

SUB-COMMITTEE ON SHIP SYSTEMS AND
EQUIPMENT
5th session
Agenda items 3, 4, 5 and 6

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**SAFETY OBJECTIVES AND FUNCTIONAL REQUIREMENTS OF THE GUIDELINES ON
ALTERNATIVE DESIGN AND ARRANGEMENTS FOR SOLAS CHAPTERS II-1 AND III**

DEVELOP NEW REQUIREMENTS FOR VENTILATION OF SURVIVAL CRAFTS

UNIFORM IMPLEMENTATION OF PARAGRAPH 6.1.1.3 OF THE LSA CODE

**CONSEQUENTIAL WORK RELATED TO THE NEW CODE FOR SHIPS OPERATING IN
POLAR WATERS**

Report of the Working Group

GENERAL

1 The Working Group on Life-Saving Appliances (LSA) met from 12 to 15 March 2018 under the chairmanship of Mr. S. Assheuer (Germany).

2 The Group was attended by delegates from the following Member States:

| | |
|----------------------------|----------------------|
| ARGENTINA | MEXICO |
| BAHAMAS | NETHERLANDS |
| BRAZIL | NIGERIA |
| CANADA | NORWAY |
| CHILE | PANAMA |
| CHINA | PERU |
| DENMARK | PHILIPPINES |
| DOMINICA | POLAND |
| FRANCE | PORTUGAL |
| GERMANY | REPUBLIC OF KOREA |
| GREECE | RUSSIAN FEDERATION |
| INDONESIA | SINGAPORE |
| IRAN (ISLAMIC REPUBLIC OF) | SWEDEN |
| ITALY | TURKEY |
| JAPAN | UNITED ARAB EMIRATES |
| LIBERIA | UNITED KINGDOM |
| MARSHALL ISLANDS | UNITED STATES |

an observer from the following intergovernmental organization:

EUROPEAN COMMISSION (EC)

and observers from the following non-governmental organizations:

INTERNATIONAL CHAMBER OF SHIPPING (ICS)

BIMCO

INTERNATIONAL ASSOCIATION OF CLASSIFICATION SOCIETIES (IACS)

INTERNATIONAL FEDERATION OF SHIPMASTERS' ASSOCIATIONS (IFSMA)

INTERNATIONAL LIFE-SAVING APPLIANCE MANUFACTURERS' ASSOCIATION
(ILAMA)

COMMUNITY OF EUROPEAN SHIPYARDS' ASSOCIATIONS (CESA)

CRUISE LINES INTERNATIONAL ASSOCIATION (CLIA)

INTERNATIONAL ASSOCIATION OF DRY CARGO SHIPOWNERS
(INTERCARGO)

THE ROYAL INSTITUTION OF NAVAL ARCHITECTS (RINA)

INTERNATIONAL TRANSPORT WORKERS' FEDERATION (ITF)

Terms of reference

3 The Working Group, taking into account the comments made and the decisions taken in plenary, was instructed to:

with regard to agenda item 3:

- .1 develop goals, functional requirements and expected performance to ensure the consistent application of SOLAS regulations III/4.3 (novel life-saving appliances or arrangements), III/38 (alternative design and arrangements) and the *Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III* (MSC.1/Circ.1212) following the principles provided in document SSE 5/3/1 (United States), based on document SSE 4/WP.3 and taking into account documents SSE 5/3 (Germany), SSE 5/3/2 (Germany) and SSE 5/INF.7 (United States), and also following the principles provided in paragraph 12.13 of document MSC 98/23 for the description of the necessary function of the draft functional requirements (expected performance) in quantitative terms;
- .2 consider whether it is necessary to establish a correspondence group and, if so, prepare the terms of reference for consideration by the Sub-Committee;

with regard to agenda item 4:

- .3 finalize draft amendments to the LSA Code based on document SSE 5/4 (United States) and taking into account document SSE 5/4/1 (China);
- .4 if time permits, consider amendments to the *Revised recommendation on testing of life saving appliances* (resolution MSC.81(70)) and necessary consequential amendments to other IMO instruments, taking into account annexes 1 and 2 to document SSE 5/4, and advise the Sub-Committee accordingly;
- .5 consider whether it is necessary to establish a correspondence group to develop new requirements for ventilation of survival crafts other than totally

enclosed lifeboats and, if so, prepare the terms of reference for consideration by the Sub-Committee;

with regard to agenda item 5:

- .6 finalize draft amendments to paragraph 6.1.1.3 of the LSA Code, taking into account document SSE 5/5 (Bahamas et al.);

with regard to agenda item 6:

- .7 finalize the specific conditions and test and performance criteria for life-saving appliances and arrangements on board ships operating in polar waters, taking into account annexes 2, 4 and 5 to document SSE 5/4, and document SSE 4/INF.4 (Japan);
- .8 if time permits, consider suitable regulatory options to address new test and performance criteria taking into account document SSE 5/4, and advise the Sub-Committee accordingly;
- .9 as the highest priority, finalize draft interim guidelines on life-saving appliances and arrangements for ships operating in polar waters based on document SSE 5/6 (Norway);
- .10 consider whether it is necessary to establish a correspondence group and, if so, prepare the terms of reference taking into account the work plan set out in document SSE 4/WP.3, paragraph 35, for consideration by the Sub-Committee; and

general:

- .11 submit a written report by Thursday, 15 March 2018.

Safety objectives and functional requirements of the guidelines on alternative design and arrangements for SOLAS chapters II-1 and III

4 In accordance with subparagraph .1 of the terms of reference, the Group considered the goals, functional requirements and expected performance to ensure the consistent application of SOLAS regulations III/4.3 (novel life-saving appliances or arrangements), III/38 (alternative design and arrangements) and the *Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III* (MSC.1/Circ.1212) following the principles provided in document SSE 5/3/1 (United States), based on document SSE 4/WP.3 and taking into account documents SSE 5/3 (Germany), SSE 5/3/2 (Germany) and SSE 5/INF.7 (United States), and also following the principles provided in paragraph 12.13 of document MSC 98/23 for the description of the necessary function of the draft functional requirements (expected performance) in quantitative terms.

5 Having briefly recalled the history of this output, the Group noted that two different outputs, both established during MSC 82 and merged later on, were benefiting from the developments of goals, functional requirements and expected performance, one for SOLAS chapter III and one to ensure the consistent application of SOLAS regulations III/4.3 (novel life-saving appliances or arrangements), III/38 (alternative design and arrangements) and the *Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III* (MSC.1/Circ.1212). The Group acknowledged that the same set of functional requirements and related expected performance will serve both purposes.

6 In the course of the considerations, the Group noted differences in the presentation of functional requirements and expected performance provided in document SSE 5/INF.7 versus those presented in document SSE 4/WP.3. The Group agreed that, in order to resolve these differences, a gap analysis between annex 1 to document SSE 4/WP.3 and document SSE 5/INF.7 should be carried out. For the next step, an agreement on the format of the presentation of the functional requirements needs to be reached. Moreover, the Group noted that a verification of completeness of the functional requirements by reviewing the LSA Code and further adjustments are the consequential steps.

7 As a consequence of the discussion above, the Group agreed to invite the Sub-Committee to establish a correspondence group to further progress this issue intersessionally. The draft terms of reference are set out in paragraph 40.

Develop new requirements for ventilation of survival crafts

Draft amendments to the LSA Code regarding ventilation on totally enclosed lifeboats

8 Following the instructions of the Sub-Committee in subparagraph .3 of the terms of reference, the Group considered draft amendments to the LSA Code based on annex 3 (Option 1) to document SSE 5/4 and taking into account document SSE 5/4/1.

9 Having recalled the discussion in plenary, the Group considered the influence of different parameters on the microclimate within an enclosed lifeboat, and agreed that the CO₂ concentration in the atmosphere of the lifeboat is the threshold for ventilation requirements. In order to not exceed a given CO₂ threshold, depending on the number, size and activity of persons in the survival craft, a minimum air exchange is required.

10 In the course of the considerations to define such a threshold, the Group noted that there is a need to distinguish between a long-term CO₂ concentration and a short-term/peak CO₂ concentration.

11 Taking into account that the focus of the standard should address minimum requirements for safety and survivability, rather than comfort, and following an in-depth discussion, the group agreed on an expected performance of CO₂ concentration threshold level of 5,000 ppm (long-term). Recalling the report of the Correspondence Group (SSE 5/4, annex 2), the Group noted that the range of a ventilation rate achieving a CO₂ threshold of 5,000 ppm (outside CO₂ concentration 400 ppm), varies from 1.6 to 5 m³/h per person depending on different percentiles, different nationalities and activity levels (SSE 5/4, annex 2, table 0-3). Finally, the Group reached consensus to follow a conservative approach and agreed on a ventilation rate of at least 5 m³/h per person to comply with the expected performance.

12 The observer of ICS expressed concerns that the agreed ventilation rate of at least 5 m³/h per person may be excessively conservative and not reflect the realistic requirements necessary to achieve the agreed CO₂ threshold of 5,000 ppm.

13 With regard to the draft amendments to paragraph 4.6.7.2 on the openings of the ventilation system and their means of closing, the Group agreed to revise the words as "and taken into consideration the requirements provided in paragraph 4.6.3.2" at the end of the paragraph.

14 In the course of the discussion, the Group agreed that in the case of ventilation power depending on the lifeboat engine, sufficient fuel shall be provided to allow for 24 hours of ventilation and at the same time run the fully loaded lifeboat at 6 knots for a period of not less than 24 h (paragraph 4.4.6.8 of the LSA Code). Furthermore, in the case of powered means of ventilation, the source of power shall not be radio batteries as referred by paragraph 4.4.6.11 of the LSA Code. In this context, the group agreed to add a new paragraph under 4.6.6 as follows:

"Where the means of ventilation is powered, the source shall not be the radio batteries referred by 4.4.6.11; and where dependent on the lifeboat engine, sufficient fuel shall be provided to comply with 4.4.6.8."

15 Following the above decision, the Group agreed that any further amendments on paragraphs 4.4.6.8 and 4.4.6.11 are not necessary.

16 The Group briefly discussed the application of the new ventilation requirements and agreed that it should apply to all new-built totally enclosed lifeboats installed on board a ship after the enter-into-force date of the amendments.

17 Based on the above-mentioned considerations, the Group prepared the draft amendments to the LSA Code regarding ventilation on totally enclosed lifeboats, as set out in annex 1.

Draft amendments to resolution MSC.81(70) and necessary consequential amendments to other IMO instruments

18 Following the instructions of the Sub-Committee in subparagraph .4 of the terms of reference, the Group had a brief discussion on subsequent draft amendments to resolution MSC.81(70) and necessary consequential amendments to other IMO instruments.

19 Having recalled the proposal contained in document SSE 4/14 (Bahamas and Japan), the Group agreed in principle to the draft amendments regarding lifeboat operational tests (paragraph 6.10 of MSC.81(70)) and regarding additional tests for totally enclosed lifeboats (paragraph 6.14), as contained in annex 2 to document SSE 4/14. The Group subsequently agreed that annex 2 to document SSE 4/14 should be the basis for the further development of draft amendments to resolution MSC.81(70) and necessary consequential amendments to other IMO instruments by a correspondence group if established by the Sub-Committee.

20 In consideration of subparagraph .5 of the terms of reference, the Group noted the decision of the Maritime Safety Committee at its ninety-seventh session to develop new requirements for ventilation of all survival crafts, and noted that the expected performance (see paragraph 12) for ventilation criteria for totally enclosed lifeboats would also be suitable for the ventilation of all other survival craft. The Group therefore invites the Sub-Committee to establish a correspondence group to further progress this issue intersessionally based on the draft terms of reference set out in paragraph 40.

Uniform implementation of paragraph 6.1.1.3 of the LSA Code

21 In accordance with subparagraph .6 of the terms of reference, the Group considered the draft amendments to paragraph 6.1.1.3 of the LSA Code, as proposed in the annex to document SSE 5/5.

22 Following a general discussion, the Group noted that the proposed draft amendments focused on manually-launched "rescue boats that are not survival craft" on cargo ships. In this context, the Group agreed to separate paragraph 6.1.1.3 and to place the words "Means shall be provided for bringing the rescue boat against the ship's side and holding it alongside so that persons can be safely embarked" at the end of the second paragraph. Finally, the Group prepared the draft amendments to paragraph 6.1.1.3 of the LSA Code, as set out in annex 2.

Consequential work related to the new Polar Code***Draft interim guidelines on life-saving appliances and arrangements for ships operating in polar waters***

23 In line with the instructions of the Sub-Committee in subparagraph .9 of the terms of reference to aim for finalization, the Group started its consideration of the draft interim guidelines on life-saving appliances and arrangements for ships operating in polar waters, based on the annex to document SSE 5/6.

24 In the course of a review of the draft interim guidelines set out in the annex to document SSE 5/6, the Group encountered a number of difficulties towards the aim of finalization during this session, in particular:

- .1 within the Group, repeated concerns were raised over differences sensed between the draft interim guidelines and the outcomes of the Correspondence Group on specific conditions and test and performance criteria for life-saving appliances and arrangements on board ships operating in polar waters;
- .2 a lack of clarity on the application of the individual requirements within the draft interim guidelines. Although it was noted that the application of the draft interim guidelines should be based on the application of the Polar Code, the specific operational assessment and respective text was proposed for clarification. However, due to the variability of voyage types in polar waters the application of different provisions within these guidelines for different operations remained disputed. In particular with regard to section 3 dealing in general with ships sailing in polar waters a further and detailed clarification will be necessary;
- .3 for a number of provisions, the distinctions of the different requirements for survival craft in general, or liferafts and lifeboats, was considered not satisfactory;
- .4 some quantitative terms, in particular food rations required for the expected time of rescue and the air temperature within lifeboats, were challenged and a justification acceptable to the Group was not available;
- .5 some sections were considered lacking in technical information to provide the guidance intended, namely the sections for areas with dangerous wildlife and operations in extended periods of darkness;
- .6 the section dealing with ships operating in ice covered water was considered in need of clarification/verification of the specific hazards to be addressed, e.g. survival craft lowered/dropped into icy water or towing of survival craft in icy water; and
- .7 it was noted that in a number of places the requirements were left to the satisfaction of the Administration which was considered contrary to the purpose of such guidelines.

25 Subsequently, the Group was not in a position to finalize the draft interim guidelines.

26 Notwithstanding the above difficulties, the Group made some progress on the development of the draft interim guidelines. The Group agreed in general on the specific operational assessment criteria as follows:

- .1 maximum expected time of rescue;
- .2 operation in low-air temperatures (ships with an assigned PST);
- .3 operation in ice;
- .4 icing of life-saving appliances and arrangements;
- .5 the effect of operation in high latitudes;
- .6 operation in extended periods of darkness; and
- .7 abandonment onto ice or land.

27 Furthermore, the Group accomplished a general review of the draft interim guidelines and identified some areas where further investigations were needed. In this context, the Group prepared a non-exhaustive list of actions for the development of draft interim guidelines in its entirety, as set out in annex 3.

28 In the course of these discussions, some industry observers also expressed concerns that some of the life-saving equipment's provisions proposed in these draft interim guidelines may not be commercially available, and thus a thorough assessment of equipment availability should be conducted prior to the finalization of these guidelines. Notwithstanding that certain equipment may not be commercially available, some members expressed the view that the draft interim guidelines should not be limited by the commercial availability of the equipment.

29 The Group agreed that the draft interim guidelines on life-saving appliances and arrangements for ships operating in polar waters, as set out in annex 4, could form a basis for further development, possibly by a correspondence group.

30 Subsequently the Group agreed to invite the Sub-Committee to establish a correspondence group to further progress this issue intersessionally, with a view towards finalization at SSE 6. The draft terms of reference are set out in paragraph 40.

Specific conditions and test and performance criteria

31 Following the instructions of the Sub-Committee in subparagraph .7 of the terms of reference, the Group had a brief consideration of the specific conditions and test and performance criteria for life-saving appliances and arrangements on board ships operating in polar waters, taking into account annexes 2, 4 and 5 to document SSE 5/4, and document SSE 4/INF.4.

32 The Group noted that the Correspondence Group had made good progress (annexes 4 and 5 to document SSE 5/4) but there was still a substantial amount of further development necessary. It was noted in particular that gaps and overlaps between the specific conditions (SSE 5/4, annex 4) and test and performance criteria (SSE 5/4, annex 5) needed to be addressed.

33 In the course of the discussion views were expressed and supported by the group that alternative testing should be considered, such as testing of representative samples instead

of a complete lifeboat in a climate chamber or conducting ventilation tests without human beings on board.

34 Moreover, the question was raised whether maintenance and survey requirements for the new/additional equipment needed to be considered.

35 In the course of these consideration, the Group noted that the specific conditions and requirements to consider for special polar life-saving appliances and arrangements (SSE 5/4, annex 4) and the draft interim guidelines (see annex 4) could be merged into one document. Furthermore, the Group noted that related test and performance criteria (SSE 5/4, annex 5), once finalized, could be annexed to the draft interim guidelines.

36 Having noted a close link between the ongoing discussion on draft interim guidelines and the specific conditions and test and performance criteria, the Group agreed to invite the Sub-Committee to establish a correspondence group to further progress this issue intersessionally. The draft terms of reference are set out in paragraph 40.

Regulatory options to address new test and performance criteria

37 In accordance with subparagraph .8 of the terms of reference, the Group briefly considered suitable regulatory options to address new test and performance criteria.

38 During the discussion, the Group noted the following views expressed on this matter:

- .1 the final outcomes should be of a non-mandatory nature, e.g. as guidelines by means of a MSC circular or resolution etc., noting the ongoing activities at ISO, and using ISO standards for such test and performance criteria was mentioned;
- .2 a categorization of the testing requirements in mandatory and non-mandatory elements could be considered, e.g. through amendments to the LSA Code and amendments to resolution MSC.81(70);
- .3 operational assessment is a fundamental element for the determination of provisions on operations in low air temperatures with respect to Polar Service Temperatures (PST) or in the polar area needs to be considered; and
- .4 a more detailed discussion was considered premature and should be postponed until the new test and performance criteria reached a more matured status.

39 In this context, the Group agreed that the regulatory options to address new test and performance criteria should be decided after the finalization of the specific conditions and test and performance criteria and the draft interim guidelines.

Establishment of a correspondence group

40 The Group, as instructed by plenary, considered the need to establish a correspondence group and agreed that a correspondence group could significantly progress the above work plan and, subsequently, prepared the following draft terms of reference of a

Correspondence Group on Life-Saving Appliances, under the coordination of the United States¹ (items 3 and 4) and Norway (item 6)²:

Taking into account the comments and decisions made at SSE 5, the Group is instructed to:

with regard to agenda item 3:

- .1 compare annex 1 to document SSE 4/WP.3 with document SSE 5/INF.7 and resolve any differences;
- .2 reach an agreement on the format of the presentation of the functional requirements;
- .3 verify completeness of the functional requirements by reviewing the LSA Code and make adjustments as necessary;
- .4 with a view to finalizing the functional requirements, further develop expected performances;
- [.5 following the principles provided in document SSE 5/3/1 and based on annex 4 to document SSE 4/WP.3, develop draft amendments to MSC.1/Circ.1212;]

with regard to agenda item 4:

- .6 review data on microclimates as referenced in annexes 1 and 2 to document SSE 5/4 and document SSE 5/4/1 with respect to survival craft and data from other sources deemed reliable and relevant;
- .7 based on that review and taking into consideration the expected performance established for totally enclosed lifeboats, identify the possible criteria on which the new ventilation requirements for survival craft other than totally enclosed lifeboat;
- .8 recommend the criteria to be used for ventilation requirements for survival craft other than totally enclosed lifeboats;

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- .9 prepare the draft amendments to the LSA Code, chapter IV, on ventilation requirements for survival craft other than totally enclosed lifeboats;
- .10 prepare draft amendments to resolution MSC.81(70) for the test of means of ventilation for all survival craft and necessary consequential amendments to other IMO instruments, based on annex 2 to document SSE 4/14, taking into consideration safe operational conditions that may allow the lifeboat hatches to be opened for ventilation;

with regard to agenda item 6:

- .11 further develop, with a view towards finalization, the draft interim guidelines on life-saving appliances and arrangements for ships operating in polar waters, based on annexes 3 and 4 to document SSE 5/WP.3 and taking into account annexes 2, 4 and 5 to document SSE 5/4, and document SSE 4/INF.4;
- .12 consider suitable regulatory options to address future new test and performance criteria, e.g. a new chapter of the LSA Code, amendments to MSC 81(70), amendments to the Polar Code part I-B or standalone resolution/circular; and
- .13 submit a report to SSE 6.

Actions requested of the Sub-Committee

- 41 The Sub-Committee is invited to approve the report in general and, in particular, to:
 - .1 note the deliberation of the group regarding the output on safety objectives and functional requirements of the guidelines on alternative design and arrangements for SOLAS chapters II-1 and III (paragraphs 4 to 6);
 - .2 agree to the draft amendments to the LSA Code regarding ventilation on totally enclosed lifeboats, and take action as appropriate (paragraph 17 and annex 1);
 - .3 agree to the draft amendments to paragraph 6.1.1.3 of the LSA Code, for submission to MSC 100 for approval (paragraph 22 and annex 2);
 - .4 note the difficulties encountered by the group finalizing the draft interim guidelines on life-saving appliances and arrangements for ships operating in polar waters (paragraphs 24 and 25);
 - .5 note the progress made on the draft interim guidelines on life-saving appliances and arrangements for ships operating in polar waters (paragraphs 26 to 29, annexes 3 and 4);
 - .6 endorse the group's view that the regulatory options to address new test and performance criteria should be decided after the finalization of the specific conditions and test and performance criteria and the draft interim guidelines on life-saving appliances and arrangements for ships operating in polar waters (paragraph 39); and

- .7 consider the recommendation of the group to re-establish the Correspondence Group on Life-Saving Appliances with the terms of reference prepared by the group, and take action as appropriate (paragraph 40).

ANNEX 1

DRAFT AMENDMENTS TO THE LSA CODE

CHAPTER IV SURVIVAL CRAFT

1 The following new paragraphs 4.6.6 and 4.6.7 are inserted after existing paragraph 4.6.5:

"4.6.6 Ventilation means

4.6.6.1 A totally enclosed lifeboat shall be provided with means to achieve a ventilation rate of at least 5 m³/h per person for the number of persons which the lifeboat is permitted to accommodate and for a period of not less than 24 hours. The ventilation means shall be operable from inside the lifeboat and shall be arranged to ensure that the lifeboat is ventilated without stratification or formation of unventilated pockets.

4.6.6.2 Where the means of ventilation is powered, the source shall not be the radio batteries referred by 4.4.6.11; and where dependent on the lifeboat engine, sufficient fuel shall be provided to comply with 4.4.6.8.

4.6.7 Openings of the ventilation system and their means of closing

4.6.7.1 Each opening of the ventilation means required in paragraph 4.6.6 shall be provided with means of closing. The means of closing shall be operable by a person from inside the lifeboat. Means shall be provided to ensure that the openings can be kept closed before, i.e. while in the stowed position, and during the launching of the lifeboat.

4.6.7.2 Inlet and outlet openings of the ventilation means and their external fittings shall be located and designed in order to minimize the ingress of water through the openings, without using the means of closing required in paragraph 4.6.7.1 and taken into consideration the requirements provided in paragraph 4.6.3.2.

4.6.7.3 For a free-fall lifeboat complying with the requirements of section 4.7, the openings and their means of closing shall be designed to withstand the loads and to prevent ingress of water under the anticipated submerged condition of the lifeboat at the time of free-fall launching.

4.6.7.4 For a lifeboat with a self-contained air support system complying with the requirements of section 4.8, the openings and their means of closing shall be designed to maintain the pressure required by section 4.8.

4.6.7.5 For a fire-protected lifeboat complying with the requirements of section 4.9, the openings and their means of closing shall be designed to ensure that the capability of protecting persons in the lifeboat is not impaired, under the conditions specified in paragraph 4.9.1."

ANNEX 2

DRAFT AMENDMENTS TO PARAGRAPH 6.1.1.3 OF THE LSA CODE

**CHAPTER VI
LAUNCHING AND EMBARKATION APPLIANCES**

1 Paragraph 6.1.1.3 is amended as follows:

"6.1.1.3 A launching appliance shall not depend on any means other than gravity or stored mechanical power which is independent of the ship's power supplies to launch the survival craft or rescue boat it serves in the fully loaded and equipped condition and also in the light condition.

On cargo ships equipped with a rescue boat which is not one of the ship's survival craft, having a mass not more than 700 kg in fully equipped condition, with engine, but without the crew, the launching appliance of the boat does not need to be fitted with stored mechanical power. Manual hoisting from the stowed position and turning out to the embarkation position shall be possible by one person. The force on the crank handle shall not exceed 160 N at the maximum crank radius of 350 mm. Means shall be provided for bringing the rescue boat against the ship's side and holding it alongside so that persons can be safely embarked."

ANNEX 3

Non-exhaustive list of actions for further development of the draft interim guidelines on life-saving appliances and arrangements for ships operating in polar waters³

Note: paragraph 24 of the main body of this working paper should also be taken into account

- 1 The scope and application of the different requirements of the guidelines should be clarified.
- 2 The application of the provisions in section 3 need to be determined in more detail.
- 3 The food rations and fresh water required for the expected time of rescue need to be further considered and justified (3.4 and 3.5).
- 4 With regard to provision 3.8, revision of the seating arrangements should be extended to all survival crafts.
- 5 The minimum personal and group survival equipment and its carriage into and stowage in the survival craft should be further considered (3.12).
- 6 The provisions related to minor repairs of the electrical systems should be further considered (3.14).
- 7 The relations between ventilation and heating and capability of maintaining an inside air temperature of at least [+20] should be further considered (4.2).
- 8 Applicability of sanitary equipment should be further considered (4.5).
- 9 An extra viewing port should be further justified (5.3).
- 10 Retroactive application or no retroactive application of survival craft construction recommendations (including sections 3, 4 and 5) has to be considered.
- 11 Appropriateness of the stability calculation application from the Polar Code in 6.3.
- 12 The purpose of 7.1 appears inconsistent with typical lifeboat usage.
- 13 With regard to section 10, further evaluation to identify specific guidance is needed. Much of what is included in this section is the same as what the Polar Code states in 8.3.3.3.
- 14 The outputs in annexes 4 and 5 to document SSE 5/4 should be considered for the further development of the draft interim guidelines.

³ The paragraph and section numbers refer to annex 4.

ANNEX 4

[DRAFT MSC CIRCULAR

INTERIM GUIDELINES ON LIFE-SAVING APPLIANCES AND ARRANGEMENTS FOR SHIPS OPERATING IN POLAR WATERS

1 The Maritime Safety Committee, at its [...] session ([*date*]), with a view to providing appropriate testing and performance standards for life-saving appliances and arrangements for ships operating in polar waters, approved the annexed *Interim guidelines on life-saving appliances and arrangements for ships operating in polar waters*.

2 The relevance and adequacy of these Interim guidelines should be assessed as experience is gained on their application and the application of the International Code for Ships Operating in Polar Waters (Polar Code).

3 Member States are invited to use the annexed Interim guidelines and to bring them to the attention of all parties concerned.]

ANNEX

INTERIM GUIDELINES ON LIFE-SAVING APPLIANCES AND ARRANGEMENTS FOR SHIPS OPERATING IN POLAR WATERS

1 General

1.1 These Interim guidelines outline possible mitigating means in order to comply with section 8.3 of the International Code for Ships Operating in Polar Waters (Polar Code), and is intended to assist ship designers and ship owners/operators as well as Administrations, in a uniform implementation of the Polar Code.

1.2 Compliance with these Interim guidelines does not necessarily mean that the ship complies with the Polar Code. There might be other hazards, conditions and mitigating means to consider in the operational assessment required in section 1.5 of the Code. The complexity of a prolonged survival time in a harsh environment should not be underestimated.

1.3 Survival after abandonment will rely on several factors, such as the types and combination of equipment, crew training and good leadership of each survival craft. The expected time of rescue is a defining factor for life-saving appliances and arrangements. Conditions that are not otherwise considered critical may become critical over time.

[1.4 While equipment enhancement greatly improves survivability, the human element is the significant factor. The crew should have good knowledge of human behaviour in a crisis, medical first aid and the management of the resources available.]

1.5 Key physical parameters for human survival, and human behaviour in a crisis should be taken into account when considering life-saving appliances and arrangements for ships operating in polar waters.

1.6 All references to the LSA Code mean the "International Life-Saving Appliance (LSA) Code" adopted by the Maritime Safety Committee of the Organization by resolution MSC.48(66), as amended.

1.7 Due to the variability of voyage types in polar waters, some of the provisions within these Guidelines may not apply to all operations. Any risk mitigation measures applied should be based on the results of the assessment as required by the Polar Code and the operational limitations identified on the Polar Ship Certificate.

2 Conditions to consider

2.1 The Polar Code considers hazards that may lead to elevated levels of risk due to an increased probability of occurrence, more severe consequences. The sources of hazards listed in section 3 of the Introduction of the Polar Code should be considered for both normal operation and emergency situations. The risk 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 in order to address the above-mentioned specific hazards may vary within polar waters and may be different in Arctic waters and the Antarctic area.

2.2 These Interim guidelines are based on the following specific operational assessment criteria:

- [.1 maximum expected time of rescue;]
- .2 operation in low-air temperatures (ships with an assigned PST);

- .3 operation in ice;
- .4 icing of life-saving appliances and arrangements;
- .5 the effect of operation in high latitudes;
- .6 operation in extended periods of darkness; and
- .7 abandonment onto ice or land.

2.3 In the following provisions, the mitigating means are organized based on their relevance in relation to the specific conditions. Some means may be relevant to more than one of the conditions. The final relevance for each individual ship is dependent on the results of the operational assessment required by section 1.5 of the Polar Code.

[3 Maximum expected time of rescue

3.1 With respect to paragraphs 2.3.1.1.3 and 2.5.2.1 of the LSA Code, all immersion suits and thermal protective aids respectively should be provided with separate gloves and permanently attached covers for the hands.

Note: it is important to keep the hands warm but at the same time imperative that people are able to open rations and water and open thermal protective suits to ventilate them and avoid building-up moisture inside the suit.

3.2 In addition to the liferaft fittings listed in paragraph 4.1.3 of the LSA Code, liferafts should be fitted with handholds to safeguard persons who are standing upright or moving inside the raft.

Note: it is of vital importance for people to be able to raise and move to mitigate pain and in the worst case scenario, thrombosis.

3.3 Exterior and interior lights, required in paragraphs 4.1.3.3, 4.1.3.4, 4.4.7.10, 4.4.7.11 and 4.4.8.29 of the LSA Code, should be capable of being in continuous operation for the expected time of rescue, unless where the Administration considers this unnecessary due to extended periods of daylight.

3.4 The food rations required for the expected time of rescue should be [12.000] kJ per person per day ([2.868] kcal). Emergency rations should not contain any allergenic.

Note: when people are cold and shivering, more energy is needed to maintain an acceptable body temperature and avoid hypothermia. The Correspondence Group has proposed 12.000 kJ (2868 kcal) for ships operating in low-air temperatures.

3.5 At least [2 litres] of fresh water per person per day until the maximum expected time of rescue should be provided. De-salting apparatus could supply the amount exceeding the requirements of paragraphs 4.1.5.1.19 and 4.4.8.9 of the LSA Code. A powered de-salting apparatus is acceptable provided that the necessary additional fuel or battery consumption is taken into account. There should be a tank or container of adequate size to collect water from the de-salting apparatus and rainwater collectors.

Note: experience from SARex II shows that people are rapidly losing body mass due to dehydration, even in cold air temperatures. Insufficient intake of water may lead to fatigue. Persons with fatigue are less likely to be able to safeguard themselves. Survival is not a waiting game, but requires active participation from all persons.

3.6 The amount of anti-seasickness medicine required in paragraphs 4.1.5.1.21 and 4.4.8.21 of the LSA Code should be increased to last for the maximum expected time of rescue.

3.7 Liferafts without inflatable floor, in accordance with paragraph 4.2.2.2.2 of the LSA Code, should have equal effective means of insulation. The proof of equality should address in particular exposure to very low seawater temperature over a prolonged period until rescue.

Note: resolution MSC. 81(70) does not have any test criteria for liferaft floor insulation. Hence, there are no criteria to consider when determining "equally effective means". The SAREX I and SAREX II have shown that there is a substantial difference between inflated floor and the equally effective means used in the first exercise. The benefits of an inflated floor is also shown in the reports referred to in document SSE 4/15/2 (Canada).

3.8 The method for calculating the liferafts capacity required in paragraphs 4.2.3 and 4.3.3 of the LSA Code should be replaced with a method of calculation agreed with the Administrations, taking into account additional equipment and rations and sufficient space for persons on board to move in order to maintain blood circulation.

The layout of the survival craft should allow all persons to move from their seat to the toilet facilities, if provided.

3.9 Notwithstanding the requirements in paragraph 4.4.1.5 of the LSA Code, thwarts or benches without backrest, including seat arrangements in compliance with paragraph 4.4.2.2.2 of the LSA Code, should not be accepted in [new] lifeboats on [new] ships in polar waters due to the prolonged time of rescue.

3.10 New lifeboats designed specific for polar waters should comply with the following provisions in lieu of paragraph 4.4.2.2 of the LSA Code. The Administration should determine to what extent these should apply to other lifeboats:

.1 [...]

Note: guidelines to be developed based on available knowledge, i.e. from SAREX II. Seating size is one matter. However, the design (ergonomics) can also play an important role. The design of the seats should minimize the back and neck pain, etc. Such pain is a cause of fatigue and persons with fatigue can be less capable of safeguarding themselves. Even a moderate pain can affect the general morale and attitude on board.

.2 each seat should have in close proximity a shelf, pocket or peg where each person can keep their personal survival kit; and

.3 the seat in the steering position should be a foldable seat and the steering position should be arranged in such a way that the operator is able to stand upright between the seat and the wheel.

Note: increased mobility for the person at the steering position will ease the task of lookout in all directions. This can be important in icy waters, but also when manoeuvring close to other survival craft etc.

3.11 Notwithstanding the requirement in paragraph 4.4.8 of the LSA Code that all lifeboat equipment should be as small and of as little mass as possible, it is important that all items are robust to remain their functionality for the maximum expected time of rescue.

3.12 All persons on board should be provided with a personal survival equipment packed in a waterproof floatable carrier bag. The personal survival equipment can be stored at the assembly or embarkation stations, and should be clearly marked with the size of the person they are intended for (if applicable). The content should include, as a minimum, all equipment needed during the abandonment and the initial part of the survival phase, until the person in charge of the survival craft has been able to organize the survival equipment provided in the survival craft. The carrier bag could also function as each person's personal storage area for equipment handed out during the survival phase in order to keep the lifeboat tidy and habitable. As a minimum, the personal survival equipment should contain:

- .1 woollen clothing (head protection, neck and face protection, gloves, socks, long underpants and sweater);
- .2 a thermal protection aid (unless insulated immersion suits are provided);
- .3 sunglasses;
- .4 a drinking mug, preferably a bottle with a screw cap. [If the water required in paragraphs 4.1.5.1.19 and 4.4.8.9 of the LSA Code is provided in bottles with a screw cap, it is not necessary to provide additional drinking mug in the personal survival kit;]
- .5 a polar survival guidance;
- .6 a seasickness bag;
- .7 a set of anti-bacterial hand wipes; and

Note: in case of seasickness or other sickness/infections on board, it is essential to prevent contamination of the environment inside the survival craft, in order to avoid increased fluid loss and to maintain a habitable environment in general.

- .8 other equipment in accordance with chapter 9 of part I-B of the Polar Code, as deemed necessary. The Administration and the company should consider the overall safety if all passengers are provided with penknives, as recommended in chapter 9 part I-B of the Polar Code.

3.13 In addition to the equipment listed in paragraphs 4.1.5 and 4.4.8 of the LSA Code, all survival craft should be equipped with:

- .1 sponges;

Note: sponges are required for liferafts (LSA Code, paragraph 4.1.5), but not for lifeboats. They are useful to dry up condensation inside the lifeboat and maintaining a habitable environment.

- .2 seasickness bags;
- .3 megaphone or other effective means of communicating important messages from the person in charge of the survival craft, unless the Administration considers the survival craft small enough to ensure that all important messages can be heard by all persons on board, taken into account the noise level caused by the lifeboat engine, harsh weather, etc.;

Note: With reference to the general remarks in section 1, the leadership of the survival craft is important for survival. Everybody on board should receive all information and messages from the person in charge of the lifeboat.

.4 [2] wooden mallets; and

.5 woollen blankets [for each person on board] [for x% of the persons on board].

3.14 In addition to the tools required in paragraph 4.4.8.27 of the LSA Code, the lifeboat should be provided with tools and critical spare parts for minor repairs of the electrical systems and its accessories.

3.15 In order to provide a habitable environment, all survival craft should be properly ventilated. The amendments to the LSA Code (adopted by resolution MSC.[XXX(YY)]) should be consulted for guidance. However, the ventilation should be capable of operating continuously for the maximum expected time of rescue, and the requirement should be applicable not only to totally enclosed lifeboats.

Note: if SSE 5 decides to implement the proposal in document SSE 5/4, annex 2, this paragraph should be adjusted accordingly.]

4 Ships operating in low-air temperatures

4.1 All life-saving appliances and arrangements should remain operational and ready for immediate use at the polar service temperature (PST), or at the temperatures specified by the LSA Code, whichever is lowest.

Note: the generic guidance in paragraph 4.1 will, in our opinion, cover a wide range of issues that relates to temperature. Hence, there are some more specific issues agreed on in the Correspondence Group that we have not proposed to address in detail.

[minimizes ingress of water and the accumulation of [moisture] [condensation] inside the craft.]

[4.2 In the survival craft the combination of personal survival equipment, ventilation, insulation and heating means, if provided, should be capable of maintaining an inside air temperature of at least [+20]°C when the outside air temperature is equal to the PST. All cold surfaces should be insulated, in particular the surfaces in direct contact with the persons, e.g. seats.]

Note: if SSE 5 decides to implement the proposal in document SSE 5/4, annex 2, this paragraph should be adjusted accordingly, as that proposal also considers the body core temperature. However, with respect to the temperature, a fully loaded lifeboat is a "best case"-condition in cold climate. The calculation has to be adjusted to take into consideration that the lifeboat not necessarily will be fully loaded. Hence, we propose to test/calculate with 50% load. Minimum temperature in stored position will mitigate problems with frozen drinking water and also concerns related to starting of lifeboat engine.

4.3 Any installed heating systems and its power sources should be dimensioned to continuously operate during the maximum expected time of rescue.

4.4 Means should be provided to avoid icing or dew on the windows of the steering position, in order to maintain lookout for ice and other hazards.

4.5 In order to avoid unnecessary exposure to cold air, survival craft should be provided with basic sanitary equipment inside them. Means should be provided to ensure the necessary hygiene on board [, including toilet facilities]. [Toilets should discharge directly overboard].

4.6 If liferafts are used instead of lifeboats, all persons should be wearing insulated immersion suits instead of thermal protective aids.

Note: if SSE 5 decides to implement the proposal in document SSE 5/4, annex 2, this paragraph should be adjusted accordingly, as that proposal also considers the body core temperature. However, with respect to temperature, a fully loaded liferaft is a "best case"-condition in cold climate. The calculation has to be adjusted to take into consideration that the liferaft will not necessarily be fully loaded.

4.7 Survival craft in their stowed position should have means to mitigate freezing of drinking water supplies.

[4.8 [New] Survival craft should have a design that minimizes ingress of water and the accumulation of [moisture] [condensation] inside the craft.]

4.9 Lifeboats should be provided with suitable low temperature grade fuel and lubrication oil for the engine and suitable low temperature grade oil for the steering gear, as necessary, or be fitted with a heating system to maintain fuel and lubrication oil at the appropriate viscosity for operation.

5 Ships operating in ice

5.1 The requirements for liferafts in accordance with paragraph 4.1.1.2 of the LSA Code should be verified with the liferaft dropped into icy water, such as ice floes or slush; or, if applicable, directly onto ice.

5.2 In addition to the requirement in paragraph 4.1.1.4 of the LSA Code, the liferaft and its fittings should be so constructed as to enable it to be towed safely through icy water when loaded with its full complement of persons and equipment.

5.3 In addition to the viewing port required in paragraph 4.1.1.5.5 of the LSA Code, liferafts should be fitted with an extra viewing port to ensure a full 360° view.

5.4 In addition to the requirements in paragraph 4.1.4.1.1 of the LSA Code, a liferaft should be able to withstand the impact when dropped into icy water from a height of not less than 3 m without damage that will affect its function.

5.5 In addition to the requirements in paragraph 4.4.7.12 of the LSA Code, the lifeboat steering position should be arranged with an adequate view astern, to allow for 360° degree lookout.

5.6 If free-fall lifeboats are used, the performance required in paragraph 4.7.4 of the LSA Code should be adjusted to the satisfaction of the Administration.

5.7 A survival craft should withstand deployment into the ice conditions expected for the operational area and its propeller, rudder or other external fittings should be capable of operating in such conditions.

6 Ships operating in conditions with risk of icing of life-saving appliances and arrangements

6.1 Means should be provided to ensure that hydrostatic release units required in paragraph 4.1.6.3 of the LSA Code are fully functional in conditions of icing of the ship.

6.2 Means should be provided to ensure that lifeboat release mechanisms operate as provided in paragraph 4.4.7.6 of the LSA Code in conditions of icing of the ship.

[6.3 The icing allowance required in paragraph 4.3.1.1 of the Polar Code should be included in the stability calculations of lifeboats as provided in paragraph 4.4.5.1 of the LSA Code.]

6.4 In paragraphs 6.1.1.7 and 6.2.2.1.8 of the LSA Code, regarding launching appliances and marine evacuation systems respectively, the phrase "as far as practicable remain effective under conditions of icing" should entail the provision of means to ensure that the systems remain effective and ready for immediate use under conditions of icing.

7 Ships operating in high latitudes

7.1 In addition to the compass required in paragraph 4.4.8.5 of the LSA Code, lifeboats should be provided with a non-magnetic [compass] [means for determining heading]. It should be possible to supply the [compass] [means for determining heading] with power from two independent batteries, e.g. one of the starting batteries and one consumption battery.

8 Ships operating in extended periods of darkness

8.1 The recommendations in paragraph 3.3 are also applicable for operations in extended periods of darkness.

9 Ships operating in areas with dangerous wildlife

9.1 Special consideration should be taken when operating in areas with dangerous wildlife, such as polar bears and walrus. Liferrafts are considered less able to withstand an attack from wildlife compared to lifeboats.

9.2 The additional viewing ports and windows provided in paragraphs 5.3 and 5.5, respectively, are also applicable for operations in areas with dangerous wildlife.

10 Abandonment onto ice or land

Shelter

10.1 The combination of a chosen type of shelter, type of personal thermal protection and other mitigating means should provide a habitable environment on ice or land while adequately protecting against cold, wind and sun. Conventional lifeboats should not normally be considered as shelters on ice or land, as they would require very specific conditions for their safe launch on ice or land.

10.2 When determining the capacity of the shelters, the expected environmental condition in the operating area should be considered. The calculation should take into account that it might be unsafe for persons to stay outside the shelter, even for short periods, in areas with low-air temperature. Hence, the same considerations as for survival craft should be taken into account.

10.3 Shelters should have insulated floor or other means to eliminate heat transfer to the ground.

Containers for group survival equipment

10.4 Each container for group survival equipment should not exceed [185 kg] when fully packed, in order to be easily movable over the ice, in line with paragraph 8.3.3.3.3 of the Polar Code. The container should have a shape that allows the crewmembers to pull it out of the water and place it onto the ice floes that can be expected in the ship's operating area.

Note: the proposed weight in square brackets corresponds with the SOLAS requirement for liferafts to be handled manually by two persons.

10.5 Unless the group survival equipment is carried in the survival craft, means should be provided to launch the containers to water, ice or land without damage to the container or its equipment.

APPENDIX

**INTERIM GUIDELINES ON TEST STANDARDS IN ADDITION TO
THE *REVISED RECOMMENDATION ON TESTING OF LIFE-SAVING
APPLIANCES* (RESOLUTION MSC.81(70))**

(Left blank intentionally, until the content of the interim guidelines above is agreed on)
