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

1 The Maritime Safety Committee, at its 101st session (5 to 14 June 2019), having considered a proposal by the Sub-Committee on Ship Systems and Equipment, at its sixth session, and recognizing the importance of life-saving appliances and arrangements for ships operating in polar waters, with a view to providing interim guidance outlining possible means of mitigating hazards in order to comply with section 8.3 of part I-A of the International Code for Ships Operating in Polar Waters (Polar Code), approved the *Interim guidelines on life-saving appliances and arrangements for ships operating in polar waters* (MSC.1/Circ.1614).

2 The Maritime Safety Committee, at its 106th session (2 to 11 November 2022), approved amendments with respect to the new provisions concerning the methodology for the calculation of the maximum time of rescue.

3 Member States are invited to bring the annexed Revised Interim Guidelines to the attention of ship designers, shipyards, shipowners, ship managers, ship operators and other organizations or persons responsible for life-saving appliances and arrangements for ships operating in polar waters.

4 Member States are also invited to bring the annexed Revised Interim Guidelines to the attention of shipmasters, ships' officers and crew and all other parties concerned.

5 The Committee agreed to keep the Revised Interim Guidelines under review, taking into account operational experience gained with their application.

6 This circular supersedes MSC.1/Circ.1614.

ANNEX

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

1 GENERAL

1.1 These Revised Interim Guidelines outline possible means of mitigating hazards in order to comply with section 8.3 of part I-A of the International Code for Ships Operating in Polar Waters (Polar Code) and are intended to assist ship designers and shipowners/operators, as well as Administrations in the uniform implementation of the Polar Code.

1.2 Compliance with these Revised Interim Guidelines does not necessarily mean that the ship complies with the Polar Code. There may be other hazards, conditions and mitigating means to be considered in the operational assessment required in section 1.5 of part I-A 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 a significant factor. The crew should have relevant knowledge of human behaviour in extended survival situations, 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 in these Revised Interim Guidelines 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 risk levels in polar waters, some of the mitigation means within these Revised Interim 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 risks due to an increased probability of occurrence and/or more severe consequences. The sources of hazards listed in section 3 of the introduction of the Code should be considered for both normal operation and emergency situations.

2.2 These Revised 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 Polar Service Temperature (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 part I-A of the Polar Code.

3 MAXIMUM EXPECTED TIME OF RESCUE

3.1 This section provides guidance for the type and amount of survival equipment related to the maximum expected time of rescue. A methodology on how to estimate the calculation of the maximum expected time of rescue is set out in the appendix to these guidelines.

Personal and group survival equipment

3.2 The following equipment should be available for all persons after abandonment and for the maximum expected time of rescue, which can be stored in survival craft or be a part of the personal survival equipment or group survival equipment and the Polar Water Operational Manual (PWOM) should consider the location, stowage and transfer of life-saving equipment:

- .1 insulated immersion suit or thermal protective aid provided with gloves should be provided with separate gloves, which shall be permanently attached to the suit/protective aid;
- .2 food rations providing a minimum of 5,000 kJ (1,195 kcal) per person per day which should be increased as necessary taking into account the operational assessment;
- .3 at least 2 litres of fresh water per person per day: de-salting apparatus or means to melt ice or snow may supply the amount exceeding the requirements of paragraphs 4.1.5.1.19 and 4.4.8.9 of the LSA Code and there should be a tank or a container of adequate size to collect water from the de-salting apparatus and rainwater collectors;
- .4 anti-seasickness medicine;
- .5 protective clothing of a material with thermal properties taking into account performance of the material when wet and type of survival craft, including head protection, neck and face protection, gloves/mittens, socks, boots, long underpants and sweaters;
- .6 sunglasses or ski goggles appropriate for the expected conditions to protect persons from snow blindness, UV rays, snow ingress and/or cold;

- .7 drinking vessel, preferably with a screw cap;
- .8 polar survival guidance;
- .9 a seasickness bag in addition to the one required by the LSA Code;
- .10 anti-bacterial gel or hand wipes;
- .11 blanket of a material with thermal properties suitable for use on the planned route, for each person on board; and
- .12 other equipment in accordance with section 9.1 of part I-B of the Polar Code, as deemed necessary.

3.3 Personal survival equipment should be packed in a waterproof floatable carrier bag. The personal survival equipment may 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. The carrier bag should also function as each person's personal storage area for equipment handed out during the survival phase in order to keep the survival craft or shelter tidy and habitable.

Capacity of survival craft

3.4 The capacity of each survival craft should comply with the following:

- .1 The seating capacity of each survival craft should be adjusted taking into account polar clothing, additional equipment including all persons carrying their intended personal survival equipment and space for occupants to stand and move in turns.
- .2 Where additional personal and group survival equipment is carried in accordance with paragraphs 8.3.3.3.2 and 8.3.3.3.3 of chapter 8 of part 1-A of the Polar Code, adequate space for the stowage of the equipment should be provided. The total combined weight including additional equipment may not exceed the weight determined for the type approval of the survival craft.

Equipment in survival craft

3.5 The following equipment should be available in the survival craft:

- .1 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, taking into account the noise level caused by the lifeboat engine, harsh weather, etc.
- .2 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 adjustments of the equipment and components to ensure operability during the survival phase.

3.6 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 retain their functionality for the maximum expected time of rescue.

3.7 Survival craft should be of a type complying with the following:

- .1 Survival craft should be fitted with handholds or handhold lines to safeguard persons who are standing upright or moving inside the craft in a seaway.
- .2 Survival craft should provide a habitable environment for all persons on board that prevent exposure to a long-term CO₂ concentration of more than 5,000 ppm for the maximum expected time of rescue. The ventilation should be considered in context with heating requirements to achieve a habitable temperature in the survival craft.
- .3 Each seat in a lifeboat should be provided with a backrest.

4 SHIPS OPERATING IN LOW AIR TEMPERATURE

4.1 This section applies to ships intended to operate in low air temperatures, as defined in the Polar Code, part I-A, regulation 1.2.12.

4.2 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 the lowest. The manufacturer should provide information of additional tests including temperature ranges which the equipment is intended for. This information should be a part of the operating and maintenance manual.

4.3 In the survival craft, the combination of personal survival equipment, ventilation, insulation and heating means, if provided, should be capable of maintaining a habitable inside air temperature 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.

4.4 Installed heating systems, if provided, and their power sources should be capable of operation during the maximum expected time of rescue.

4.5 Means should be provided to avoid icing or dew on the windows of the lifeboat steering position, in order to maintain a proper lookout.

4.6 In order to avoid exposure to cold air, toilet equipment should be provided inside the survival craft.

4.7 Liferafts should be provided with inflatable floors or equivalent and all persons should be wearing insulated immersion suits instead of thermal protective aids.

4.8 Survival craft and containers for group survival equipment in their stowed position should have means to mitigate the freezing of drinking water supplies.

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 This section applies to Category A and B ships and ice strengthened Category C ships.

5.2 All survival craft should be arranged for launching in such a way that they will not be damaged or cause sufficient impact to injure persons on board.

5.3 Survival and rescue craft and their fittings should be so constructed as to prevent damage from contact with ice when loaded with its full complement of persons and equipment.

5.4 A survival craft should withstand a controlled 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 This section applies to ships operating in conditions where ice accretion is likely to occur on life-saving appliances and arrangements.

6.2 Means should be provided to ensure the function of launching appliances, release mechanisms, hydrostatic release units and marine evacuation systems in the expected conditions of icing.

6.3 Lifeboats and rescue boats should maintain positive metacentric height (GM) when loaded as required by paragraph 4.4.5.1 of the LSA Code and with an additional ice load of 30 kg/m² on exposed horizontal surfaces and 7.5 kg/m² for the projected lateral area of each side of the lifeboat.

6.4 Means for removing ice should be provided for all survival craft likely to accumulate ice.

6.5 Entrances, hatches and means of ventilation should be designed and equipped in a way that they can be operated during icing condition to allow mitigation of ice accretion and remove the accumulated ice.

7 SHIPS OPERATING IN HIGH LATITUDES

7.1 This section applies to ships operating in areas of high latitudes.

7.2 Lifeboats and rescue boats on ships proceeding to latitudes over 80°N should be fitted with a non-magnetic means for determining heading. It should be possible to supply the means with power from two independent batteries.

8 SHIPS OPERATING IN EXTENDED PERIODS OF DARKNESS

8.1 This section applies to all ships operating in polar waters during extended periods of darkness.

8.2 Survival craft exterior and interior lights should be capable of being in operation for the extended periods of darkness during the maximum expected time of rescue. Lifeboat searchlights should be capable of being in continuous operation for the maximum expected time of rescue.

9 ABANDONMENT TO ICE OR LAND

9.1 This section applies to ships where the assessment required by paragraph 1.5 of part I-A of the Polar Code identifies a potential of abandonment onto ice or land.

9.2 Special consideration should be given when operating in areas with dangerous wildlife. Additional flares and/or a flare gun should be provided.

Shelter

9.3 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.

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

9.5 Shelters should have insulated floor or other means to minimize heat transfer to the surface.

Group survival equipment

9.6 The container for group survival equipment when fully loaded should have a size, shape and mass that enables it to be towed through icy water, and also allows two crew members to pull it out the water and tow it on ice or on land.

9.7 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 contents. Means to launch such containers should be independent of the ship power system.

APPENDIX

METHODOLOGY ON HOW TO ESTIMATE THE MAXIMUM EXPECTED TIME OF RESCUE

1 The following equation may be used to estimate the maximum expected time of rescue without factoring in vessels of opportunity (VOO):

$$t = t_{comm} + t_{prep} + \frac{d_i}{v} + (t_{crew} + t_{fuel}) \times \beta + t_{search} \times n_l + t_{resc} \times l \\ + \left(t_{shore} + 2 \frac{d}{v} \right) \times (l - 1)$$

Where:

t = the total estimated exposure time (h);

t_{comm} = the time elapsed between the stricken ship sending initial communication and SAR personnel receiving it (h);

t_{prep} = the time elapsed between receiving communication and deploying SAR resource (h);

d_i = the distance the rescue resource must travel from its initial location to the last known location of the distressed vessel (nm);

v = the cruising speed of the rescue resource (kt);

t_{crew} = the time for the crew to switch and relaunch (h);

t_{fuel} = the fuelling time of the craft (h);

β = the number of stops required;

$$= [d_i / r] - 1, \quad \{\beta \in \mathbb{N}\}$$

r = the range of the rescue craft (nm);

t_{search} = the time elapsed while searching for evacuees to rescue (h);

$$= (t_2 \times v_{drift}) / v_{search}$$

t_2 = the travel time to the incident location, including stops for fuel;

$$= d_i / v + (t_{crew} + t_{fuel}) \times \beta$$

v_{drift} = the drift speed of the survival craft (kt);

v_{search} = the search speed of the rescue craft (kt);

n_l = the number of lifeboats/life rafts containing the evacuees;

t_{resc} = the total rescue time per rescue attempt (h);

$$= t_{(r-marine)}$$

$$= t_{(r-air)} \times cap$$

$t_{(r-marine)}$ = the time elapsed during a rescue for a marine resource (h);

$t_{(r-air)}$ = the time elapsed during a rescue for an air resource (h);

cap = the total capacity of the rescue resources;

l = the number of loads (rounded to the highest non-decimal number);

$$= [n / cap], \quad \{l \in N\}$$

n = the number of evacuees;

t_{shore} = the time spent on shore activities when depositing the evacuees (h);

d = the distance to the nearest safe base to which the evacuees are brought if multiple loads of evacuees are required depending on the capacity of the SAR resource (nm).

It is recommended that local SAR experts be consulted to provide estimates for the variables in the above equation and that high end values be used to provide a factor of safety.

2 Assuming it is closer than a SAR resource, the following formula can be used to estimate the probability of a VOO (capable of affecting the rescue) impacting time to rescue:

$$\text{Probability of VOO} = \frac{\text{Total Count}}{\text{Total Days in Month}} \times 100\%$$

Where:

Total Count = the total number of days in which a VOO is present.

Total Days in Month = the total number of days in the month of interest.

For the calculated probability, the following formulae can be used to estimate the impact that VOO may have on time to rescue:

$$t = t_{comm} + t_{prep} + \frac{r_{voo}}{v} + (t_{crew} + t_{fuel}) \times \beta + t_{search} \times n_l + t_{resc} \times l \\ + \left(t_{shore} + 2 \frac{d}{v} \right) \times (l - 1)$$

Where:

r_{voo} = the radial distance from the emergency location to a VOO (nm).