

SUB-COMMITTEE ON SHIP DESIGN AND
CONSTRUCTION
1st session
Agenda item 3

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ENGLISH ONLY

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

Draft text of the Polar Code

Submitted by Norway

SUMMARY

Executive summary: This document contains the draft text of the Polar Code as developed by the correspondence group

Strategic direction: 5.2

High-level action: 5.2.1

Planned output: 5.2.1.19

Action to be taken: Paragraph 2

Related documents: SDC 1/3 and SDC 1/3/3

1 Attached in the annex is the text of the draft Polar Code as developed by the correspondence group, established at DE 57. The Sub-Committee is invited to note that, in addition to the unsolved issues reported in document SDC 1/3/3, there are a number of comments and square brackets for further consideration in the working group, if established.

Action requested of the Sub-Committee

2 The Sub-Committee is invited to note the outcome of the correspondence group and agree to use the annex as basis for further discussion in the working group.

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

(Note: The preamble will be revisited once the draft text is accepted to see that there is alignment between the code text and the 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.] (Note: It is commented that the preamble should recognize that other adjacent areas could also pose similar risks.)

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.]]

(Note: it has been proposed that when addressing this potential synergistic risk level, the precautionary principle should be applied.)

Alternative:

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

3.bis 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.

(Note: Included based on the discussions in the ISWG)

4 [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.)

5 [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.]]

[6 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.]

(Note: This is the preferred alternative, however 6 is also proposed deleted.)

7 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.

(Note: According to MSC.1/Circ.1394, references to relationship to other relevant codes/standards should be in the preamble.)

INTRODUCTION

(Note: Square brackets to be revisited towards finalization)

[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] Sources of hazards

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

2.2 Factors that may increase probability include:

- .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];

Alternatively

Encountering sea or glacial ice, with the potential for damage to hull and machinery;

- .2 experiencing topside icing, with potential loss of stability and equipment functionality;

(Note: New proposal)

- .3 very low temperature as it affects the working environment and human performance, maintenance and emergency preparedness tasks, material properties and equipment efficiency;

Alternatively:

Exposure to extremely low temperatures, with potential for material failures and loss of human performance;

- .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;

- .6 remoteness and possible lack of accurate and complete hydrographical data and information and seamarks;

- .7 Limited infrastructure such as hydrography and navigational aids, with potential for groundings;

(Note: New proposal related to .6 above)

- .8 Lack of experience in polar operations, with potential for human error.
(Note: New proposal)

2.3 Factors which may increase the severity of consequences include:

- .1 low temperature as it affects human performance, survival time and performance of safety equipment and systems;
- .2 remoteness with respect to [response time] [readily availability of sufficient SAR facilities and supplies for survivors];

Alternatively:

Remoteness, with the potential for delays in emergency response;
Limited communications capability, with the potential to affect incident response;

- .3 Lack of suitable emergency response equipment, with the potential for limiting the effectiveness of mitigation measures; (Note: New proposal)
- .4 [the possible escalation of emergencies due to combination of hazards acting in concert to exacerbate the situation]; and

Alternatively

Rapidly changing and severe weather conditions, with the potential for escalation of incidents;

- .5 the environment with respect to sensitivity to harmful substances and other environmental impacts and its need for longer restoration.]

Alternatively

Lack of resilience of ecosystems, with the potential for more severe and lasting environmental damage;

Alternatively

2.3 [The Polar Code considers additional or more severe hazards encountered in Polar Waters. The additional hazards can be effected by:

- 1. low temperature as it [can] affect[s] [survival time] working environment and human performance, maintenance and emergency preparedness tasks, material properties and equipment efficiency, and malfunction of safety equipment and systems;
- 2. ice as it can affect hull structure, stability characteristics, machinery systems, navigation, the outdoor working environment and maintenance and emergency preparedness tasks;
- 3. darkness as it can affect navigation and human performance;
- 4. high latitude as it [can] affect[s] navigation systems, communication systems and the quality of ice imagery information;
- 5. remoteness due to lack of proper charts and seamarks and lack of readily available and sufficient SAR facilities; [and]

6. [enhanced] environmental sensitivity to both operational and accidental damage.]

2.4 [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.]

(Note 10: To be revisited once the draft is more finalized. So far we have not developed any requirements related to geographical location or time of year)

[Section 3] 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.

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

(Note: This is the MARPOL definition and should not be changed)

(Figure 1 and 2 in the guidelines will change numbers as the Antarctic area comes first in the definitions)

3.2 [*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)

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

3.3 *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.

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

3.5 *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.

3.6 *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.

[3.7 [*First year ice* means sea ice of not more than one winter growth developing from young ice with thickness from [0.2-1.0] [0.3-2.0] metre.]

(Note: 0.3-2.0 meter is according to WMO)

3.8 *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.

(Note: Do we need this?)

[3.8.bis *Medium first-year ice* means first-year ice of 70-120 cm thickness.]

3.9 [*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.]

3.10 *Organization* means the International Maritime Organization.

(Note: Do we need this?)

3.11 *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.

(Note: Need for this is questioned)

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

(Note: Need for this is questioned)

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

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

(Note: Do we need this?)

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

(Note: Do we need this?)

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 4] Structure of the Code

4.1 This Code consists of Parts I and 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.

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

[4.2 bis Part I-A and I-B may be amended by MSC and Part II-A and II-B may be amended by MEPC] (Note: This is not a final text, more a reminder)

4.3 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.

4.4 Each chapter consists of the overall goal of the chapter and functional requirements to fulfill the goal. Where considered necessary, additional prescriptive requirements have been included. However, these additional prescriptive requirements may not cover all necessary measures to achieve compliance with a functional requirement and full compliance must be demonstrated to the satisfaction of the Administration.]

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

Alternatively:

The requirements included in this Part as applicable under the relevant paragraphs of this Code, apply to ships operating in Polar Waters.

[1.2 Exemptions]

[1.2.1 This Code shall not apply to any warship, naval auxiliary or other ship owned or operated by a State and used, for the time being, only on Government non-commercial service. However, each Party to the Code shall ensure, by the adoption of appropriate measures not impairing the operations or operational capabilities of such ships owned or operated by it, that such ships act in a manner consistent, so far as is reasonable and practicable, with the Code.]

(Note: As the Polar Code will be made mandatory through SOLAS and MARPOL, the more general exemptions should follow the parent Convention and be deleted here.)

[1.2bis Functional requirements

(Coordinators comment: If Accepted this should go to the General part.)

(Note: New proposal to describe functional requirements and clarify their legal status, based on goal based standards example in SOLAS II-2 which was approved by MSC)

1.2.1 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.]

(Coordinators comments: Please see section 4 of introduction.)

[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. (Note: NAV has not been able to come up with a definition of conning position and this should either be deleted or sent to NAV)

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.]

(Note: This should in my view not be included as this is an STCW matter.)

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 *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

(Note: It is commented that the HSC Code has separate parts for survey and certificate, however SOLAS has not. Both ways will work)

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 x and [approved by the Administration].

(Note: It is proposed to delete "approved by the Administration")

Alternatively:

[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.

(Note: The text is considered necessary as SOLAS lists the various certificated in reg.1/12.a)viii and the Polar Code Certificate is obviously not listed. Perhaps an amendments to SOLAS reg.1/12a)viii should be considered)

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.

(Note: SOLAS text)

Alternatively:

[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.]

(Note: HSC text)

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.]

(Note: Last part proposed deleted)

1.5 [Operational Limitations] [Risk assessment]

(Note: The [risk] assessment is not only related to safety and should be in the General part and we will see if there is anything left for "operational Limitations") It is proposed to add by whom this risk assessment shall be conducted. It is also commented that it should not be a full risk assessment)

1.5.1 [A risk] [An] assessment shall be conducted to determine whether operational limitations, plans, procedures or additional safety equipment are necessary [in order to comply with the requirements of this Part] [to reduce risk by meeting additional provisions of the Code]. [Reference is made to Chapter 2 – Polar Water Operational Manual, Chapter 6 – Machinery, Chapter 9 – Lifesaving appliances and arrangements, Chapter 12 – Operations, Chapter 14 – Contingency Measures, Part II-A [Environmental Protection Measures] [Pollution Prevention Measures]. Consideration shall be given to the intended operating environment of the ship, including:

Alternatively:

[1.5.1 In order to obtain a Polar Ship Certificate, the Company shall conduct [a risk assessment] [and assessment] to determine risks related to the ship operational profile under recognized or expected threats. This assessment could provide information on operational limitations, plans, procedures or additional safety equipment necessary to reduce risk by meeting additional provisions of the Code. Consideration shall be given to the intended operating environment of the ship, including:]

Alternatively

[A risk assessment] [an assessment] shall be conducted to define the operating limits for the ship, taking into account all construction features, equipment, manning, and operational procedures necessary to prevent incidents with potential safety or environmental

consequences. [Reference is made to Chapter 2 – Polar Water Operational Manual, Chapter 6 – Machinery, Chapter 9 – Lifesaving appliances and arrangements, Chapter 12 – Operations, Chapter 14 – Contingency Measures, Part II-A Pollution Prevention Measures]. Consideration shall be given to the operating environment for the ship, including:]

- .1 operations in low temperatures,
- .2 operations in [ice-covered waters] [or near ice],
- .3 abandonment onto ice or land,
- .4 ice accretion [and freezing] on ship's systems and components,
- .5 [lack of available] [availability of] response resources,
- .6 availability of adequate reception facilities
- .7 maximum expected time of rescue

[1.5.2 Details of hazards, [unique to polar operations which are expected to be encountered] and the means by which risks are mitigated, shall be documented in the Polar Water Operational Manual to the satisfaction of the Administration.]

(Note: Deletion proposed.)

[1.5.4 With icebreaker assistance, the ship may operate in more severe ice conditions than prescribed by the Code to the ship [as specified in the Polar Water Operational Manual]. [Relevant terms [of operation] should be specified in the Polar Water Operational Manual.]

Alternatively

[1.5.4 Different operational limitations may apply depending on whether the ship is operating independently or with icebreaker escort. Where appropriate, the PWOM should properly specify both options.]

(Note: should probably migrate to Chapter 2 with other PWOM provisions.)

New proposals round 4:

[1.5.5 Risk assessments shall be conducted based on the Guidelines adopted by the Organization¹.

1.5.6 The risk assessment shall be reassessed at periods established by the Administration based on the results of the ship operation.

1.5.7 When the ship operation profile is changed, the Company shall conduct and submit to the Administration a new assessment.

1.5.8 The Company shall establish procedures to monitor the uncertainties assumed during risk assessments. This information shall be submitted to the Administration in the cases indicated in paragraphs 1.5.6 and 1.5.7.]

Proposal for a new section:

[1.6 Performance Standards

1.6.1 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 Refer to *Guidelines for the approval of alternatives and equivalents as provided for in various IMO*

1.6.2 Except as provided in 1.6.4, equipment stowed in exposed locations of the ship shall be certified for a temperature that is equal to or lower than the minimum anticipated temperature [+ safety margin], if this temperature is lower than the one required by relevant IMO instruments.

1.6.3 Survival systems and equipment shall be certified to ensure its operation at minimum anticipated temperature during the maximum expected rescue time.

1.6.4 Exposed shipborne navigational equipment shall be certified to ensure its operation at lowest mean daily average temperature.]

New proposal:

1.7 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.

(Note: This text is from HSC-Code)

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 hazards listed in [the Introduction], as applicable]. [risk assessment required under Chapter 1.5]

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 [unexpected] conditions that [temporarily] exceed the ships capabilities in normal operations.]

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

2.3 Requirements/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;
- .4 voyage duration; and
- .5 Waste Stream Management.]

[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 the 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:

- .1 measures to be taken in the event of encountering conditions which exceed the ships design capabilities or limitations;
- .2 emergency response using all equipment required under other chapters of this code;
- .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 2.2.5, 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.] (Note: alternative to addressing this in chapter 1)

CHAPTER 3 – STRUCTURAL INTEGRITY [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:

(Note: It is proposed to delete the introduction under all the headings “functional requirements”)

- .1 Materials used shall be suitable for operation at the ships design 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/requirements

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 Organization² or other standards offering an equivalent level of safety based on the design service temperature.

(Note: Concerns has been raised on the legality of the former text, so I have used the formulations from chapter 2 throughout the Code. See also section 4 of introduction (When there is only one requirement, subparagraphs is not used))

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 Organization³ or other standards offering an equivalent level of safety.
- [.1 Category A ships shall be ice strengthened and the scantling of the ship 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 Organization⁴ or other standards offering an equivalent level of safety.

² Refer to IACS Unified requirements for Polar Ships (UR S-6 and UR I1, I3 (Oct.2007) and UR I2 Nov. 2010).

³ Refer to Polar Class 1-5 of IACS Unified requirements for Polar Ships (UR I1 and I3 (Oct.2007) and UI I2 (Nov. 2010)).

⁴ Refer to Polar Class 6-7 of IACS Unified requirements for Polar Ships (UR I1 and I3 (Oct.2007) and UI I2 (Nov. 2010)).

- [.2 Category B ships shall be ice strengthened and the scantling of the ship 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.
- [.3 Category C ships shall be ice strengthened and the scantling of the ship shall be approved by the Administration, or a recognized organization accepted by it, taking into account acceptable standards adequate for the ice types and the 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 [and when encountering any ice types and concentrations defined in the Polar Waters Operations Manual]. (Note: Deletion of last part proposed.)

CHAPTER 4 – STABILITY (INTACT AND DAMAGE) [AND SUB-DIVISION]

4.1 Goal

4.1.1 The goal of this chapter is to ensure provision of sufficient stability and subdivision for ships in intact and damaged conditions.

4.2 Functional requirements

4.2.1 In order to achieve the goal set out in 3.1.1 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

- .1 Ships of category A and B shall have sufficient residual stability to sustain ice related damages.
- .2 All ships shall have sufficient stability in intact and damaged condition when subject to ice accretion.
- .3 Ships of category A shall have sufficient stability to sustain the effects of riding up on ice.
- .4 All ships shall have sufficient residual stability to sustain grounding.

4.3 Requirements/regulations

4.3.1 The effect of ice accretion shall be included in the intact and damage stability calculations in accordance with specifications at least equivalent to those given in part B of the 2008 IS Code.

[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 necessary measures taken to ensure that the ice accretion does not exceed the values given in the Polar Water Operational Manual.]

4.4 [Intact stability in ice] [Additional requirements for category A [and B] ships]

4.4.1 Suitable calculations shall be carried out and/or tests conducted to demonstrate the following:

- .1 the ship, when operated in ice within approved limitations, during a disturbance causing roll, pitch, heave or heel due to turning or any other cause, shall maintain sufficient positive stability; and]
- .2 For ships whose operational profile includes riding up in ice and icebreakers of all classes, when riding up in ice and remaining momentarily poised at the lowest stem extremity, shall maintain sufficient positive stability.

4.4.2 Sufficient positive stability in paragraph[s 3.4.1.1 and]3.4.1.2 means that the ship is in a state of equilibrium with a positive metacentric height of at least 150 mm, and a line 150 mm below the edge of the freeboard deck as defined in the applicable ICLL, is not submerged.

4.4.3 For performing stability calculations on ships that ride up onto the ice, the ship shall be assumed to remain momentarily poised at the lowest stem extremity as follows:

- .1 for a regular stem profile, at the point at which the stem contour is tangent to the keel line;
- .2 for a stem fitted with a structurally defined skeg, at the point at which the stem contour meets the top of the skeg;
- .3 for a stem profile where the skeg is defined by shape alone, at the point at which the stem contour tangent intersects the tangent of the skeg; or
- .4 for a stem profile of novel design, the position shall be specially considered.

4.5 Stability in damaged conditions

4.5.1 Ships of category A and B 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, has $s_i = 1$ for all loading conditions.

4.5.2 The ice damage extent to be assumed when demonstrating compliance with paragraph 3.5.1 shall be such that:

- .1 longitudinal extent 0.045 of deepest ice waterline length if centred forward of the point of maximum beam on the waterline, and 0.015 of waterline length otherwise;
- .2 transverse extent is 760 mm measured normal to the shell over the full extent of the damage;

- .3 vertical extent the lesser of 0.2 of draft at the upper [ice] waterline⁵, or of 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.

4.5.3 Damage as defined in paragraph 3.5.2 is to be assumed at any position along the side shell.

4.6 Subdivision

4.6.1 Double bottoms shall be arranged over the breadth and the length between forepeak and afterpeak bulkheads.

[4.6.2 Ships with ice strengthening and ships that have icebreaking bow forms and short forepeaks may dispense with double bottoms up to the forepeak bulkhead in the area of the inclined stem.]

[Note: Definition of 'short forepeak', 'forepeak bulkhead' is needed].

CHAPTER 5 – WATERTIGHT AND WEATHERTIGHT INTEGRITY

[Note: This chapter was not discussed by SLF and I have made some comments and proposals]

5.1 Goals

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 4.1.1 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

- .1 [All exposed] Closing appliances [relevant to watertight and weathertight integrity of the ship] shall be designed [and dimensioned] [taking into account the design basis [metocean] conditions for the ship] to avoid malfunction. [Note: I think this is covered by the more general requirements for material and construction and could be deleted.]
- .2 All doors and the adjacent deck areas on emergency escape routes and navigation bridge doors and the adjacent deck areas shall be [designed and arranged so that they remain free of snow and ice so as to be readily functional.] [accessible at all times] [and readily used by personnel wearing bulky polar clothing.]] [Note: This is covered in chapter 9, is not related to integrity and could be deleted.]

⁵ Refer to the IACS Unified Requirements for Polar Class Ships.

- [.3 [For ships operating in [low] air temperature[s below 0°C], access to the deck for personnel (e.g. doors, hatches, etc.) and to other equipment located on the main decks shall be available at all times. Access by the operating personnel shall not be obstructed by ice accumulation or endangered by overhead ice accumulation.] (Note: I think this is the additional measure we are looking fore and is also what the regulations/requirements address.)
- .4 Where appropriate, weathertight doors, hatches and closing devices should be designed to be operated by personnel wearing heavy winter clothing including thick mittens] (Covered in chapter 7??)

If you agree with my comments paragraph 5.2.1 will look like this:

5.2.1 In order to achieve the goal set out in 4.1.1 above, for ships operating in [low air temperature] [temperatures below 0°C], access to the deck for personnel (e.g. doors, hatches, etc.) and to other equipment located on the main decks shall be available at all times. Access by the operating personnel shall not be obstructed by ice accumulation or endangered by overhead ice accumulation.]

(Note: I would also propose to move the last sentence down to requirements/regulations)

5.3 Requirements/regulations

5.3.1 In order to comply with the functional requirements of paragraph 5.2.1.3 above, the following apply:

- [.1 Where appropriate, arrangements or equipment shall be provided to efficiently remove ice build-up around hatches and doors.]
- [.2 If the hatches or doors are hydraulically operated, the hydraulic oil shall be suitable for [the minimum anticipated temperature]. A heater or other suitable means for heating purposes shall be provided for the hydraulic oil sump, where necessary. The use of steam heating coils is not permitted. If the power unit and hydraulic lines are located in a heated space, a heater is not necessary.]

Alternatively:

- [.2 Hatches and doors shall be operable at the minimum anticipated temperature.]
- [.3 Hatch and door seals shall remain effective at the minimum anticipated temperature.]

CHAPTER 6 – MACHINERY INSTALLATIONS

(Note: It is commented that we need a common understanding of the term machinery systems and it is proposed that we are talking about main propulsion, steering gear, emergency and essential auxiliary systems that are essential for the safety of the ship and the survivability of the crew. It is proposed included as a footnote, see below. It has also been pointed out that SOLAS uses Machinery installations and we should use the same here)

6.1 Goal

(Note: It has been commented that some of the requirements should apply also in temperatures between 0 and minus 10 degree C)

The goal of this chapter is to ensure that at all times, machinery [installations] [propulsion, essential auxiliary and deck 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:

New proposal round 4:

[6.2.1 Material of machinery installations⁶ exposed to sea water shall be selected taking into account the effects of water temperature.]

(Note: There are several comments that the sea temperature is not an issue particular for Polar waters)

6.2.2 For ships [intended] [expected] to operate in low air temperatures, machinery installations shall [be designed and constructed to] provide functionality under the anticipated environmental conditions, [and when subjected to] [taking into account] [and when at risk of]:

- .1 ice accretion;
- .2 ice and snow ingestion

New proposals in round 4:

- [.3 freezing
- .4 seawater intake temperature
- .5 cold and dense inlet air
- .6 material embrittlement
- .7 freezing or excessive viscosity of liquids
- .8 loss of performance of battery or other stored energy device]

6.2.3 [For ships [intended] [expected] to operate in ice⁷] [where ice-strengthening is required by chapter 3] [expected to operate in Ice-covered waters] , machinery installations shall be [designed and constructed to provide] [capable of providing] functionality under the anticipated environmental conditions, [and when subjected to] [taking into account]:

- .1 loads imposed directly by ice interactions
- .2 ship responses to ice interactions [resistance in ice-covered waters]
- .3 ice ingestion by seawater systems

(Note: proposed deleted as covered by 6.2.2.2)

New proposal round 4:

- [.4 Low temperature sea water (between 0 and -2 degrees C)]

6.2.4 [Main propulsion] Machinery shall be designed and constructed to provide the ability of moving and maneuvering in the design sea ice condition.

(Note: Deletion proposed. Performance standard needed?)

(Note: Moved from 6.3.3.1)

⁶ It means main propulsion, steering gear, emergency and essential auxiliary systems that are essential for the safety of the ship and the survivability of the crew.

⁷ Need to agree on the wording here and use the same in the other chapters.

Alternatively:

[6.2.4 For ships intended to operate in ice, [machinery shall be designed and constructed to provide the ability of moving and maneuvering in the design sea ice condition] [icebreaking and maneuvering capabilities and limitations shall be included in the PWOM]

[6.2.5 [For category A ships, machinery] [Machinery] installations shall incorporate necessary levels of redundancy.]

(Note: Deletion supported by the majority, however mostly based on lack of clarity. Will the new proposed section 6.3.5 offer that clarity?)

6.3 Regulations/requirements

6.3.1 Where operational procedures are required to provide the functionality required under 6.2, these shall be included or referred to in the ship's PWOM.

[New proposal (see 6.2.1 above):

[6.3.2 In order to comply with the functional requirements of 6.2.1 above, the following shall apply

- .1 Material of machinery installations exposed to sea water shall conform to standards at least equivalent to those acceptable to the Organization⁸.
- .2 Where emergency source of power is supplied by accumulator batteries, they shall be of a type suitable and properly sized for operation in the prevailing conditions, or means shall be provided to protect them from the environment.]

6.3.3 In order to comply with the functional requirement of paragraph 6.2.2 above, the following apply:

- .1 Materials for machinery and its foundations shall conform to standards at least equivalent to those acceptable to the Organization⁹ [for the lowest mean daily average temperature adopted.]
- .2 Exposed electrical [cabling piping, valves and fittings] [installation and appliances] must function at the [operational temperatures].

Alternatively:

- [.2 Exposed electrical systems and exposed piping, valves and fittings shall remain functional at the [design service temperature]. Materials of exposed systems shall be acceptable to the Administration⁸.]
- .3 Working liquids shall be maintained in a viscosity range that ensures operation of the machinery. (Note: It is commented that 6 is also a matter for ships operating in temperatures above -10°C.)
- .4 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 [and that all air intakes are so arranged as to not be blocked by ice and snow].

⁸ [For category A and B ships,] refer to IACS UR I1 to I3.

⁹ Refer to IACS UR I1 to I3 or IACS UR S6.

(Note: It is commented that many of these items are covered in UR I3)

- [.5 The assessment required by paragraph 1.5.2 shall determine the need for additional design or operational measures in order to protect machinery systems and its associated equipment against the effect of low temperature and/or build-up of ice.]

Alternatively:

- [.5 Machinery systems and associated equipment shall be protected against the effect of low temperature and ice accretion through design or operational measures based on the assessment required by paragraph 1.5.2.]

(Note: Subparagraph .5 with the proposed deletion of the rest of the paragraph is supported by the majority. However I have kept the proposed merging of the reminding paragraphs as this is a new proposal. In keeping these 3 paragraphs, the proposal is to delete sub-para 5 above.)

- [.5 Machinery systems and/or their indicators/instrumental not located inside heated spaces must be protected against the effects of low temperatures and build-up of ice with the selection of appropriate protection methods, such as heating, covers. Means to control the condition of such protections shall be provided
- .6 Anchor windlass, towing and mooring equipment shall be protected from icing by suitable means.
- .7 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 requirements of paragraph 6.2.3 above, the following apply: (Note for clarification based on some comments: 6.2.3 addresses only ships operating in ice)

- .1 Scantlings of propeller blades, propulsion line, rudder stock and other appendages shall conform to standards at least equivalent to those acceptable to the Organization.
- .2 Machinery installations shall be designed and constructed to withstand loads, vibrations and accelerations resulting from the interaction of ice with hull, propulsion system(s), steering system(s), and other appendages subject to ice contact¹⁰.

New proposals for chapter 6.bis included here for consideration:

3. Ships expected to engage in ice breaker operations, with anchors located outside the vessel's shell plating, shall be designed to enable anchors to be pulled back or lifted onto deck to avoid contact with icebreaker's towing notch.
4. For ships expected to be engaged in icebreaker operations by close coupled towing, the shape and the strength of the bow shall be designed for this purpose.

¹⁰ Refer to IACS UR I1 to I3.

Alternative to 6.3.4.2

- .2 Scantlings of propeller blades, propulsion line, steering equipment and other appendages of Category A ships shall be approved by the Administration, or a recognized organization accepted by it, taking into account standards acceptable to the Organization¹¹ or other standards offering an equivalent level of safety.
- .3 Scantlings of propeller blades, propulsion line, steering equipment and other appendages of Category B ships shall be approved by the Administration, or a recognized organization accepted by it, taking into account standards acceptable to the Organization¹² or other standards offering an equivalent level of safety.
- .4 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 for the ice types and concentrations encountered in the area of operation.
- [.5 Sea intake chests of machinery systems shall be designed to prevent ingestion of ice.]

(Note: It is commented that this was in the previous version and should be kept since it is linked to 6.2.3.3.)

6.3.5 In order to comply with the requirements of paragraph 6.2.5 above, the following apply:

- .1 Provisions shall be made to ensure ready starting of the emergency source power units at the operational temperatures.
- .2 For ships of Category A and B, the assessment required at paragraph 1.5.2 shall demonstrate that essential machinery systems have an acceptable level of redundancy.

CHAPTER 7 – OPERATIONAL SAFETY

7.1 Goal

(Note: It is my understanding that this chapter addresses normal operation)

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

7.2 Functional requirements

(Note: The general view seems to be that this chapter should not have the -10 degree limit. If the -10 degrees limit is kept it should be included as a new 7.2.1.1)

¹¹ Refer to Polar Class 1-5 of IACS Unified requirements for Polar Ships (UR I1 and 13 (Oct.2007) and UI I2 (Nov. 2010)).

¹² Refer to Polar Class 6-7 of IACS Unified requirements for Polar Ships (UR I1 and 13 (Oct.2007) and UI I2 (Nov. 2010)).

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.

7.2.2 [Category A and B ships] shall be outfitted to mitigate the risks of injuries to persons onboard resulting from high accelerations and or ramming during icebreaking operations.

(Note: Deletion is proposed as these risks are also present in normal heavy weather operation)

7.3 Requirements/regulations

7.3.1 In order to comply with the functional requirements of paragraph 7.2.1 above, the following apply:

- .1 [Based on the expected environmental conditions] [Taking into account the assessment required in Chapter 1], the following protective cloth and accessories shall be provided to enable the crew to perform their outdoor duties on board:
 - .1 clothing that is able to mitigate water and humidity during work and, at the same time, provide sufficient insulation to maintain thermal comfort during rest;
 - .2 head and eye protection gear to reduce loss of body heat and protect vision from ultraviolet rays. Head and eye protection shall be compatible and usable with communications equipment; and
 - .3 slip-resistant, insulated safety footwear.
- .2 The Company shall adequately adjust the outdoor working times to the temperature. Regular communications with crewmembers working outdoors in low air temperatures should be maintained.
- .3 Climatic metrics such as temperature, wind speed and humidity shall be regularly monitored in the [relevant] locations where outside work is to be performed. (Note: Deletion proposed)
- .4 Deicing systems, if installed, shall be [safe for human and efficient] [arranged to protect against harmful accidental human contact.]
- .5 [Where deck systems are not easily operable by persons using protective clothing, supplementary measures shall be provided to facilitate their use.]

7.3.2 In order to comply with the functional requirements of paragraph 7.2.2 above, [facilities] [spaces] shall be provided with non-slip decking, [three ridged sides], handholds and insulation from exposed hot surfaces.]

(Note: It is questioned if this is a Polar water specific issue)

CHAPTER 8 – FIRE SAFETY [FIRE PROTECTION]

8.1 Goals

8.1.1 The goal of this chapter is to ensure that active and passive fire protection arrangements are effective and operable at all times.

8.2 Functional requirements

8.2.1 In order to achieve the goal set out in 7.1.1 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

- .1 All components of fire extinguishing systems shall be designed to ensure availability and effectiveness and be protected from ice accretion under all relevant conditions.
- .2 fire system arrangements shall take into consideration the need for persons to wear bulky and cumbersome cold weather gear, where appropriate.
- .3 Materials in fire system arrangements shall be suitable, ref. 2.3.1.
- .4 Local equipment and machinery controls shall be arranged so as to avoid freezing and ice accretion.
- .5 Sea suction to fire extinguishing systems shall be protected against clogging by ice.
- .6 Accesses and escape routes shall be arranged so as to remain free of ice.
- .7 Extinguishing media shall be suitable for intended operation.

8.3 Requirements/regulations

[8.3.1 Where relevant for the operational boundaries, portable and semi-portable water and foam 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 design parameters.]

8.3.1 For ships where fixed fire-fighting 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.

8.3.5 Fire pumps, including emergency fire pumps, shall be located in compartments providing minimum temperatures above [10°C].[above freezing]

8.3.6 Where relevant for the operational boundaries, isolating valves in exposed locations are to be protected from ice accretion.

8.3.7 [The fire main is to be arranged so that external sections can be isolated, [deadlegs are excluded or minimized] and means of draining shall be provided.]

8.3.8 Fire-fighter's outfits shall be stored in warm locations on the ship.

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 design 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] [surrounded by ice].

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/regulations

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
- .2 for ships intended to operate in low air temperatures, testing of life-saving appliances, shall be performed at a temperature [10⁰C] below the design service temperature, unless recommendations on life-saving appliances¹³ specifies a lower temperature .

(Note: It is suggested that the square bracketed part is not needed)

9.3.3 *Survival*

(Note: Has been reorganized based on comments received)

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.

¹³ Refer to the *Revised recommendation on testing of life-saving appliances* (MSC.81(70), as amended).

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 an assessment shall consider the need for ships to be provided with survival resources for use following abandonment, [whether into water or] onto ice or land to maximize the probability of survival for the expected time of rescue; and
- .2 no lifeboat shall be of any type other than partially or totally enclosed type.
- .3 Taking into account the assessment referred to in paragraph .2 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 9.3.3.3 identifies a potential of abandonment onto ice, the following apply:
 - .1 group survival equipment shall be carried, unless an equivalent level of functionality for survival on ice [or ashore] 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 when carried in addition to persons, in the survival craft, the survival craft and launching appliances shall have sufficient capacity to accommodate the additional equipment.

- .5 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
- .6 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, the following apply:

- .1 emergency food rations consisting of not less than [5,000 kJ (1,200 kcal)] [2000 kJ] per day for each person the survival craft is permitted to accommodate shall be provided.
- .2 0.5 l of fresh water per day for each person the survival craft is permitted to accommodate shall be provided.
- [.3 a de-salting apparatus proven to be operable in the expected emergency conditions; and]
- .4 emergency rations shall be palatable, consumable for anticipated emergency conditions, and packed in accordance with the requirements of the LSA Code.]

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.

10.2.2.2 [An appropriate level of redundancy shall be provided for the additional navigation equipment and systems addressed by this Code] [so that a single point failure does not prevent the vessel from receiving the necessary level of information].

(Note: Deletion proposed. If kept needs clarification)

10.3 Regulations/requirements

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 ice imagery;

(Note: Clarification of displaying is requested. It is proposed to specify the information provider WMO?)

.2 Ships shall have two independent echo-sounding devices [or other electronic means, to measure and display the available depth of water] [of which one echo-sounding device has forward looking capabilities]; and

(Note: This means 4 transducers and more display on the bridge. Proposed deleted. It is also commented that forward looking capabilities is not common in existing devices and should not be required.)

.3 Ships, regardless of their tonnage, shall be fitted with a Class A automatic identification system (AIS);

(Note: This is here to cover also ships below 500 tonnes. Keep or not depends on the outcome of application discussions. Chapter V of SOLAS applies to all ships)

(Coordinators comment: From here and down, it is proposed that the requirements are only for ships intended to operate in ice.)

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

.1 At least one of the radars required by SOLAS or a separate, radar shall be equipped with enhanced ice detection capability¹⁴;

.2 [For ships intended to operate in ice] [Ships] shall have two speed and distance measuring equipment where the second one may be the electronic position fixing system or the GPS/GNSS/GLONASS [compass][receiver];

.3 Ships intended to operate in ice, and where equipment required by 10.3.2.3.2 and 10.3.2.3.3 above have sensors that project below the hull, such sensors shall be protected against ice;

.4 Ships [intended to operate in ice] shall be equipped with two remotely rotatable, narrow-beam search lights [controllable from the conning position] 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;

(Note: Number and location of searchlight needs clarification)

.5 Ships with enclosed bridge wings [intended to operate in ice] shall be equipped with a sound reception system on the navigation bridge for reception of exterior noises/signals; and

¹⁴ Performance standard to be developed.

(Note: This is covered by SOLAS V/19.2.1.8, however it says “unless the Administration determines otherwise” for ships below 300gt)

- .5.bis [In category A ships [constructed on or after [date]] the] The bridge wings shall be enclosed or designed to protect navigational [and operational] equipment and operating personnel and to permit operating personnel observation of the ice/hull contact.]

(Note: Relocated from chapter 7)

- .6 Ships [intended to operate in ice] that may be involved in an escorting operation shall be equipped with adequate visual signals at the astern to [indicate when the ship is stopped]. [provide appropriate indication whilst being stopped]

Alternative proposal:

- [.6 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.]

10.3.1.2 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 Uninterrupted Power Supply UPS unit with a minimum operating duration of 30 minutes]; and
- .2 Ships [going] [proceeding] to latitudes over [70] [80] degrees shall be fitted with at least one GPS/GNSS/ GLONASS compass or equivalent¹⁵. [The GPS/GNSS/GLONASS aerial should have a clear unrestricted view to prevent interruption of signals.] [In addition, marine transmitting heading devices (THD) shall be provided in ships operating in latitudes over 70 degrees.(delete footnote)]

(Note: It is suggested to only use GNSS as that covers all)

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 should 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 should 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

¹⁵ Resolution MSC.116(73) includes *Performance standards for marine transmitting heading devices (THD)*. Standard ISO 22090-3 defines THD based on GNSS principles and is the realization of a GPS compass.

moisture from the outside face of a window should have operating mechanisms protected from freezing or the accumulation of ice that would impair effective operation.

(.1 and .2 could be combined)

- .3 [For ships with a design temperature [minimum operational temperature requested] of minus 25°C or less, additional testing [is] [may be] required [depending on the certified minimum temperature established by the manufacturer and/or the arrangement on board].

(Note: If new section 1.6 is accepted, this can be deleted)

- .4 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];

(Note: Clarification on the mention of “satellite communications” is needed as the two-way voice data is transmitted by VHF.)

- .2 Reliable means on board for enabling RCCs to immediately initiate two-way communications shall be provided;
- .3 Suitable means of communications shall be provided where escort and convoy operations are expected; and

(Note: Deletion proposed as covered by SOLAS)

- .4 [Appropriate o] On-scene voice communications shall be provided; and

(Note: Deletion proposed. It is questioned why as this was proposed by COMSAR. This is required by SOLAS regulation IV/4.1.5 and apply to all passenger ships and cargo ships of 300 gt and above while at sea. It should therefore be deleted here)

- .5 appropriate communication equipment to enable telemedical assistance in polar areas. (10.2.1.1.5)

(Note: Should be clarified by requirements.)

Coordinators comment: This was supported by the sub-committee and should be left for NCSR to make a final decision)

11.2.2 *Survival craft communications capabilities*

- .1 All [rescue boats] and lifeboats, whenever released, shall carry equipment suitable for [GMDSS], distress alerting, locating, [and on-scene communications]; and

Alternatively:

- .1 All rescue boats and lifeboats, whenever released for evacuation, shall carry an active system suitable for distress alerting, locating, and on-scene communications with rescue assets upon evacuation into the water or onto ice or land;

(Note: Has also been proposed deleted)

- .2 All [other] survival craft, whenever released [for evacuation], shall carry equipment suitable for [distress alerting and] locating.

(Note: It has been proposed that these two paragraphs should be merged, but it has little support)

11.3 **Regulations/requirements**

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 of category A, [all icebreakers, and other ships intended to provide icebreaking escort] shall be equipped with a special [icebreaking] 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)

(Note: It is proposed that reference could be made to COLREG part D vs 349)

(Note deletion of the SB text proposed as icebreakers, and other ships intended to provide icebreaking escort are all cat A ships)

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 that shall conform to performance standard referred in SOLAS] and equipment for voice communications with aircraft on 121.5 and 123.1 MHz. (10.3.1.1 for ships)

(Note: If new section 1.6 is accepted, reference to performance standard can be deleted)

(Propose deleted as covered in SOLAS and existing GMDSS equipment but I think we need the last part)

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 that conform to performance standard referred in SOLAS and equipment for voice communications with aircraft on 121.5 and 123.1 MHz; and

(Note: If new section 1.6 is accepted, reference to performance standard can be deleted)

New proposal:

(Note If 11.2.1.4 is deleted, this should not be taken in board)

- .1.bis 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
- .2 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.

(Note: If new section 1.6 is accepted, reference to performance standard can be deleted)

(Note: It is commented that equipment required by 11.3.2.1 is not required in SOLAS and should be deleted unless justified)

11.3.2.2 [Mandatory communications equipment for use in survival craft and rescue boats shall be capable of operation throughout the [maximum expected time of rescue] [5 days].]

CHAPTER 12 – OPERATIONAL [REQUIREMENTS] [MANAGEMENT] [OPERATIONAL ASPECTS [OF VOYAGES IN POLAR WATERS]]

(Note: I have not included comments on this chapter as we need to agree on a possible merging and I did not ask for comments on this chapter. Option 2 is deleted. I only found a few issues not covered in option 1 and they have been included)

12.1 Goal

Alternative 1

12.1.1 The goal of this chapter is to facilitate safe navigation, avoidance of dangerous situations [and to minimize impact on wild life].

Alternative 2

12.1.1 The goal of this chapter is to identify and define the operational requirements which are essential for vessels operating in polar waters.

Alternative 3

12.1.1 The goal of this chapter is to ensure that operations are planned and conducted with adequate attention to safety and environmental protection.

12.2 Functional requirements

12.2.1 In order to achieve the goal set out in 12.1.1 above, the following functional requirements are embodied in the regulations of this chapter:

Alternative 1

- [.1 Ships shall be provided with documentation for operations and training.
- .2 Voyage planning shall take account of anticipated conditions and areas of environmental sensitivity.

- .3 Appropriate preparations shall be made for emergency response.
- [.4 [Communications with] [reporting to] relevant authorities shall keep them appraised of the conduct of the voyage.]]
- [.5 Safe navigation with icebreaker assistance should be ensured if applicable.]

Alternative 2

- [.1 Voyage planning shall be performed prior to entering Polar waters.
- .2 Ships shall be provided with sufficient information in order to make the necessary planning.]

12.3 Requirements for documentation

12.3.1 [All ships operating in polar waters shall carry on board at all times:

- .1 Polar Ship certificate, as specified in regulation ...;
- .2 [Polar Water Operating Manual, as specified in Chapter 1];
- .3 training manual as specified in paragraph ..; and,
- .4 voyage plan as specified in paragraph....]

(Note: To be reconsidered closer to finalization of the Code)

12 4 Requirements for voyage planning

12.4.1 Voyage planning for polar waters shall take into consideration, as appropriate [but not limited to]:

- .1 the anticipated environmental considerations along the route;
- .2 the availability of SAR, [salvage and repair capabilities], waste reception facilities and safe havens;
- [.3 national and international designated protection areas along the route;]

Alternatively:

- [.3 known key areas for marine mammals, [national and international designated protection areas]]
- .4 known key areas for marine mammals and **other migratory species**;

Alternatively 3 and 4:

- [.3 known key areas for marine mammals, [national and international designated protection areas and particularly sensitive sea areas (PSSA)]]

- .5 national and international systems of navigational control and reporting;
and
- .6 ship capabilities and characteristics, as reflected in the PWOM.
- [.7 particularly sensitive areas for which predefined special precaution is warranted.]

Alternatively:

12.4.1 The company and the ship shall take full consideration of operating in areas remote from SAR facilities and take into account the guidance given in MSC.1/Circ.1184 Enhanced contingency planning guidance for passenger ships operating in areas remote from SAR facilities. In particular ships shall coordinate with the JRCC (Joint Rescue Coordination Center) to ensure that assistance within reasonable time from other ships or SAR facilities is available at a comparable capacity to the number of persons on board.

Proposal from document ISWG PC/4 (United States)

[12.4.1 All ships operating in polar waters shall prepare a detailed voyage plan that covers the entire voyage from berth to berth. The voyage plan shall identify a route that takes into account:

- .1 any relevant up-to-date information relating to known areas with densities of cetaceans including seasonal migration areas, and cetacean habitat, and avoid such areas, as far as possible; and
- .2 any relevant ships' routing systems, speed restrictions or recommendations, and vessel traffic services relating to known areas with densities of cetaceans.

12.4.2 In the event that cetaceans are encountered, any existing best practices regarding interactions with cetaceans should be considered, including maintaining minimum safe distances; maintaining slow, safe speed in accordance with rule 6 of the Convention on the International Regulations For Preventing Collisions at Sea.]

12.5 Reporting

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

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

12.6 Procedures

[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, in particular, but not limited, to:

- .1 procedures for the operational maintenance of fire safety systems [lifesaving appliances and anchoring mooring and towing] under the design temperatures and icing;
- .2 procedures for the operational maintenance of life-saving appliances and evacuation means under the design temperatures and icing;

- .3 procedures for the operational maintenance of anchoring, mooring and towing under the design temperature and icing;
- .4 communication and assistance procedures in the event of navigation in remote areas where SAR service could be unavailable for a long period (MSC.1/Circ.1184);
- .5 procedures for sustaining a long period on board in the event of stacking on ice; and
- .6 procedures for evacuation, survival craft launching and survival in lifesaving appliances at sea and on land.
- .7 required spare parts that may be needed in order to maintain effective operation of ship's systems and equipment under severe environmental conditions.
- .8 Procedures for towing in ice (cat A and B)

[12.7 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 L6 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.]

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

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

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 [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 preparedness¹⁶

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.

13.6 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:

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.

- .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.

(To be completed)

- .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.]¹⁷
- .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 drill¹⁸ 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 intended operations, or be advised by another person on the bridge having such training and experience.

¹⁷ Drill Frequency subject to the result of the discussion of the draft Polar Code (paragraph 13.2.5.1.3).

¹⁸ Damage control drills should be further clarified and their scope differentiated from the ones concerning military ships.

- .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 Preparedness¹⁹

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.

[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.

¹⁹ Emergency preparedness for environmental protection has not been included at this stage. Draft paragraph 14.2.2 in Chapter 14 should be discussed first.

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.)

CHAPTER 14 – [EMERGENCY CONTROL] [CONTINGENCY MEASURES]

14.1 Goal

[14.1.1 The goal of this chapter is to provide for [means] [risk control measures] to limit the consequences of incidents or accidents [as far as it is possible and safe]].

14.2 Functional requirements

[14.2.1 In order to achieve the goal set out in 14.1.1 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

14.2.1.1 The Contingency Plan required in SOLAS regulation III/29 and the Cooperation Plan required in SOLAS regulation V/7.3 shall include specific aspects of polar water operations. Additionally, the Company shall implement shipboard plans and procedures to manage contingencies related to the identified risks in polar waters such as delay or unavailability of search and rescue services, hull repairs and [or environmental impact by spills of harmful substances or garbage]

[14.2.1.1.bis Ships shall be equipped to enable the crew to provide shipboard damage control and perform minor hull repair as far as is safe and [practicable], to make temporary repairs to a minor hull breach or to take precautionary measures to prevent escalation of damage or flooding, so that the ship may proceed to a location where more substantial repairs can be effected.]

Alternatively

[14.2.1.1.bis Ships shall be equipped to provide shipboard damage control and perform minor hull repair above and below the waterline.

14.2.1.2 Ships shall be equipped and arranged to facilitate internal emergency transfer of liquid cargo and fuel. Ships shall be equipped to enable assisting ships to perform external emergency transfer of liquid cargo and fuel, during dead ship condition.]

(Note: 14.2.1.2, is proposed for new ships only.)

Alternatively

14.2.1.2 Ships shall be equipped to enable the emergency transfer of liquid cargo or fuel.

14.2.1.3 All ships shall have the capability to contain and clean up minor deck spills [caused by equipment failure] and be arranged to prevent such spills over side.

Alternatively:

14.2.1.3 Equipment, provided in accordance with paragraphs 14.2.1.1.bis and 14.2.1.2, shall be such as to enable a ship, as far as is safe and practicable, to proceed to a location where more substantial repairs can be effected.]

New proposal:

[14.2.1.4 Ships shall be equipped facilitate salvage operators' access to cargo/fuel tanks to perform emergency transfer of liquid cargo/fuel.]

14.3 Regulations/requirements

14.3.1 In order to comply with the functional requirements of 14.2.1.1 above the following apply:

- .1 All the procedures, plans and instructions shall be certified under Part 7 of the ISM Code, and shall be available on board.
- .2 Plans and procedures shall be prepared for contingencies such as:
 - .1 [Pollution mitigation in the event of spill or unintended discharge;]
 - .2 Communication and assistance procedures in the event of navigation in remote areas where a SAR service could be unavailable for a long period;

- .3 Sustaining people on board for a long period in the event of stacking on ice; and
- .4 Evacuation, survival craft launching and survival on lifesaving appliances at sea and ashore.

14.3.2 In order to meet the functional requirements of 14.3.1.bis and 14.3.2 above, the following apply:

- .1 [All new vessels over 5,000 gross tons shall be designed or equipped with onboard equipment to facilitate recovery of the oils or other harmful substances contained in bunkers and cargo tanks.]. The equipment shall prevent seafarers from toxic exposure and shall conform to performance standards not inferior to those adopted by the Organization;
- .2 [Portable pumps and hoses shall be provided on board for emergency transfer of fuel.];
- .3 An inventory of the equipment shall be kept on board, along with directions for safe use and guidelines to assist in determining when such use is warranted; and
- .4 The personnel responsibilities for equipment deployment, oversight, and maintenance shall be determined by the Company, which will provide for crew training in the use of such equipment.

CHAPTER X – OPERATIONS

(Proposed merging of chapter 2, 12 and 14)

(Note: There will be a numbering job at the end.)

X.1 Goal

12.1.1 The goal of this chapter is to provide the Company, master and crew with sufficient information regarding the ship's operational capabilities and limitations in order to support their decision-making process and ensure that operations are planned and conducted with due consideration to safety and environmental protection.

X.2 Functional requirements

12.2.1 Shipboard operations and equipment shall take into account the documentation and procedures required by paragraphs 12.2.2 and 12.2.3.

12.2.2 The master and crew shall have access to documentation detailing the ship-specific capabilities and limitations in relation to the hazards [listed in the Introduction] [identified by the risk assessment required by Chapter 1], as applicable.

12.2.3 The master and crew shall have access to specific procedures to be followed during:

- .1 normal operations in order to avoid encountering conditions that exceed the ships capabilities;
- .2 incidents resulting from hazards identified by the risk assessment required by Chapter 1;

- .3 unexpected conditions that temporarily exceed the ships capabilities for normal operations such as lower air temperatures and increased ice thicknesses; and
- .4 icebreaker assistance operations, as applicable.

X.3 Regulations/requirements

12.3.1 Each ship shall have on board a polar water operational manual (PWOM) taking into consideration the risk assessment required by Chapter 1 and the requirements of this chapter. Where limitations of a ship's operations are part of achieving compliance with the requirements of the Code these operational limitations shall be documented in the PWOM.

12.3.2 In order to comply with the requirements of paragraph 12.2.2, the PWOM shall contain relevant information, which may include results from ice trials, with the ship's capabilities and limitations for:

- .1 operation in ice, low air temperatures, and high latitudes, as applicable;
- .2 voyage duration;
- .3 intended areas of operation; and
- .4 waste stream management.

12.3.3 In order to comply with the requirements of paragraph 12.2.3.1, the PWOM shall include or refer to procedures for the following:

- .1 voyage planning to avoid environmental conditions that exceed the ship's design capabilities or limitations outlined in the Polar Ship Certificate with due consideration to hazards to safe navigation identified by the risk assessment;
- .2 implementation of special measures to maintain equipment and system functionality essential to the safety of the ship under low temperatures, topside icing and the presence of sea ice, as applicable;
- .3 receiving forecasts of the environmental conditions;
- .4 crew familiarity with the operations and equipment required by this chapter;
- .5 when to provide additional watchstanders, as necessary based on the risk assessment; and
- .6 measures for towing in ice, as applicable.

12.3.4 When developing the voyage plan, the master shall consider a route from berth to berth taking into account the following:

- .1 the procedures required by paragraph 12.3.3.1;

- .2 the 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 from former years;
- .5 places of refuge;
- .6 any relevant up-to-date information relating to known areas with densities of cetaceans including seasonal migration areas; and
- .7 any relevant ships' routing systems, speed restrictions or recommendations and vessel traffic services relating to known areas with densities of cetaceans.

12.3.5 In the event that cetaceans are encountered, any existing best practices regarding interactions with cetaceans should be considered,²⁰ including maintaining minimum safe distances; maintaining slow, safe speed in accordance with rule 6 of the Convention on the International Regulations for Preventing Collisions at Sea.

12.3.6 An up-to-date voyage plan shall be provided to a Company representative on shore.

12.3.7 In order to comply with the requirements of paragraph 12.2.3.2, the PWOM shall include or refer to procedures for the following:

- .1 maintaining life support and ship integrity during prolonged entrapment by ice, as applicable;
- .2 evacuation, launching of survival craft and survival of personnel in ice covered waters, or directly onto the ice or land, as applicable;
- .3 distress alert notification to the relevant Rescue Coordination Centre (RCC) and nearby vessels;
- .4 actions as a ship assisting someone in distress, in particular communications from and to the RCC, and on-scene communications with the craft in distress and other responders, including aircraft;
- .5 additional contingency measures for abandon ship, man overboard, medical care/first aid and SAR;²¹
- .6 additional contingency measures to mitigate pollution in the event of a spill or discharge taking into account the plans and procedures required by Part II-A of the Code;

²⁰ Refer to MEPC/Circ.674 on Guidance document for minimizing the risk of ship strikes with cetaceans.

²¹ All ships refer to MSC.1/Circ.1184 on Enhanced contingency planning guidance for passenger ships operating in areas remote from SAR facilities.

- .7 additional contingency measures for damage control, salvage and fire-fighting, as necessary based on the risk assessment required by Chapter 1.

12.3.8 The additional contingency measures required by paragraphs 12.3.7.5 through 12.3.7.7 shall:

- .1 identify resources, under contract or some other prior approved arrangement, for response in all geographic areas in polar waters in which the vessel intends to operate; and
- .2 identify a Company representative on shore empowered to activate and engage in contracting with resources and obligate funds for response.

12.3.9 In order to comply with the requirements of paragraph 12.2.3.3, the PWOM shall include or refer to procedures to be followed in the event of encountering conditions which exceed the ship's design capabilities or limitations outlined in the Polar Ship Certificate.

12.3.10 In order to comply with the requirements of paragraph 12.2.3.4, the PWOM shall include or refer to procedures for the following:

- .1 communications with ice convoy or icebreaker;
- .2 compliance with navigational instructions of the commanding icebreaker; and
- .3 reporting damage and manoeuvring difficulties to ice convoy or icebreaker.

12.3.11 Onboard equipment referenced in the procedures required by this chapter shall be functional in low air temperatures, topside icing and high latitudes, as applicable. The PWOM shall include or refer to operating procedures for this equipment and crew familiarity training for equipment applicable to their assigned duties.

Part I-B

(Note: to be relocated if agreed)

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.

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)

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 | ISS1A Super | IS-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 liferafts. Containers should be designed so that they may be easily moved over the ice and be floatable. Content?

[Additional guidance to chapter 12

In the event that marine mammals are encountered, any existing best practices should be considered to minimize unnecessary disturbances.

Where ships are trafficking near areas of cultural heritage and cultural significance, shipowners and masters should consider planning to minimize the impact of the ship's voyage to that area.]

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 Definitions

In addition to the definitions included in MARPOL Annex I and the introduction of this Code, the following definitions are pertinent to this Part:]

.1 *Resilience capabilities* means.....] (Note: Do we need to define this term? It is only used in the goal)

1.3 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.

1.4 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.]

1.5 Requirements

1.5.1 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. [However, the Administration may approve alternative measures in fishing vessels [constructed before [date]]

(Note: This text is included as an example should MEPC decide to exclude fishing vessels from the zero discharge requirement in line with the decision to include any exemptions in the Code itself. Similar text could be included in other chapters pending MEPC's decision.)

1.5.2 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;
- .2 For categories A and B ships, constructed on or after [date of entry into force], all tanks used for carriage of oil and 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 and 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 Definitions

In addition to the definitions included in MARPOL Annex II and the Introduction of this Code, the following definitions are pertinent to this Part:]

- .1 *Resilience capabilities* means.....]

2.3 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.

2.4 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;
- .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.

2.5 Requirements

2.5.1 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;

- .2 Any discharge into the sea of noxious liquid substances, or mixtures containing these substances, is prohibited.

2.5.2 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;
- .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 – 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 Definitions

- .1 *Resilience capabilities means.....*

4.3 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.

4.4 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 sewage [discharge] from ships.

4.5 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 Organization²²:

²² Refer to resolution MEPC.2(VI), resolution MEPC.159(55) or resolution MEPC.227(64) as applicable.

- .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.
- .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 Organization²³. 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 Definitions

- .1 *Resilience capabilities* means.....

5.3 Goal

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

²³ Refer to the *2012 Guidelines on implementation of effluent standards and performance tests for sewage treatment plants* (resolution MEPC.227(64)).

5.4 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.

5.5 Requirements

5.5.1 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.

5.5.2 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:

- .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.
- .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 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 made 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 effect 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 Certificate²⁴

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 Number²⁵

²⁴ 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 / C²⁶ 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)

²⁵ In accordance with *IMO ship identification number scheme* adopted by the Organization by resolution A.600(15).
²⁶ Delete as appropriate.