Supporting Polar Code Implementation & Compliance

2nd Meeting of the Arctic Shipping Best Practice Information Forum

Alicia Nash
14 May 2018
Overview of Contents

• Lloyd’s Register’s Polar Code Certification Activity
• Steps to Polar Code Certification
• LR Resources & Web Portal Submissions
• Challenges
• Summary
Lloyd’s Register’s Polar Code Certification Activity

- Approximately seven Polar Ship Certificates issued to date.
- 22 ongoing polar compliance assessments being completed by technical support offices globally.
- The vessels vary from new/existing and Cat B & C (PST/no PST).
- Currently PSCs are only issued for Cat C existing vessels.
Steps to Polar Code Certification

- Confirm operating envelope
- Anticipate the operational limitations
- Pre-Audit the ship (gap analysis – for existing ships)
- Undertake Operational Assessment
- Update procedures (create PWOM)
- Install / upgrade equipment or systems (where appropriate)
- Submit the Operational Assessment report, PWOM, Ship Plans/Particulars and Equipment List
- Compliance assessment (and survey)
- Certification
Operating Envelope Guidance and Template

Introduction

What is the operating envelope?

The operating envelope represents the quantification of the range of conditions that the ship itself could be subjected to during its normal operation. This is necessary for the design or enhancement of the hull structure, as well as the selection or upgrade of equipment, and the definition of training requirements or additional training for crew as per the Polar Water Operational Manual.

Why is the operating envelope important?

The operating envelope identifies what conditions the ship is intended to operate in; they are the basis for planning the requirements of the Polar Code and effectively assume limitations for ship operation. If the operating envelope is too broad, requirements for ship equipment and systems will be overly severe. If the operating envelope is too narrow, the ship may be overly restricted in terms of permissible operations in polar waters.

Do I need an operating envelope?

The Polar Code does not require an operating envelope to be explicitly written; however, implicitly the operating envelope needs to be determined so that the ship’s characteristics—such as the keel lines or the specification of equipment for low temperatures—can be defined. The operating envelope and the template are a recommended means of approaching this definition activity in a structured manner.

Establishing the Operating Envelope

To establish the ship’s operating envelope, use the following questions as a guide:

Area

What polar region will you be operating in, or do you anticipate operating in?

The area will be used to identify relevant ice, temperature and ice concentration data. It will also be used to determine the temperature of the ambient operations and the proximity of research and rescue (SAR) support infrastructure. Latitude will be used to determine whether the ship will be exposed to extended periods of darkness.

Example: Arctic, high Arctic, Antarctic, Antarctica Peninsula or specific routes, port calls, shuttle service to

Establishing: Operating area, sector, region, routing.

Polar Code
Operating Envelope Guidance and Template
Version 1.0 September 2016

Example: Summertime Trade to Baffin Island

Polar Code
Operating Envelope Guidance note and template
Version 1.0 September 2016

Area

Polar region

Target port of call

Latitude range:

Target port of call

Latitude range:
# Operational Assessment Guidance and Template

<table>
<thead>
<tr>
<th>Phase Identified</th>
<th>Polar Code requirement / mitigation requirement</th>
<th>Polar Code reference</th>
<th>Risk Control measure applied</th>
<th>Control Measure description &amp; Equipment specification</th>
<th>Control Measure description &amp; Operational procedure</th>
<th>Description of alternative arrangement if applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ICE INGESTION</strong></td>
<td>seawater supplies for machinery systems shall be designed to prevent ingestion of ice, or otherwise arranged to ensure functionality.</td>
<td>6.3.1.3 ✓ Ice-class sea chest provided with ballast plates, CWS recirculation and steam. See Safety Arrangement Drawing.</td>
<td></td>
<td>PWOM includes advice on clearing of sea chests. See PWOM Division 2, Chapter 5.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SNOW ACCUMULATION</strong></td>
<td>Machinery installations and associated equipment shall be protected against the effect of snow accumulation.</td>
<td>6.3.1.1 ✓ Deck side steam provided to enable clearing of ice and snow. Intake Nozzles have flame heating. See Winterization Arrangement Plan.</td>
<td></td>
<td>PWOM includes advice to crew on the effect of ice accretion. Procedures include clearing ice and snow using steam hoes. See PWOM Division 2, Chapter 5.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SNOW INGESTION</strong></td>
<td>Machinery installations and associated equipment shall be protected against the effect of snow ingestion.</td>
<td>6.3.1.1 ✓ Deck side steam provided to enable clearing of ice and snow. Intake Nozzles have flame heating. See Winterization Arrangement Plan.</td>
<td></td>
<td>PWOM includes advice to crew on the effect of ice accretion. Procedures include clearing ice and snow using steam hoes. See PWOM Division 2, Chapter 5.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LOW TEMPERATURE</strong></td>
<td>Machinery installations and associated equipment shall be protected against the effect of freezing and increased viscosity of liquids.</td>
<td>6.3.1.1 ✓ Exposed machinery installations limited. Low temperature greases provided for exposed machinery installations. See Winterization Arrangement Plan.</td>
<td></td>
<td>PWOM includes advice on hazards associated with increased viscosity of liquids. See PWOM Division 2, Chapter 5.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LOW TEMPERATURE</strong></td>
<td>Machinery installations and associated equipment shall be protected against the effect of seawater intake temperature.</td>
<td>6.3.1.1 ✓ CWS recirculation in sea chest with temperature-controlled valve / monitoring provided. See CWS system diagram.</td>
<td></td>
<td>PWOM includes advice on sea chest temperature management. See PWOM Division 2, Chapter 5.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LOW TEMPERATURE</strong></td>
<td>Working liquids shall be maintained in a viscosity range that ensures operation of the machinery.</td>
<td>6.3.1.2 ✓ Exposed machinery installations limited. Low temperature greases provided for exposed machinery installations. See Winterization Arrangement Plan.</td>
<td></td>
<td>PWOM includes advice on hazards associated with increased viscosity of liquids. See PWOM Division 2, Chapter 5.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ADDITIONAL HAZARD</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Guidance on using POLARIS and setting Operational Limitations

Polar Code Limitation Wording for the Polar Ship Certificate

Introduction

What are operational limitations?

Environmental conditions in polar regions vary significantly based on location and season, so do the risks associated with operating there. In respect to identify, from a regulatory perspective, the limitations that a ship has when operating in these conditions, the Polar Code requires operational limitations to be determined in the operational assessment and included on the Polar Ship Certificate. The limitations are primarily linked with ship characteristics that have been selected by the shipowner, implemented in the ship design, and described on the Certificate (e.g., polar service temperature (PST), low ice class).

These limitations are included on the Certificate:

- Ice conditions
- Low temperature
- High latitudes

Why are operational limitations important?

As operational limitations are included on the polar ship certificates, they are a direct and tangible means upon which operators should be planned and managed. The operational limitations themselves are the foundation for enabling the owner/operator and other interested parties, such as the administration, national authorities, other operators, charterers, and others - to understand what capabilities the ship has to operate safely in polar environments. Therefore, assuming these limitations are, in practice, have implications in terms of the validity of assurance and the assignment of responsibility in the case of accidents.

Is the requirement of operational limitations?

The selection of the ship characteristics should be validated against the operating environment (the known environmental conditions) as part of the operational assessment. This ensures that there is evidence of the process on the part of the owner/operator in identifying valid ship characteristics for the intended operational conditions. As a result of this validation process, the ship characteristic that is either existing or proposed for a new design may be used to anticipate what the wording of the limitations will say on the Certificate. It is a fact, however, that the owner/operator can anticipate the content of the Certificate and propose what limitations the ship should have. Although it is the responsibility of the flag administration that recognized organizations to enter appropriate limitations on the Certificate, it is the responsibility of the owner/operator to undertake the operational assessment and set ship characteristics that will enable the ship to function safely in the operating environment. Consequently, it is the owner/operator who proposes the operational limitations as part of the output of the operational assessment.

It is, therefore, recommended that, at the conclusion of the operational assessment, the following guidance is used to propose limitation wording for the Certificate that aligns with the outcomes of the assessment.

Operational Limitations on the Polar Ship Certificate

The following section contains background information and recommended wording to be used when proposing operational limitations for the Polar Ship Certificate.

Ice Conditions

Operational limitations for ice conditions are set based on the ship's ability to function safely in low temperature, regardless of the ice conditions. The Polar Code requires that a methodology is utilized to determine a set of operational limitations for operating in ice. Guidance on such methodologies is contained within MSC.1/Circ.1658, Guidance on methodology for assessing operational capabilities and limitations in ice. This circular also contains, as an example, wording for use on all Polar Ship Certificates. The content of the example is repeated below. As an example, it is recommended that limitations for ice conditions follow the same format as described in MSC.1/Circ.1658 and described below when being proposed as outcomes of the operational assessment.

Ice Conditions

Lloyd's Register is a leading provider of technical and professional services around the world, with expertise in engineering, sustainability, and quality assurance. We are committed to helping our clients navigate the challenges of a changing world, and our experts work collaboratively with clients to deliver innovative solutions that drive performance and reduce risk. Our services include auditing, inspection, and certification, as well as training and development. We are proud to support businesses of all sizes, from small startups to multinational corporations, as they strive to achieve their full potential.

Polar Code

Polar Code Wording for the Polar Ship Certificate

Guidance note

Low operation temperature

Limited to 2°C and below

High latitude

Limited to 30°S to 70°N

Ice type

Limited to new ice and floe

Figure of merit

Limited to 0.05 m

RECOMMENDATIONS

- It is recommended that the wording for ice conditions be as follows:
- Operational limitations for ice conditions are set based on the ship’s ability to function safely in low temperatures, regardless of the ice conditions.
- Guidance on such methodologies is contained within MSC.1/Circ.1658, Guidance on methodology for assessing operational capabilities and limitations in ice.
- This circular also contains, as an example, wording for use on all Polar Ship Certificates. The content of the example is repeated below. As an example, it is recommended that limitations for ice conditions follow the same format as described in MSC.1/Circ.1658 and described below when being proposed as outcomes of the operational assessment.

Operational Limitations on the Polar Ship Certificate

The following section contains background information and recommended wording to be used when proposing operational limitations for the Polar Ship Certificate.

Ice Conditions

Operational limitations for ice conditions are set based on the ship’s ability to function safely in low temperature, regardless of the ice conditions. The Polar Code requires that a methodology is utilized to determine a set of operational limitations for operating in ice. Guidance on such methodologies is contained within MSC.1/Circ.1658, Guidance on methodology for assessing operational capabilities and limitations in ice. This circular also contains, as an example, wording for use on all Polar Ship Certificates. The content of the example is repeated below. As an example, it is recommended that limitations for ice conditions follow the same format as described in MSC.1/Circ.1658 and described below when being proposed as outcomes of the operational assessment.

Ice Conditions

Limited to new ice and floe

High latitude

Limited to 30°S to 70°N

Low operation temperature

Limited to 2°C and below

Figure of merit

Limited to 0.05 m

RECOMMENDATIONS

- It is recommended that the wording for ice conditions be as follows:
- Operational limitations for ice conditions are set based on the ship’s ability to function safely in low temperatures, regardless of the ice conditions.
- Guidance on such methodologies is contained within MSC.1/Circ.1658, Guidance on methodology for assessing operational capabilities and limitations in ice.
- This circular also contains, as an example, wording for use on all Polar Ship Certificates. The content of the example is repeated below. As an example, it is recommended that limitations for ice conditions follow the same format as described in MSC.1/Circ.1658 and described below when being proposed as outcomes of the operational assessment.

www.lr.org/polarcode
Meeting the Polar Code on 1 January 2017: Guidance for Existing Ships

Guidance note

Introduction

What is the Polar Code?

The ICS’s International Code for Ships Operating in Polar Waters (the Polar Code) is a comprehensive, global standard for ships operating in polar waters. It provides a framework for the prevention of marine pollution and the protection of the environment in areas where the effects of shipping and maritime activities are particularly significant.

The Polar Code applies to all ships operating in polar waters, including, for example, oil tankers, gas carriers, and passenger vessels. It is intended to ensure that ships are equipped with the necessary equipment and procedures to prevent pollution and to assist in the protection of the environment.

Part of the Code applies to all ships carrying SOLAS certificates and operating in polar waters. Part of the Code applies to all ships operating in polar waters (including, for example, offshore oil rigs). Polar waters are defined in Figure 1 below.

Figure 1. Area of application specified for the Polar Code

When do existing ships need to comply with the Polar Code?

All ships operating in polar waters must comply with the Polar Code, regardless of their size or type. Existing ships (ships constructed before 1 January 2017) that are not in compliance with the Polar Code must comply with the Code by 1 January 2017.

Guidance on Part IIA Compliance for Existing Ships

The following section includes:

- a summary of the key operational requirements from Part IIA Chapter 1 of the Polar Code;
- commentary on the certification associated with these requirements; and
- recommended actions to ensure a ship’s documentation aligns with the requirements.

However, it remains the responsibility of the ship owner and/or operator to ensure the Polar Code and implement changes to the ship’s documentation in the ship company procedures.

Operational Requirements for Existing Ships

The code applies to all ships operating in polar waters (including, for example, offshore oil rigs). Polar waters are defined in Figure 1 below.

Part of the Code applies to all ships carrying SOLAS certificates and operating in polar waters. Part of the Code applies to all ships operating in polar waters (including, for example, offshore oil rigs). Polar waters are defined in Figure 1 below.

Certification and Documentation Requirements

International Oil Pollution Prevention certificate

The Polar Code amendments to MARPOL Annex I include an additional section on Form A and Form B. The text is as follows:

A ship may be required to carry an International Oil Pollution Prevention (IOPP) Certificate Form A or Form B. Form A contains information about the ship’s compliance with the Polar Code, while Form B contains information about the ship’s compliance with the International Convention for the Prevention of Pollution from Ships (MARPOL). The form must be completed and signed by the master of the ship and submitted to the competent authority.

The following should be noted:

- The amendments only refer to the areas of the Polar Code that are new.
- Section 2 of Part IIA is not applicable to category A ships.
- The amendments do not affect existing ships.

www.lr.org/polarcode
LR Resources & Web Portal Submissions

Regulatory Interpretation Guide to the Polar Code

The International Code for Ships Operating in Polar Waters
A regulatory interpretation guide

CHAPTER 4 – SUBDIVISION AND STABILITY

4.1 Goal
The goal of this chapter is to ensure adequate subdivision and stability in both intact and damaged conditions.

4.2 Functional requirements
In order to achieve the goal set out in paragraph 4.1 above, the following functional requirements shall be embodied in the regulations of this chapter:

1. ships shall have sufficient stability in intact conditions when subject to ice accretion; and
2. ships of Category A and B, constructed on or after 1 January 2017, shall have sufficient residual stability to withstand ice-related damage.

4.3 Regulations
4.3.1 Stability in intact conditions
In order to comply with the functional requirement of paragraph 4.2.1, for ships operating in areas and during periods when ice accretion is likely to occur, the following stability allowance shall be made in the stability calculations:

1. 10% on exposed weather decks and garveys;
2. 17% for the projected lateral area of each side of the ship below the waterline; and
3. the projected vertical area of freeboard surfaces of rail, sunken, spar (except masthead) and rigging of ships having no sails and the projected lateral areas of other openings shall be computed by increasing the total projected area of freeboard surfaces by 10% and the area occupied by the ice accretion by 15%.

4.3.2 Ice accretion
Paragraph 4.3.1 shall apply to ships constructed on or after 1 January 2017, and the ice accretion shall be computed in accordance with the Polar Code.

4.3.3 Ice accretion
Paragraph 4.3.1 shall also apply to ships constructed on or after 1 January 2017, and the ice accretion shall be computed in accordance with the Polar Code.

4.3.4 Ice accretion
Paragraph 4.3.1 shall not apply to ships constructed on or after 1 January 2017, and the ice accretion shall be computed in accordance with the Polar Code.
LR Resources & Web Portal Submissions

Examples from the Portal:

CHAPTER 1:

PART IIA - POLLUTION PREVENTION MEASURES - CHAPTER 1:

CHAPTER SUMMARY

In Arctic waters any discharge into the sea of oil or oily mixtures from any ship shall be prohibited. Operations in Polar Waters, in accordance with MARPOL Annex I, must take into account procedures for oil or oily mixtures which must be documented in the Oil Record Books, manuals and the shipboard oil pollution emergency plan or the shipboard marine pollution emergency plan. Additionally, there are specific structural requirements for ships operating in Polar Waters. See full text of Chapter 1 below.

Additional Guidance for Chapter 1 (Part II-A)

The additional guidance advises operators on the selection of stern tube lubricants, such as non-toxic biodegradable lubricants or water-based systems, and make structural and engineering suggestions. See full text of additional guidance.

SUBMISSIONS

Lloyd’s Register (LR)

Hyperlink 1: The Polar Code by Lloyd's
Lloyd’s provides information and assistance for users to comply with the Polar Code. Lloyd’s interactive toolkit allows users to work through the Code on their own terms and download Lloyd’s register free guidance, templates and examples to help understand and meet compliance needs.

Hyperlink 2: Lloyd’s Polar Code Resources
Lloyd’s also provides guidance documents on the Operational Assessment, setting operational limitations (limitation wording), determining the Operating Envelope and the How to use POLAR5.

Hyperlink 3: The Polar Code: A Regulatory Interpretation Guide
This document provides Lloyd’s Register guidance on all aspects of the Polar Code (chapter by chapter). For Chapter 1, see the LR Regulatory Guide pages 21 to 26.

Lloyd’s Register website.
Challenges

- Output of the Operational Assessment not captured in the PWOM
- PWOM standard template
- Interpreting the Code (goal based requirements)
Summary

- LR resources are available at www.lr.org/polarcode and now on the Arctic Shipping Best Practice Information Forum.
- Challenges exist with implementation and compliance of the Code but together with clients we are working towards solutions to make the process as smooth as possible.
Thank you

Alicia Nash
Senior Engineering Plan Appraisal Surveyor
Lloyd’s Register Marine & Offshore

Arctic Specialist – Polar Code & Winterisation

E: alicia.nash@lr.org
T: +1 905 633 1925
Lloyd's Register Canada Ltd. 5420 North Service Road, Suite 506, Burlington ON L7L6C7