PAME II-2018

Agenda Item: 6.2(b)(ii)

Example of the Norwegian interpretations to parts of the polar code

Submitted by Norway

No.		No.		Interpretations
	INTRODUCTION			
2	Definitions			
2.1	*Category A ship* means a ship designed for operation in polar waters in at least medium first-year ice, which may include old ice inclusions.			**The relationship between ship category, ice/polar class, ice conditions and POLARIS as a decision support tool** Even if the ice/polar class assigned to the ship is part of the decision on the category of the ship, it is not the only parameter. During the development of the Polar Code, some requirements were specifically linked to the category as defined in the Polar Code. Although, some capacities of the ship, such as ice strengthening, may permit operation in more severe ice conditions than given in the definitions of the ship category, the ship is not allowed to operate in ice conditions more severe than given by the definition of the ship's category. The reason for this is that there are not only the separate capacities of the ship that will give the category, but the ship must adhere to all
2.2	*Category B ship* means 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.			
2.3	*Category C ship* means a ship designed to operate in open water or in ice conditions less severe than those included in categories A and B.			
	PART I-A SAFETY MEASURES			
	CHAPTER 1 – GENERAL			
1.3	Certificate and survey			

1.3.7	Where applicable, the certificate shall reference a methodology to assess operational capabilities and limitations in ice to the satisfaction of the Administration, taking into account the guidelines developed by the Organization[5].			regulations for the category. For example, a category C ship is not allowed to operate in ice conditions defined for a category B ship although the ship is built with a Baltic ice class that allows for operation in ice conditions corresponding to first-year ice up to 1 meter thickness in the Baltic sea. Further, the result of POLARIS or similar acceptable tools may result in more serve ice conditions than given in the definitions of ship category. POLARIS shall only be used as a decision support tool on board and is not involved in deciding the ship category. The ship category is a result of the ice class assigned to the ship and the compliance with all requirements related to the category. A category A ship shall be built with IACS polar class 1-5. A category B ship shall be built with IACS polar class 6-7. A category C ship may be built with a lower ice class than IACS polar 7, as a Baltic ice class or without an ice class. Other standards offering an equivalent level of safety may be used on a case-by-case evaluation. Only ships intended to operate exclusively in ice free waters may be built without any ice class. **Ice conditions for a category C ship to operate in** There seems to be some confusion about the ice types and ice concentrations a category C ship may operate in.
	[5] Refer to guidance to be developed by the Organization.			
	CHAPTER 3 – SHIP STRUCTURE			
	Goal			
3.1	The goal of this chapter is to provide that the material and scantlings of the structure retain their structural integrity based on global and local response due to environmental loads and conditions.			
	Functional requirements		Regulations	
3.2	In order to achieve the goal set out in paragraph 3.1 above, the following functional requirements are embodied in the regulations of this chapter:			
.2	in ice strengthened ships, the structure of the ship shall be designed to resist both global and local structural loads anticipated under the foreseen ice conditions.	3.3.2	In order to comply with the functional requirements of paragraph 3.2.2 above, the following apply:	
		.1	scantlings of category A ships shall be approved by the Administration, or a recognized organization accepted by it, taking into account standards acceptable	

			to the Organization[7] or other standards offering an equivalent level of safety;	A category B ship is defined as 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. Further, a category B ship shall be built in accordance with Polar Class 6 or 7 of IACS URI Requirements concerning Polar Class or other standards offering an equivalent level of safety. Thin first-year ice means first-year ice 30 – 70 cm thick. So far, we may say that a category B ship may operate in at least first-year ice 30 – 70 cm thick which may include old ice inclusions. A category C ship is defined as a ship designed to operate in open water or in ice conditions less severe than those included in categories A and B. An ice condition less severe than first-year ice 30 – 70 cm thick, which may include old ice inclusions, may be interpreted as - First-year ice 30-70 cm thick, not including old inclusions, - First-year ice of less than 30 cm thickness, which may include old ice inclusions, or - First-year ice of less than 30 cm, not including old ice inclusions. A common interpretation of the ice conditions a category C ship may operate in is highly welcome.
		.2	scantlings of category B ships shall be approved by the Administration, or a recognized organization accepted by it, taking into account standards acceptable to the Organization[8] or other standards offering an equivalent level of safety;	
		.3	scantlings of ice strengthened category C ships shall be approved by the Administration, or a recognized organization accepted by it, taking into account acceptable standards adequate for the ice types and concentrations encountered in the area of operation; and	
		.4	a category C ship need not be ice strengthened if, in the opinion of the Administration, the ship's structure is adequate for its intended operation.	
	[7] Refer to Polar Class 1-5 of IACS URI Requirements concerning Polar Class (latest version). [8] Refer to Polar Class 6-7 of IACS URI Requirements concerning Polar Class (latest version).			

No.		No.		

	CHAPTER 2 – POLAR WATER OPERATIONAL MANUAL (PWOM)			
2.1	Goal			
	The goal of this chapter is to provide the owner, operator, master and crew with sufficient information regarding the ship's operational capabilities and limitations in order to support their decision-making process.			
2.2	Functional requirements	2.3	Regulations	
2.2.1	In order to achieve the goal set out in paragraph 2.1 above, the following functional requirements are embodied in the regulations of this chapter.	2.3.1	In order to comply with the functional requirements of paragraphs 2.2.1 to 2.2.6, the Manual shall be carried on board.	**The Polar Water Operation Manual (PWOM)** The polar code does not require the polar water operational manual to be approved. The manual should be a living document used on board and updated as necessary. The manual is essential for the certification process, in addition to be user friendly for the crew on board. The manual shall contain capacities and limitations found in the operational assessment, it shall be ship-specific and the "Model table of contents for the Polar Water Operational Manual (PWOM)" in Appendix 2 of the Polar Code is recommended to be used.
2.2.2	The Manual shall include information on the ship-specific capabilities and limitations in relation to the assessment required under paragraph 1.5.	2.3.2	In order to comply with the functional requirements of paragraph 2.2.2, the Manual shall contain, where applicable, the methodology used to determine capabilities and limitations in ice	
2.2.3	The Manual shall include or refer to specific procedures to be followed in normal operations and in order to avoid encountering conditions that exceed the ship's capabilities.	2.3.3	In order to comply with the functional requirements of paragraph 2.2.3, the Manual shall include risk-based procedures for the following:	
		.1	voyage planning to avoid ice and/or temperatures that exceed the ship's design capabilities or limitations;	
		.2	arrangements for receiving forecasts of the environmental conditions;	
		.3	means of addressing any limitations of the hydrographic, meteorological and navigational information available;	

		.4	operation of equipment required under other chapters of this Code; and	
		.5	implementation of special measures to maintain equipment and system functionality under low temperatures, topside icing and the presence of sea ice, as applicable.	
2.2.4	The Manual shall include or refer to specific procedures to be followed in the event of incidents in polar waters.	2.3.4	In order to comply with the functional requirements of paragraph 2.2.4, the Manual shall include risk-based procedures to be followed for:	
		.1	contacting emergency response providers for salvage, search and rescue (SAR), spill response, etc., as applicable; and	
		.2	in the case of ships ice strengthened in accordance with chapter 3, procedures for maintaining life support and ship integrity in the event of prolonged entrapment by ice.	
2.2.5	The Manual shall include or refer to specific procedures to be followed in the event that conditions are encountered which exceed the ship's specific capabilities and limitations in paragraph 2.2.2.	2.3.5	In order to comply with the functional requirements of paragraph 2.2.5, the Manual shall include risk-based procedures to be followed for measures to be taken in the event of encountering ice and/or temperatures which exceed the ship's design capabilities or limitations.	
2.2.6	The Manual shall include or refer to procedures to be followed when using icebreaker assistance, as applicable.	2.3.6	In order to comply with the functional requirements of paragraph 2.2.6, the Manual shall include risk-based procedures for monitoring and maintaining safety during operations in ice, as applicable, including any requirements for escort operations or icebreaker assistance. Different operational limitations may apply depending on whether the ship is operating independently or	

			with icebreaker escort. Where appropriate, the PWOM should specify both options.	

No.		No.		
	CHAPTER 4 –SUBDIVISION AND STABILITY			
	Goal			
4.1	The goal of this chapter is to ensure adequate subdivision and stability in both intact and damaged conditions.			
4.2	Functional requirements	4.3	Regulations	
	In order to achieve the goal set out in paragraph 4.1 above, the following functional requirements are embodied in the regulations of this chapter:			
		4.3.1	Stability in intact conditions	
.1	ships shall have sufficient stability in intact conditions when subject to ice accretion; and	4.3.1.1	In order to comply with the functional requirement of paragraph 4.2.1, for ships operating in areas and during periods where ice accretion is likely to occur, the following icing allowance shall be made in the stability calculations:	**Ice accretion and damage stability calculations** The Polar Code chapter 4 introduces the weight of a theoretical ice accretion to all types of ships operating in polar waters. The ice accretion is added to compensate for the added weight on the ship and the adverse effect to the ship's stability caused by icing the ship may suffer from in some weather conditions. This ice accretion is also used in the 2008 Intact Stability Code, mainly for fishing vessels and offshore support vessels. The weight of ice is calculated by the same method by the two
		.1	30 kg/m2 on exposed weather decks and gangways;	
		.2	7.5 kg/m2 for the projected lateral area of each side of the ship above the water plane; and	
		.3	the projected lateral area of discontinuous surfaces of rail, sundry booms, spars (except masts) and rigging of ships having no sails and the projected lateral area of other small objects shall be computed	

			by increasing the total projected area of continuous surfaces by 5% and the static moments of this area by 10%.	instruments, but the text in the two instruments differs slightly. This difference in wording between the polar code and the 2008 intact code has led to questions if the ice accretion have to be considered in both intact stability and calculation of the damage stability limiting curves when calculating stability according to the polar code. The 2008 intact stability code includes the ice accretion in both intact stability and damage stability limiting curves. The SDC1 discussed the matter and concluded that consensus was not reached to include ice accretion in both intact and damage stability calculations. During the preparation of the polar code, it was not intended to deviate from the way of treating ice accretion outside polar areas. Interpretation IMO and SDC should once again look into this issue to clarify whether the ice accretion is to be included in the damage stability limiting curves. In the meantime, the “intact conditions” in 4.2.1 should be read as “condition of loading”.
		4.3.1.2	Ships operating in areas and during periods where ice accretion is likely to occur shall be:	**Removing of ice accretion** Ice removal equipment must be dimensioned in relation to the ship's design and available crew. Accumulated ice must not fall down and destroy other structures. Available personnel with regard to
		.1	designed to minimize the accretion of ice; and	
		.2	equipped with such means for removing ice as the Administration may require; for example, electrical and pneumatic devices, and/or special tools such as axes or wooden clubs for removing ice from bulwarks, rails and erections.	

		4.3.1.3	Information on the icing allowance included in the stability calculations shall be given in the PWOM.	manual ice removal must be sufficient to keep ice accretion at an acceptable level over time.
		4.3.1.4	Ice accretion shall be monitored and appropriate measures taken to ensure that the ice accretion does not exceed the values given in the PWOM.	Exposed areas should be covered / shielded to prevent accumulation of ice. In general, surfaces should be smoot to reduce the risk of icing. Where this design point is not possible or appropriate, systems should be provided to ensure that the ice and snow does not accumulate (heating, etc.). An analysis to identify the equipment needed based on the size, design and operation of the ship should be carried out. The equipment shall be effective and ensure minimal risk exposure of personnel in relation to falling ice, working in an unsafe environment and exposure to environmental conditions. Equipment like axes, wooden clubs, spades, salt, glycol etc. shall also be available on board.
		4.3.2	Stability in damaged conditions	
.2	ships of category A and B, constructed on or after 1 January 2017, shall have sufficient residual stability to sustain ice-related damages.	4.3.2.1	In order to comply with the functional requirements of paragraph 4.2.2, ships of categories A and B, constructed on or after 1 January 2017, shall be able to withstand flooding resulting from hull penetration due to ice impact. The residual stability following ice damage shall be such that the factor si, as defined in SOLAS regulations II-1/7-2.2 and II-1/7-2.3, is equal to one for all loading conditions used to calculate the attained subdivision index in SOLAS regulation II-1/7. However, for cargo ships that comply with subdivision and damage stability regulations in another instrument developed by the Organization, as provided by SOLAS regulation II-	**S_{mom}, probability to survive heeling moments** The polar code 4.3.2.1 specifies that s_i, as defined in SOLAS regulations II-1/7-2.2 and II-1/7-2.3, shall be equal to one (1). This implies that the factor S_{mom} of SOLAS regulation II-1/7-2.4 shall not be applied for a passenger ship when calculating residual stability after ice damage.

			1/4.1, the residual stability criteria of that instrument shall be met for each loading condition.	

No.		No.		
	CHAPTER 8 – LIFE-SAVING APPLIANCES AND ARRANGEMENTS			Guidelines currently under development and discussions in IMO. Interpretations should first be developed when guidelines are finished.
	CHAPTER 9 – SAFETY OF NAVIGATION			
	CHAPTER 10 – COMMUNICATION			