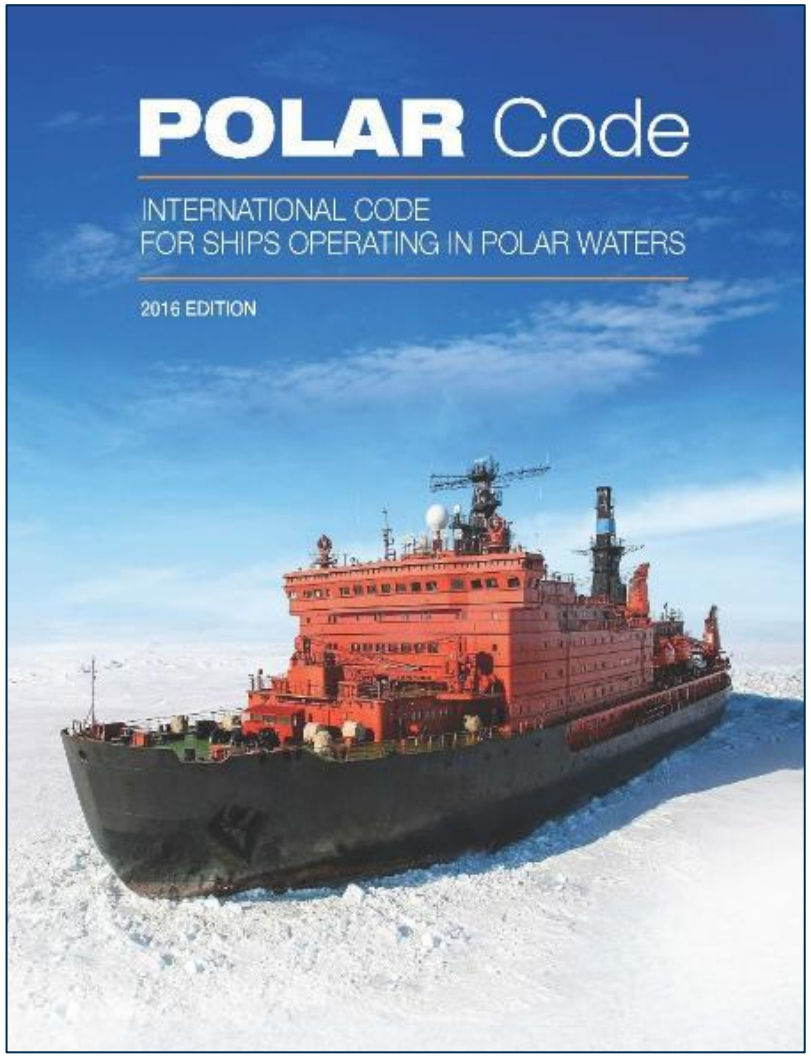
IMO POLARIS Update: Current Usage and Status

James Bond | 1 Nov 2022

Regulatory Regime: POLAR CODE

- IMO Polar Code:
  - In force for almost six years for new ships
  - Existing ships compliance by 1st intermediate survey after 1 Jan 2018
- This means that ..... any SOLAS certificated ship going into Polar waters must comply with the Polar Code and have a Polar Ship Certificate (PSC) and an accompanying Polar Waters Operating Manual (PWOM)



Polar Code: TRAINING

- Standards of Training Certification & Watchkeeping of Seafarers
  - Masters, chief mates and officers in charge of a navigational watch are to be qualified in accordance with Chapter V of the STCW Convention, 1978, as amended
  - The requirements are set out in regulation V/4 of the STCW Convention and detailed in Section A-V/4 of the STCW Code
  - Polar training requirements are dependent upon ship type and concentration of ice in the intended / certificated area of operation
    - More stringent for tankers and passenger ships than others
    - More stringent as ice concentrations increase

STCW Code Table A-V/4-1

Specification of minimum standard of competence in basic training for ships operating in polar waters

Ref: https://www.edumaritime.net/stcw-code

Source: IMO

Column 1 Competence	Column 2 Knowledge, understanding and proficiency	Column 3 Methods for demonstrating competence	Column 4 Criteria for evaluating competence
Contribute to safe operation of vessels operating in polar waters	*Basic knowledge of ice characteristics and areas where different types of ice can be expected in the area of operation:* .1 ice physics, terms, formation, growth, ageing and stage of melt .2 ice types and concentrations .3 ice pressure and distribution .4 friction from snow covered ice .5 implications of spray-icing; danger of icing up; precautions to avoid icing up and options during icing up .6 ice regimes in different regions; significant differences between the Arctic and the Antarctic, first year and multiyear ice, sea ice and land ice .7 use of ice imagery to recognize consequences of rapid change in ice and weather conditions	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved training programme	Identification of ice properties and their characteristics of relevance for safe vessel operation Information obtained from ice information and publications is interpreted correctly and properly applied Use of visible and infrared satellite images Use of egg charts Coordination of meteorological and oceanographic data with ice data Measurements and observations of weather and ice conditions are accurate and appropriate for safe passage planning

Polar Code: POLAR SHIP CERTIFICATE

Certificate No.:

POLAR SHIP CERTIFICATE

This Certificate Shall Be Supplemented By A Record Of Equipment For The Polar Ship Certificate

ISSUED UNDER THE PROVISIONS OF THE
INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974,
AS MODIFIED BY THE PROTOCOL OF 1988 RELATING THERETO
UNDER THE AUTHORITY OF THE GOVERNMENT OF

Republic of the Marshall Islands
(name of the State)
by **American Bureau of Shipping**

Particulars of Ship:

Name of Ship	Distinctive Number or Letters	Port of Registry	Gross Tonnage[1,2]	IMO Number[3]

THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with the applicable safety-related provisions of the International Code for Ships Operating in Polar Waters.

2 That the survey [4] showed 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 relevant provisions of the Code.

Category (choose an item) ship as follows:

Ice Class and Ice Strengthened Draft Range				
Ice Class	Maximum Draft		Minimum Draft	
	Aft	Fwd	Aft	Fwd

2.1 Ship type:

2.2 Ship restricted to operate in

2.3 Ship intended to operate in low air temperature:

2.3.1 Polar Service Temperature:

2.4 Maximum expected time of rescue days [5]

1 The above gross tonnage has been determined in accordance with the International Convention on Tonnage Measurement of Ships, 1969.
2 The above gross tonnage has been determined by the authorities of the Administration in accordance with the national tonnage rules which were in force prior to the coming into force for existing ships of the International Convention on Tonnage Measurement of Ships, 1969.
3 In accordance with IMO ship identification number scheme adopted by the Organization by resolution A.1078(28).
4 Subject to regulation 1.3 of the International Code for Ships Operating in Polar Waters.
5 Polar Code I-A/1.2.7 states maximum time of rescue shall never be less than 5 days.

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5 Operational limitations

The ship has been assigned the following limitations for operation in polar waters:

5.1 Ice Conditions:	
5.2 Temperature (°C):	
5.3 High Latitudes:	

This certificate is valid until subject to the annual/intermediate surveys in accordance with section 1.3 of the Code.

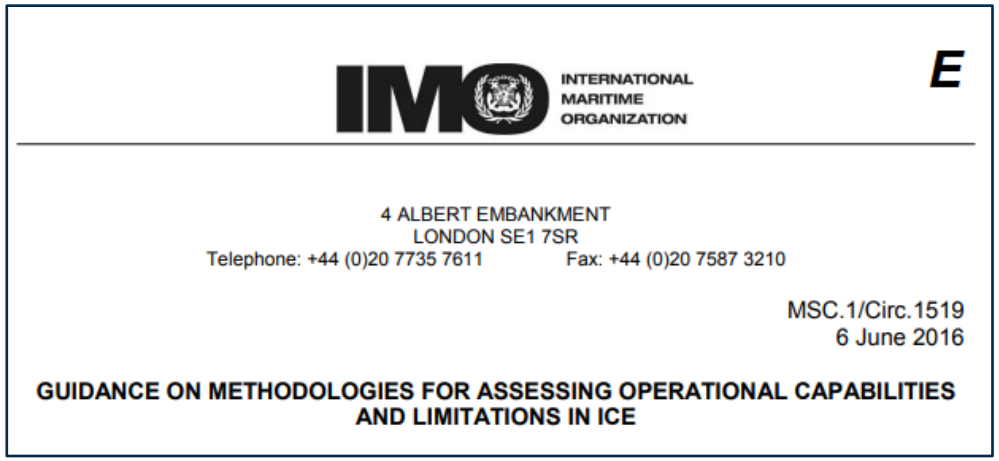
- Typical Language:

  5.1 Limited to operation in polar waters in accordance with the outcome of the accepted system for determining operational limitations appropriate to the ice strengthening applied

  Name of System: POLARIS

IMO POLARIS

- Relates Ice Class to an Ice Regime
- Methodology of choice: **IMO's POLARIS**
  - POLARIS = Polar Operational Limit Assessment Risk Indexing System
  - Documented in IMO MSC.1/Circ.1519
- Multiple uses
  - Evaluating risk of immediate operation
  - Voyage planning:
    - Where and when can a PC6 operate, PC4, 1C, etc?
    - How does the operational window change between a IA Super and a PC6?



IMO INTERNATIONAL MARITIME ORGANIZATION

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4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1519
6 June 2016

GUIDANCE ON METHODOLOGIES FOR ASSESSING OPERATIONAL CAPABILITIES AND LIMITATIONS IN ICE

- Risk evaluated based on Ice Class & ice regime encountered
- POLARIS outcome is a ***single value*** Risk Index
  - RIO = $(C_1 x RV_1)+(C_2 x RV_2)+(C_3 x RV_3)+(C_4 x RV_4)$
    - $C_1 \ldots C_4$ concentrations of ice types within ice regime (mixture of different ice types and ice free water)
    - $RV_1 \ldots RV_4$ Risk Values (RV) for each ice class

ABS

POLARIS Status

- POLARIS is interim guidelines, no real proposals to update because of lack of data
- Still we see some surprising activities in polar waters –
  Is POLARIS "getting the job done"?
- Recall: POLARIS is an index indicating relative risk of operating a given ice class in a defined ice regime
  - Ice Class defines strength, not capability
  - Ice Class is a proxy, within POLARIS, for safe operations
    …a higher ice class means it is safer to transit in nastier ice
  - Capability is dependent upon hull form, power and crew

POLARIS Sticking Point: Risk Values

- Ice Classes in Risk Value tables provide clear guidance
- Issue: Non Ice Class line is problematic

Increasing ice thickness (severity)

Winter Risk Values (RVs)

Polar Ship Category	ICE CLASS	ICE FREE --	NEW ICE 0-10 cm	GREY ICE 10-15 cm	GREY WHITE ICE 15-30 cm	THIN FIRST YEAR 1ST STAGE 30-50 cm	THIN FIRST YEAR 2ND STAGE 50-70 cm	MEDIUM FIRST YEAR 1ST STAGE 70-95 cm	MEDIUM FIRST YEAR 2ND STAGE 95-120 cm	THICK FIRST YEAR 120-200 cm	SECOND YEAR 200-250 cm	LIGHT MULTI YEAR 250-300 cm	HEAVY MULTI YEAR 300+ cm
A	PC1	3	3	3	3	2	2	2	2	2	2	1	1
	PC2	3	3	3	3	2	2	2	2	2	1	1	0
	PC3	3	3	3	3	2	2	2	2	2	1	0	-1
	PC4	3	3	3	3	2	2	2	2	1	0	-1	-2
	PC5	3	3	3	3	2	2	1	1	0	-1	-2	-2
B	PC6	3	2	2	2	2	1	1	0	-1	-2	-3	-3
	PC7	3	2	2	2	1	1	0	-1	-2	-3	-3	-3
C	IAA	3	2	2	2	2	1	0	-1	-2	-3	-4	-4
	IA	3	2	2	2	1	0	-1	-2	-3	-4	-5	-5
	IB	3	2	2	1	0	-1	-2	-3	-4	-5	-6	-6
	IC	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8
	No Ice Class	3	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-8

Decreasing ice class

Increased Risk

- Issues for No Ice Class: This is being used by industry as the “catch all”
  - Yachts (steel, aluminium, FRP and composite), non cargo ship hull forms

ABS

POLARIS Sticking Point: Decision Guidance

- Decision Guidance is not fully being used as intended:
  - Recall Working Group discussion regarding "Go", "No Go" as being too strict and subject to challenge
  - Intent was that "Ops subject to special consideration" means stop, wait for ice conditions to change or obtain assistance
  - "Elevated Ops Risk" was to mean reduce speed to near zero with the understanding that the ship is in ice conditions that could exceed structural capacity
  - Evident that planning voyage and "desktop exercises" are incorporating <u>negative</u> RIOs with planned mitigation (this was not the intent)

RIO_{SHIP}	Ice classes PC1-PC7	Ice classes below PC 7	Color Code
20 ≤ RIO	Normal operation	Normal operation	
10 ≤ RIO < 20			
0 ≤ RIO < 10			
-10 ≤ RIO < 0	Elevated operational risk	Operation subject to special consideration	
-20 ≤ RIO < -10	Operation subject to special consideration	Operation subject to special consideration	
-30 ≤ RIO < -20			

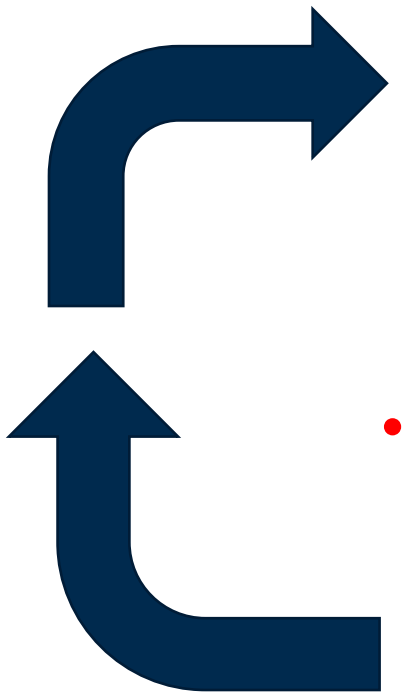
POLARIS Sticking Point: Definition of Open Water

Open water means 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.

- Issue: If a Polar Ship Certificate Para 2.2 lists ship operations restricted to “open water” there is a possible 61ºN versus 59ºN dichotomy
- In Labrador Sea, Davis Strait and Baffin Bay ice charts often show presence of icebergs and no sea ice
- Current work around: Instead of “open water” increase to “Other”. This implies operations for which the operator did not intend and triggers additional training.
- Problem lies within phrase “large area of freely navigable water”, this is undefined and varies ship to ship

Operational Data in Ice Covered Waters to Support Industry Needs

- **Industry Needs:**
  - Emission Reductions
    - Improved efficiency in ice covered waters
      - Less power for the same ice conditions through (principally) a reduction in ice resistance
    - Route optimisation
      - Avoiding difficult ice, means less power consumed
  - A clearer (more accurate?) safety regime
    - When is it safe (to go faster)?
    - What ice to avoid?
    - Reduction in steel weight = increased DWT = increased efficiency
  - Data to support reasonable regulatory regime updates



How to address industry needs?

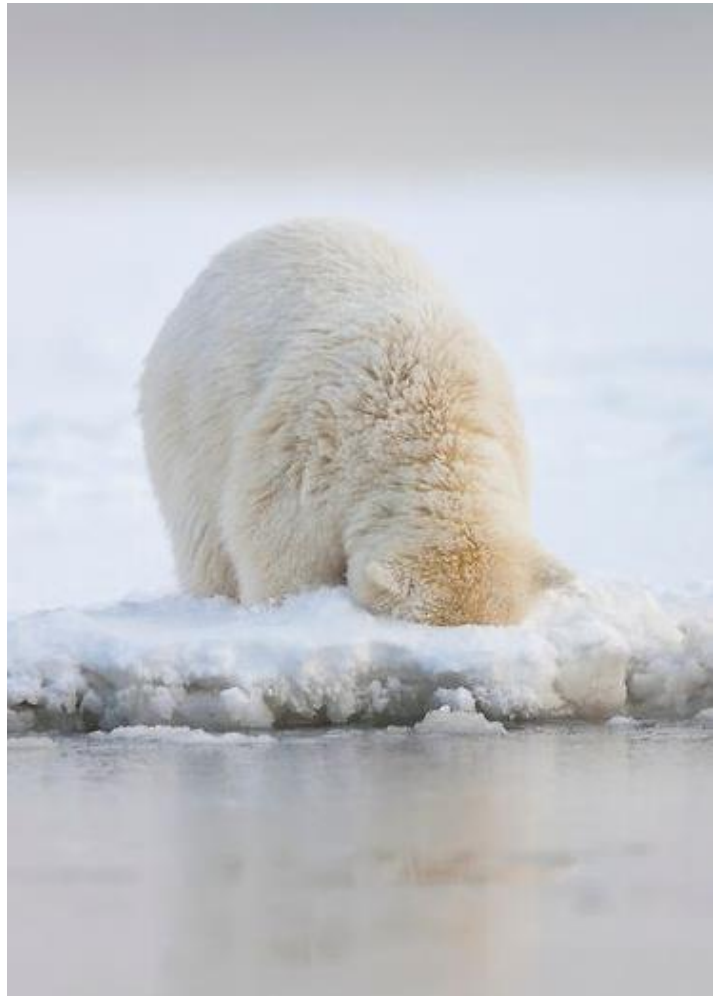
- Data, data, data
  - Collaboration on data collection
  - Tools and platforms to use industry ships as measuring systems
  - Capture operational feedback
  - Dedicated measurement campaigns
  - Data sharing

The foundation of updating POLARIS, Polar Code (if necessary), Energy Efficiency regulations is strong operational data ***combined*** with environmental data

The alternative is misshaped or inadequate regulations / and operating regime that will lead to accidents or economic penalties for industry.

What Else Can be Done?

- Tools for remote sensing
  - Ice concentration is only part of the story (ease of navigation)
  - Ice thickness, ice strength and stage of decay are all needed to evaluate the actual risk profile. What measurement tools could be developed to deploy on ships?
- Pre-emptive approach to regulation updates
  - Less of a “head in the sand” approach to the maturity of existing regulations
  - Re-examination of known incidents
  - Gather the **data** to support regulatory updates



Thank You

www.eagle.org

James Bond
jbond@eagle.org