Implementing the Polar Code: Gaps and Challenges

English version provided by the author

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Summary

Since the entry into force of the International Code for Ships Operating in Polar Waters (the Polar Code) on 1 January 2017, the Spanish Maritime Administration has only certified one ship, Research Vessel (RV) *Sarmiento de Gamboa.* This document describes the major gaps and challenges encountered during the certification process.

Background

The RV *Sarmiento de Gamboa* was delivered in 2008 by the Freire Shipyard in Vigo, Spain. It is owned and operated by the Spanish National Research Council, under the aegis of the Ministry of Science and Innovation.

Following the entry into force of the Polar Code, and to expand Spain's research activities in the Arctic and the Antarctic, it was decided to certify the vessel, taking advantage of the flexibility offered by the Code's goal-based standards. This certification was carried out in 2018.

Due to its design and structure, the vessel meets the necessary Polar Code requirements to work in the areas covered by the Code, with certain limitations. Its Polar Certificate authorizes the *Sarmiento de Gamboa* to conduct operations in both the Arctic and the Antarctic provided that it limits its activities to ice-free waters in areas where the air temperature is not low. In addition, it may only operate in the summer season, whether in the Southern or the Northern hemisphere.

Gaps and challenges during the certification process

Most controversial aspects of the certification of the *Sarmiento de Gamboa*

1. Goal-based standards:

The Polar Code includes four chapters (Ship Structure, Machinery Installations, Fire Safety/Protection, and Life-Saving Appliances and Arrangements) which may be applied not by complying with their associated regulations but rather with their functional requirements through an alternative design. This is the main difference between the application of the Polar Code compared with other standards with which we are more familiar.

In the case of the *Sarmiento de Gamboa*, rather than substantiating compliance with functional requirements, operational limits were established, which facilitated the process.

1. Determining the Polar Service Temperature:

The polar service temperature (PST) is a determining factor due to its crucial importance to the application of the Polar Code, and is calculated using the temperature data set from the past 10 years in the area of operation during the months of operation.

The navigable routes necessarily run through areas in which there is no data available from direct temperature measurement. Therefore, it is necessary to extrapolate from the data collected at research stations, based on the applicable environmental conditions, to draw up a temperature map in order to select the relevant temperatures. The standard should be implemented in this manner, making clear which extrapolation models are considered acceptable.

1. Operational assessment. Development of risk assessment models:

The operational assessment defined in section 1.5 of Part 1-A, Chapter 1 is considered a core aspect of the Polar Code.

The *Sarmiento de Gamboa* was not initially designed or built for polar navigation. As mentioned previously, its certification necessarily involved imposing a number of operational limitations to eliminate risks inherent to the hazards of polar navigation (e.g. ice, low temperature, high latitude). Therefore, it was not necessary to conduct the risk assessments for which the lack of models has been commented on.

The problem is that to date, and based on Spain's experience, of the hazards listed in section 3 of the Introduction to the Polar Code that require assessment, the only risk assessment model that has been implemented is that relating to ice conditions (Polar Operational Limit Assessment Risk Indexing System, or POLARIS, in MSC.1/Circ.1519).

Without a standard assessment model for the other hazards (e.g. low temperature, high latitude), it can be very difficult for operators to carry out risk assessments and for the relevant administrations to analyse them, considering that the second greatest hazard would be that of navigating in areas with low air temperatures, due to their implications for the ship’s structure.

By way of example, in 2023 the vessel's operator requested that the Spanish Maritime Administration expand its Polar Certificate to enable the *Sarmiento de Gamboa* to conduct oceanographic campaigns in Arctic waters, provided these waters were ice free, and in areas without low air temperatures and not at a high latitude. To expand this certification, evidence had to be provided regarding such aspects as the vessel's suitability and its equipment, the climate characteristics of the planned navigation areas, and amendments to the Polar Water Operational Manual (PWOM). Ultimately, it was a question of carrying out the aforesaid risk assessment in order to enable the elimination of the prevailing restrictions and to determine the restrictive measures that would be appropriate going forward.

1. Certification of life-saving appliances and arrangements for polar conditions:

The Code requires that survival systems and equipment be fully operational at PST during the maximum expected rescue time (never less than 5 days).

The problem encountered with regards to this equipment is that there is no testing standard for these conditions, nor are there certificates for conventional equipment indicating the extreme temperatures applicable to the product, meaning that very few current standards are able to guarantee such times under PST conditions.

It would be desirable to link the Polar Code to testing standards that could serve as a benchmark so that it would be possible to find equipment on the market with a clear range of applicability, based on a specific temperature and time duration.

In the case of the RV *Sarmiento de Gamboa*, the ship does not operate at low temperatures and therefore its PST is never below the temperature limit for conventional equipment testing.

*Comparison of requirements for category C ships, which are subject to much lower requirements and have very different times and needs than category A ships*

Category C vessels may essentially have variable requirements based on the eight different types of polar waters included in their category (risk of ice impact), PST, and latitude of operations. Certification may, therefore, range from a document review—when   
the establishment of operational limits mitigates all hazards inherent to polar navigation (which could extend to practically every steel-hulled ship with an average construction standard)—to much higher certification levels entailing the verification of the hull scantling, ice strengthening, suction design, materials and operational temperature limit of motor fluids in essential systems depending on the PST, the installation of appliances to prevent essential systems and equipment from freezing, as well as the carrying of the PWOM and other related documents.

*Necessary modifications, life-saving equipment acquired, and how operations for the Antarctic campaign are reflected in the PWOM*

The *Sarmiento de Gamboa* is an example of a conventional vessel certified for polar navigation in which the mitigation of risk is absolute due to the operational limits established. Therefore, the vessel may only sail in the Antarctic to the north of 63ºS, during the Antarctic summer, in ice-free waters; i.e. restricted to lower latitudes, outside of low-temperature areas, and where there is no possibility of encountering ice. The additional equipment that had to be brought on board included life rafts that were especially designed to ensure that launch mechanisms would not freeze, personal survival kits, and equipment for communications with aircraft. Moreover, a PWOM had to be drafted, and the International Convention for the Prevention of Pollution from Ships (MARPOL) procedures already adopted by the ship had to be adapted to a polar environment.

*Training of onboard personnel*

In the case of the RV *Sarmiento de Gamboa,* pursuant to Section 3 of Part I-A1, Chapter 12 of the Polar Code, and taking into account the type of ship, its category C classification, and its operational limits in polar waters, it was not necessary for the ship’s masters, chief mates, and officers in charge of a navigational watch to be certified under the provisions of Regulation V/4 of the amended STCW-78 Convention and Section A-V/4 of the Training Code.

Nevertheless, an agreement was reached and it was considered prudent for masters and officers in charge of a navigational watch to obtain the basic training certificates provided for in Regulation V/4 of STCW as amended by the Polar Code.

Conclusions and Recommendations

* Encourage all relevant stakeholders to conduct meetings, workshops, seminars, or other means of sharing concerns and resolving doubts regarding application of the Polar Code, establishing an active dialogue with the International Maritime Organization.
* Further develop standard assessment models for the main hazards faced by ships sailing in polar waters, along with guidelines for their proper assessment.
* Highlight and promote the use, by all stakeholders involved in international maritime operations in polar waters, of tools such as the Arctic Shipping Best Practice Information Forum established by the Working Group on the Protection of the Arctic Marine Environment (PAME), and the group of navigation experts of the Council of Managers of National Antarctic Programs (COMNAP), to harmonize the interpretation and improve the implementation of the Polar Code.