure of ship examination to obtain the Polar Ship Certificate (PSC) that is the requirement of the Polar Code, is complicated and does not fully disclose the entire process of examination. Furthermore, since most of the ships operating on the Northern Sea Route are built before the Polar Code entered into force, it is difficult to implement all the requirements. This leads to the situation where shipping companies may circumvent the regulations by understating the probability and/or consequences of risks in their analyses [16].

The Polar Code also requires that the vessels operating in Polar Waters need to submit a Polar Water Operational Manual (PWOM) to be able to obtain a Polar Ship Certificate. PWOM details the ship's procedures of operational risk assessment, capabilities and limitations. This document, however, does not require the approval by the ship's flag state supervising authorities, which can make it difficult to integrate PWOM regulations into the onboard safety management system of the ship. Therefore, vessels of the same type may have content-wise different documentation [2; 13].

The question of ship ice class equivalency received a great deal of attention during the Polar Code deliberations and it is still a debated issue. This is due to the large number of national and international classification societies with their own ice class notations. Some call for a comparison table structuring the equivalency of all ship ice classes [2], whereas others argue that one-to-one ice class equivalency between class notations simply does not exist [9]. Nevertheless, the current version of the Polar Code is linked to the recognized Polar Class Rules of the International Association of Classification Societies (IACS) as the principal basis of comparison [11]. In case the ship does not have an IACS Polar Class notation, a ship-specific quantitative assessment is necessary to

accept an alternative ice class. Ultimately, the decision for the ship's ice class equivalency will rest with its Flag State.

Another issue that the Polar Code has been criticized for is its lack of guidelines clarifying requirements for safe evacuation and survival, which may contribute to the great variation in onboard polar protective equipment [7]. The search and rescue exercises SARex1-3, arranged by the Norwegian Coast Guard, the University of Stavanger and the company, GMC of Stavanger in 2016-2018 in the waters surrounding Svalbard, tested emergency response equipment with respect to the Polar Code's requirements for survival. The findings from the three SARex exercises showed that ships on polar voyages are often equipped with insufficient survival equipment and resources for emergency situations that require the ship to be abandoned.

Figure 3. IMO's visual representation of safety issues presented in the Polar Code [9].

The outcome of SARex exercises resulted in the approval of IMO interim guidelines on life-saving appliances and arrangements for ships operating in polar waters in June 2019. These guidelines provide descriptive guidance for complying with the requirements of the Polar Code for life-saving appliances and arrangements, including issues such as food and water emergency supplies per person per day, exposure to CO_2 concentrations for the maximum expected time of rescue, requirements for lifeboats and rescue boats, and to the survival craft's capacity, equipment and safety measures needed for cold climate voyages. The guidelines also specify survival suits, protective clothing and other survival equipment. However, the compliance with the guidelines should not achieved mechanically without any thought and control otherwise the use of such descriptive requirements may be ineffectual [7].

Another challenge related to Arctic marine traffic is the lack of ship crews with the necessary experience on operating in polar waters [5]. To improve the situation, training requirements for crew of ships in polar waters were included in the Polar Code. To assist in complying with these requirements, IMO validated basic and advanced model training courses in February 2017 to provide guidance to maritime academies and training institutes. However, updated training courses should include some type of field activities, use of simulator capabilities based on a more proactive emergency response procedure in order to mitigate the high risks [5].

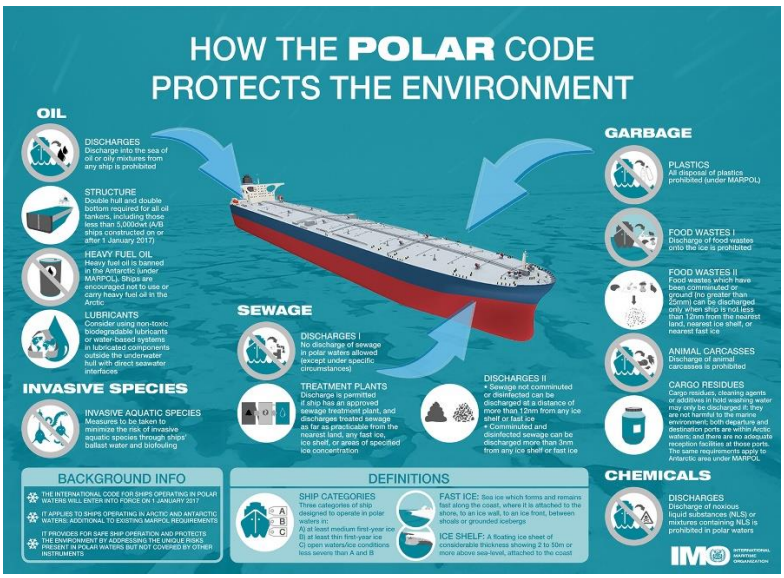

Figure 4. IMO's visual representation of environmental issues presented in the Polar Code [9].

The final issue related to the challenges in the implementation of the Polar Code is related to its approach on environmental risks. Concerns have been raised regarding heavy fuel oil (HFO) and non-SOLAS vessels operating in the Arctic region, especially with respect to fishing vessels that are dominant in Arctic waters. When burned, HFO emits black carbon, a short-lived pollutant that contributes to global warming [4]. The Arctic, which is already warming twice as fast as the rest of the world, is especially sensitive to these emissions. Besides, HFO as the heaviest and most viscous type of residual fuel oil would be very difficult to clean up in the Arctic in case of oil spill. In the Antarctic, the use of HFO as fuel and its carriage in bulk, either as cargo or ballast, are prohibited. However, the Polar Code only recommends ships not to use HFO while operating in the Arctic. Another environmental issue not included in the Polar Code is that protecting marine life from underwater ship noise. The IMO is, however, working on this issue and this work will be discussed in the next section.

Ongoing work on improving safety in the Arctic

As discussed in the previous section, the experience gained with the application of the Polar Code has shown several needs for its development. IMO has already initiated work on some of them, and others are foreseen to be addressed in the near future. One important issue that the IMO is working on is the extension of the Polar Code's application to non-SOLAS ships operating in polar waters. As a first step, the IMO Assembly in 2019 adopted a resolution urging the Member States to voluntarily implement the safety measures prescribed in the Polar Code for non-SOLAS ships operating in polar waters, including fishing vessels of 24 meters in length and above and pleasure yachts of 300 gross tonnage and above not engaged in trade. Further, IMO has developed two sets of draft guidelines for these types of the vessels, both are expected to be approved next year. The session in November 2020 further looked into applying the Polar Code chapters 9 (Safety of navigation) and 11 (Voyage planning) of the Polar Code to non-SOLAS ships. The IMO Maritime Safety Committee agreed that safety guidelines should also be developed for pleasure yachts of 300 GT and above but less than 500 GT engaged in trade in addition to cargo ships of 300GT and above but less than 500 GT [9].

In addition to its work directly addressing the Polar Code, the IMO is also working on its more general regulation that affects the safety of operating on polar waters. First, the IMO's Sub-Committee is going to consider proposed revisions to the IMO guidelines on places of refuge for ships in need of assistance, which were adopted in 2003, to provide guidance when a ship is in need of assistance but safety of life is not involved (when safety of life is involved, search and rescue provisions should be followed) [9]. Second, to ensure safe shipping, IMO is continuing its work reviewing Global Maritime Distress and Safety System (GMDSS) with the aim of enabling the use of modern communication systems in the GMDSS. Recognition of navigation systems such as the Global Positioning System (GPS), Global Navigation Satellite System (GLONASS), and others is also on the agenda. All ships have to carry a global navigation satellite system or terrestrial radio navigation receiver, or other means, to establish and update the ship's position by automatic means throughout the voyage [12].

Moreover, IMO has taken action to improve the environmental regulation in the Arctic waters. It has been looking at how to measure and report on Black Carbon emissions, as part of its work to consider the impact on the Arctic of Black Carbon emissions from international shipping. At the same time, IMO aims to enhance existing regulations and introduce new support measures to reduce marine plastic litter from ships [9]. Furthermore, in November 2020, IMO's Marine Environment Protection Committee approved a ban on the use of HFO and its carriage for use by ships in Arctic waters after July 1, 2024 [9]. The ban is expected to be formally adopted by the full IMO assembly next year.

The HFO ban has been a debated issue among the IMO Member States and its stakeholders. For example, Russia argues a ban would "negatively impact the local

communities and industries of the region" which depend on ships to bring fuel, food and goods to remote areas and that the "potential benefits [of the ban]… remain unclear" [8]. On the other hand, Finland, Germany, Iceland, the Netherlands, New Zealand, Norway, Sweden, and the US state that the most effective HFO ban would be that with no exemptions or waivers. However, the ban exemptions and waivers will allow most ships to use and carry HFO until 2029. The research of the International Council on Clean Transportation studied the amount of HFO that would have been carried and used due to exemptions and waivers, if the ban had been in place in 2019. The study shows that the ban would have reduced HFO carriage only by 30% and HFO use by 16% of in 2019, and this would have mitigated Black Carbon emissions by 5% [4].

It should also be noted that the reduction of harmful emissions of marine traffic is not a straightforward issue. The IMO set a 0.50% limit for sulphur in ships' fuel oil that came into force on 1 January 2020 in order to cut sulphur oxide emissions from ships operating worldwide. To meet these requirements, most of the ships have to use higher quality fuel oil with lower sulphur content, which increases the shipping costs [9]. The aim was to have major health and environmental benefits globally, including improving air quality and reducing risks of acidification of the oceans. However, a recent study suggests that low-sulphur fuel actually increases black carbon emissions: "The results clearly indicate that new blends of marine fuels with 0.5 percent sulphur content can contain a large percentage of aromatic compounds which have a direct impact on black carbon emissions" [14].

In addition to the above-described initiatives, there remain matters that should be considered in the future to improve safety in the Arctic waters. The first issue is the further development and strengthening of the maritime infrastructure. This concerns the availability of port reception facilities, as well as restrictions for ship incineration either as banning of it in ecologically sensitive areas or introducing a specific distance requirement from the ice-face and/or land. Furthermore, researchers underline the unsatisfactory coverage of nautical charting for coastal navigation in polar waters. If charts do exist, their usefulness is limited due to the lack of any reliable depth or hazard information.

Finally, there are other issues related to shipping in polar waters to address in the future, including:

- discharge of sewage through approved sewage treatment plants;
- control of discharge of grey water, i.e., the wastewater from ship galleys, showers, laundries, as well as food pulp, which could potentially cause harm to the environment due to concentrations of nutrients and other oxygen-demanding materials;
- measures to reduce underwater ship noise to minimize disturbance to marine life [6; 15].

Concluding remarks

The “climate change” phenomenon is clearly impacting negatively upon the Arctic environment. On the other hand, it is also creating significant opportunities for shipping and extraction of natural resources due to reduced sea ice. With more and more ships navigating in polar waters, IMO responded to international concern about the environmental protection and the safety of seafarers and passengers onboard ships operating in these areas through the adoption of the mandatory Polar Code. The Polar Code significantly contributes to safe and sustainable shipping in the most challenging regions of the world. However, critical voices called for the Code’s further development even before the ink on its final version got dry.

Some researchers voiced their concerns about inadequate infrastructure of existing Arctic ports and ships, built before 2017 and operating on the Northern Sea Route. The Polar Code has been criticized for is its lack of guidelines clarifying requirements for safe evacuation and survival. Some important issues such as HFO use and non-SOLAS vessels, operating in the Arctic region, left unaddressed. It also turned out that the procedure to obtain the Polar Ship Certificate is quite complicated in Russia and does not fully disclose the entire process of examination.

However, the Polar Code is under continuous review due to the feedback gained during its implementation. This process may result in revising the existing regulations and/or the guidance but may also look at the adaptation of completely new requirements, taking into account ongoing work at IMO. To give some examples, the IMO is working on the extension of the Polar Code’s application to non-SOLAS ships operating in polar waters, places of refuge for ships in need of assistance, and navigation systems. A draft text of a ban on the use and carriage for use of HFO in the Arctic was recently agreed. Some regulations will potentially be revised, including the 0.50% set limit for sulphur in ships' fuel because a recent study suggests that low-sulphur fuel actually increases black carbon emissions.

The Arctic region is experiencing a rapid transition, and protecting its safety requires actions in different areas. A long list of important issues remains to address, among them are discharge of sewage, control of discharge of grey water, measures to reduce underwater ship noise to minimize disturbance to marine life, and others.

Literature

[1] Arctic shipping status report (ASSR) #1 (2020). PAME. Arctic Council.

[2] Banshikova I. (2018). International code for ships operation in polar waters. Master thesis. 65-78.

[3] Borch O.J., et al. (2016). Maritime activity and risk patterns in the High North MARPART Project Report 2. Nord University. 17-48.

[4] Comer B., Osipova L., Georgef E., Mao X. (2020). The International Maritime Organization's proposed Arctic heavy fuel oil ban: likely impacts and opportunities for improvement. The international council on clean transportation. 10-17.

[5] Dalaklis D., Baxevani E. (2018). Maritime Transport in the Arctic after the Introduction of the Polar Code: A Discussion of the New Training Needs. Sustainable Shipping in a Changing Arctic. WMU Studies in Maritime Affairs. Volume 7. 383-398.

[6] Deggim H. (2017). The International Code for Ships Operating in Polar Waters (Polar Code). Sustainable Shipping in a Changing Arctic. WMU Studies in Maritime Affairs. Volume 7. 15-36.

[7] Engtrø E., Gudmestad O.T., Njå O. (2020). Implementation of the Polar Code: Functional Requirements Regulating Ship Operations in Polar Waters. Arctic Review on Law and Politics Vol. 11. 47–69.

[8] Farand Ch. (2020). Loopholes in Arctic heavy fuel oil ban defer action to the end of the decade. Climate home news.

[9] International Maritime Organization official web page (2020). Sub-Committee on Pollution Prevention and Response (PPR 7), 17-21 February 2020. www.imo.org.

[10] International Maritime Organization (2016). Polar code : international code for ships operating in polar waters. London, 72 p.

[11] IMO Polar Code Advisory (2016). American Bureau of Shipping. 30-32.

[12] Lakeman R. (2020). IMO Continues GMDSS Work. The Maritime Executive.

[13] Petrov A.A., Chereysky I.Z, Idrisova S.A. (2018) Technical issues to develop the Polar Water Operation Manual and the need to control its content. Scientific and engineering paper collection of the Russian maritime ship registry.

[14] Reduction of the impact on the Arctic of black carbon emissions from international shipping (2019). IMO pre-session public release.

[15] Roach J.A. (2017). Beyond the Polar Code: IMO Measures for Assuring Safe and Environmentally Sound Arctic Navigation. Sustainable Shipping in a Changing Arctic. WMU Studies in Maritime Affairs. Volume 7. 52-68.

[16] Shilkina M. (2020) Practical application of Polar code regulations for ships in operation. Science week at the St. Petersburg State Maritime Technical University. 16-19.

NDI NORTHERN DIMENSION INSTITUTE

Northern Dimension

Co-funded by the European Union