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GUIDELINES ON INTERPRETATION OF THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS IN BULK (IBC CODE) AND THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING LIQUEFIED GASES IN BULK (IGC CODE) AND GUIDELINES FOR THE UNIFORM APPLICATION OF THE SURVIVAL REQUIREMENTS OF THE IBC AND IGC CODES

The Maritime Safety Committee, at its fifty-first session, approved the Guidelines on Interpretation of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code) and the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code), set out at annex.

The Committee agreed that the Guidelines for the Uniform Application of the Survival Requirements of the Bulk Chemical Code (BCH Code) and the Gas Carrier Code (GC Code), approved by the Maritime Safety Committee at its forty-second session and circulated under symbol MSC/Circ.286, should also be applied to the IBC and IGC Codes and these are included in the annex hereto.

The Maritime Safety Committee, at its fifty-eighth session, approved the amendments to the section concerning "Drainage of cargo tank vent system" and included a new section on "Proposal for venting arrangements on board chemical tankers".

Member Governments are invited to apply the guidelines to the IBC and IGC Codes where appropriate and also in respect of the BCH and GC Codes where applicable.

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ANNEX

GUIDELINES ON INTERPRETATION OF THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS IN BULK (IBC CODE) AND THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING LIQUEFIED GASES IN BULK (IGC CODE) AND GUIDELINES FOR THE UNIFORM APPLICATION OF THE SURVIVAL REQUIREMENTS OF THE IBC AND IGC CODES

The following information should be considered as guidance towards interpretation of provisions in the IBC and IGC Codes. Interpretations, other than those offered, may satisfy Administrations and may be accepted to fulfil the requirements of the Codes.

INTERPRETATION OF PROVISIONS IN THE IBC CODE

Ship type and cargo tank location requirements for slop tanks
(Paragraphs 2.6.1 and 3.3.5)

Any cargo tank may be used for holding contaminated cargo pump-room bilge water and cargo tank washings irrespective of the cargo tank location requirements of paragraph 2.6 of the Code.

Maximum allowable area of suction well
(Paragraph 2.6.2)

The area of suction well should not be greater than that required to accommodate equipment such as cargo pumps, suction pipes, valves, associated heating coils, etc., and to ensure efficient flow and the necessary access for cleaning and maintenance.

Longitudinal extent of damage to superstructure
(Paragraphs 2.7.8 and 2.8.1)

The longitudinal extent of damage to superstructure in the instance of side damage to a machinery space aft under paragraph 2.8.1 should be the same as the longitudinal extent of the side damage to the machinery space (see figure 1).

Stepped machinery space forward bulkhead
(Paragraphs 2.8.1.3 and 2.8.1.5)

The concept of a stepped machinery space forward bulkhead is already implied in paragraph 3.2.1 of the Code, and in regulation II-2/56 of the 1974 SOLAS Convention, as amended. For damage stability considerations when such a bulkhead contains a step more than 3 m in length, damage should be treated as shown in figure 2.

The range of positive stability where the residual stability should be evaluated
(Paragraph 2.9.3.1)

The 20° range may be measured from any angle commencing between the position of equilibrium and the angle of 25° (or 30° if no deck immersion occurs).

Segregation of mutually hazardous reactive cargoes
(Paragraphs 3.1.2.1, 15.16.2.3 and .4)

A cruciform joint (see figure 3) can be considered a "double barrier" for the purpose of segregation as follows:

.1 between mutually hazardous reactive cargoes;
.2 between water reactive cargoes and water.

Siting of cargo piping
(Paragraph 3.1.3)

The siting of cargo piping is considered to be adequately covered by paragraph 3.7 of the Code.

Location of air intakes and openings
(Paragraph 3.2.2)

Compliance with other relevant paragraphs of the Code and in particular with paragraphs 3.2.3, 3.7, 8.2.2, 12.1.5 and 15.12 where applicable would also ensure compliance with this paragraph.

Openings into accommodation spaces, etc.
(Paragraph 3.2.3)

Air outlets are subject to the same requirements as air inlets and air intakes. This interpretation also applies to paragraphs 3.2.2, 3.7.4, 8.2.3, 15.12.1.3 and 19.3.8.

Doors in the prohibited area in the house front or side openings into spaces not giving access to accommodation
(Paragraph 3.2.3)

Access facing the cargo area or in prohibited zones should be restricted to stores for cargo-related and safety equipment, cargo control stations and emergency showers.

Deck spillage barrier
(Paragraph 3.2.3)

For all chemical tankers regardless of the cargo to be carried. Where a deckhouse is substituted for a superstructure and liquid could flow along the

sides of the house, the house front should be continued to the sides of the ship in the form of a sill or a separate spillage barrier should be arranged as described in regulation II-2/56.6 of the 1974 SOLAS Convention, as amended.

Escapes from a cargo pump-room
(Paragraph 3.3.1)

In general a cargo pump-room should be provided with one set of access/escape ladders. Where it is envisaged that personnel are normally employed in a pump-room or the pump-room is unusually large, the Administration may require an additional means of escape. Two doorways from the pump-room house, emerging above the weather deck are preferable.

Seal lubrication
(Paragraph 3.3.7)

Lubrication or other means of ensuring permanence of gastight seals should be effected from outside the cargo pump-room.

Access to spaces in the cargo area
(Paragraph 3.4)

Although fuel oil tanks are not included in the definition of "cargo area" where such tanks are adjacent to cargo tanks the requirements of paragraph 3.4 are applicable.

Escape from double bottom tanks and similar spaces
(Paragraph 3.4.1)

To take care of restrictions in the movement of personnel and to limit the time needed for a possible emergency escape, two separate means of access should be provided in double bottom tanks and similar spaces where obstructions impede movement. The two accesses should be as widely separated as practicable.

The provision of only one access may be approved in special circumstances if the ability to readily traverse the space or to remove an injured person can be proved to the satisfaction of the Administration.

Discharge arrangements of permanent ballast tanks sited immediately adjacent to cargo tanks
(Paragraph 3.5.1)

An eductor situated in the cargo area using water power from the machinery spaces is acceptable for discharge purposes provided a non-return valve and means of separation are fitted in the supply line and the supply line is above deck level. A non-return valve and means of separation should be located outside the machinery space (see figure 4).

Ballast connection to cargo tanks or piping
(Paragraph 3.5.2)

The filling arrangement may consist of a portable spool piece or flexible hose plus an isolating valve on the inlet to the cargo tank. This isolating valve is in addition to the required non-return valve. Consideration should be given to the arrangement of in-tank piping and the creation of static electricity.

Bilge pumping from spaces in the cargo area
(Paragraph 3.5.3)

The relaxation at the end of the paragraph should be limited to spaces not enclosing piping which may contain cargo.

Coamings at bow and stern manifolds
(Paragraph 3.7.7)

The expression "suitable height" should mean the height of coaming to be of approximately 150 mm, however nowhere less than 50 mm above upper edge of sheer strake.

Other exceptional cases
(Paragraph 5.2.2.2)

Cargo piping should be welded except for necessary flanged connections to valves, expansion joints (as permitted in paragraph 5.2.2.1), spool pieces and similar fittings or where required for coating, lining, fabrication, inspection or maintenance.

Designed to preclude risk of leakage
(Paragraph 5.5.2.1)

The intent is to guard against the hazard of cargo leaking past a valve gland into the space where the valve is located.

Valves for cargo transfer control system
(Paragraph 5.6.1.1)

The provisions of paragraph 5.6.1.1 are not intended to be additional to those of paragraphs 5.5.2 and 5.5.3 for cargo piping below deck.

Compatibility of ship's cargo hoses
(Paragraph 5.7.1)

This paragraph applies to cargo hoses carried on board the vessel and "compatibility with the cargo" means that:

.1 the cargo hose does not lose it mechanical strength or deteriorate unduly when in contact with the cargo, and

.2 the cargo hose material does not affect the cargo in a hazardous way.

Consideration must be given to internal and external surfaces with respect to the above where hoses may be used as an integral part of, or connected to emergency cargo pumps and submerged in the cargo tank.

Material of construction
(Paragraphs 6.2.2 and 6.2.4)

Cargo pump-room structure, fittings and equipment other than electrical apparatus, which are normally only exposed to vapours from the pump-room bilges are not subject to the requirements of these paragraphs. Electrical items are subject to paragraph 6.2.3.

Drainage of cargo tank vent system
(Paragraph 8.1.2)

When large amounts of drainage from vent lines is envisaged provision for a hose connection to a drain line draining to a suitable slop tank should be provided.

Hazardous zones on open deck
(Paragraph 10.2.3.5)

For this purpose the length of the cargo area on open deck to be measured is to extend between the forward bulkhead of the foremost cargo tank and the after bulkhead of the aftermost cargo tank or when independent tanks are fitted the forward bulkhead of the foremost hold space and the after bulkhead of the aftermost hold space.

Capacity of the fire-extinguishing system
(Paragraphs 11.3.5.3 and 11.3.7)

For ships of less than 4000 tonnes deadweight the minimum capacity of a monitor should be 1000 ℓ/min and the application rate should be at least 10 ℓ/min/m^2 of the surface to be protected.

Simultaneous use of foam fire-fighting system and water
(Paragraph 11.3.12)

The simultaneous use of the minimum number of jets of water should be possible on deck over the full length of the ship, in the accommodation, service spaces, control spaces and machinery spaces.

Portable fire-extinguishing equipment
(Paragraph 11.3.14)

The capacity of portable fire-extinguishing equipment should be as specified in the 1974 SOLAS Convention, as amended.

Pump-rooms and other enclosed spaces normally entered
(Paragraph 12.2)

A pump-room is subject to this paragraph whether or not control for pumps and valves is fitted external to the pump-room.

Independency of systems
(Paragraphs 13.1.1 and 15.19)

In almost all cases a code cargo which requires a high level alarm and overflow control also requires a closed gauging device.

A cargo tank containing such a product therefore requires three sensors:

.1 level gauging;
.2 high level alarm;
.3 overflow control.

The sensing elements for .1, .2 and .3 should be separated although sensors for .2 and .3 (reed switches, float chambers, electronic devices, etc.) may be contained in the same tube.

Electronic, pneumatic, hydraulic circuits required for sensors .1, .2 and .3 should be independent of each other such that a fault on any one will not render either of the others inoperative.

Where processing units are used to give digital or visual indication such as in a bridge space the independency of circuitry should be maintained at least beyond this point. The power should be supplied from distribution boards.

Where a control room or a bridge space containing a modular unit is envisaged, separate level indication and visual alarms must be provided for each of the functions .1, .2 or .3. An audible alarm must also be provided but since this is not directional it need not be separate. An audible alarm must also be arranged in the cargo area. Where there is no control room an audible and visual alarm should be arranged at the cargo control station.

Testing of sensors should be arranged from outside the tanks although entry into product clean tanks is not precluded.

Simulation testing of electronic circuits or circuits which are self-monitoring is acceptable.

Lockers for protective equipment
(Paragraph 14.1.2)

Lockers for work clothes and protective equipment which are not new or have not undergone a thorough cleaning process should not open directly into accommodation spaces.

Additional breathing apparatus
(Paragraph 14.2.4.2)

The equivalent quantity of spare bottled air in lieu of the low-pressure air line should be at least 4800 litres.

Ammonia nitrate sclution

Injection of ammonia gas into the cargo
(Paragraph 15.2.6)

For the purpose of injecting ammonia the cargo may be circulated by means of the cargo pump. Gaseous ammonia may be injected into the circulating cargo.

Cargo pump design for ammonium nitrate solution
(Paragraph 15.2.7)

The seal for the centrifugal pump should be a stuffing box provided with a lantern ring. Fresh water under pressure should be injected into the stuffing box at the location of the lantern ring (see figure 5).

Hydrogen peroxide solution
(Paragraph 15.5.10.2)

Piping/hose failure should be assumed to be total.

Propylene oxide - piping separation
(Paragraph 15.8.33)

Until an amendment can be introduced into the IBC Code:

"15.8.33 Before each loading of propylene oxide, ..." should be interpreted as having the following meaning:

"15.8.33 Before each initial loading of propylene oxide, and before every subsequent return to such service, ...".

Cargo tank vents
(Paragraph 15.13.5)

Internal obstructions should be avoided beyond the requirement for pressure vacuum valves and flame screens which should be accessible for inspection and maintenance.

Special consideration to cargo pump-rooms below deck
(Paragraph 15.18)

No circumstances can be foreseen where an Administration might allow any relaxation.

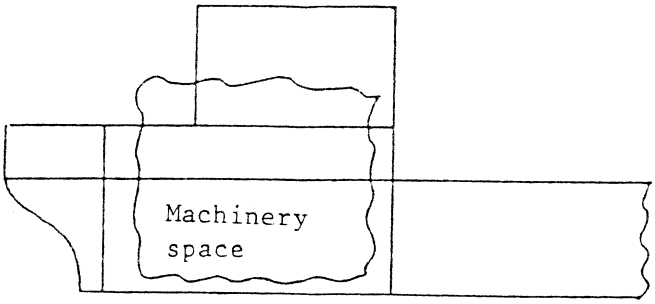

Figure 1 - Longitudinal extent of damage to superstructure
(Paragraphs 2.7.8 and 2.8.1)

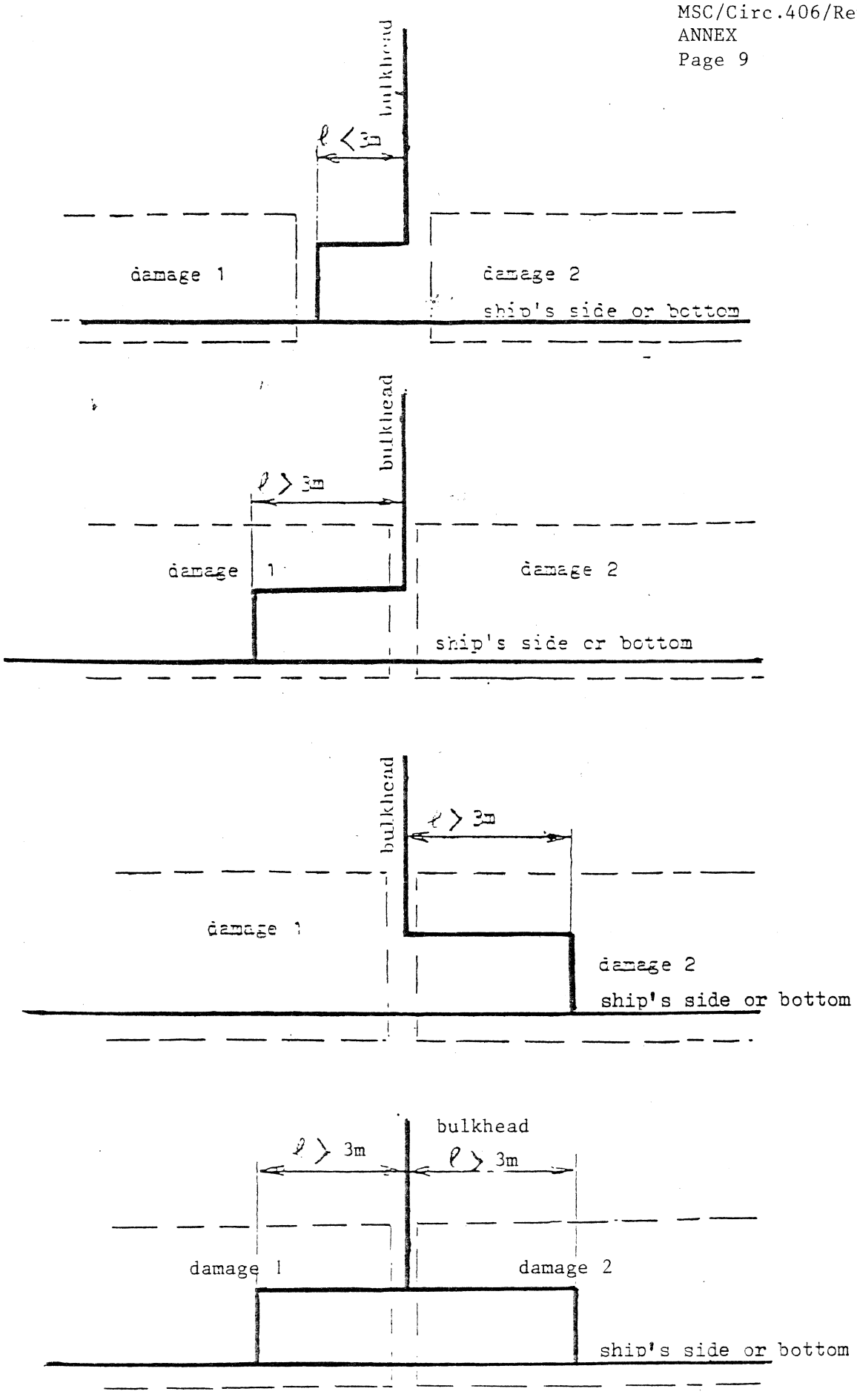

Figure 2 - Damage to stepped machinery space forward bulkhead
(Damages are not simultaneous) (Paragraphs 2.8.1.3 and 2.8.1.5)

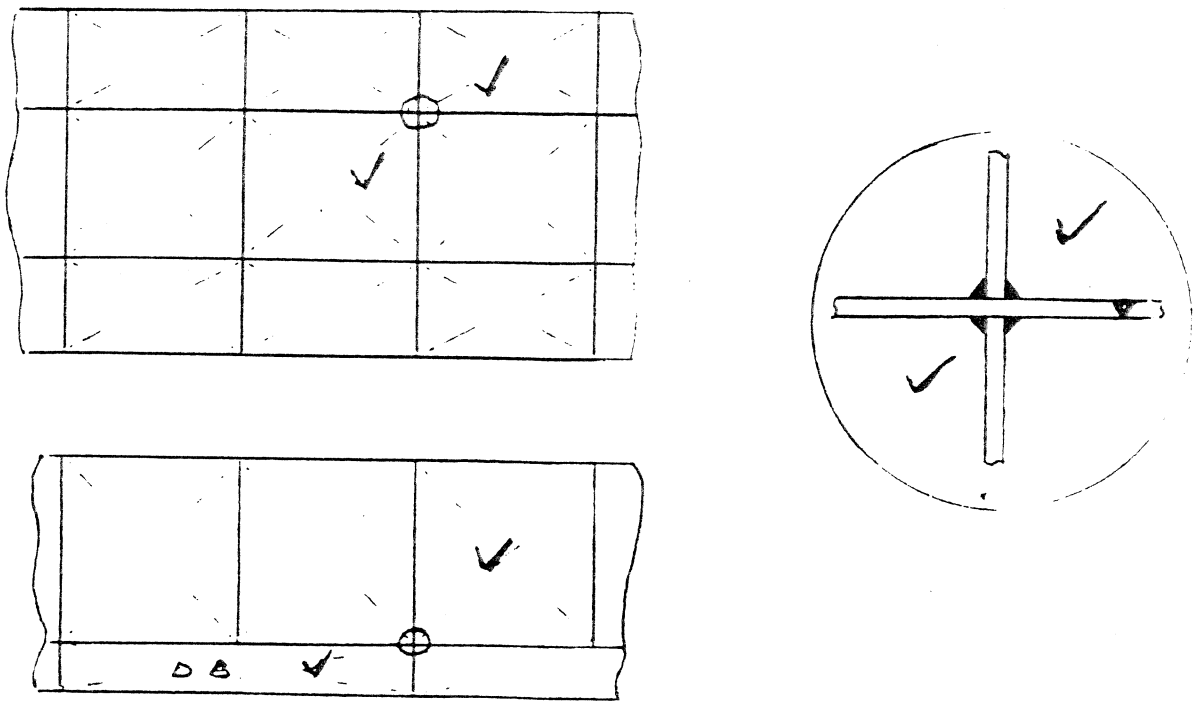

Figure 3 - Segregation of mutually hazardous reactive cargoes
(Paragraphs 3.1.2.1, 15.16.2.3 and .4)

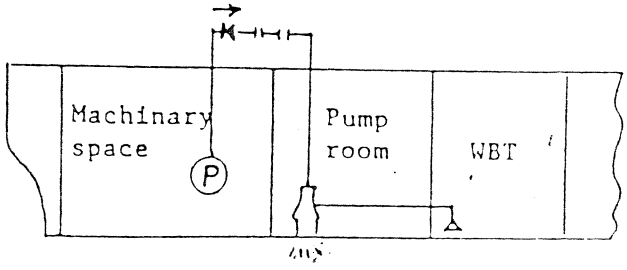

Figure 4 - Discharge arrangement of permanent ballast tanks sited immediately adjacent to cargo tanks
(Paragraph 3.5.1)

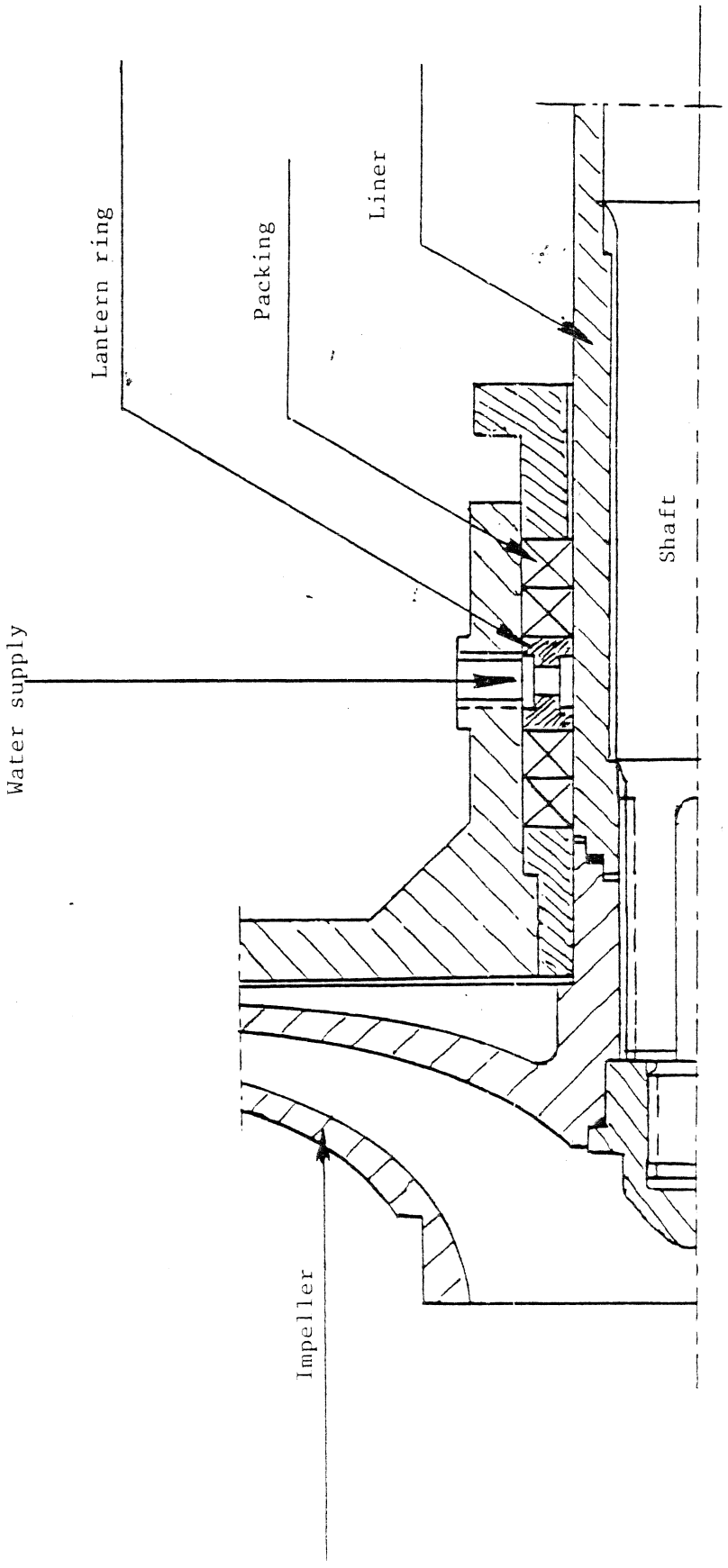

Figure 5 - Water flushed seal in chemical pump
(Paragraph 15.2.7)

INTERPRETATION OF PROVISIONS IN THE IGC CODE

Longitudinal extent of damage to superstructure
(Paragraphs 2.7.8 and 2.8.1)

The longitudinal extent of damage to superstructure in the instance of side damage to a machinery space aft under paragraph 2.8.1 should be the same as the longitudinal extent of the side damage to the machinery space (see figure 1).

The range of positive stability where the residual stability should be evaluated
(Paragraph 2.9.2.1)

The 20° range may be measured from any angle commencing between the position of equilibrium and the angle of 25° (or 30° if no deck immersion occurs).

Location of air intakes and openings
(Paragraph 3.2.2)

Compliance with other relevant paragraphs of the Code and in particular with paragraphs 3.2.4, 3.8, 8.2.10 and 12.1.6 where applicable would also ensure compliance with this paragraph.

Openings into accommodation spaces, etc.
(Paragraph 3.2.4)

Air outlets are subject to the same requirements as air inlets and air intakes. This interpretation also applies to paragraphs 3.2.2, 3.8.4 and 8.2.10.

Location of the bulkhead separating cargo pump-room and cargo compressor rooms from accommodation and service spaces, etc.
(Paragraphs 3.3.1.2 and 3.3.1.3)

When cargo pump-room and compressor rooms are permitted to be fitted at the after end of the aftermost hold space the bulkhead which separates the cargo pump-rooms and compressor rooms from accommodation and service spaces, control stations and machinery spaces of category A should be so located as to avoid the entry of gas to these spaces through a single failure of a deck or bulkhead. The same conditions should also be satisfied when cargo pump-rooms and compressor rooms fitted within the cargo area, have a bulkhead in common with accommodation and service spaces, control stations and machinery spaces of category A.

Monitoring of overpressure in spaces protected by air-locks
(Paragraphs 3.6.3 and 3.6.4)

The following means are considered acceptable alternatives to differential pressure sensing devices in spaces having a ventilation rate not less than 30 air changes per hour:

.1 monitoring of current or power in the electrical supply to the ventilation motors; or

.2 air flow sensors in the ventilation ducts.

In spaces where the ventilation rate is less than 30 air changes per hour and where one of the above alternatives is fitted, in addition to the alarms required by paragraph 3.6.3, the arrangements should be made to de-energize electrical equipment which is not of the certified safe type, if more than one air lock door is moved from the closed position.

Cargo tank connections for gauging or measuring devices
(Paragraph 5.6.2)

The requirements of paragraph 5.6.2, providing relaxations for cargo tanks referred to in paragraph 5.6.1.2, should not apply to cargo tank connections for gauging or measuring devices of cargo tanks referred to in paragraph 5.6.1.1.

Meaning of the term "liquid full"
(Paragraphs 8.3.1 and 15.1.4.2)

The words "to prevent the tank from becoming liquid full" contained in paragraphs 8.3.1 and 15.1.4.2 have the following meaning: At no time during the loading, transport or unloading of the cargo including fire conditions will the tank be more than 98% liquid full, except as permitted by paragraph 15.1.3. These requirements, along with those of paragraph 8.2.17, are intended to ensure that the pressure relief valves remain in the vapour phase, since their design and capacity are based on such a condition.

Independency of systems
(Paragraph 13.3.1)

The sensor for automatic closing of the loading valve for overflow control as required in paragraph 13.3.1 may be combined with the liquid level indicators required by paragraph 13.2.1.

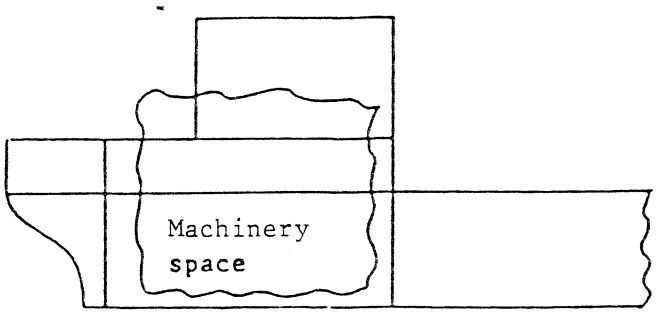

Figure 1 - Longitudinal extent of damage to superstructure
(Paragraphs 2.7.8 and 2.8.1)

GUIDELINES FOR THE UNIFORM APPLICATION OF THE SURVIVAL REQUIREMENTS OF THE BULK CHEMICAL CODE AND THE GAS CARRIER CODE

(approved by the Maritime Safety Committee at its forty-second session, 1980)

Preamble

The following should be considered as guidelines for the purpose of uniform application of the survival requirements of the Bulk Chemical Code and the Gas Carrier Code. Alternative methods to the suggested specific programme of calculations and presentation, which demonstrate, to the Administration's satisfaction, compliance with the applicable survival criteria, may be accepted.

1 Alternative methods of calculation and presentation of ship survival capability:

.1 The parcel tanker will require a complete analysis of the limiting survival characteristics over the full range of intended loading conditions (as detailed in 2);

.2 The dedicated service tanker will require approval of calculations based on service conditions proposed by the builder or owner, in which case the certificate of fitness should be endorsed in respect of the conditions accepted;

.3 The inherently safe ship is one that will meet survival requirements with the ship assumed to be at a maximum draught and trim with all compartments within the extent of damage assumed to be empty with maximum vertical centre of gravity (adjusted for free liquids).

2 Minimum required metacentric height (GM) or maximum allowable height of the centre of gravity (KG) as a function of the draught of the parcel tanker.

2.1 A systematic investigation of damage survival characteristics should be undertaken by making calculations to obtain the minimum required GM or maximum allowable KG at a sufficient number of draughts within the operating range to permit the construction of a series of curves of "required GM" or "allowable KG" in relation to draught and cargo tank content in way of the damage. The curves must be sufficiently comprehensive to cover operational trim requirements.

2.2 Each of the curves thus constructed relates to one position of assumed damage only and the calculations should be repeated for each damage and lesser extent of damage to be assumed at any part of the ship.

2.3 Where it can be determined by inspection that the effect of certain assumed damage will be less onerous than other assumed damage, for which calculations are provided and curves prepared, then the investigation of such damage cases may be dispensed with.

2.4 The damage calculations should take account of:

.1 tanks in way of the assumed damage filled with liquid at increments of about 25% between empty and the maximum weight of liquid, or liquids, intended to be carried in the particular tanks under consideration;

.2 the distribution of liquids in the adjacent tanks concerned which will give the most severe result, taking into account trim;

.3 a number of draughts over the operating range, up to and including the tropical freeboard mark. The fresh water freeboards need not be considered;

.4 the effect of damage involving the machinery space and adjacent tanks containing liquids over a number of draughts as in 2.4.3;

.5 the ship in either the departure or the arrival condition, whichever will give the most severe result;

.6 the ship without trim and a sufficient number of trims covering the operating range, in order to permit interpolation.

3 Particulars concerning survival capability calculations.

3.1 The calculations should be based on moulded lines and include large appendages such as shaft bosses, skegs and bow thrusters.

3.2 The metacentric heights (GM), stability levers (GZ) and centre of gravity positions (KG) for judging the final survival conditions should be calculated by the constant displacement (lost buoyancy) method.

3.3 The calculations should be done for the ship freely trimming.

3.4 Only computer calculations acceptable to the Administration should be used.

3.5 Where the assumed damage causes the ship to trim by the stern, the ship in the intact condition should be assumed to have the largest allowable trim by the stern, consistent with operational requirements.

3.6 Where the assumed damage causes the ship to trim by the bow the ship in the intact condition should be assumed to have the largest allowable trim by the bow, consistent with operational requirements.

3.7 Lesser extent of damage should be taken into account only where indicated by the presence of subdivision extending into the maximum extent of damage, e.g. double-bottom tanks, side ballast tanks, side cargo tanks, fuel tanks and void spaces. However, the following should be given attention:

.1 "Lesser extent" means the reduction of any one of the three maximum dimensions of damage singly or in combination and also the assessment of the effect of damage affecting any combination of compartments within the maximum extent of damage.

.2 Where any damage involves the release of very heavy cargo liquid, then heel to the intact side of the ship may take place. In such cases the effect of lesser vertical extent of damage above the level of the tank top may result in the larger angle of heel, since otherwise the effect of cargo loss may be compensated by flood water entering the double-bottom tanks on the damaged side.

3.8 The number of calculations required to show compliance with survival requirements should be that necessary to obtain sufficient data for the loading manual and should be such that all loading conditions indicated in 1 can be covered, i.e. no additional calculations should be necessary once the series of calculations has been executed.

3.9 Calculations to determine the displacement, trim and the vertical position of the centre of gravity should be performed for each operational loading condition. The vertical position of the centre of gravity should be corrected for free surface effects. One method would be to construct graphs showing the free surface moments of the criterion angle, for all filling levels at a specific gravity of one. The free surface moments for all tanks can then be taken from the graphs and be multiplied by the cargo specific gravity.

3.10 In calculating the effect of free surface of consumable liquids it is to be assumed that, for each type of liquid, at least one transverse pair or a single centreline tank has maximum free surface, and the tank or combination of tanks to be taken into account are to be those where the effect of free surfaces is the greatest; in each tank the centre of gravity of the contents is to be taken at the centre of volume of the tank. The remaining tanks are to be assumed either completely empty or completely filled, and the distribution of consumable liquids among these tanks is to be such as to obtain the greatest possible height above the keel for the centre of gravity.

3.11 To take account of the presence of structure within cargo compartments, a permeability of 0.95 should be assumed as stated in the Codes. Where, in particular cases such as the cargo tanks of gas carriers, this assumption would lead to a significant discrepancy in cargo tank volume, it is preferable to calculate the permeability taking into account actual tank structure, the volume of tank insulation should then be calculated separately and an appropriate permeability applied.

3.12 Attention should be paid to the possibility of progressive flooding through deck cargo pipes and common cargo tank ventilation pipes, if these are immersed at large angles of heel after damage. The possibility of progressive flooding through ballast piping passing through the assumed extent of damage, where positive action valves are not fitted to the ballast system at the open ends of the pipes in the tanks served, should be considered. Where remote control systems are fitted to ballast valves and these controls pass through the assumed extent of damage then the effect of damage to the system should be considered to ensure that the valves would remain closed in that event.

3.13 Where the ship is required to be capable of sustaining bottom damage anywhere in its length (L), the following method should be used when damage is assumed to occur in the vicinity of the 0.3 L position from the forward perpendicular:

.1 when applying the longitudinal extent of bottom damage applicable to the foremost part of the ship, no part of the damage should be assumed to extend abaft the 0.3 L position from the forward perpendicular.

.2 when applying the longitudinal extent of damage applicable to the rest of the ship's length the damage should be assumed to extend to a foremost limit including a point at 0.3 L minus 5 m abaft the forward perpendicular.

3.14 In ships carrying liquefied gases, large cargo tanks may be subdivided into the sections by centreline and transverse bulkheads which are liquid-tight but which have openings near the top of the tank. These openings would permit spillage of cargo from one section of the cargo tank to another when the ship is heeled where the tank is undamaged, or loss of cargo due to spillage from sections of a damaged cargo tank. The effect of this spillage should be taken into account in calculations and also in any calculation of GM or KG for loading conditions where a "required GM" or "allowable KG" curve is to be used.

3.15 In ships carrying liquefied gases, the ability of longitudinal bulkheads fitted within cargo tanks to withstand the unequal pressures due to flooding of one section of cargo tank should only be considered in the final stage of flooding.

3.16 Where lubricating oil drain tanks fitted below the main engine would be affected by the vertical extent of bottom damage then flooding of the engine-room by way of the drain tank and engine should be assumed to take place.

3.17 In ships with machinery spaces aft, the machinery space and steering gear compartment should be regarded as being common for damage purposes when any access is fitted in the after machinery space bulkhead, unless a remotely operated sliding watertight door is fitted, or the sill of the access openings

fitted with hinged watertight doors which are to be kept closed at sea is at least 0.3 m above the damage waterline and will not be submerged within the minimum range of residual stability.

3.18 Where dry cargoes are carried at the same time as bulk liquid cargoes which require compliance with the requirements of the Codes then the permeability of the space carrying the dry cargo is to be ascertained.

3.19 The harmonized regulations specify that no account should be taken of cross-flooding arrangements to attain stipulated limits of heel in the final state of equilibrium after damage. However, compartments on the opposite sides of a ship could be regarded as single compartments from the aspect of flooding if they were to be linked by openings or ducts of sufficiently large area. In such cases consideration should be given to the adequacy of tank air flow and to the effect of free surface.

4 Stability information and Certificate of Fitness.

4.1 With regard to loading conditions to be submitted to the Administration (exclusive of the loading conditions contained in loading and stability manual) the principal objective, at the stage of design evaluation, is that the Administration can satisfy itself that the calculations presented will cover all conditions of full and partial loading, including variations of draught and trim. To achieve this objective the Administration may either:

.1 require a complete analysis of survival requirements over the full range of probable loading conditions; or

.2 undertake approval on the basis of service conditions proposed by the builder or owner, in which case the Certificate of Fitness should be endorsed for the conditions accepted.

4.2 Particular attention should be paid to the provision of adequate stability data to enable the master to take into account accurately the effect of liquid heeling moments of the contents of undamaged tanks. These heeling moments vary with the specific gravity of the liquid and the percentage filling of the tanks and may change significantly in magnitude from condition to condition. Adequate information would include curves showing the variation of liquid heeling moment with the contents of each individual tank.

4.3 In addition to the usual loading information required under intact stability requirements the master should be supplied with the following information pertaining to damage stability:

.1 data relative to loading and distribution of cargo and ballast necessary to ensure compliance with damage survival requirements;

.2 data relative to the ship's survival capabilities;

.3 a damage control drawing showing the position of important fittings and listing instructions for their control:

.4 data relating to the effect of free surface or liquid heeling moments of cargo tanks at all stages of filling;

.5 example calculations and standard blank forms to facilitate calculations.

4.4 The following should be stated on the Certificate of Fitness:

.1 the deepest draught or least freeboard permitted for those loading conditions which require greater freeboard than the International Load Line Certificate (1966);

.2 the range of specific gravities of cargoes which may be carried, this relates to all cargoes;

.3 the particular cargo tanks in which certain ranges of specific gravities of cargoes may be carried, if relevant;

.4 details of fittings, valves etc., the control of which is essential for survival, together with instructions for control, operation and logging; and

.5 identification of required loading and stability manual.

PROPOSAL FOR VENTING ARRANGEMENTS ON BOARD CHEMICAL TANKERS

The following arrangement may be accepted as providing a level of protection equivalent to that requested by SOLAS, regulation II-2/59.1.5 and contained in the annex to MSC/Circ.373/Rev.1. The arrangement may be used on non-inerted or inerted cargo tanks with vent pipe sizes up to and including 100 mm in diameter.

1 Piping systems referred to in chapter 8 of the IBC Code may be provided with the following;

.1 pressure/vacuum valves with the following characteristics:

- constructed in accordance with the appropriate sections of MSC/Circ.373/Rev.1 excluding the type test procedures for flame arresting capabilities:
- opening overpressure of at least 0.18 bar;

.2 a flame-arresting device fitted at the pipe outlet which has been tested for flashback in accordance with paragraph 3.2.2 and, where applicable, paragraph 2.5.4 of MSC/Circ.373/Rev.1;

.3 the vacuum side of the valve to be protected with a flamescreen as defined in MSC/Circ.373/Rev.1 or a device tested for flashback.

2 It should be ensured that when the valve is open a minimum flow velocity of at least 10 m/sec is maintained at the outlet of the assembly above the flame-arresting device.
