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CONSTRUCTION
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Agenda item 3

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**DEVELOPMENT OF A MANDATORY CODE FOR SHIPS OPERATING
IN POLAR WATERS**

Report of the Working Group

GENERAL

1 The Working Group on Development of a Mandatory Code for Ships Operating in Polar Waters met from 20 to 23 January 2014 under the chairmanship of Ms. T. Stemre (Norway).

2 The Group was attended by delegations from the following Member Governments:

ARGENTINA
AUSTRALIA
BAHAMAS
BRAZIL
CANADA
CHILE
CHINA
COOK ISLANDS
DENMARK
FINLAND
FRANCE
GERMANY
GREECE
ICELAND
JAPAN

LIBERIA
MARSHALL ISLANDS
NETHERLANDS
NEW ZEALAND
NORWAY
PANAMA
POLAND
REPUBLIC OF KOREA
RUSSIAN FEDERATION
SINGAPORE
SOUTH AFRICA
SWEDEN
UNITED KINGDOM
UNITED STATES
VANUATU

by observers from the following intergovernmental organizations:

INTERNATIONAL HYDROGRAPHICAL ORGANIZATION (IHO)
EUROPEAN COMMISSION (EC)

and observers from the following non-governmental organizations in consultative status:

INTERNATIONAL CHAMBER OF SHIPPING (ICS)
BIMCO
INTERNATIONAL ASSOCIATION OF CLASSIFICATION SOCIETIES (IACS)
OIL COMPANIES INTERNATIONAL MARINE FORUM (OCIMF)
FRIENDS OF THE EARTH INTERNATIONAL (FOEI)
INTERNATIONAL ASSOCIATION OF DRILLING CONTRACTORS (IADC)
INTERNATIONAL LIFE-SAVING APPLIANCE MANUFACTURERS' ASSOCIATION
(ILAMA)
COMMUNITY OF EUROPEAN SHIPYARDS' ASSOCIATIONS (CESA)
INTERNATIONAL ASSOCIATION OF INDEPENDENT TANKER OWNERS
(INTERTANKO)
CRUISE LINES INTERNATIONAL ASSOCIATION (CLIA)
WORLD WIDE FUND FOR NATURE (WWF)
THE ROYAL INSTITUTION OF NAVAL ARCHITECTS (RINA)
INTERNATIONAL TRANSPORT WORKERS' FEDERATION (ITF)
NAUTICAL INSTITUTE (NI)
PACIFIC ENVIRONMENT
CLEAN SHIPPING COALITION (CSC)

Terms of reference

3 Taking into account the comments made and decisions taken in plenary, the working group is instructed to:

- .1 finalize the draft International Code of safety for ships operating in polar waters (Polar Code), on the basis of the reports of the correspondence groups (SDC 1/3/3, SDC 1/3/5, SDC 1/3/6, SDC 1/5 and SDC 1/INF.10), taking into account the documents submitted to this session; and
- .2 submit a written report by Thursday, 23 January 2014.

4 As instructed, the group considered the draft Polar Code, contained in document SDC 1/INF.10, and main issues are described hereunder (unless expressed otherwise, chapter numbers and paragraph numbers are those contained in document SDC 1/INF.10).

PART I-A - SAFETY MEASURES

Chapter 10 – Safety of navigation

Chapter 11 – Communication

5 The group considered draft chapter 10 (Safety of navigation) and chapter 11 (Communication) of the draft Polar Code, included in document SDC 1/INF.10, and agreed to forward the following paragraphs of the draft Code, as set in the annex, (in particular on parts in square brackets) to the first session of the Sub-Committee on Navigation, Communications and Search and Rescue (NCSR 1) for further consideration (e.g. whether these paragraphs are covered by the current SOLAS requirements) and finalization thereof, for submission to MSC 94, with a view to adoption of the Polar Code (see also paragraphs 14.2 and 24):

- 10.3.1.1.1 (10.3.1.1.1)
- 10.3.1.2.4 (10.3.1.1.4.6)
- 10.3.1.3.1 (10.3.1.2.1)
- 11.2.1.1 (11.2.1.1)
- 11.2.1.1.3 (11.2.1.5) for clarification

11.3.2.2 (11.3.2.2)
[12.5] (12.5) for clarification
3.1.5 (paragraph 2.2.5 of Introduction)

(Note: paragraph number in brackets are those of document SDC 1/INF.10)

6 In addition to the above paragraphs to be forwarded to NCSR 1, the group also agreed that other paragraphs in chapters 10 and 11 may be further examined and finalized by NCSR 1, if so decided by NCSR 1. In this regard, the group further concurred with a view to ask the Sub-Committee to decide whether the above paragraphs to be forwarded to NCSR 1 should also be considered by MSC 93.

7 The working group considered the need to require the carriage of ice radar on ships intended to operate in ice. (10.3.1.1.4.1) It was agreed that until a performance standard for such radars is available it is premature to mandate their use. However, it could be recommended for consideration as a risk mitigation measure under part I-B of the Code.

Chapter 2 – Polar Water Operational Manual (PWOM)

8 The group agreed to keep the structure of chapter 2 (i.e. not to combine with chapters 12 and 14, as suggested) and prepared a revised chapter 2. The group also agreed that, depending on the outcome of section 1.5 (Risk assessment) and other relevant chapters, chapter 2 may be further modified.

9 In relation to environment elements that may be included in Polar Ship Certificate and/or Polar Water Operational Manual (PWOM), the group noted the possibility that chapter 2 and relevant parts in part I-A should be moved to Introduction.

10 With regard to possible approval of a PWOM by an Administration, the group generally agreed that PWOM need not be approved by Administrations, however, any operational limitations will have to be approved by the Administration (see also paragraphs 49 and 50).

Chapter 12 – Operational [requirements]

Chapter 14 – [Emergency control] [Contingency measures]

11 The group considered how to proceed with relevant chapters 12 and 14 and generally agreed to firstly focus on voyage planning requirements, based on the draft chapters 12, 14 and X, contained in document SDC 1/INF.10.

12 After lengthy discussion on specific requirements for voyage planning, the group agreed to the list set out in the draft Polar Code to be considered during voyage planning. However, there was no agreement on terminology in addressing [wildlife] [cetaceans] and then consequently both of the terms were kept in square brackets. Some delegations expressed concerns on how to implement the requirements since, due to lack of definite source of data on densities of [wildlife], the master may be put in a difficult position in port State control, based on such a mandatory requirements. The United States requested that measures with regard to interactions with cetaceans be reinserted in square brackets after some of the contents was incorporated and later removed from a previous paragraph.

13 The delegation of Panama, supported by the delegations of United States, ICS, INTERTANKO and OCIMF, stated on "Wildlife" debate as follows. Many delegations were of the opinion that the term "wildlife" should not be placed within the mandatory section of the Code. The term was not defined and was regarded as vague, with no clear indication on

how many species will be required to meet the requirement or where to obtain the information. The use of this term would result in an excessive administrative burden to masters, as it would cover all animal species, including migratory birds. On this matter, it was recalled that the Sub-Committee had instructed the working group to eliminate the vague expressions. Further, it was also noted that IMO has no guidance for masters encountering "wildlife". For these reasons the mandatory section of the code should be limited to cover cetaceans only.

14 With respect to remaining sections in chapter 12, the group agreed to:

- .1 regarding section 12.3 on Requirements for documentation, delete the section;
- .2 regarding section 12.5 on Reporting, though some delegations proposed to delete the requirement, recognizing the importance of it, put square brackets around the requirements and to forward it to NCSR 1 for clarification and finalization (see paragraph 5);
- .3 regarding section 12.6 on Procedures relating to the ISM system, move it to chapter 2 with square brackets; and
- .4 regarding section 12.7 on Navigation with icebreaker assistance, move it to part I-B under chapter 2. The delegation of the Russian Federation reserved its position.

15 Having completed chapter 12, the group agreed to change the title of the chapter to Voyage planning.

16 The group deleted chapter 14 since the requirements therein are covered by chapters 2 and 12.

Definition and use of temperature in the Polar Code

17 The group considered the matter related to definition and use of temperature on the Polar Code, based on documents SDC 1/3/2 and SDC 1/3/14 (Argentina) and documents SDC 1/3/9 and SDC 1/INF.12 (Canada). After a thorough discussion, the group agreed to add, in Introduction, definitions of "Ship intended to operate in low air temperature", "Mean Lowest Daily Low (Minimum) Temperature" and "Polar Service Temperature (PST)" with some square brackets. Based on these decisions, the group modified the draft Code accordingly.

18 For ships intended to operate in low air temperatures, the Polar Service Temperature will be shown on the Polar Ship Certificate. This indication of capability will be used in voyage planning and operations to reduce the risk of experiencing conditions that may reduce the functionality of essential safety equipment.

19 Using this approach to the implementation of temperature-related requirements is intended to clarify the threshold below which ships may be required to adopt additional design and operational measures and which can be readily adapted into the testing and certification systems used in the few areas in which SOLAS currently addresses temperature. It was noted by IACS that the approach could be aligned with existing standards developed by IACS.

20 In this context, the observers from ICS and CLIA expressed concern that new requirements, such as the concept of polar service temperature, have been developed in haste, without a sufficient understanding of the technical justification and likely impact on the design and equipping of both new and existing ships.

Chapter 6 – Machinery installations

21 The group comprehensively reviewed chapter 6 (Machinery installations), based on its decision on temperature, and, in particular, listed elements relating to machinery installations, which should be considered for all ships and for ships intended to operate in low air temperatures.

22 As instructed, the group discussed possible application of requirements for existing ships and generally agreed that the matter should be further considered, subject to submissions to the Committee. The group also agreed, in general, to the need for Guidance to Administrations for such exemptions.

Chapter 1 (General), section 1.5 – Risk assessment Introduction, section 2 – Source of hazards

23 The group considered the matter related to risk assessment (chapter 1 – General, section 1.5), in conjunction with source of hazards (Introduction, section 2), and, following extensive discussion, agreed to modify the requirements of risk assessment and move them to Introduction.

24 The group also modified sources of hazards (Introduction, section 2), taking into account document SDC 1/3/13 (IHO). The group agreed to forward paragraph 2.1.6 of Introduction, as set out in the annex to NCSR 1 for consideration (see paragraph 5).

25 With regard to 1.2*bis* on functional requirements of chapter 1, the group agreed to move it to section 4 (structure of the Code) under paragraph 4.4 as an alternative for further discussion.

Chapter 3 – ship structure

26 The group modified chapter 3 (ship structure), taking into account documents SDC 1/INF.10. and SDC 1/3/7 (France). With regard to the deletion of text in square brackets in paragraph 3.3.2.4, the delegation of Iceland and Norway reserved their positions.

27 After discussing paragraphs 3.2.1.1 and 3.3.1, the delegation of Argentina noted that DST (design service temperature) is defined in the draft Code as MLDLT (Mean Lowest Daily Low temperature) – 10°C while the design temperature is defined in the IACS UR S6 standard as the Mean Lowest Daily Average Temperature (MLDAT). He stated that, due to this fact, DST will result in more than 10°C below MLDAT and this difference will entail more stringent requirements for hull material of new and existing ships. The group decided to replace the term "design service temperature (DST)" with the term "polar service temperature (PST)".

Chapter 13 – [Crewing] [Manning] [training familiarity, and certification and training]

28 The group considered draft chapter 13, together with three alternative proposals of chapter 13, included in document SDC 1/INF.10. After lengthy discussion on the draft chapter, the group could not reach an agreement on range of issues, including the introduction of "another person" (ice navigator or ice pilot), and forwarded all these options,

together with document SDC 1/3/11 (Argentina) as agreed in plenary, to the first session of the Sub-Committee on Human Element, Training and Watchkeeping (HTW 1) for consideration and recommendation to MSC 93, and, if necessary, to NCSR 1 for further consideration.

29 The group also discussed the level of additional qualifications, if any, that would be required on different ships in different operations. As no agreement could be reached, this issue has also been forwarded to HTW 1.

30 The delegations of the Bahamas and Panama expressed the following concerns in relation to the proposed introduction of other personnel on board vessels other than the adequately qualified crew to serve as "ice advisers" in order to dispense with the mandatory polar water operations training requirements of this code. Such proposal potentially opens the way to allow even highest ice-class ships operating in harshest polar environment to be manned by crew without appropriate polar operations training assuming a single non-crew person holding such qualification is placed on board. Since there is a lack of clarity of the role of the proposed "ice adviser" on board and an absence of established training and certification requirements within the STCW Convention for such person, it would be problematic to member states to assess their competence and legal status, including aspects related to the overriding authority of the master. Moreover with the two levels of mandatory training being prescribed in the Polar Code, introduction of such persons is considered unnecessary and redundant. Furthermore, the current structure of the Polar Code does not prohibit a company to utilize these types of navigation assistance for non-ice strengthened ships either based on provisions within their Safety Management System or through the regulations of the coastal state.

31 Other delegations expressed opinion that this approach represents current practice in many polar operations. It provides flexibility, increases safety and it does not involve any difficulties for the operators or Administrations involved.

Chapter 8 – Fire safety/protection

32 The group modified chapter 8 (Fire safety/protection), taking into account the report of the report of the correspondence group (SDC 1/3/5), and forwarded to the first session of the Sub-committee on Ship Systems and Equipment (SSE 1) for consideration of the need for the development of additional performance or test standards.

Chapter 4 – Stability and subdivision

33 The group modified chapter 4 (stability and subdivision), taking into account the report of the SDS Correspondence Group (SDC 1/3/6) and the report of the (IS) correspondence group (SDC 1/5).

34 The group agreed the following requirements should apply to new ships only:

- .1 (Functional requirements) Ships of category A and B constructed on or after [DD/MM/YYYY] shall have sufficient residual stability to sustain ice related damages; and
- .2 (Stability in damaged conditions) Ships of category A and B constructed on or after [DD/MM/YYYY] shall be able to withstand flooding resulting from hull penetration due to ice impact.

Chapter 7 – Operational safety

35 In considering chapter 7 (Operational safety), the group recalled that MLC (Maritime Labour Convention, 2006) entered into force 20 August 2013 and considered that the Convention covers general measures to address crew's safety and health. Nevertheless, acknowledging the importance of such measures, the group agreed to retain the goal and functional requirements of the chapter and, in addition, developed a single requirement with reference to MSC-MEPC.2/Circ.3 (Guidelines on the basic elements of a shipboard occupational health and safety programme).

36 In considering chapter 7 related to deletion of 7.3.3, the delegation of Iceland expressed its view that a Polar Code addressing safety requirements applicable for ships operating in polar waters would not serve its purpose if it didn't address risks of personal injuries associated with slippery deck areas and surfaces due to snow or icing and the need to provide for suitable measures to prevent injuries to persons working on or transiting through such areas. Since the Icelandic position was not fully debated by the working group due to time constrain, the Icelandic delegation was invited to reflect its view in the report.

Chapter 9 – Life-saving appliances and arrangements

37 The group modified chapter 9 (Life-saving appliances and arrangements) and forwarded paragraphs 9.3.3.7, 9.3.3.3.4.4 and 9.3.3.3.4.5, as set out in the annex, to SSE 1 for consideration on the need for the development of new performance or test standards.

Other

38 Due to time constraint, the group was not able to consider parts I-B and II-B hence documents SDC 1/3/8, SDC 1/3/10, SDC 1/3/12, parts of SDC 1/3/13, SDC 1/3/16, primarily related to part I-B of the draft Code were not considered.

Application

39 The group agreed that the application of the Polar Code should be harmonized with the application provisions of SOLAS, which would make the Code mandatory.

40 With regard to the application of the Code for existing ships, the group also agreed to insert the following text in Application of chapter 1 in square brackets:

"Ships built prior to [date of entry into force] shall meet the requirements of the Code with the exceptions of part I-A, paragraphs 4.2.1, 4.5.1, 10.3.1.1.5bis".

However, the group recognized that the application of the various requirements within the Code needs further consideration.

PART II-A – POLLUTION PREVENTION MEASURES

Application

41 The group agreed to insert the same principle on application, used in SOLAS (see paragraph 40) in each chapter of part II-A (Pollution Prevention Measures).

42 In this regard, some delegations noted that the proposed amendments in part II-A were negotiated with the understanding that MARPOL applicability for each of the parent annexes would be extended to the corresponding chapters of part II-A, with exceptions

provided on a regulation-by-regulation basis. It was requested that this issue be sent to MEPC to consider the general applicability of part II-A.

Goal

43 The group, having noted the concern that the goal of MARPOL is wider than that of the draft Polar Code, agreed to refer the matter to MEPC for further consideration.

Chapter 1 – Prevention of oil pollution

44 The group agreed to delete the text "[However, the Administration may approve alternative measures in fishing vessels [constructed before [date]]" in paragraph 1.5.1.2, taking into account the two step approach agreed in part I-A (i.e. first SOLAS ships, second non-SOLAS ships). The group noted a concern raised that the operation of fishing vessels is different from that of commercial ships.

Chapter 2 – Prevention of Pollution from Noxious Liquid Substances

45 As instructed by plenary, the group considered paragraph 2.5.2.2 and noted the concern that the structural requirements of the draft Polar Code will impact Type III chemical tankers, which is not required by the current IBC Code. The group agreed to refer the matter to MEPC for further consideration.

Chapter 4 – Prevention of Pollution by Sewage from Ships

46 When considering paragraph 4.5.1, the group noted the concern on inconsistency in part II-A that the requirements in the paragraph are not included in other chapters.

47 In addition to the aforementioned specific issues to be forwarded to MEPC, the group agreed to refer the draft Polar Code as a whole (particularly Introduction and part II) to MEPC, for review, including matters related to possible inconsistencies between chapters in part II-A and the associated MARPOL annexes and impact of the Polar Code requirements on other certificates and document relating to environment.

48 In this context, the group, recognizing that the submission deadline to MEPC 66 is 7 February 2014, recommended the Sub-Committee to ask MEPC to relax the submission deadline related to the draft Polar Code.

Certification and documentation

49 It was noted that the certification and verification regime, in terms of the status of the Certificate; the Polar Water Operational Manual and the implementation of the certification requirements with respect to existing statutory certification in SOLAS and MARPOL require further consideration. The possible administrative burden associated with a general update as opposed to a standalone set of polar documentation should be taken into account in any decisions by MSC and MEPC.

50 It was further noted that the content and application of the Polar Ship Certificate was not discussed and further work is needed. In particular, the documentation of the operational capabilities and limitations expected to be included in the Certificate remain to be defined. As such it was noted that the implications in terms of verification of such documentation could only be considered after the content of the Certificate is established.

DRAFT POLAR CODE

51 Having also modified remaining parts of the draft Code, the group prepared the draft International Code for ships operating in polar waters (Polar Code), as set out in the annex, for consideration by the Sub-Committee, with a view to submission to MEPC 66 and MSC 93 for further consideration prior to subsequent adoption.

52 Bearing in mind that there are still square brackets in the draft Code, the group recommended the Sub-Committee to invite Member States and international organizations to submit documents, if necessary, to MSC 93 and MEPC 66 when it considers the draft Code.

53 Noting the considerable number of outstanding items remaining in the draft text of the Polar Code and the apparent limited availability of working arrangements at the upcoming sessions of the Committees, the delegations of the Marshall Islands, Panama, Liberia, CLIA, ICS, INTERTANKO and OCIMF urged that maximum resources are made available and allocated by the Committees to reconciling these remaining items in a full and complete manner. This is to ensure that sufficient consideration may be given to finding the most appropriate solutions to these issues, and ensure the Code is completely developed prior to adoption.

Action requested of the Sub-Committee

54 The Sub-Committee is invited to:

- .1 forward relevant paragraphs of the draft Polar Code to NCSR 1 for further consideration and finalization, for submission to MSC 94, with a view to adoption of the Polar Code (paragraph 5 and the annex);
- .2 in addition to the aforementioned paragraphs to be forwarded, forward also whole chapters 10 and 11 to NCSR 1 for further examination and finalization, if so decided by NCSR 1 (paragraph 6 and the annex);
- .3 decide whether the paragraphs to be forwarded to NCSR 1 should also be considered by MSC 93 (paragraph 6 and the annex);
- .4 note the group's view that, with regard to possible approval of a PWOM (Polar Water Operational Manual) by an Administration, PWOM need not be approved by Administrations (paragraph 10);
- .5 endorse the group's decision on specific requirements of voyage planning in chapter 12 of the draft Code (paragraph 12);
- .6 endorse the group's decision regarding navigation with icebreaker assistance (which was included in chapter 2 of document SDC 1/INF.10) to move it to part I-B under chapter 2 (paragraph 14.4);
- .7 endorse the group's decision regarding definition and use of temperature in Introduction of the Polar Code (paragraph 17);
- .8 in relation to chapter 6 (Machinery installations), endorse the group's view on possible application of requirements for existing ships that the matter should be further considered, subject to submission to the Committee (paragraph 22);

- .9 endorse the group's modifications to chapter 3 on ship structure (paragraph 26 and the annex);
- .10 with regard to chapter 13 related to training and manning, included in document SDC 1/INF.10, forward the draft chapter with options to HTW 1 for consideration and recommendation to MSC 93 (paragraph 28 and the annex);
- .11 forward chapter 8 (Fire safety/protection) and chapter 9 (Life-saving appliances and arrangements) to SSE 1 for consideration and recommendation to MSC 93 (paragraphs 32 and 37 and the annex);
- .12 concur with the group's view on the application of the Code for existing ships (paragraph 40 and the annex);
- .13 with regard to part II-A on Pollution Prevention Measures, note the group's consideration and endorse that the group referred the draft Polar Code as a whole (particularly Introduction and part II), together with specific issues, to MEPC for further consideration (paragraphs 41 to 47 and the annex);
- .14 regarding the submission deadline to MEPC 66 (7 February 2014), recommend MEPC to relax the submission deadline related to the draft Polar Code (paragraph 48);
- .15 concur with the group's view on certification and documentation and invite Member States and international organizations to submit documents to MSC and MEPC on the matter (paragraphs 49 and 50);
- .16 agree, in principle, to the draft International Code for ships operating in polar waters (Polar Code), for submission to MEPC 66 and MSC 93 for further consideration prior to subsequent adoption (paragraph 51 and the annex);
- .17 endorse the group's recommendation that the Sub-Committee invites Member States and international organizations to submit documents, if necessary, to MEPC 66 and MSC 93 when it considers the draft Code (paragraph 52); and
- .18 approve the report, in general.

ANNEX

**DRAFT INTERNATIONAL CODE FOR SHIPS OPERATING
IN POLAR WATERS**

*(The notes in parenthesis are not part of the text
but represent issues for further consideration)*

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Preamble

1 [The international Code for Ships Operating in Polar Waters has been developed to supplement existing IMO instruments in order to increase the safety of ships' operation and mitigate its impact on the environment in the harsh, remote [complex] and vulnerable polar waters.]

2 [The Code acknowledges that the polar [environments] [water operation] [may] impose additional demands on ships, their systems and operation beyond the existing requirements of the International Convention for the Safety of Life at Sea (SOLAS), 1974, the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the 1978 Protocol relating thereto (MARPOL), as amended, and other relevant binding IMO instruments. Such additional demands [are] [result from] [related to] the environmental conditions, the remoteness of the operation and other [unique] factors that are of particular significance in polar waters.]

3 [The Code also acknowledges that [some] polar marine ecosystems are particularly vulnerable to ships operation. [The Code furthermore acknowledges that the potential rapid rate of change in addition to the severe multiple hazards in polar waters that [may], when acting together, present a synergistic risk level that is greater than the sum of the specific individual risks normally considered when evaluating risk mitigation measures.] [This enhanced or multiple effects have been taken into consideration in the development of the Code.]]

Alternative:

3 [The Code also acknowledges that polar ecosystems are vulnerable to human activities, including ship operation.]

4 Though the safety part (part I-A) of the Polar Code does not specifically refer to environmental protection, the relationship between the additional safety measures and the protection of the environment is acknowledged as any safety measure taken to reduce the probability of an accident to happen, will largely benefit the environment.

5 [While Arctic and Antarctic waters have [a number of] [some] similarities, there are also significant differences. Hence, although the Code is intended to apply as a whole to both Arctic and Antarctic, the legal and geographical differences between the two areas have been taken into account.]

(Note: To be revisited when the content is agreed to see if there are different requirements for the two areas in the Code.)

6 [The key principles for developing the Polar Code has been to use a risk-based approach in determining scope and to adopt a holistic approach [in mitigating identified risks to acceptable levels] [to minimize the consequences of identified risks.]]

[7 The Code addresses the safety of persons on board, ship and cargo and the prevention of pollution by ships [and also considers systems external to the ship such as communication capabilities, availability of information to the navigation systems, [traffic monitoring systems] as well as search and rescue and pollution response capabilities.]

8 Nothing in this Code shall be taken as conflicting with the United Nations Convention on the Law of the Sea, 1982, the Antarctic Treaty System and other international instruments applicable to polar waters.

INTRODUCTION

[Section 1] Goal

The goal of this Code is to provide for safe ship operation and the [protection of the polar environment] [prevention of pollution from ships] by addressing risks present in polar waters and not adequately mitigated by other instruments of the Organization.

[Section 2] Definitions

For the purpose of this Code, the terms used have the meanings defined in the following paragraphs. Terms used, but not defined in the Code, shall have the same meaning as defined in SOLAS and MARPOL.

2.1 *Antarctic area* means the sea area south of latitude 60° S (see figure 1)

2.2 [*Arctic waters* means those waters which are located north of a line from the latitude 58°00'0 N and longitude 042°00'0 W to latitude 64°37'0 N, longitude 035°27'0 W and thence by a rhumb line to latitude 67°03'9 N, longitude 026°33'4 W and thence by a rhumb line to Sørkapp, Jan Mayen and by the southern shore of Jan Mayen to the Island of Bjørnøya, and thence by a great circle line from the Island of Bjørnøya to Cap Kanin Nos and hence by the northern shore of the Asian Continent eastward to the Bering Strait and thence from the Bering Strait westward to latitude 60°N as far as Il'pyrskiy and following the 60th North parallel eastward as far as and including Etolin Strait and thence by the northern shore of the North American continent as far south as latitude 60°N and thence eastward along parallel of latitude 60°N, to longitude 56°37'1 W and thence to the latitude 58°00'0 N, longitude 042°00'0 W (see figure 2).]

(Note: Proposed changed and it is questioned if the figure matches the text ref. comment Vanuatu in round 4)

2.3 *Polar waters* includes both Arctic [waters] and Antarctic [waters] [area]

2.4 *The Antarctic Treaty System* means the Antarctic Treaty, the measures in effect under that Treaty, its associated separate international instruments in force and the measures in effect under those instruments.

2.5 *Category A ship* means ships designed for operation in polar waters at least in medium first-year ice, which may include old ice inclusions.

2.6 *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.

2.7 *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.

[2.8 *First year ice* means sea ice of not more than one winter growth developing from young ice with thickness from 0.3-2.0 metre.

2.9 *MARPOL* means the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the 1978 Protocol relating thereto (MARPOL 73/78), as amended.

2.10 *Mean Lowest Daily Low (Minimum) Temperature* means the mean value of lowest temperature during a year or the ship operation period of the low (minimum) temperature during a 24 hour period. The mean value is to be derived from at least [10] years of data.

2.11. *bis Medium first-year ice* means first-year ice of 70-120 cm thickness.

2.12 [Open water mean [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.]

2.13 *Organization* means the International Maritime Organization.

2.14 *Polar Service Temperature (PST)* means a temperature at least [10°C] [2σ] below MDLT for the intended operation in polar areas.

2.15 *Polar Ship Certificate* means a certificate issued by the Administration or by an organization recognized by the Administration [indicating] [defining] the environmental conditions and operational capability for which the ship has been designed for operation in polar waters.

2.16 *Polar Water Operational Manual (PWOM)* means.....

2.17 [Sea ice means any form of ice found at sea which has originated from the freezing of sea water.]

2.18 *Ship intended to operate in low air temperature* means a ship which is intended to undertake voyages to or through areas where the Mean Lowest Daily Low (Minimum) Temperature (MDLT) is below [-10°C].

2.19 SOLAS means the International Convention for the Safety of Life at Sea, 1974, as amended.

2.20 STCW means the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended.

Figures 1 and 2 from resolution A.1024(26) to be inserted here.

(Note: Svalbard is missing on the map in resolution A.1024(26).)

[Section 3] Sources of hazards

3.1 The Polar Code considers hazards which may lead to elevated levels of risk due to increased probability of occurrence, more severe consequences, or both:

- .1 ice as it may affect hull structure, stability characteristics, machinery systems, navigation, the outdoor working environment, maintenance and emergency preparedness tasks, and malfunction of safety equipment and systems;
- .2 experiencing topside icing, with potential reduction of stability and equipment functionality;
- .3 low temperature as it affects the working environment and human performance, maintenance and emergency preparedness tasks, material properties and equipment efficiency, human performance, survival time and performance of safety equipment and systems;
- .4 extended periods of darkness or daylight as it may affect navigation and human performance;
- .5 high latitude as it affects navigation systems, communication systems and the quality of ice imagery information;

- remoteness and possible lack of accurate and complete hydrographic data and information, reduced availability of navigational aids and seamarks with increased potential for groundings compounded by remoteness, limited readily deployable SAR facilities, delays in emergency response and limited communications capability, with the potential to affect incident response;
- .6 Potential Lack of ship crew experience in polar operations, with potential for human error;
 - .7 potential Lack of suitable emergency response equipment, with the potential for limiting the effectiveness of mitigation measures;
 - .8 Rapidly changing and severe weather conditions, with the potential for escalation of incidents; and
 - .9 the environment with respect to sensitivity to harmful substances and other environmental impacts and its need for longer restoration.]

3.2 The risks level within polar waters may differ depending on the geographical location, time of the year with respect to daylight, ice-coverage, etc. Thus, the mitigating measures required to address the above specific hazards may vary within polar waters and may be different in Arctic and Antarctic Waters

[Section] 4 Operational limitations

4.1 When applying for a Polar Ship Certificate, a [risk] assessment shall be provided listing the ship's operational capabilities and limitations.

The assessment shall take into consideration the following:

- .1 the anticipated range of operating conditions;
- .2 hazards as listed in section 2.1 above; and
- .3 additional hazards identified.

The assessment shall include information on identified operational limitations, plans or procedures or additional safety equipment necessary to satisfy the provisions of this Code and mitigate incidents with potential safety or environmental consequences.

[Section 5] Structure of the Code

[5.1 This Code consists of Introduction, parts I and part II. The Introduction contains mandatory provisions applicable to both part I and part II. part I is subdivided into part I-A, which contains mandatory provisions on safety measures, and part I-B containing recommendations on safety. part II is subdivided into part II-A, which contains mandatory provisions on pollution prevention, and part II-B containing recommendations on pollution prevention.

5.2 Part I-A is mandatory in accordance with the relevant SOLAS chapter. Part II-A is mandatory in accordance with the relevant MARPOL Annexes.

5.3 Mandatory provisions included in parts I-A and II-A assume that, unless expressly provided otherwise in this Code, requirements contained in mandatory IMO instruments, as applicable, are complied with.

[5.4 Each chapter consists of the overall goal of the chapter and functional requirements to fulfill the goal. Where considered necessary, additional requirements have been included.]

Alternatively:

[5.1 The functional requirements of this part shall be achieved by ensuring compliance with the prescriptive requirements specified in each chapter, or by alternative design and arrangements which comply with [SOLAS chapter XIII regulation 6] and operational limitations which comply with [SOLAS chapter XII regulation 2bis]. A ship shall be considered to meet the functional requirements set out in this part when either:

- .1 the ship's design and arrangements comply with all the prescriptive requirements in each chapter;
- .2 part(s) of the ship's design and arrangements have been reviewed and approved in accordance with [SOLAS chapter XIII regulation 6] and [SOLAS chapter XII regulation 2 bis] and the remaining parts of the ship comply with the relevant prescriptive requirements in each chapter.]

PART I-A SAFETY MEASURES

CHAPTER 1 – GENERAL

[1.1 Application

Unless expressly provided otherwise, the requirements of this part shall apply to ships operating in polar waters

[Ships built prior to [date of entry into force] shall meet the requirements of the Code with the exceptions of part I-A, paragraphs 4.2.1, 4.5.1, 10.3.1.1.5bis.]

[1.2 Exemptions]

[1.3 Definitions

In addition to the definitions included in the relevant SOLAS chapters and the [introduction] [General part] of this Code, the following definitions are applicable to this part]

1.3.1 *Conning position* means the stations in which the ship's steering control and devices for ahead or astern operations are located.

1.3.2 *Escort* means any ship with superior ice capability in transit with another ship.

1.3.3 *Escorted operation* means any operation in which a ship's movement is facilitated through the intervention of an escort.

1.3.4 *Habitable environment* means a ventilated environment that will protect against hypothermia.

1.3.6 *Icebreaker* means any ship whose operational profile may include escort or ice management functions, whose powering and dimensions allow it to undertake aggressive operations in ice-covered waters.

1.3.7 [*Ice breaking capability* means maximum thickness of level compact ice through which a ship is capable of moving continuously using full power at a minimum steady speed of about 2 knots (1 m/s). It is assumed that ice-bending strength is not less than 500 kPa and ice has natural cover about 20-25 cm deep.]

1.3.8 *Ice Class* means the notation assigned to the ship by the Administration or by an organization recognized by the Administration showing that the ship has been designed for navigation in sea-ice conditions.

1.3.9 [*Ice Navigator* means any individual who, in addition to being qualified [under the STCW Convention] [based on training and competencies outlined in the STW Guidelines], is specially trained and otherwise qualified to direct the movement of a ship in [or near] ice-covered waters [as set out in this Code.]]

1.3.10 *2008 IS Code* means the International Code on Intact Stability, 2008, as adopted by resolution MSC.267(85).

1.3.11 *Low air temperature* means air temperature less than or equal to -10°C.

[1.3.12 *Maximum expected time of rescue* means the time adopted for the design of equipment and system that provide survival support. It shall never be taken as less than 5 days.]

[1.3.13 *Machinery Installations* means equipment and machinery and its associated piping and cabling, which is necessary for the safe operation of the vessel.]

1.3.14 *Polar Class (PC)* means the ice class assigned to the ship by the Administration or by an organization recognized by the Administration based upon IACS Unified Requirements. (Note: Proposed moved to part I-B)

1.4 Certificate and survey

1.4.1 Every ship that is on a voyage that is in whole or in part in polar waters and to which this Code applies shall have on board a valid Polar Ship Certificate and a Polar Waters Operation Manual (PWOM) complying with chapter 2 and [approved by the Administration].

Alternatively:

[1.4.1 Every ship that is on a voyage that is in whole or in part in polar waters and to which this Code applies shall have on board a valid Polar Ship Certificate.]

1.4.2 The Polar Ship Certificate shall be issued after an initial or renewal survey to a ship which complies with the relevant requirements of this Code. The certificate referred to in this regulation shall be issued or endorsed either by the Administration or by any person or organization recognized by it in accordance with SOLAS regulation XI-1/1. In every case, that Administration assumes full responsibility for the certificate.

1.4.3 The Polar Ship Certificate shall be drawn up in the form corresponding to the model given in annex X to part A-I of this Code. If the language used is neither English, nor French nor Spanish, the text shall include a translation into one of these languages.

Alternatively:

[1.4.3 The Polar Ship Certificate shall be that of the model given in the annex 1 to the Code. If the language used is not English, French or Spanish, the text shall include a translation into one of these languages.]

1.4.4 Polar Ship Certificate endorsement and renewal survey dates shall be harmonized with those related to other SOLAS certificates. [Therefore, in passenger ships operating in polar waters, renewal surveys shall be carried out at the intervals required in SOLAS regulation II-1/7. In cargo ships, intermediate and renewal surveys shall be carried out at the intervals established in SOLAS regulations II-1/8, II-1/9 and II-1/10, as applicable.]

1.5 Performance Standards

1.5.1 Unless expressly provided otherwise, ship systems and equipment addressed in this Code shall satisfy at least the same performance standards referred to in SOLAS.

1.5.3 For ships operating in low air temperature, systems and equipment required by this Code shall be fully functional at the polar service temperature.

[1.5.4 For ships operating in low air temperature, survival systems and equipment shall be certified to ensure its operation at polar service temperature during the maximum expected rescue time.]

[1.6 Review of the Code

1.6.1 The Code will be reviewed by the Organization at intervals preferably not exceeding [two/six years] to consider revision of existing requirements to take account of new developments in design and technology.

1.6.2 Where a new development in design and technology has been found acceptable to an Administration, that Administration may submit particulars of such development to the Organization for consideration for incorporation into the Code during periodical review.]

CHAPTER 2 – POLAR WATER OPERATIONAL MANUAL

2.1 Goal

2.1.1 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

2.2.1 The Manual shall include the ship-specific capabilities and limitations in relation to the risk assessment required under section 3 of Introduction.

2.2.2 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 ships capabilities.

2.2.3 The Manual shall include or refer to specific procedures to be followed in the event of incidents in polar waters.

2.2.4 The Manual shall include or refer to specific procedures to be followed in the event that conditions are encountered which exceed the ships' specific capabilities and limitations in paragraph 2.2.1.

2.2.5 The Manual shall include or refer to procedures to be followed when using icebreaker assistance, as applicable.

[Procedures, plans, and instructions for the key shipboard operations certified under the ISM Code, part 7 shall include all the identified polar water risks to the ship, personnel, and the environment]

[The Cooperation Plan required in SOLAS regulation V/7.3 shall include specific aspects of polar water operations.]

2.3 Regulations

2.3.1 In order to comply with the functional requirements of paragraph 2.2.1, the manual shall contain relevant information with the ship's capabilities and limitations for:

- .1 operation in ice, as applicable;
- .2 operation in low air temperatures, as applicable;
- .3 communication and navigation capabilities in high latitudes; and
- .4 voyage duration

2.3.2 In order to comply with the functional requirements of paragraph 2.2.2, 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.

2.3.3 In order to comply with the functional requirements of paragraph 2.2.3, the manual shall include risk-based procedures to be followed for:

- .3 contacting emergency response providers for salvage, SAR, spill response, etc. as applicable; and
- .4 in the case of ships intending to operate in ice, procedures for maintaining life support and ship integrity in the event of prolonged entrapment by ice.

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 measures to be taken in the event of encountering ice and/or temperatures which exceed the ships design capabilities or limitations;

2.3.5 In order to comply with the functional requirements of paragraph 2.2.5, 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 ice breaker 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.

CHAPTER 3 –SHIP STRUCTURE

3.1 Goal

3.1.1 The goal of this chapter is to provide that the material and scantling of the structures retain their structural integrity based on global and local response due to environmental loads and conditions.

3.2 Functional requirements

3.2.1 In order to achieve the goal set out in 2.1.1 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

- .1 for ships intended to operate in low air temperature, materials used shall be suitable for operation at the ships polar service temperature.
- .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 Regulations

3.3.1 In order to comply with the functional requirements of paragraph 3.2.1.1 above, materials of exposed structures in ships and materials exposed to sea water, shall be approved by the Administration, or a recognized organization accepted by it, taking into account standards acceptable to the Organization¹ or other standards offering an equivalent level of safety based on the polar service temperature.

3.3.2 In order to comply with the functional requirements of paragraph 3.2.1.2 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 Organization² or other standards offering an equivalent level of safety.
- .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 Organization³ 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.
- .4 Category C ships need not be Ice Strengthened if, in the opinion of the Administration, the ships structure is adequate for its intended operation

¹ Refer to IACS UR S6 Use of Steel Grades for Various hull Members – Ships of 90m in Length and Above (2013) and IACS URI Requirements concerning Polar Class (2011).

² Refer to Polar Class 1 – 5 of IACS URI Requirements concerning Polar Class (2011).

³ Refer to Polar Class 6 – 7 of IACS URI Requirements concerning Polar Class (2011).

CHAPTER 4 – STABILITY AND SUBDIVISION

4.1 Goal

- 4.1.1 The goal of this chapter is to ensure provision of adequate stability and subdivision in intact and damaged conditions.

4.2 Functional requirements

- 4.2.1 In order to achieve the goal set out in paragraph 4.1.1 above, the following functional requirements are embodied in the regulations of this chapter, as appropriate:

- .1 Ships of category A and B constructed on or after [DD/MM/YYYY] shall have sufficient residual stability to sustain ice related damages.
- .2 Ships shall have sufficient stability in intact condition when subject to ice accretion.

4.3 Requirements

- 4.3.1 For ship operating in areas and during periods where ice accretion is likely to occur, the effect of ice accretion shall be included in the intact stability calculations in accordance with specifications at least equivalent to those the following:

Insert text from 2008 IS Code, part B, paragraph 6.3.1 here

- 4.3.2 Information on the ice accretion stipulated in the stability calculations shall be given in the Polar Water Operational Manual-
- 4.3.3 Ice accretion shall be monitored and appropriate measures taken to ensure that the ice accretion does not exceed the values given in the Polar Water Operational Manual.

4.4 Stability in damaged conditions

- 4.4.1 Ships of category A and B constructed on or after [DD/MM/YYYY] 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 s_i , as defined in SOLAS regulation II-1/7-2.2 and 2.3, has $s_i = 1$ for all loading conditions d_s , d_l and d_p as defined in SOLAS regulations II-1 2.10,11 and 12. Damage stability GZ , Range and heel at equilibrium criteria contained in instruments applicable to ship types not included in SOLAS chapter II-1, part B should be substituted as the denominators to the GZ_{max} and Range numerators, respectively, and heel at equilibrium used in the calculation of the K factor value in the $s_{final,i}$ formula for the purposes of calculating s_i .
- 4.4.2 The ice damage extent to be assumed when demonstrating compliance with paragraph 4.5.1 shall be such that:
- .1 longitudinal extent is $0.045 \times$ length of deepest ice waterline length if centred forward of the point of maximum beam on the waterline, and $0.015 \times$ length of waterline length otherwise;

- .2 transverse extent penetration depth is 760 mm measured normal to the shell over the full extent of the damage;
 - .3 vertical extent is the lesser of 0.2 of draft at the upper ice waterline, or the longitudinal extent;
 - .4 the centre of the ice damage may be located at any point between the keel and 1.2 times the deepest ice draft; and
 - .5 the vertical extent of damage may be assumed to be confined between the keel and 1.2 times the deepest ice draft.
- 4.4.3 Damage as defined in paragraph 4.5.2 is to be assumed at any position along the side shell.

CHAPTER 5 – WATERTIGHT AND WEATHERTIGHT INTEGRITY

5.1 Goal

5.1.1 The goal of this chapter is to provide measures to maintain watertight and weathertight integrity.

5.2 Functional requirements

5.2.1 In order to achieve the goal set out in 5.1.1 above, all closing appliances and doors relevant to watertight and weathertight integrity of the ship shall remain functional.

5.3 Requirements

5.3.1 In order to comply with the functional requirements of paragraph 5.2.1 above, the following apply:

- .1 Means shall be provided to remove or prevent ice and snow accretion around hatches and doors.
- .2 If the hatches or doors are hydraulically operated, means shall be provided to prevent freezing or excessive viscosity of liquids.
- .3 Where appropriate, weathertight doors, hatches and closing devices should be designed to be operated by personnel wearing heavy winter clothing including thick mittens.

CHAPTER 6 – MACHINERY INSTALLATIONS

[For the purpose of this chapter, ships intended to operate in ice means ships that [are ice-strengthened in accordance with chapter 3] [or that are expected to encounter high concentrations of any type of ice].]

6.1 Goal

The goal of this chapter is to ensure that, machinery installations are capable of delivering the required functionality necessary for safe operation of ships.

6.2 Functional requirements

In order to achieve the goal set out in paragraph 6.1 above, the following functional requirements are embodied in the regulations of this chapter, as appropriate:

6.2.1 Machinery installations shall provide functionality under the anticipated environmental conditions, taking into account:

- .1 ice accretion and/or snow accumulation;
- .2 ice ingestion;
- .3 [freezing and]viscosities of liquids;
- .4 seawater intake temperature; and
- .5 snow ingestion.

6.2.2 In addition, ships intended to operate in low air temperatures, machinery installations shall provide functionality under the anticipated environmental conditions, also taking into account:

- .1 cold and dense inlet air;
- .2 material embrittlement; and
- .3 loss of performance of battery or other stored energy device.

6.2.3 For ships intended to operate in ice, machinery installations shall provide functionality under the anticipated environmental conditions, taking into account:

- .1 loads imposed directly by ice interaction; and
- .2 ice ingestion from sea water.

6.3 Regulations

6.3.1 In order to comply with the functional requirement of paragraph 6.2.1.1 above, the following apply:

- .1 Machinery installations and associated equipment shall be protected against the effect of ice accretion and/or snow accumulation, ice ingestion, freezing of liquids, seawater intake temperature through design or operational measures based on the assessment required by section 3 of the Introduction.
- .2 Working liquids shall be maintained in a viscosity range that ensures operation of the machinery.

6.3.2 In order to comply with the functional requirement of paragraph 6.2.2.1 above, exposed machinery and electrical installation and appliances shall function at the polar service temperature.

6.3.3 In order to comply with the functional requirement of paragraph 6.2.2.2 above, the following apply:

- .1 Means shall be provided to ensure that combustion air for internal combustion engines driving essential machinery is maintained at a temperature in compliance with the criteria provided by the engine manufacturer.

- [.2 Searchlights are to be fitted with heating or provided with a cover, as well as with heating arrangements for the directional motor.]

6.3.4 In order to comply with the functional requirement of paragraph 6.2.2.3 above, the following apply:

- .1 Materials for machinery and its foundations shall conform to standards at least equivalent to those acceptable to the Organization⁴.

6.3.5 In order to comply with the functional requirements of paragraph 6.2.3.1 above, the following apply:

- .1 Scantlings of propeller blades, propulsion line, steering equipment and other appendages of category A shall be approved by the Administration, or a recognized organization accepted by it, taking into account standards acceptable to the Organization⁵ or other standards offering an equivalent level of safety.
- .2 Scantlings of propeller blades, propulsion line, steering equipment and other appendages of category B shall be approved by the Administration, or a recognized organization accepted by it, taking into account standards acceptable to the Organization⁶ or other standards offering an equivalent level of safety.
- .3 Scantlings of propeller blades, propulsion line, steering equipment and other appendages 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 with the ice types and concentration encountered in the area of operation.

6.3.6 In order to comply with the functional requirements of paragraph 6.2.3.2 above, seawater supplies for machinery systems shall be designed to prevent ingestion of ice⁷, or otherwise arranged to ensure functionality.

⁴ Refer to IACS URI Requirements concerning Polar Class (2011).

⁵ Refer to Polar Class 1 – 5 of IACS URI Requirements concerning Polar Class (2011).

⁶ Refer to Polar Class 6 – 7 of IACS URI Requirements concerning Polar Class (2011).

⁷ Refer to MSC/Circ.504, Guidance on Design and Construction of Sea Inlets under Slush Ice Conditions.

CHAPTER 7 – OPERATIONAL SAFETY

7.1 Goal

The goal of this chapter is to provide for safe working conditions during normal operations including outdoor duties.

7.2 Functional requirements

In order to achieve the goal set out in 7.1 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

7.2.1 Measures shall be taken to provide personal protection and avoid injuries to persons on board under the anticipated environmental conditions, and when subjected to:

- .1 wind and snow; or
- .2 ice accretion.

7.3 Requirements

[7.3.1 In order to comply with the functional requirement of paragraph 7.2.1 above, a risk assessment required by applicable international instruments⁸ shall follow a hazard identification process⁹ that takes into account the sources of hazards listed in section 2 of the Introduction. This shall be used to determine the potential need for additional measures to ensure the health and safety of persons on board.]

CHAPTER 8 – FIRE SAFETY/PROTECTION

8.1 Goals

8.1.1 The goal of this chapter is to ensure that fire safety systems and appliances are effective and operable, and that means of escape remain available so that persons on board can safely and swiftly escape to the lifeboat and liferaft embarkation deck under the expected environmental conditions.

8.2 Functional requirements

8.2.1 In order to achieve the goal set out in paragraph 8.1 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

- .1 all components of fire safety systems and appliances if installed in exposed positions shall be protected from ice accretion and snow accumulation;
- .2 local equipment and machinery controls shall be arranged so as to avoid freezing, snow accumulation and ice accretion and their location to remain accessible at all time;

⁸ MLC, 2006 Regulation 4.3, ISM Code, etc.

⁹ MSC-MEPC.2/Circ.3.

- .3 the design of fire safety systems and appliances shall take into consideration the need for persons to wear bulky and cumbersome cold weather gear, where appropriate;
- .4 means shall be provided to remove or prevent ice and snow accretion from accesses; and
- .5 extinguishing media shall be suitable for intended operation.

8.2.2 For ships intended to operate in low air temperature, the following apply:

- .1 all components of fire safety systems and appliances shall be designed to ensure availability and effectiveness under the polar service temperature ,
- .2 materials used in exposed fire safety systems shall be suitable for the polar service temperature and service; and
- .3 all two way portable radio communication equipment shall be operable at the polar service temperature.

8.3 Regulations

8.3.1 In order to comply with the requirement of paragraph 8.2.1.1, isolating and pressure/vacuum valves in exposed locations are to be protected from ice accretion and remain accessible at all time.

8.3.2 In order to comply with the requirement of paragraph 8.2.1.2 the following apply:

- .1 fire pumps including emergency fire pumps, water mist and water spray pumps shall be located in compartments maintained above freezing;
- .2 the fire main is to be arranged so that exposed sections can be isolated and means of draining of exposed sections shall be provided. Fire hoses and nozzles need not be connected to the fire main at all times, and may be stored in protected locations near the hydrants;
- .3 firefighter's outfits shall be stored in warm locations on the ship; and
- .4 where fixed water-based firefighting systems are located in a space separate from the main fire pumps and use their own independent sea suction, this sea suction is to be also capable of being cleared of ice accumulation."

8.3.3 In order to comply with the requirement of paragraph 8.2.2.1, portable and semi-portable extinguishers shall be located in positions protected from freezing temperatures, as practicable. Locations subject to freezing are to be provided with extinguishers capable of operation under the polar service temperature.

8.3.4 In order to comply with the requirement of paragraph 8.2.2.2, materials used in exposed fire safety systems shall be suitable for the polar service temperature and service;

CHAPTER 9 – LIFE-SAVING APPLIANCES AND ARRANGEMENTS

9.1 Goal

The goal of this chapter is to provide for safe escape, evacuation and survival.

9.2 Functional Requirements

In order to achieve the goal set out in paragraph 9.1. above, the following functional requirements are embodied in the regulations of this chapter, as appropriate:

9.2.1 Escape

9.2.1.1 Exposed escape routes shall remain accessible and safe, taking into consideration the potential icing of structures and snow accumulation.

9.2.1.2 Survival craft and muster and embarkation arrangements shall provide safe abandonment of ship, taking into consideration the possible adverse environmental conditions during an emergency.

9.2.2 Evacuation

9.2.2.1 All life-saving appliances and associated equipment shall be functional under [the polar service temperature] and under the possible adverse environmental conditions during the maximum expected time of rescue.

9.2.2.2 Ships shall have means to ensure safe evacuation of persons, including safe deployment of survival equipment, when operating in ice covered waters, or directly onto the ice, as applicable.

9.2.3 Survival

9.2.3.1 Adequate thermal protection shall be provided for all persons on board, taking into account the intended voyage, the anticipated weather conditions (cold and wind), and the potential for immersion in ice covered water, where applicable.

9.2.3.2 Life-saving appliances and associated equipment shall take account of the potential of operation in long periods of darkness, taking into consideration the intended voyage.

9.2.3.3 Taking into account the presence of any hazards, as identified in section 1 (Introduction), resources shall be provided to support survival following abandoning ship, whether to the water, to ice or to land, for the maximum expected time of rescue. These resources shall provide:

- .1 a habitable environment;
- .2 protection of persons from the effects of cold, wind and sun;
- .3 space to accommodate persons equipped with thermal protection adequate for the environment;
- .4 means to provide sustenance;
- .5 safe access and exit points; and
- .6 means to communicate with rescue assets.

9.3 Requirements

9.3.1 *Escape*

In order to comply with the functional requirements of paragraph 9.2.1.1 above, the following apply:

- .1 for ships exposed to ice accretion, means shall be provided to remove or prevent ice and snow accretion from escape routes, muster stations, embarkation areas, survival craft, its launching appliances and access to survival craft;
- .2 exposed escape routes shall be arranged so as not to hinder passage by persons wearing suitable polar clothing; and
- .3 For ships intended to operate in low air temperatures, adequacy of embarkation arrangements shall be assessed, having full regard to any effect of persons wearing additional polar clothing.

9.3.2 Evacuation

In order to comply with the functional requirements of paragraph 9.2.2.1 above, the following apply:

- .1 where the functional requirements of this chapter are achieved by means of adding devices requiring a source of power, this source shall be able to operate independently of the ship's main source of power; and

9.3.3 Survival

9.3.3.1 In order to comply with the functional requirements of paragraph 9.2.3.1 above, the following apply:

- .1 for passenger ships, a proper sized immersion suit or a thermal protective aid shall be provided for each person on board; and
- .2 where immersion suits are required, they shall be of the insulate type.

9.3.3.2 In order to comply with the functional requirements of paragraph 9.2.3.2 above, ships intended to operate in extended periods of darkness, searchlights suitable for continuous use to facilitate operation in ice shall be provided for each lifeboat.

9.3.3.3 In order to comply with the functional requirements of paragraph 9.2.3.3 above, the following apply:

- .1 no lifeboat shall be of any type other than partially or totally enclosed type ; and
- .2 an assessment shall consider the need for ships to be provided with survival resources for use following abandonment, onto ice or land to maximize the probability of survival for the expected time of rescue.

- .3 Taking into account the assessment referred to in paragraph .1 above, appropriate survival resources, which address both individual (personal survival equipment) and shared (group survival equipment) needs, shall be provided, as follows:
 - .1 life-saving appliances and group survival equipment that provide effective protection against direct wind chill for all persons on board;
 - .2 personal survival equipment in combination with life-saving appliances or group survival equipment that provide sufficient thermal insulation to maintain the core temperature of persons subject to the minimum temperatures anticipated for the voyage;
 - .3 personal survival equipment that provide sufficient protection to prevent frostbite of all extremities under the minimum temperatures anticipated for the voyage;
- .4 Whenever the assessment referred to in paragraph 9.3.3.1 identifies a potential of abandonment onto ice or land, the following apply:
 - .1 group survival equipment shall be carried, unless an equivalent level of functionality for survival is provided by the ship's normal life-saving appliances;
 - .2 when required, personal and group survival equipment sufficient for 110% of the persons on board shall be stowed in easily accessible locations, as close as practical to the muster or embarkation stations; and
 - .3 containers for group survival equipment shall be designed to be easily movable over the ice and be floatable.
 - .4 Whenever the assessment identifies the need to carry personal and group survival equipment, means shall be identified of ensuring that this equipment is accessible following abandonment.
 - .5 If carried in addition to persons, in the survival craft, the survival craft and launching appliances shall have sufficient capacity to accommodate the additional equipment.
 - .6 Passengers and the special personnel, if any, shall be instructed in the use of the personal survival equipment and the action to take in an emergency; and
 - .7 The crew shall be trained in the use of the personal survival equipment and group survival equipment.

9.3.3.7 In order to comply with the functional requirements of paragraph 9.2.3.3.4 above, adequate emergency rations shall be provided.

CHAPTER 10 – SAFETY OF NAVIGATION

10.1 Goal

The goal of this chapter is to provide appropriate nautical information and navigational equipment functionality for safe navigation

10.2 Functional requirements

In order to achieve the goal set out in 10.1 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

10.2.1 Nautical information

10.2.1.1 Ships shall be equipped to receive up-to-date information including ice information for safe navigation.

10.2.1.2 Systems for providing reference headings and position fixing shall be suitable for the intended areas.

10.2.2 Navigational equipment functionality

10.2.2.1 The navigational equipment and systems shall be designed, constructed, and installed to retain their functionality under the expected environmental conditions in the area of operation.

10.3 Regulations

10.3.1 Nautical information

10.3.1.1 In order to comply with the requirements of paragraph 10.2.1.1 above, the following apply:

- .1 Ships shall have equipment capable of receiving and displaying information on ice [thickness and concentration];
- .2 Ships shall have two independent echo-sounding devices; and

10.3.1.2 [For ships intended to operate in ice], the following apply:

- .1 Where equipment required by 10.3.3.3.2 above have sensors that project below the hull, such sensors shall be protected against ice;
- .2 Ships shall be equipped with two remotely rotatable, narrow-beam search lights controllable from the bridge to provide lighting over an arc of 360 degrees. If such coverage is not possible to obtain, two supporting searchlights shall be placed one on each side of the bridge wing;
- .3 [In category A ships [constructed on or after [date]] the bridge wings shall be enclosed or designed to protect navigational equipment and operating personnel

- .4 Ships that may be involved in operations with an icebreaker escort shall be equipped with a manually initiated flashing red light visible from astern to indicate when the ship is stopped. This light shall have a range of visibility of at least two (2) nautical miles, the horizontal and vertical arcs of visibility shall conform to the stern light specifications in COLREG.]

10.3.1.3 In order to comply with the requirements of paragraph 10.2.1.2 above, the following apply:

- .1 Ships shall have two non-magnetic means to determine and display their heading. Both means shall be independent, and if energy-consuming, they shall be connected to the ship's main and emergency source of power. and [to an individual Uninterruptible Power Supply UPS unit with a minimum operating duration of 30 minutes]; and
- .2 Ships proceeding to latitudes over 80 degrees shall be fitted with at least one GNSS compass or equivalent.

10.3.2 Navigational equipment functionality

In order to comply with the requirements of paragraph 10.2.2.1 above, the following apply:

- .1 Ships intended to operate low air temperature shall be fitted with a suitable means to de-ice sufficient conning position windows to provide unimpaired forward and astern vision from conning positions.
- .2 The windows described in .1 shall be fitted with an efficient means of clearing melted ice, freezing rain, snow, mist and spray from outside and accumulated condensation from inside. A mechanical means to clear moisture from the outside face of a window shall have operating mechanisms protected from freezing or the accumulation of ice that would impair effective operation.
- .3 Means to prevent the accumulation of ice on antennas required for navigation, communication and safe operation shall be provided.

CHAPTER 11 – COMMUNICATION

11.1 Goal

The goal of this chapter is to provide for effective communication for ships and survival craft during normal operation and in emergency situations taking into account operation in high latitude.

11.2 Functional requirements

In order to achieve the goal set out in 11.1 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

11.2.1 *Ship communication*

- .1 Two-way voice and data communications [reliable] at all points along the intended operating routes taking account of the limitations of shore

stations [and available satellite communications] shall be provided [by the ship borne equipment];

- .2 Suitable means of communications shall be provided where escort and convoy operations are expected; and
- .3 appropriate communication equipment to enable telemedical assistance in polar areas shall be provided. (10.2.1.1.5)

(Note: Need clarifications on what kind of telemedical assistance that is available/possible.)

11.2.2 Survival craft communications capabilities

- .1 [All [rescue boats] and lifeboats, whenever released, shall carry at least one equipment capable of transmitting and receiving GMDSS compatible communications suitable for, distress alerting, locating, [and on-scene communications.; and]
- .2 All [other] survival craft, whenever released [for evacuation], shall carry equipment suitable for [distress alerting and] locating.

11.3 Regulations

11.3.1 Ship communication

11.3.1.1 In order to comply with the functional requirements of paragraph 11.2.1.3 above, ships intended to provide icebreaking escort] shall be equipped with a special sound signaling system mounted to face astern to indicate escort and emergency manoeuvres to following ships as described in the International Code of Signals. (10.3.1.2)

11.3.1.2 In order to comply with the functional requirements of paragraph 11.2.1.4 above, on-scene communications capability in ships, shall include [maritime VHF-DSC equipment. and equipment for voice communications with aircraft on 121.5 and 123.1 MHz. (10.3.1.1 for ships)

11.3.2 Survival craft communications capabilities

11.3.2.1 In order to comply with the functional requirements of paragraph 11.2.2.1 above, the following apply:

- .1 On-scene communications capability in lifeboats, shall include maritime VHF-DSC equipment and equipment for voice communications with aircraft on 121.5 and 123.1 MHz; and
- .2 All rescue boats and lifeboats, shall carry on-scene communications equipment for use with rescue assets upon evacuation into the water or to ice or to land, and
- .3 [Distress alerting and locating equipment required by 11.2.2 shall include [EPIRBs SARTs and AIS-SARTs] [EPIRBs and search and rescue locating devices]_Such equipment shall conform to performance standards

referred in SOLAS or other alternative equipment that is compatible with GMDSS and acceptable to the administration..]

11.3.2.2 [Mandatory communications equipment for use in survival craft and rescue boats shall be capable of operation during the maximum expected time of rescue].

CHAPTER 12 – VOYAGE PLANNING

12.1 Goal

12.1.1 The goal of this chapter is to ensure that the Company, master and crew are provided with sufficient information to enable operations to be conducted with due consideration to safety of ship and persons on board [and, as appropriate, environmental protection.]

12.2 Functional requirements

12.2.1 In order to achieve the goal set out in 12.1.1 above, the voyage plan shall take into account the potential hazards of the intended voyage.

12.3 Requirements

12.3.1 In order to comply with the requirements of paragraph 12.4.1, the master shall consider a route through polar waters taking into account the following:

- .1 the procedures required by the PWOM;
- .2 any limitations of the hydrographic information and aids to navigation available;
- .3 current information on the extent and type of ice and icebergs in the vicinity of the intended route;
- .4 statistical information on ice and temperatures from former years;
- .5 places of refuge;
- .6 current information and measures to be taken when cetaceans are encountered relating to known areas with densities of [wildlife] [cetaceans] including seasonal migration areas¹⁰;
- .7 current information on relevant ships' routing systems, speed recommendations and vessel traffic services relating to known areas with densities of [wildlife] [cetaceans] including seasonal migration areas¹¹;
- .8 national and international designated protection areas along the route; and
- .9 operation in areas remote from SAR capabilities¹².

¹⁰ Refer to MEPC/Circ.674 on Guidance document for minimizing the risk of ship strikes with cetaceans.

¹¹ Refer to MEPC/Circ.674 on Guidance document for minimizing the risk of ship strikes with cetaceans.

¹² Refer to MSC.1/Circ.1184 and A.999(25).

[12.5 Reporting

Prior to entering Polar waters, ships should report to a recognized position report system accessible by search and rescue authorities.]

CHAPTER 13 – [CREWING] [MANNING] [, TRAINING FAMILIARITY, AND CERTIFICATION AND TRAINING]

(Note: Alternative proposals included at the end of chapter 13)

13.1 Goal

13.1.1 The goal of this chapter is to ensure that ships are appropriately manned by adequately qualified, trained and experienced personnel.

13.2 Functional requirements

13.2.1 In order to achieve the goal set out in 13.1.1 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

- .1 The [crewing] [manning] of all ships in polar waters shall take account of the provisions listed in this chapter, and also of the relative lack of shore and support infrastructure which may be available to assist in any operations.
- .2 The ship's officers [and crew] shall be made familiar with cold weather survival.
- .3 The Company shall establish an appropriate training programme according to the tasks and responsibilities assigned to qualified personnel, particularly ship's deck and engine officers.
- [.4 Ice Navigator(s) shall be provided, as appropriate.]

[13.3 Ice Navigator qualifications and training

[13.3.1 The Ice Navigator shall have documentary evidence of having satisfactorily completed an approved training programme in ice navigation.]

13.3.2 Such a training programme shall provide knowledge, understanding and proficiency required for operating a ship in polar ice-covered waters, including recognition of ice formation and characteristics; ice indications; ice manoeuvring; use of ice forecasts, atlases and codes; hull stress caused by ice; ice escort operations; ice-breaking operations and effect of ice accretion on vessel stability.

13.3.3 Qualifications of an Ice Navigator shall include documentary evidence of having completed on-the-job training, as appropriate, and may include simulation training.

[13.3.4 The Administration shall issue a certificate of Ice Watchkeeper to persons with a valid deck certificate who have also completed successfully the required course of study for Ice Navigators.]

13.4 Certification

13.4.1 The certificate of competency of these persons shall be endorsed for full accreditation as an Ice Navigator by the Administration on completion of 30 days experience

as a deck watchkeeper while the ship is under way and making way in the presence of ice, and an additional 20 days in polar waters to obtain designation of Arctic or Antarctic Ice Navigator.

13.4.2 Endorsement shall be revalidated every five years. Endorsements may be revalidated once the bearer establishes that the person has had 30 days of Ice Navigator experience within the preceding five-year period. The Administration shall establish procedures for revalidation.]

13.5 Emergency preparedness¹³

13.5.1 In identifying potential emergency shipboard situations in accordance with ISM Code, part 8 provisions, the Company shall consider the influence and impact of the environmental conditions in polar waters.

13.5.2 The Company shall adopt measures in order to ensure the onboard training required by SOLAS regulations II-2/15.2.2 and III/19.4 is adequate for polar water navigation, including instructions and information for passengers in accordance with SOLAS regulation III/19.2.

13.5.3 Training manuals required by SOLAS regulations II-2/15.2.3 and III/35 shall be prepared taking into account polar water environmental conditions. Procedures, plans, and instructions for emergency preparedness shall include all aspects of ship operations in polar waters and, in particular, instructions or procedures on:

- .1 evacuation, survival craft launching, and survival in life-saving appliances at sea and on land (special instructions necessary to use ship's life-saving appliances in severe weather and sea conditions on ice or in a combination of water and ice cover);
- .2 cold weather survival at sea and on land (cold shock, hypothermia, first-aid treatment of hypothermia, and other appropriate first-aid procedures);
- .3 long periods of time on board in case of stacking on ice; and
- .4 communication and assistance procedures in case of navigation in remote areas where SAR service could be unavailable for long periods of time.

13.5.4 Onboard instruction and operation of the ship's evacuation, fire and damage control⁵ appliances and systems shall include appropriate cross training of crew members with appropriate emphasis on changes to standard procedure made necessary by operations in polar waters.

13.5.5 Training equipment shall be maintained in good condition. A number of sewing kits and replacement parts (buttons, bootlaces, etc.) shall be kept on board for the purpose of minor repairs to training kit items.

¹³ Emergency preparedness for environmental protection has not been included at this stage. Draft paragraph 14.2.2 in chapter 14 should be discussed first.

13.6 Drills

13.6.1 The Company shall adopt measures in order to ensure that drills on board required by SOLAS regulations II-2/15.2, III/19.3 and III/30 are suitable for polar water navigation and are documented and certified under the ISM Code provisions. In particular:

- .1 evacuation drill scenarios for crew members shall be varied so that different emergency conditions are simulated, including abandonment into the water, onto the ice if appropriate, or a combination of the two. Each evacuation drill shall include:
 - .1 exercises in passenger control in cold temperatures, as appropriate;
 - .2 checking that all personnel are suitably dressed;
 - .3 donning of immersion suits or thermal protective clothing by appropriate crew members; and
 - .4 [testing of emergency lighting for assembling and abandonment; and] instruction in survival at sea and the use of the ship's life-saving appliances and survival kits.
- .2 [Rescue boat drills shall be conducted as far as reasonable and [practicable] with due consideration of the dangers of launching into polar ice-covered waters, if applicable.]¹⁴
- .3 Fire drill scenarios shall vary each week so that emergency conditions are simulated for different ship compartments, with appropriate emphasis on those changes to standard procedures made necessary by operations in polar waters and low temperatures.
- .4 [Damage control drill¹⁵ scenarios shall vary each week so that emergency conditions are simulated for different damage conditions with appropriate emphasis on those conditions resultant from operations in polar waters.]

CHAPTER 13 – MANNING AND TRAINING FAMILIARITY (Proposal by Canada)

13.1 Goal

13.3.1 The goal of this chapter is to ensure that ships are appropriately manned by adequately qualified, trained and experienced personnel.

13.2 Functional requirements

13.2.1 In order to achieve the goal set out in 13.1.1 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

- .1 The Master, mates, and officers in charge of a navigational watch shall have training and experience appropriate for the vessel's capabilities and

¹⁴ Drill Frequency subject to the result of the discussion of the draft Polar Code (paragraph 13.2.5.1.3).

¹⁵ Damage control drills should be further clarified and their scope differentiated from the ones concerning military ships.

intended operations, or be advised by another person on the bridge having such training and experience.

- .2 Chief Engineer and Second Engineer officers in charge of an engineering watch shall have training and experience appropriate for the vessel's capabilities and intended operations.
- .3 For all ships operating in low air temperature, the company shall establish an appropriate training programme according to the tasks and responsibilities assigned to qualified personnel, taking into account the risks relevant to normal operations, in abnormal situations and in emergency situations in polar waters.

13.3 Requirements/regulations

13.3.1 In order to comply with the functional requirements of 13.2.1.1, the Master, mates and officers in charge of a navigational watch shall be qualified as follows:

- .1 Except as provided for in .2, all ships engaged on voyages other than in open waters shall have on board at least one person qualified in accordance with Regulation II/2 or II/3 of chapter 2 of the STCW Convention, and that have completed an advanced training for ships operating in polar waters.
- .2 All ice strengthened ships, other than tankers or passenger ships, that enter into an area of New or Nilas Ice (less than 10 cm thick) that is not deformed by ridges, and where no ice of land origin, second-year or multi-year ice is present shall have on board at least one person qualified in accordance with Regulations II/1, II/2 or II/3 of chapter 2 of the STCW Convention, and that have completed a basic training for ships operating in polar waters
- .3 All tankers and passenger ships engaged on voyages in open water other than ice-free waters shall have on board at least one person qualified in accordance with Regulation II/1, II/2 or II/3 of chapter 2 of the STCW Convention, and that have completed a basic training for ships operating in polar waters.
- .4 Ships that are on voyages for which measures have been put in place to ensure that all waters en route only in ice-free water do not require officers that have completed training for ship operating in polar waters.

13.3.2 The requirements of 13.3.1 may be satisfied if a person other than a member of the crew, qualified in accordance with Regulation II/1, II/2 or II/3 of chapter 2 of the STCW Convention as appropriate, and that have completed a training for ships operating in polar waters at the appropriate level is on the bridge to provide advice.

13.3.3 Vessel operations [in ice] shall meet at all times section A-VIII/1 of the STCW Code with regards to hours of rest requirements for the persons qualified with training for ships operating in polar waters.

13.3.4 In order to comply with the functional requirements of 13.2.1.3, the Company training program shall include the following as appropriate:

- .1 Survival in cold weather at sea and on land
- .2 Use of personal and group survival equipment
- .3 Abandonment on ice
- .4 Fire-fighting in cold weather
- .5 Operation of machinery and equipment in cold weather and cold water

13.5 Emergency Preparedness¹⁶

Canada agree to delete, as it should be covered in chapter 2 and in 13.2 and 13.3.

13.6 Drills

Canada does not believe this section is needed, the drills shall be conducted taking into consideration the training given for polar operations and the equipment on board.

CHAPTER 13 – [CREWING] [MANNING] [, TRAINING FAMILIARITY, AND CERTIFICATION AND TRAINING] (Proposal by Argentina):

13.1 Goal

13.3.1 The goal of this chapter is to ensure that ships are appropriately operated and manned by adequately qualified, trained and experienced personnel.

13.2 Functional requirements

13.2.1 In order to achieve the goal set out in 13.1.1 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

- .1 Masters, officers in charge of a navigational watch and officers in charge of an engineering watch on board ships operating in polar waters shall have the relevant experience and training.
- .2 The ship's officers [and crew] shall be made familiar with cold weather survival.
- .3 The Company shall establish an appropriate training programme according to the tasks and responsibilities assigned to qualified personnel, taking into account the relevant risks during normal and emergency situations.
- .4 The Company shall consider the influence and impact of the environmental conditions in polar waters in its safety management system.

¹⁶ Emergency preparedness for environmental protection has not been included at this stage. Draft paragraph 14.2.2 in chapter 14 should be discussed first.

[13.3 Qualifications and training

Masters, officers in charge of a navigational watch and officers in charge of an engineering watch on board ships operating in polar waters shall be trained and certified in accordance with the provision of the STCW Convention.

CHAPTER 13 – CREW TRAINING AND CERTIFICATION *(Proposal by the United States)*

13.1 Goal

13.1.1 The goal of this chapter is to ensure that ships are manned by adequately qualified, trained and experienced personnel.

13.2 Functional Requirements

13.2.1 Crew members shall be capable of performing their assigned duties with due consideration to shipboard procedures required by this Code and operations in low air temperatures and ice-covered waters, as applicable.

13.3 Regulations/requirements

13.3.1 In order to comply with the requirement of paragraph 13.2.1 above:

- .1 Every crew member on board ships intended to operate in low air temperatures shall receive training, taking into account any applicable requirements under the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 1978, as amended.
- .2 Every crew member shall be made familiar with the procedures and equipment contained or referenced in the Polar Water Operational Manual relevant to their assigned duties.
- .3 Every officer in charge of a navigational watch on board ships intended to operate in ice shall be trained in ice navigation taking into account any applicable requirements under the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 1978, as amended. A temporary ice pilot for each navigational watch holding an STCW ice navigation endorsement may be provided when ships operate in ice to satisfy this requirement.

(Note: Propose requirements be developed by HTW regarding on board familiarity training, drills, and STCW certifications.)

PART I-B
[ADDITIONAL GUIDANCE REGARDING THE PROVISIONS OF PART I-A]
[RECOMMENDATORY MEASURES]

Additional guidance to chapter 2

Recommendations for content of Ice/Polar Operational Manual (from DE 55/12/11 IACS)

In terms of structural design, a safe speed curves should to be considered:

- .1 GREEN – below and up to the safe speed with no deformation;
- .2 ORANGE – the area from the green to the allowable deformation; and
- .3 RED – the area above the allowable deformation speed.

(insert figure 2 in paragraph 11 of DE 55/12/11)

Safe distance curves should be considered as follows:

- .1 GREEN – the distance is at or beyond the safe stopping distance;
- .2 ORANGE – The distance is between the safe stopping distance and the stopping distance using astern engine movement; and
- .3 RED – The distance is less than the stopping distance with astern engine movement.

The typical contents of Ice Certificate are to include the following information:

- .1 Guidelines/User Manual What is a speed/ice curve?;
- .2 information required for use (ice thickness, concentrations, etc., and the source of the data);
- .3 how to use a speed/ice curve (allowable deformations, safety margins, etc.);
- .4 speed/Ice Curves Data plots for various generic ice conditions (escort, independent, ridges, ice pressure, etc.; and
- .5 recommendations Specific ship advice based on speed/ice curves.

(See also DE 55/12/22)

Guidance on navigation with icebreaker assistance

To achieve compliance with the functional requirements in paragraph 12.2.1.5 above:

- .1 while approaching to a starting point of the ice convoy to follow the icebreaker/icebreakers or in case of the escorting by icebreaker of one ship to the point of meeting with icebreaker, the ship establishes radio communication on the VHF channel 16 and acts in compliance with icebreaker's instructions;

- .2 the icebreaker rendering the icebreaker assistance of ship ice convoy commands ships in the ice convoy;
- .3 position of a ship in the ice convoy is determined by the icebreaker rendering the assistance.
- .4 ship within the ice convoy, in accordance with the instructions of the icebreaker rendering the assistance, establishes communication with the icebreaker by VHF channel indicated by the icebreaker;
- .5 the ship while navigating in the ice convoy has to ensure: compliance with the instructions of the icebreaker;
- .6 position in the ice convoy, speed and distance to a ship ahead as instructed by the icebreaker; immediate notification of the icebreaker of any difficulties to maintain the position within the ice convoy, speed and/or distance to any other ship in the ice convoy; and
- .7 immediate reporting to the icebreaker of any damage.]

In developing the ship's contingency plans ships should consider damage control measures arrangements for emergency transfer of liquids and access to tanks and spaces during salvage operations.

Additional guidance to chapter 3

The following issues could be included in the additional guidance, but they are not yet developed in detail:

- .1 Guidelines for the applicability of the ship related to structural integrity and propulsion capability for sailing in ice-covered polar waters, and possible operational instructions for the master of the ship related to navigation in different ice conditions;
- .2 Guidelines for determination of the minimum engine power of the ship for the anticipated operation of the ship in polar waters;
- .3 a table indicating the approximate correspondence between the polar classes and other ice classes of classification societies and Administrations.

Table 2.1. Approximate correspondence between ice classes

Approximate correspondence between the polar classes for existing ships

[A table indicating the approximate correspondence of structural strength between the polar classes and other ice classes of classification societies and Administrations for category A ships is given in table 2.1 and category B ships in table 2.2.

Table 2.1. Approximate correspondence of structural strength between ice classes for category A ships

Class	Ice Class				
	PC1	PC2	PC3	PC4	PC5
IACS PC	PC1	PC2	PC3	PC4	PC5
ABS		A4	A3	A2	
DNV	POLAR-30	POLAR-20	ICE-15 POLAR-10	ICE-10 ICE-15	ICE-05
KR	PL-20 PL-30	ICE-15 PL-10	ICE-05 ICE-10		
GL		Arc3	Arc2	Arc1	
LR		AC2	AC1.5	AC1	
RS		Arc9/Arc8	Arc7	Arc6	
Notes					
1. It is required to assess the ship on a case-by-case basis.					
2. This table is prepared based on comparative bow shell plate thicknesses for typical ice class configurations and vessels. Consideration should be given to other scantlings, materials, machinery, steering and propeller requirements.					

Table 2.2. Approximate correspondence of structural strength between ice classes for category B ships

Class	Ice Class	
	PC6	PC7
IACS PC	PC6	PC7
FSICR	IA Super	IA
ABS	A1	A0
BV	IA Super	IA
CCS	B1*	B1
DNV	Ice 1A*	Ice 1A
GL	E4	E3
KR	1A Super	1A
LR	1AS FS	1A FS
NK	IA Super	IA
RINA	IAS	IA
RS	Arc5	Arc4
Note		
1. IACS Polar Classes are developed based on independent navigation in multi-year ice, whilst corresponding ice classes shown are developed based on navigation in the Northern Baltic in first-year ice conditions. Consideration should be given to the intended operation and measures included in the PWOM as appropriate, such as safe speeds in ice.		

Other ice classes will be assessed on a case-by-case basis.]

When abrasion and corrosion resistant coatings and claddings are used they shall be matched to the anticipated loads and structural response.

Additional guidance to chapter 8

Personal survival kits should be stored so that they may be easily retrieved in an emergency situation. Arrangements such as storage in dedicated lockers near the assembly stations may be considered. Content?

Group survival kits should be stored so that they may be easily retrieved and deployed in an emergency situation. Any containers should be located adjacent to the survival craft and

liferrafts. Containers should be designed so that they may be easily moved over the ice and be floatable. Content?

Additional guidance to chapter 10

Radars equipped with enhanced ice detection capability should be promoted used in particular in shallow waters.

Additional guidance to chapter 12

In developing and executing a voyage plan ships should consider the following:

1. In the event that marine mammals are encountered, any existing best practices should be considered to minimize unnecessary disturbance.
2. Planning to minimize the impact of the ship's voyage where ships are trafficking near areas of cultural heritage and cultural significance.

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(Note: If kept it is commented that a reporting system must be in place and some clarification is asked for.)

PART II-A
POLLUTION PREVENTION MEASURES [ENVIRONMENTAL PROTECTION MEASURES]

CHAPTER 1 – PREVENTION OF OIL POLLUTION

1.1 Application

Unless expressly provided otherwise, ships operating in polar waters shall comply with the provisions included in this chapter.

1.2 Goal

The goal of this chapter is to provide for means to reduce and to the extent practicable prevent harmful environmental impacts from oil from ships, taking into account the particular environmental conditions and resilience capabilities in polar waters.

1.3 Functional requirements

In order to achieve the goal set out in paragraph 1.3 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

- .1 Plans, manuals, records and procedures and means shall be provided to avoid environmental impact from oil or oily mixtures during normal operation.
- .2 Ships shall be designed and have plans to minimize the risk of any environmental impact from oil or oily mixtures in case of an emergency situation in particular one that may lead to an oil spill in ice covered waters.

1.4 Requirements

1.4.1 In order to comply with the functional requirements in paragraph 1.4.1 above, the following apply:

- .1 any manuals and records required by MARPOL Annex I shall take into account operation in polar waters; and
- .2 any discharge into the sea of oil or oily mixtures from any ship shall be prohibited.

1.4.2 In order to comply with the functional requirements in paragraph 1.4.1.2 above, the following apply:

- .1 the shipboard oil pollution emergency plan required by MARPOL Annex I shall take into account operation in polar waters; and
- .2 for categories A and B ships, constructed on or after [date of entry into force], all tanks used for carriage of oil or oily mixtures shall be separated from the outer shell by a distance not less than 760 mm. Where this is not practicable, this requirement needs not to be met for tanks containing oil or oily mixtures carried in way of the machinery space with an individual capacity of 20 m³ or less.

CHAPTER 2 – PREVENTION OF POLLUTION FROM NOXIOUS LIQUID SUBSTANCES

2.1 Application

Unless expressly provided otherwise, ships operating in polar waters shall comply with the provisions included in this chapter.

2.2 Goal

The goal of this chapter is to provide for means to reduce and to the extent practicable prevent harmful environmental impacts from noxious liquid substances from ships, taking into account the particular environmental conditions and resilience capabilities in polar waters.

2.3 Functional requirements

In order to achieve the goal set out in paragraph 2.3 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

- .1 Records, manuals and means shall be provided to avoid environmental impact from noxious liquid substances during normal operation; and
- .2 Ships shall be designed and have plans to minimize the risk of environmental impact from noxious liquid substances in case of an emergency situation.

2.4 Requirements

2.4.1 In order to comply with the functional requirements in paragraph 2.4.1 above, the following apply:

- .1 The cargo record book and the Procedure and Arrangement Manual required by MARPOL Annex II shall take into account operation in polar waters; and
- .2 Any discharge into the sea of noxious liquid substances, or mixtures containing these substances, is prohibited.

2.4.2 In order to comply with the functional requirements in paragraph 2.4.2 above, the following apply:

- .1 The shipboard marine pollution emergency plan for noxious liquid substances required by MARPOL Annex II shall take into account operation in polar waters; and
- .2 For categories A and B ships, constructed on or after [date of entry into force], all tanks used for carriage of noxious liquid substances shall be separated from the outer shell by a distance not less than 760 mm. ;

CHAPTER 3 – PREVENTION OF POLLUTION BY HARMFUL SUBSTANCES IN PACKAGED FORM

Kept blank intentionally. (Note: I understand this has been done before. If at any point additional requirements will be included, we do not need to renumber and the numbers of the other chapters will match the number of the Annexes in MARPOL)

CHAPTER 4 – PREVENTION OF POLLUTION BY SEWAGE FROM SHIPS

4.1 Application

Unless expressly provided otherwise, ships operating in polar waters shall comply with the provisions included in this chapter.

4.2 Goal

The goal of this chapter is to provide for means to reduce and to the extent practicable prevent harmful environmental impacts by sewage from ships, taking into account the particular environmental conditions and resilience capabilities in polar waters.

4.3 Functional requirements

In order to achieve the goal set out in paragraph 4.3 above, ships shall be operated to minimize the risk of environmental impact by discharge of sewage from ships.

4.4 Requirements

In order to comply with the functional requirements in paragraph 4.4 above, the following apply:

- .1 Subject to the provisions of MARPOL Annex IV, regulation 3, discharges of sewage within polar waters are subject to the following additional requirements in accordance with standards [approved by the Administration based upon guidelines developed by] [acceptable to] the Organization¹⁷:
 - .1 discharges of sewage that is comminuted and disinfected and permitted under MARPOL Annex IV, regulation 11.1.1 shall be at a distance of more than 3 nautical miles from any ice shelf or land-fast ice and shall be as far as practicable from areas of ice concentration exceeding 1/10;
 - .2 discharges of sewage that is not comminuted and disinfected and permitted under MARPOL Annex IV, regulation 11.1.1 shall be at a distance of more than 12 nautical miles from any ice shelf or land-fast ice and shall be as far as practicable from areas of ice concentration exceeding 1/10; and
 - .3 discharges of sewage permitted under MARPOL Annex IV, regulation 11.1.2 or MARPOL Annex IV, regulation 11.3 shall be as far as practicable from the nearest land, any ice shelf, land-fast ice or areas of ice concentration exceeding 1/10.

¹⁷ Refer to resolution MEPC.2(VI), resolution MEPC.159(55) or resolution MEPC.227(64) as applicable.

- .2 Discharge of sewage into the sea is prohibited from cargo ships of category A and B, constructed on or after [date of entry into force], and passenger ships constructed on or after [date of entry into force] except when such discharges have been treated by means of a type-approved sewage treatment plant based upon guidelines developed by the Organization¹⁸. Such discharges shall be, as far as practicable, from the nearest land, any ice shelf, land-fast ice or areas of ice concentration exceeding 1/10.
- .3 Notwithstanding the requirements of paragraph 4.5.1, ships that operate in areas of ice concentrations exceeding 1/10 for extended periods of time may discharge sewage if such sewage has been treated by means of a [type-approved] sewage treatment plant [approved] based upon guidelines developed by the Organization²². Such discharge shall be subject to the approval of the Administration, [and shall be noted in the Polar Ship Certificate with supplemental operational information in the Polar Water Operations Manual.] (Note: TYPE-approval based upon guidelines is questioned)

CHAPTER 5 – PREVENTION OF POLLUTION BY GARBAGE

5.1 Application

Unless expressly provided otherwise, ships operating in polar waters shall comply with the provisions included in this chapter.

5.2 Goal

The goal of this chapter is to provide for means to reduce and to the extent practicable prevent harmful environmental impacts by discharge of garbage from ships, taking into account the particular environmental conditions and resilience capabilities in polar waters.

5.3 Functional requirements

In order to achieve the goal set out in paragraph 5.3 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

- .1 records and, plans shall facilitate the minimization of environmental impact by garbage;
- .2 ships shall be operated to minimize the risk of environmental impact by garbage.

5.4 Requirements

5.4.1 In order to comply with the functional requirements in paragraph 5.4.1 above, any plans and records required by MARPOL annex V shall take into account operation in polar waters.

5.4.2 In order to comply with the functional requirements in paragraph 5.4.2 above, ships to which the requirements of MARPOL Annex V, regulation 6 do not apply shall comply with the following:

¹⁸ Refer to the *2012 Guidelines on implementation of effluent standards and performance tests for sewage treatment plants* (resolution MEPC.227(64)).

- .1 discharge of food waste is only permitted when the ship is en route and as far as practicable from the nearest land, but in any case not less than 12 nm from the nearest land, nearest ice shelf, or nearest land-fast ice and shall be as far as practicable from areas of ice concentration exceeding 1/10;
- .2 food waste shall be comminuted or ground and shall be capable of passing through a screen with openings no greater than 25 mm. Food wastes shall not be contaminated by any other garbage type;
- .3 food waste shall not be discharged onto the ice; and
- .4 discharge of animal carcasses within Arctic waters is prohibited.

PART II-B

[INFORMATION AND ADDITIONAL GUIDANCE TO PART II-A] [RECOMMENDATORY MEASURES]

GENERAL INFORMATION

Different from the Arctic, the Antarctic has been specifically regulated under various MARPOL Annexes prior to the entry into force of the Polar Code. Upon entry into force of the Polar Code, there will still be some differences in the environmental protection requirements for ships operating in the Antarctic and ships operating in the Arctic:

MARPOL Annex I

- 1 The Antarctic area was designated a special area under MARPOL Annex I.
- 2 Discharge requirements are contained in regulations 15 and 34 of the Annex.
- 3 Regulation 15.4 provides that any discharge into the sea of oil or oily mixtures from any ship shall be prohibited.
- 4 Requirements on the reception facilities in special areas are contained in regulation 38.
- 5 Regulation 43 prohibits the use or carriage of [certain] oils in the Antarctic area.

MARPOL Annex II

- 1 Regulation 13.8.2 prohibits any discharge into the sea of noxious liquid substances or mixtures containing such substances.

MARPOL Annex V

- 1 The Antarctic area was designated a special area under MARPOL Annex V.
- 2 Discharge requirements for special areas are contained in regulation 6 of the annex. Regulation 6.1.1 also provides that discharge of introduced avian products, including poultry parts, is not permitted in the Antarctic area unless it has been treated to make sterile.

MARPOL Annex VI

- 1 MEPC 65 approves draft amendments to MARPOL VI to exempt cargo ships having ice-breaking capacity from EEDI requirements.

[1 Additional guidance to chapter 1

(Note: This part is proposed deleted)

In addition to the provisions contained in chapter 1 of this Code, ships shall comply with regulation 43 of MARPOL Annex I, which prohibits the use or carriage of heavy fuel oil in Antarctic area. [Ships may, on a voluntary basis, not use or carry heavy fuel oil in Arctic area.]

2 Additional guidance to chapter 5

To meet the discharge requirements of MARPOL Annex V, due consideration should be given to resolution MEPC.219(63) *2012 Guidelines for the implementation of MARPOL Annex V* and resolution MEPC.220(63) *2012 Guidelines for the development of garbage management plans*. Given that the discharge of animal carcasses is prohibited, consideration should be given to the management, treatment, and storage of animal carcasses and, as appropriate, any future guidelines developed by the Organization.

3 Miscellaneous additional guidance

3.1 Until the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention) enters into force, the ballast water management provisions of the ballast water exchange standard, set out in regulation D-1, or the ballast water performance standard, set out in regulation D-2 of the BWM Convention should be considered as appropriate. The provisions of the Guidelines for ballast water exchange in the Antarctic treaty area (resolution MEPC.163(56)) should be taken into consideration.

3.2 In selecting the ballast water management system, attention should be paid to limiting conditions specified in the appendix of the Type Approval Certificate and the temperature under which the system has been tested, in order to ensure its suitability and effectiveness in polar waters.

3.3 Non-toxic biodegradable lubricants or water-based systems should be considered for stern tube bearings, stern seals, and other lubricated components located outside the underwater hull.

3.4 In order to minimize the risk of invasive aquatic species transfers via biofouling, measures should be considered to minimize the risk of more rapid degradation of anti-fouling coatings associated with polar ice operations. Reference is made in particular to resolution MEPC.207(62), *2011 Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species*.

Table: Example of matters related to anti-fouling systems taken into consideration by some ice going ships (This table is used by some operators of ice going ships)

	Hull	Sea Chest
Year round operation in ice covered polar waters	Abrasion resistant low friction ice coating No anti-fouling system	Abrasion resistant coating Compliant with the AFS Convention. Thickness of anti-fouling system to be decided by ship owner.
Intermittent operation in ice covered polar waters	Abrasion resistant low friction ice coating In sides above bilge keel max thickness of anti-fouling system 75 µm [to protect hull between application of anti-fouling system and next anticipated voyage to ice covered waters]. In bottom area thickness to be decided by ship owner. Composition of anti-fouling system should be decided	Compliant with the AFS Convention. Thickness of anti-fouling system to be decided by ship owner.
Category B & C vessels	Compliant with the AFS Convention. Thickness of anti-fouling system to be decided by ship owner.	Compliant with the AFS Convention. Thickness of anti-fouling system to be decided by ship owner.

APPENDIX

Form of Certificate for Ships operating in Polar Waters

POLAR SHIP [SAFETY] CERTIFICATE

This Certificate is a supplement to the Passenger Ship Safety Certificate/Cargo Ship Safety Construction Certificate¹⁹

The certificate shall be supplemented by a Polar Water Operational Manual

(Official seal)

(State)

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

(name of the State)

by _____
(person or organization authorized)

Name of ship
Distinctive number or letters
Port of registry
Gross tonnage
IMO Number²⁰

¹⁹ Delete as appropriate.

THIS IS TO CERTIFY:

- 1 That the ship has been surveyed in accordance with the requirements of regulation I/7 of the *Safety of Life at Sea*.
- 2 That the survey showed that the ship complied with the requirements of the International Code for Ships operating in Polar Waters as a

Category A / B / C²¹ ship as follows:

Ice class/ No Ice class ³	Minimum operational temperature °C	[Latitude]	Any other limitations	

- 3 The ships was/was not³ subjected to an alternative design and arrangements in pursuance of regulations(s) [XIII/6] of the Safety of Life at Sea Convention;
- 4 Document of approval of alternative design and arrangements for [structural integrity] machinery and electrical installations/fire protection/life-saving appliances and arrangements³ is/is not³ appended to this Certificate.
- 5 That an Exemption Certificate has/has not³ been issued.

This certificate is valid until

Completion date of the survey on which this certificate is based:
(dd/mm/yyyy)

Issued at
(Place of issue of certificate)

.....
(Date of issue)

.....
(Signature of authorized official issuing the certificate)

(Seal or stamp of the issuing authority, as appropriate)

²⁰ In accordance with *IMO ship identification number scheme* adopted by the Organization by resolution A.600(15).
²¹ Delete as appropriate.