GUIDANCE FOR STATUTORY IMPLEMENTATION

PART 6. STATUTORY

VOLUME G
GUIDANCE ON INTACT STABILITY
2014 EDITION

BIRO KLASIFIKASI INDONESIA

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Foreword

This BKI Guidance on Intact Stability serves as Society's not binding recommendation on matters related to intact stability. In addition, the use of this Guidance is to go together and complement the use BKI Guidelines on Intact Stability.

This Guidance contains the following 2 (two) main sections and 1 (one) appendice:

Section 1	Operational Provisions Against Capsizing
Section 2	Considerations For Watertight and Weathertight Integrity
Annex A	Recommendations for Skippers of Fishing Vessels on Ensuring AVessel's Endurance in Conditions of Ice Formation

It shall be noted that the application of this Guidance shall be based on company's personnel and ship's crew professional judgment, therefore does not relieve their responsibility for the decision taken in the circumstance. The impact of the judgment and decision is beyond BKI responsibility.

The following Guidance come into force on January 1st, 2014

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Section 1

Operational Provisions Against Capsizing

A. General precautions against capsizing

1. Compliance with the stability criteria does not ensure immunity against capsizing, regardless of the circumstances, or absolve the master from his responsibilities. Masters should therefore exercise prudence and good seamanship having regard to the season of the year, weather forecasts and the navigational zone and should take the appropriate action as to speed and course warranted by the prevailing circumstances.[14]

2. Care should be taken that the cargo allocated to the ship is capable of being stowed so that compliance with the criteria can be achieved. If necessary, the amount should be limited to the extent that ballast weight may be required.

3. Before a voyage commences, care should be taken to ensure that the cargo, cargo handling cranes and sizeable pieces of equipment have been properly stowed or lashed so as to minimize the possibility of both longitudinal and lateral shifting, while at sea, under the effect of acceleration caused by rolling and pitching.[15]

4. A ship, when engaged in towing operations, should possess an adequate reserve of stability to withstand the anticipated heeling moment arising from the tow line without endangering the towing ship. Deck cargo on board the towing ship should be so positioned as not to endanger the safe working of the crew on deck or impede the proper functioning of the towing equipment and be properly secured. Tow line arrangements should include towing springs and a method of quick release of the tow.

5. The number of partially filled or slack tanks should be kept to a minimum because of their adverse effect on stability. The negative effect on stability of filled pool tanks should be taken into consideration.

6. The stability criteria contained in Section 2 set minimum values, but no maximum values are recommended. It is advisable to avoid excessive values of metacentric height, as these might lead to acceleration forces which could be prejudicial to the ship, its complement, its equipment and to safe carriage of the cargo. Slack tanks may, in exceptional cases, be used as a means of reducing excessive values of metacentric height. In such cases, due consideration should be given to sloshing effects.

7. Regard should be paid to the possible adverse effects on stability where certain bulk cargoes are carried. In this connection, attention should be paid to the IMO Code of Safe Practice for Solid Bulk Cargoes.

B. Operational precautions in heavy weather

1. All doorways and other openings, through which water can enter into the hull or deckhouses, forecastle, etc., should be suitably closed in adverse weather conditions and accordingly all appliances for this purpose should be maintained on board and in good condition.

2. Weathertight and watertight hatches, doors, etc., should be kept closed during navigation, except

[14] Refer to the Revised Guidance to the master for avoiding dangerous situations in adverse weather and sea conditions (MSC.1/Circ.1228).

[15] Refer to the Guidelines for the preparation of the Cargo Securing Manual (MSC/Circ.745).

when necessarily opened for the working of the ship and should always be ready for immediate closure and be clearly marked to indicate that these fittings are to be kept closed except for access. Hatch covers and flush deck scuttles in fishing vessels should be kept properly secured when not in use during fishing operations. All portable deadlights should be maintained in good condition and securely closed in bad weather.

3. Any closing devices provided for vent pipes to fuel tanks should be secured in bad weather.

4. Fish should never be carried in bulk without first being sure that the portable divisions in the holds are properly installed.

C. Ship handling in heavy weather

1. In all conditions of loading necessary care should be taken to maintain a seaworthy freeboard.

2. In severe weather, the speed of the ship should be reduced if propeller emergence, shipping of water on deck or heavy slamming occurs.

3. Special attention should be paid when a ship is sailing in following, quartering or head seas because dangerous phenomena such as parametric resonance, broaching to, reduction of stability on the wave crest, and excessive rolling may occur singularly, in sequence or simultaneously in a multiple combination, creating a threat of capsize. A ship's speed and/or course should be altered appropriately to avoid the above-mentioned phenomena.[16]

4. Reliance on automatic steering may be dangerous as this prevents ready changes to course which may be needed in bad weather.

5. Water trapping in deck wells should be avoided. If freeing ports are not sufficient for the drainage of the well, the speed of the ship should be reduced or the course changed, or both. Freeing ports provided with closing appliances should always be capable of functioning and are not to be locked.

6. Masters should be aware that steep or breaking waves may occur in certain areas, or in certain wind and current combinations (river estuaries, shallow water areas, funnel shaped bays, etc.). These waves are particularly dangerous, especially for small ships.

7. In severe weather, the lateral wind pressure may cause a considerable angle of heel. If anti-heeling measures (e.g., ballasting, use of anti-heeling devices, etc.) are used to compensate for heeling due to wind, changes of the ship's course relative to the wind direction may lead to dangerous angles of heel or capsizing. Therefore, heeling caused by the wind should not be compensated with anti-heeling measures, unless, subject to the approval by BKI, the vessel has been proven by calculation to have sufficient stability in worst case conditions (i.e. improper or incorrect use, mechanism failure, unintended course change, etc.). Guidance on the use of anti-heeling measures should be provided in the stability booklet.

8. Use of operational guidelines for avoiding dangerous situations in severe weather conditions or an on-board computer based system is recommended. The method should be simple to use.

9. High-speed craft should not be intentionally operated outside the worst intended conditions and limitations specified in the relevant certificates, or in documents referred to therein.

D. Precautions for Fishing Vessel

1. A part from general precautions referred to in A,B and C, the following measures should be

[16] Refer to the Revised Guidance to the master for avoiding dangerous situations in adverse weather and sea conditions (MSC.1/Circ.1228).

considered as preliminary guidance on matters influencing safety as related to stability:

1.1. all fishing gear and other heavy material should be properly stowed and placed as low in the vessel as possible;

1.2. particular care should be taken when pull from fishing gear might have a negative effect on stability, e.g., when nets are hauled by power-block or the trawl catches obstructions on the sea-bed. The pull of the fishing gear should be from as low a point on the vessel, above the waterline, as possible;

1.3. gear for releasing the deck load in fishing vessels which carry the catch on deck, e.g., herring, should be kept in good working condition;

1.4. when the main deck is prepared for carrying deck load by dividing it with pound boards, there should be slots between them of suitable size to allow easy flow of water to freeing ports, thus preventing trapping of water;

1.5. to prevent a shift of the fish load carried in bulk, portable divisions in the holds should be properly installed;

1.6. reliance on automatic steering may be dangerous as this prevents changes to course which may be needed in bad weather;

1.7. necessary care should be taken to maintain adequate freeboard in all loading conditions, and where load line regulations are applicable they should be strictly adhered to at all times; and

1.8. particular care should be taken when the pull from fishing gear results in dangerous heel angles. This may occur when fishing gear fastens onto an underwater obstacle or when handling fishing gear, particularly on purse seiners, or when one of the trawl wires tears off. The heel angles caused by the fishing gear in these situations may be eliminated by employing devices which can relieve or remove excessive forces applied through the fishing gear. Such devices should not impose a danger to the vessel through operating in circumstances other than those for which they were intended.

E. Precautions for Offshore Supply Vessel

1. The arrangement of cargo stowed on deck should be such as to avoid any obstruction of the freeing ports or of the areas necessary for the drainage of pipe stowage positions to the freeing ports.

2. A minimum freeboard at the stern of at least 0.005 L should be maintained in all operating conditions

F. Operational measures for ships carrying timber deck cargoes

1. The stability of the ship at all times, including during the process of loading and unloading timber deck cargo, should be positive and to a standard acceptable BKI. It should be calculated having regard to:

1.1. the increased weight of the timber deck cargo due to:

1.1.1. absorption of water in dried or seasoned timber, and

1.1.2. ice accretion, if applicable (Section 6 (Icing considerations) of BKI Guidelines on Intact Stability);

1.2. variations in consumables;

1.3. the free surface effect of liquid in tanks; and

1.4. weight of water trapped in broken spaces within the timber deck cargo and especially logs.

2. The master should:

2.1. cease all loading operations if a list develops for which there is no satisfactory explanation and it would be imprudent to continue loading;

2.2. before proceeding to sea, ensure that:

2.2.1 the ship is upright;

2.2.2 the ship has an adequate metacentric height; and

2.2.3 the ship meets the required stability criteria.

3. The masters of ships having a length less than 100 m should also:

3.1. exercise good judgement to ensure that a ship which carries stowed logs on deck has sufficient additional buoyancy so as to avoid overloading and loss of stability at sea;

3.2. be aware that the calculated GM0 in the departure condition may decrease continuously owing to water absorption by the deck cargo of logs, consumption of fuel, water and stores and ensure that the ship has adequate GM_0 throughout the voyage; and

3.3. be aware that ballasting after departure may cause the ship's operating draught to exceed the timber load line. Ballasting and deballasting should be carried out in accordance with the guidance provided in the Code of Safe Practice for Ships Carrying Timber Deck Cargoes, 1991 (IMO resolution A.715(17)).

4. Ships carrying timber deck cargoes should operate, as far as possible, with a safe margin of stability and with a metacentric height which is consistent with safety requirements but such metacentric height should not be allowed to fall below the recommended minimum, as specified in Section 3, C 2 of BKI Guidelines on Intact Stability.

5. However, excessive initial stability should be avoided as it will result in rapid and violent motion in heavy seas which will impose large sliding and racking forces on the cargo causing high stresses on the lashings. Operational experience indicates that metacentric height should preferably not exceed 3% of the breadth in order to prevent excessive accelerations in rolling provided that the relevant stability criteria given in Section 3, C 2 of BKI Guidelines on Intact Stability are satisfied. This recommendation may not apply to all ships and the master should take into consideration the stability information obtained from the ship's stability booklet.

G. Operating booklets for certain ships

1. Special purpose ships and novel craft, should be provided with additional information in the stability booklet such as design limitations, maximum speed, worst intended weather conditions or other information regarding the handling of the craft that the master needs to operate the ship safely.

2. For double hull oil tankers of single cargo tank across design, an operation manual for loading and unloading cargo oil should be provided, including operational procedures of loading and unloading cargo oil and detailed data of the initial metacentric height of the oil tanker and that of free surface correction of liquids in cargo oil tanks and ballast tanks during loading and unloading cargo oil (including ballasting and

discharging) and cargo oil washing of tanks[17].

3. The stability booklet of ro-ro passenger ships should contain information concerning the importance of securing and maintaining all closures watertight due to the rapid loss of stability which may result when water enters the vehicle deck and the fact that capsize can rapidly follow.

[17] Refer to the Guidance on intact stability of existing tankers during liquid transfer operations (MSC/Circ.706-MEPC/Circ.304).

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Section 2

Considerations for Watertight and Weathertight Integrity

A. Hatchways

1 . Cargo and other hatchways in ships to which the International Convention on Load Lines, 1966, applies should comply with Regulations 13, 14, 15, 16 and 26(5) of this Convention.

2 . Hatchways in fishing vessels to which the 1993 Torremolinos Protocol applies should comply with regulations II/5 and II/6 of this Protocol.

3 . In decked fishing vessels of 12 m in length and over but less than 24 m in length hatchways should comply with the following:

3.1 . All hatchways should be provided with covers and those which may be opened during fishing operations should normally be arranged near to the vessel's centreline.

3.2 . For the purpose of strength calculations it should be assumed that hatchway covers other than wood are subject to static load according to Regulation 16 ICLL ’66 as ammended or the weight of cargo intended to be carried on them, whichever is the greater

3.3. Where covers are constructed of mild steel, the maximum stress according to 3.2 multiplied by 4.25 should not exceed the minimum ultimate strength of the material. Under these loads the deflections should not be more than 0.0028 times the span.

3.4. Covers made of materials other than mild steel or wood should be at least of equivalent strength to those made of mild steel and their construction should be of sufficient stiffness to ensure weathertightness under the loads specified in 3.2.

3.5. Covers should be fitted with clamping devices and gaskets or other equivalent arrangements sufficient to ensure weathertightness.

3.6. The use of wooden hatchway covers is generally not recommended in view of the difficulty of rapidly securing their weathertightness. However, where fitted they should be capable of being secured weathertight.

3.7. The finished thickness of wood hatchway covers should include an allowance for abrasion due to rough handling. In any case, the finished thickness of these covers should be at least 4 mm for each 100 mm of unsupported span subject to a minimum of 40 mm and the width of their bearing surfaces should be at least 65 mm.

3.8. The height above deck of hatchway coamings on exposed parts of the working deck should be at least
300 mm for vessels of 12 m in length and at least 600 mm for vessels of 24 m in length. For vessels of intermediate length the minimum height should be obtained by linear interpolation. The height above deck of hatchway coamings on exposed parts of the superstructure deck should be at least 300 mm.

3.9. Where operating experience has shown justification and on approval of the competent authority the height of hatchway coamings, except those which give direct access to machinery spaces may be reduced from the height as specified in 3.8 or the coamings may be omitted entirely, provided that efficient watertight hatch covers other than wood are fitted. Such hatchways should be kept as small as practicable

and the covers should be permanently attached by hinges or equivalent means and be capable of being rapidly closed or battened down.

B. Machinery space openings

1 In ships to which the International Convention on Load Lines, 1966 or the Protocol of 1988 relating thereto as amended, as applicable, applies, machinery space openings should comply with regulation 17.

2 In fishing vessels to which the 1993 Torremolinos Protocol applies and in new decked fishing vessels of 12 m in length and over, but less than 24 m in length, the following requirements of regulation II/7 of this Protocol should be met:

2.1. machinery space openings should be framed and enclosed by casings of a strength equivalent to the adjacent superstructure. External access openings therein should be fitted with doors complying with the requirements of regulation II/4 of the Protocol or, in vessels less than 24 m in length, with hatch covers other than wood complying with the requirements of A.3 ; and

2.2. openings other than access openings should be fitted with covers of equivalent strength to the unpierced structure, permanently attached thereto and capable of being closed weathertight.

3. In offshore supply vessels, access to the machinery space should, if possible, be arranged within the forecastle. Any access to the machinery space from the exposed cargo deck should be provided with two weathertight closures. Access to spaces below the exposed cargo deck should preferably be from a position within or above the superstructure deck.

C. Doors

1. In passenger ships to which the International Convention for the Safety of Life at Sea, 1974, applies, doors should comply with regulations II-l/13 and 16 of this Convention.

2. In ships to which the International Convention on Load Lines, 1966 or the Protocol of 1988 relating thereto, as amended, as applicable, applies, doors should comply with regulation 12 of this Convention.

3. In fishing vessels to which the 1993 Torremolinos Protocol applies, doors should comply with regulation II/2 and regulation II/4 of this Protocol.

4. In decked fishing vessels of 12 m in length and over but less than 24 m in length:

4.1. Watertight doors may be of the hinged type and should be capable of being operated locally from each side of the door. A notice should be attached to the door on each side stating that the door should be kept closed at sea.

4.2. All access openings in bulkheads of enclosed deck erections, through which water could enter and endanger the vessel, should be fitted with doors permanently attached to the bulkhead, framed and stiffened so that the whole structure is of equivalent strength to the unpierced structure, and weathertight when closed, and means should be provided so that they can be operated from each side of the bulkhead.

4.3. The height above deck of sills in those doorways, companionways, deck erections and machinery casings situated on the working deck and on superstructure decks which give direct access to parts of that deck exposed to the weather and sea should be at least equal to the height of hatchway coamings as specified in A.3.8.

4.4 Where operating experience has shown justification and on approval of the competent authority, the height above deck of sills in the doorways specified in 4.3 except those giving direct access to machinery spaces, may be reduced to not less than 150 mm on superstructure decks and not less than 380 mm on the working deck for vessels 24 m in length, or not less than 150 mm on the working deck for vessels of 12 m in length. For vessels of intermediate length the minimum acceptable reduced height for sills in doorways on the working deck should be obtained by linear interpolation.

D. Cargo ports and other similar openings

1. Cargo ports and other similar openings in ships to which the International Convention on Load Lines, 1966 or the Protocol of 1988 relating thereto, as amended, as applicable, applies should comply with regulation 21 of this Convention.

2. Openings through which water can enter the vessel and fish flaps on stern trawlers in fishing vessels to which the 1993 Torremolinos Protocol applies should comply with regulation II/3 of this Protocol.

3. Cargo port and other similar openings in passenger ships to which the International Convention for the Safety of Life at Sea, 1974 applies should comply with regulations II-1/15, 17 and 22 of this Convention. In addition, such openings in ro-ro passenger ships to which this Convention applies, should comply with regulation II-1/17-1 of this Convention.

4. Cargo port and other similar openings in cargo ships to which the International Convention for the Safety of Life at Sea, 1974 applies should comply with regulation II-1/15-1 of this Convention.

E. Sidescuttles, window scuppers, inlets and discharges

1. In passenger ships to which the International Convention for the Safety of Life at Sea, 1974 applies, openings in shell plating below the bulkhead deck should comply with regulation II-1/15 of this Convention. Watertight integrity above the bulkhead deck should comply with regulation II-1/17 of this Convention. In addition, in ro-ro passenger ships, watertight integrity below the bulkhead deck should comply with regulation II-1/23 and integrity of the hull and superstructure should comply with regulation II-1/17-1 of this Convention.

2. In ships to which the International Convention on Load Lines, 1966 or the Protocol of 1988 relating thereto, as amended, as applicable, applies, scuppers, inlets and discharges should comply with regulation 22 and sidescuttles should comply with regulation 23 of this Convention.

3. In fishing vessels to which the 1993 Torremolinos Protocol applies, sidescuttles and windows should comply with regulation II/12 and inlets and discharges should comply with regulation II/13 of this Protocol.

4. In decked fishing vessels of 12 m in length and over but less than 24 m in length, sidescuttles, windows and other openings and inlets and discharges should comply with the following:

4.1. sidescuttles to spaces below the working deck and to enclosed spaces on the working deck should be fitted with hinged deadlights capable of being closed watertight;

4.2. sidescuttles should be fitted in a position such that their sills are above a line drawn parallel to the working deck at side having its lowest point 500 mm above the deepest operating waterline;

4.3. sidescuttles, together with their glasses and deadlights, should be of substantial construction to the satisfaction of the competent authority;

4.4. skylights leading to spaces below the working deck should be of substantial construction and

capable of being closed and secured weathertight, and with provision for adequate means of closing in the event of damage to the inserts. Skylights leading to machinery spaces should be avoided as far as practicable;

4.5. toughened safety glass or suitable permanently transparent material of equivalent strength should be fitted in all wheelhouse windows exposed to the weather. The means of securing windows and the width of the bearing surfaces should be adequate, having regard to the window material used. Openings leading to spaces below deck from a wheelhouse whose windows are not provided with the protection required by 4.6 should be fitted with a weathertight closing appliance;

4.6. deadlights or a suitable number of storm shutters should be provided where there is no other method of preventing water from entering the hull through a broken window or sidescuttle;

4.7. the competent authority may accept sidescuttles and windows without deadlights in side or aft bulkheads of deck erections located on or above the working deck if satisfied that the safety of the vessel will not be impaired;

4.8. the number of openings in the sides of the vessel below the working deck should be the minimum compatible with the design and proper working of the vessel and such openings should be provided with closing arrangements of adequate strength to ensure watertightness and the structural integrity of the surrounding structure;

4.9. discharges led through the shell either from spaces below the working deck or from spaces within deck erections should be fitted with efficient and accessible means for preventing water from passing inboard. Normally each separate discharge should have an automatic non-return valve with a positive means of closing it from a readily accessible position. Such a valve is not required if the competent authority considers that the entry of water into the vessel through the opening is not likely to lead to dangerous flooding and that the thickness of the closing should be provided with an indicator showing whether the valve is open or closed. The open inboard end of any discharge system should be above the deepest operating waterline at an angle of heel satisfactory to the competent authority;

4.10. in machinery spaces main and auxiliary sea inlets and discharges essential for the operation of machinery should be controlled locally. Controls should be readily accessible and should be provided with indicators showing whether the valves are open or closed. Suitable warning devices should be incorporated to indicate leakage of water into the space; and

4.11. fittings attached to the shell and all valves should be of steel, bronze or other ductile material. All pipes between the shell and valves should be of steel, except that in vessels constructed of material other than steel, other suitable materials may be used.

5. In cargo ships to which the International Convention for the Safety of Life at Sea, 1974 applies, external openings should comply with regulation II-1/15-1 of this Convention.

F. Other deck openings

1. Miscellaneous openings in freeboard and superstructure decks in ships to which the International Convention on Load Lines, 1966 or the Protocol of 1988 relating thereto, as amended, as applicable, applies should comply with regulation 18 of this Convention.

2. In decked fishing vessels of 12 m and over where it is essential for fishing operations, flush deck scuttles of the screw, bayonet or equivalent type and manholes may be fitted provided these are capable of being closed watertight and such devices should be permanently attached to the adjacent structure. Having regard to the size and disposition of the openings and the design of the closing devices, metal-to-metal closures may be fitted if they are effectively watertight. Openings other than hatchways, machinery space openings, manholes and flush scuttles in the working or superstructure deck should be protected by enclosed

structures fitted with weathertight doors or their equivalent. Companionways should be situated as close as practicable to the centreline of the vessel.[1]

G. Ventilators, air pipes and sounding devices

1. Ventilators in ships to which the International Convention on Load Lines, 1966 or the Protocol of 1988 relating thereto, as amended, as applicable, applies should comply with regulation 19 and air pipes should comply with regulation 20 of this Convention.

2. Ventilators in fishing vessels to which the 1993 Torremolinos Protocol applies should comply with regulation II/9 and air pipes should comply with regulation II/10 of this Protocol. Sounding devices should comply with regulation II/11 of this Protocol.

3. Ventilators and air pipes in fishing vessels of 12 m in length and over but less than 24 m in length should comply with the following:

3.1. ventilators should have coamings of substantial construction and should be capable of being closed weathertight by devices permanently attached to the ventilator or adjacent structure. Ventilators should be arranged as close to the vessel's centreline as possible and, where practicable, should extend through the top of a deck erection or companionway;

3.2. the coamings of ventilators should be as high as practicable. On the working deck the height above deck of coamings of ventilators, other than machinery space ventilators, should be not less than 760 mm and on superstructure decks not less than 450 mm. When the height of such ventilators may interfere with the working of the vessel their coaming heights may be reduced to the satisfaction of the competent authority. The height above deck of machinery space ventilator openings should be to the satisfaction of the competent authority;

3.3. closing appliances need not be fitted to ventilators the coamings of which extend more than 2.5 m above the working deck or more than 1.0 m above a deck-house top or superstructure deck;

3.4. where air pipes to tanks or other spaces below deck extend above the working or superstructure decks the exposed parts of the pipes should be of substantial construction and, as far as is practicable, located close to the vessel's centreline and protected from damage by fishing or lifting gear. Openings of such pipes should be protected by efficient means of closing, permanently attached to the pipe or adjacent structure, except that where the competent authority is satisfied that they are protected against water trapped on deck, these means of closing may be omitted; and

3.5. where air pipes are situated near the side of the vessel their height above deck to the point where water may have access below should be at least 760 mm on the working deck and at least 450 mm on the superstructure deck. The competent authority may accept reduction of the height of an air pipe to avoid interference with the fishing operations.

4. In offshore supply vessels air pipes and ventilators should comply with the following:

4.1. air pipes and ventilators should be fitted in protected positions in order to avoid damage by cargo during operations and to minimize the possibility of flooding. Air pipes on the exposed cargo and forecastle decks should be fitted with automatic closing devices; and

4.2. due regard should be given to the position of machinery space ventilators. Preferably they should be fitted in a position above the superstructure deck, or above an equivalent level if no superstructure deck is fitted.

[1] Refer to regulation II/8 of the 1993 Torremolinos Protocol.

H. Freeing ports

1. Where bulwarks on the weather portion of the freeboard or superstructure decks or, in fishing vessels, the working decks form wells, freeing ports should be arranged along the length of the bulwark as to ensure that the deck is freed of water most rapidly and effectively. Lower edges of freeing ports should be as near the deck as practicable.[2]

2. In ships to which the International Convention on Load Lines, 1966 or the Protocol of 1988 relating thereto as amended, as applicable, applies, freeing ports should comply with regulation 24 of this Convention.

3. In decked fishing vessels of 12 m in length and over, freeing ports should comply with the following.[3]

3.1. The minimum freeing port area A in m², on each side of the vessel for each well on the working deck, should be determined in relation to the length l and height of bulwark in the well as follows:

3.1.1. A = K * l where:
K = 0.07 for vessels of 24 m in length and over
K = 0.035 for vessels of 12 m in length;

for intermediate lengths the value of K should be obtained by linear interpolation (l need not be taken as greater than 70% of the vessel's length);

3.1.2 where the bulwark is more than 1.2 m in average height, the required area should be increased by 0.004 m² per metre of length of well for each 0.1 m difference in height; and

3.1.3 where the bulwark is less than 0.9 m in average height, the required area may be decreased by 0.004 m² per metre of length of well for each 0.1 m difference in height.

3.2. The freeing port area calculated according to 8.3.1 should be increased where BKI considers that the vessel's sheer is not sufficient to ensure rapid and effective freeing of the deck of water.

3.3. Subject to the approval of BKI, the minimum freeing port area for each well on the superstructure deck should be not less than one-half the area A given in 3.1 except that where the superstructure deck forms a working deck for fishing operations the minimum area on each side should be not less than 75% of the area A.

3.4. Freeing ports should be so arranged along the length of bulwarks as to provide the most rapid and effective freeing of the deck from water. Lower edges of freeing ports should be as near the deck as practicable.

3.5. Pound boards and means for stowage and working the fishing gear should be arranged so that the effectiveness of the freeing ports will not be impaired or water trapped on deck and prevented from easily reaching the freeing ports. Pound boards should be so constructed that they can be locked in position when in use and will not hamper the discharge of shipped water.

3.6. Freeing ports over 0.3 m in depth should be fitted with bars spaced not more than 0.23 m nor less than 0.15 m apart or provided with other suitable protective arrangements. Freeing port covers, if fitted, should be of approved construction. If devices are considered necessary for locking freeing port covers during fishing operations they should be to the satisfaction of the competent authority and easily operable from a readily accessible position.

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[2] Refer to regulation 24(5) of the International Convention on Load Lines, 1966 or the Protocol of 1988 as amended, as applicable and regulation 11/14(4) of the 1993 Torremolinos Protocol.

[3] Refer to regulation II/l4 of the 1993 Torremolinos Protocol.

3.7. In vessels intended to operate in areas subject to icing, covers and protective arrangements for freeing ports should be capable of being easily removed to restrict ice accumulation. Size of opening and means provided for removal of these protective arrangements should be to the satisfaction of the competent authority.

3.8. In addition, in fishing vessels of 12 m in length and above but less than 24 m in length where wells or cockpits are fitted in the working deck or superstructure deck with their bottoms above the deepest operating waterline, efficient non-return means of drainage overboard should be provided. Where bottoms of such wells or cockpits are below the deepest operating waterline, drainage to the bilges should be provided.

3.9. In offshore supply vessels, special attention should be given to adequate drainage of pipe stowage positions, having regard to the individual characteristics of the vessel. However, the area provided for drainage of the pipe stowage positions should be in excess of the required freeing port area in the cargo deck bulwark and should not be fitted with shutters.

I. Miscellaneous

1. Ships engaged in towing operations should be provided with means for quick release of the towing hawser.

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Annex

Recommendations for Skippers of Fishing Vessels on Ensuring A Vessel's Endurance in Conditions of Ice Formation

A. Prior to departure

1. Firstly, the skipper should, as in the case of any voyages in any season, ensure that the vessel is generally in a seaworthy condition, giving full attention to basic requirements such as:

1.1. loading of the vessel within the limits prescribed for the season (paragraph 1.2.1 below);

1.2 weathertightness and reliability of the devices for closing cargo and access hatches, outer doors and all other openings in the decks and superstructures of the vessel and the watertightness of the sidescuttles and of ports or similar openings in the sides below the freeboard deck to be checked;

1.3. condition of the freeing ports and scuppers as well as operational reliability of their closures to be checked;

1.4. emergency and lifesaving appliances and their operational reliability;

1.5. operational reliability of all external and internal communication equipment; and

1.6. condition and operational reliability of the bilge and ballast pumping systems.

2. Further, with special regard to possible ice accretion, the skipper should:

2.1. consider the most critical loading condition against approved stability documents with due regard to fuel and water consumption, distribution of supplies, cargoes and fishing gear and with allowance for possible ice accretion;

2.2. be aware of the danger in having supplies and fishing gear stored on open weather deck spaces due to their large ice accretion surface and high centre of gravity;

2.3. ensure that a complete set of warm clothing for all members of the crew is available on the vessel as well as a complete set of hand tools and other appliances for combating ice accretion, a typical list thereof for small vessels is shown in section 4 of this annex;

2.4. ensure that the crew is acquainted with the location of means for combating ice accretion, as well as the use of such means, and that drills are carried out so that members of the crew know their respective duties and have the necessary practical skills to ensure the vessel's endurance under conditions of ice accretion;

2.5. acquaint himself with the meteorological conditions in the region of fishing grounds and en route to the place of destination; study the synoptical maps of this region and weather forecasts; be aware of warm currents in the vicinity of the fishing grounds, of the nearest coastline relief, of the existence of protected bays and of the location of ice fields and their boundaries; and

2.6. acquaint himself with the timetable of the radio stations transmitting weather forecasts and warnings of the possibility of ice accretion in the area of the relevant fishing grounds.

B. At sea

1. During the voyage and when the vessel is on the fishing grounds, the skipper should keep himself informed on all Longterm and shortterm weather forecasts and should arrange for the following systematic meteorological observations to be systematically recorded:

1.1. temperatures of the air and of the sea surface;

1.2. wind direction and force;

1.3. direction and height of waves and sea state;

1.4. atmospheric pressure, air humidity; and

1.5. frequency of splashing per minute and the intensity of ice accumulation on different parts of the vessel per hour.

2. All observed data should be recorded in the vessel's logbook.The skipper should compare the weather forecasts and icing charts with actual meteorological conditions, and should estimate the probability of ice formation and its intensity.

3. When the danger of ice formation arises, the following measures should be taken without delay:

3.1. all the means of combating ice formation should be ready for use;

3.2. all the fishing operations should be stopped, the fishing gear should be taken on board and placed in the underdeck spaces. If this cannot be done all the gear should be fastened for storm conditions on its prescribed place. It is particularly dangerous to leave the fishing gear suspended since its surface for ice formation is large and the point of suspension is generally located high;

3.3. barrels and containers with fish, packing, all gear and supplies located on deck as well as portable mechanisms should be placed in closed spaces as low as possible and firmly lashed;

3.4. all cargoes in holds and other compartments should be placed as low as possible and firmly lashed;

3.5. the cargo booms should be lowered and fastened;

3.6. deck machinery, hawser reels and boats should be covered with duck covers;

3.7. lifelines should be fastened on deck;

3.8. freeing ports fitted with covers should be brought into operative condition, all objects located near scuppers and freeing ports and preventing water drainage from deck should be taken away;

3.9. all cargo and companion hatches, manhole covers, weathertight outside doors in superstructures and deckhouses and portholes should be securely closed in order to ensure complete weathertightness of the vessel, access to the weather deck from inner compartments should be allowed only through the superstructure deck;

3.10. a check should be carried out as to whether the amount of water ballast on board and its location is inaccordance with that recommended in "Stability guidance to skippers"; if there is sufficient freeboard, all the empty bottom tanks fitted with ballast piping should be filled with seawater;

3.11. all firefighting, emergency and lifesaving equipment should be ready for use;

3.12. all drainage systems should be checked for their effectiveness;

3.13. deck lighting and searchlights should be checked;

3.14. a check should be carried out to make sure that each member of the crew has warm clothing; and

3.15. reliable twoway radio communication with both shore stations and other vessels should be stablished; radio calls should be arranged for set times.

4. The skipper should seek to take the vessel away from the dangerous area, keeping in mind that the lee edges oficefields, areas of warm currents and protected coastal areas are a good refuge for the vessel during weather when ice formation occurs

5. Small fishing vessels on fishing grounds should keep nearer to each other and to larger vessels.

6. It should be remembered that the entry of the vessel into an icefield presents certain danger to the hull, especially when there is a high sea swell. Therefore the vessel should enter the icefield at a right angle to the icefield edge at low speed without inertia. It is less dangerous to enter an icefield bow to the wind. If a vessel must enter an icefield with the wind on the stern, the fact that the edge of the ice is more dense on the windward side should be taken into consideration. It is important to enter the icefield at the point where the ice floes are the smallest.

C. During ice formation

1. If in spite of all measures taken the vessel is unable to leave the dangerous area, all means available for removal of ice should be used as long as it is subjected to ice formation.

2. Depending on the type of vessel, all or many of the following ways of combating ice formation may be used:

2.1. removal of ice by means of cold water under pressure;

2.2. removal of ice with hot water and steam; and

2.3. breaking up of ice with ice crows, axes, picks, scrapers, or wooden sledgehammers and clearing it with shovels.

3. When ice formation begins, the skipper should take into account the recommendations listed below and ensure their strict fulfilment:

3.1. report immediately ice formation to the shipowner and establish with him constant radio communication;

3.2. establish radio communication with the nearest vessels and ensure that it is maintained;

3.3. do not allow ice formation to accumulate on the vessel, immediately take steps to remove from the vessel's structures even the thinnest layer of ice and ice sludge from the upper deck;

3.4. check constantly the vessel's stability by measuring the roll period of the vessel during ice formation. If the rolling period increases noticeably, immediately take all possible measures in order to increase the vessel's stability;

3.5 ensure that each member of the crew working on the weather deck is warmly dressed and wears a safety line securely attached to the guardrail;

3.6 bear in mind that the work of the crew on ice clearing entails the danger of frostbite. For this reason it isnecessary to make sure that members of the crew working on deck are replaced periodically;

3.7. keep the following structures and gears of the vessel first free from ice:

3.7.1 aerials;

3.7.2 running and navigational lights;

3.7.3 freeing ports and scuppers;

3.7.4 lifesaving craft;

3.7.5 stays, shrouds, masts and rigging;

3.7.6 doors of superstructures and deckhouses; and

3.7.7 windlass and hawse holes;

3.8. remove the ice from large surfaces of the vessel, beginning with the upper structures (such as bridges, deckhouses, etc.), because even a small amount of ice on them causes a drastic worsening of the vessel's stability;

3.9. when the distribution of ice is not symmetrical and a list develops, the ice must be cleared from the lower side first. Bear in mind that any correction of the list of the vessel by pumping fuel or water from one tank to another may reduce stability during the process when both tanks are slack;

3.10. when a considerable amount of ice forms on the bow and a trim appears, ice must be quickly removed. Water ballast may be redistributed in order to decrease the trim;

3.11. clear ice from the freeing ports and scuppers in due time in order to ensure free drainage of the water from the deck;

3.12. check regularly for water accumulation inside the hull;

3.13. avoid navigating in following seas since this may drastically worsen the vessel's stability;

3.14. register in the vessel's logbook the duration, nature and intensity of ice formation, amount of ice on the vessel, measures taken to combat ice formation and their effectiveness; and

3.15. if, in spite of all the measures taken to ensure the vessel's endurance in conditions of ice formation, the crew is forced to abandon the vessel and embark on lifesaving craft (lifeboats, rafts) then, in order to preserve their lives, it is necessary to do all possible to provide all the crew with warm clothing or special bags as well as to have a sufficient number of lifelines and bailers for speedy bailing out of water from the lifesaving craft.

D. List of equipment and hand tools

1. A typical list of equipment and hand tools required for combating ice formation:

1.1. ice crows or crowbars;

1.2. axes with long handles;

1.3. picks;

1.4. metal scrapers;

1.5. metal shovels;

1.6. wooden sledge hammers;

1.7. fore and aft lifelines to be rigged each side of the open deck fitted with travellers to which lizards can be attached.

2. Safety belts with spring hooks should be provided for no less than 50% of the members of the crew (but not less than 5 sets), which can be attached to the lizards.

Notes:

1. The number of hand tools and lifesaving appliances may be increased, at the shipowner's discretion.

2. Hoses which may be used for ice combating should be readily available on board.

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