MSC/Circular.608/Rev.1 - Interim Guidelines for Open-top Containerships - (adopted on 5 July 1994)

The Maritime Safety Committee

1. The Maritime Safety Committee, at its sixty-second session (24 to 28 May 1993), approved interim guidelines for open-top containerships, which were disseminated by MSC/Circ.608 and provided a set of requirements for the design of this type of ships. While noting that certain provisions of the guidelines were still of an interim nature and agreeing that these should be revised in the future on the basis of relevant proposals, the Committee requested the Sub-Committee on Fire Protection, in particular, to improve further the fire protection requirements applicable to open-top containerships for future inclusion in the guidelines.

2. Noting further that the interim guidelines permit a number of spectra and range of zero-crossing periods to be used for the tank test determination of the rate of green water ingress, the Committee recommended that Administrations provide the Organization with information on the spectra and zero-crossing periods, which would provide a useful basis upon which the requirements for such tank tests could be improved.

3. At its sixty-third session (16 to 25 May 1994), the Maritime Safety Committee approved a revised section 9 of these guidelines developed by the FP Sub-Committee at its thirty-eighth session (28 June to 2 July 1993). The revised guidelines incorporating the revised section 9 are set out in the annex to the present circular.

4. Member Governments are invited to apply the provisions of the interim guidelines in the design and operation of open-top containerships, as appropriate.

1 Definitions

1.1. ñOpen-top containership" means a containership especially designed so that one or more of the cargo holds need not be fitted with hatch covers.

1.2. ñFreeboard" is the distance between the assigned load line and freeboard deck.

1.3. ñFreeboard deck", for the purposes of chapters I and II of Annex I of the International Convention on Load Lines, 1966 (LL 1966), is the freeboard deck according to the LL 1966 as if hatch covers are fitted on top of the hatch coamings.

1.4. ñMaximum sustained speed" is defined as the maximum service speed taking into account speed loss due to resistance increase in regular waves. Voluntary speed loss is not taken into consideration.

1.5. ñMinimum ship manoeuvring speed" is defined to be the minimum speed which maintains directional control and is consistent with the operating characteristics of the ship.

1.6. ñGreen water" is sea water other than spray shipped aboard the ship under normal operational conditions.

2 Freeboard

2.1. Minimum freeboard should be determined by seakeeping characteristics and stability. Model tests and calculations should be carried out to provide Administrations with:

.*1*. measured data for the maximum hourly rate of ingress of green water likely to be shipped into each cargo hold;

.*2*. evaluation of the adequacy of the discharge rates from cargo hold freeing ports (if they are fitted).

2.2. The maximum hourly rate of ingress of green water in any one open hold determined from model testing should not exceed the hatch opening area multiplied by 400 mm/hour.

2.3. A conventional geometrical freeboard and minimum bow height should be calculated assuming that hatch covers are fitted. Under no circumstances should a freeboard and bow height be assigned to an open-top containership which is less than the equivalent geometrical freeboard determined from the LL 1966.

2.4. All seasonal freeboards should be omitted unless the minimum geometrical freeboard and corresponding seasonal freeboards for which the ship is eligible (assuming hatch covers fitted) are greater than the freeboard for which the model tests were satisfactorily carried out. In that case, the minimum geometrical freeboard and the corresponding seasonal freeboards greater than the freeboard for which the model tests were carried out should be assigned.

2.5. The minimum freeboard and minimum bow height assigned to the ship should not be less than those corresponding to the model test conditions.

3 Strength

. The general and local strength of the hull should be sufficient in the intact flooded condition.

4 Initial and periodic surveys

4.1. As a condition of assignment, each open-top containership should maintain fully operational hold dewatering systems, including all system redundancies. The operability and condition of the hold dewatering systems and freeing ports if they are fitted should be inspected monthly by the crew and entered in the shipôs log book for annual verification by the Administration.

4.2. At each load line renewal survey, the Administration should require that the hold dewatering systems be fully tested to assure proper functioning.

4.3. The structural survey schedule requirements for the open cargo holds should reflect that they are exposed to the sea atmosphere. A complete inspection of the open cargo holds should be conducted in conjunction with the load line renewal survey.

5 Procedure of model tests

5.1. The model experiments should be carried out in long-crested, irregular waves. The Pierson-Moskovitz, JONSWAP, or Bretschneider wave spectrum generated for the purpose of these experiments should have a significant wave height of approximately 8.5 m at the most unfavourable realistic wave period (zero crossing) as determined by calculation or previous testing experience.

5.2. For ships operating in restricted areas only, the Administration may allow other spectra.

5.3. The effect of wind generated spray need not be simulated during the tests.

5.4. The model experiments should be carried out for at least the following wave directions based on International Towing Tanks Conference conventions:

.*1*. following seas (0°/360°)

.*2*. quarter following seas (45°/315°)

.*3*. beam seas (90°/270°)

.*4*. quarter head seas (135°/225°)

.*5*. head seas (180°)

5.5. The model experiments should be carried out for at least the following speeds:

.*1*. maximum sustained speed in head seas and quarter head seas;

.*2*. minimum ship manoeuvring speed in quarter following seas and following seas;

.*3*. zero ship speed (dead ship condition) in beam seas.

5.6. The Administration may require additional tests.

5.7. The model experiments should be carried out with a self-propelled, unrestrained model without the necessity to change course and the time period of each experiment should correspond to at least one hour real time.

5.8. The loading condition used for the tests should correspond at least to the maximum loaded draught with level trim. If operational trim values differ substantially from level trim, additional trim values should be included in the model test programme.

5.9. The KG value selected should correspond to the actual value most likely to be encountered during the shipôs service. If KG values which may be expected during the operation of the ship differ substantially from this selected KG value, additional KG values should be included in the model test programme.

5.10. For each test condition, the cargo hold which ships most water should be determined by preliminary tests for each combination of heading, trim and KG. In running tests for the full duration specified above, this least favourable hold should be simulated as having no containers, whilst other cargo holds (each cargo hold as a separate entity) may be simulated as completely fully loaded with containers above the line of the weather deck (or hatch coaming where applicable). Containers should not be used as a means to prevent shipping of water into an empty hold where they are stacked outboard of the open hold. Rain covers for the open holds should not be simulated in the model tests.

5.11. In additional to the usual parameters measured (ship motions, ship speed, relative motions, rudder angles, etc.) the volume of water entering all open cargo holds should be measured for each experiment. The quantities of water taken aboard the model should be

removed and measured after each test run so that the metacentric height, moment of inertia and displacement are not appreciably disturbed by any accumulation of water during the testing programme.

5.12. Where freeing ports are fitted, an additional model test to comply with 2.1.2 should be conducted at a draught which corresponds to the condition of the ship fully loaded with cargo and open holds flooded to the static equilibrium level with freeing ports open. A hold permeability of 70% by volume should be assumed. Tests should be conducted at zero speed in beam seas.

5.13. The Administration may require an observer to witness the tests. A comprehensive report should be submitted to the Administration.

6 Intact stability

6.1. The stability of the ship in all conditions of loading should meet the provisions of the Code of Intact Stability for All Types of Ships Covered by IMO Instruments.

6.2. Where cargo hold freeing ports are fitted, they should be considered closed for the purpose of determining the flooding angle, provided that the reliable and effective control of closing of these freeing ports is satisfactory to the Administration.

6.3. With all open holds completely filled with water (permeability of 0.70 for container holds) to the level of the top of the hatch side or hatch coaming or, in the case of a ship fitted with cargo hold freeing ports, to the level of those ports, the stability of the fully laden ship in the intact condition should meet the survival criteria (with factor s = 1) of chapter II-1 part B-1 of SOLAS 1974, as amended.

6.4. For the condition with flooded holds and an intact ship the free surfaces may be determined as follows: The holds are fully loaded with containers. The seawater enters the containers and will not pour out during heeling. This condition should be simulated by defining the amount of water in the containers as fixed weight items. The free space surrounding the containers is then flooded with seawater. This free space should be evenly distributed over the full length of the open cargo holds.

6.5. Intermediate conditions of hold flooding should be investigated.

7 Damage stability

. Open-top containerships should comply with the subdivision and damage stability criteria of chapter II-1 part B-1 of SOLAS 1974, as amended. The coamings of open-top holds should be considered as downflooding areas.

8 Hold bilge dewatering system and freeing ports

8.1. The bilge pumping system should have a required capacity to pump:

.*1*. the maximum hourly rate of green water shipped in seagoing conditions as established by the comprehensive model testing specified;

.*2*. an amount equal to rainfall of 100 mm/hour regardless of the installation of rain covers;

.3 the amount of shipped green water measured during the seakeeping model tests for the dead ship condition in beam seas, multiplied by safety factor 2;

.4 four-thirds of the amount of water required for fire-fighting purposes in the largest hold;

.5 an amount equal to the capacity required for ships with closed cargo holds,

whichever is the greater.

8.2 The pumping of hold bilges should be possible by at least three bilge pumps.

8.3 At least one of these pumps should have a capacity of not less than the required capacity as defined in 8.1 and should be dedicated to bilge and ballast service only. It should be located in such a way that it will not be affected by a fire or other casualty to the space containing the pumps required in 8.4 below or the space containing the main source of power and should be supplied from the emergency switchboard required by regulation II-1/43 of SOLAS 1974, as amended.

8.4 The combined output of at least two further pumps should not be less than the required capacity as defined in 8.1. These pumps should be supplied from the main source of electrical power required by regulation II-1/41 of SOLAS 1974, as amended, or any other source of power independent of the emergency switchboard required by regulation II-1/43 of SOLAS 1974, as amended.

8.5 The bilge pumping system, including the piping system, should incorporate sufficient redundancy features so that the system will be fully operational and capable of dewatering the hold spaces at the required capacity in the event of failure of any one system component.

8.6 The bilge pumping system should be arranged to be effective within the limiting angles of inclination required for the emergency source of electrical power by SOLAS 1974, as amended, and bilge wells should be readily accessible for cleaning.

8.7 All open cargo holds should be fitted with high bilge level alarms. The alarms should annunciate in the machinery spaces and the manned control location and be independent of bilge pump controls.

8.8 If the loss of suction prevents the proper functioning of the bilge system, special measures to prevent this should be considered, as for instance, the installation of level indicators.

8.9 Open cargo hold drain wells should be designed to ensure unobstructed discharge of water and easy access for cleaning under all conditions.

8.10 If provided, freeing ports should be fitted on both sides of each open cargo hold, subject to the following:

.1 the number, size and location of the freeing ports on each side of each open hold should be sufficient to prevent the accumulation of water above the level defined in 5.12;

.2. efficient means of closure to prevent the accidental ingress of water should be provided. Such means should be operated from above the freeboard deck. In the case of a ship operating in areas where icing is likely to occur, these arrangements should be suitable to enable the ports to operate efficiently under such conditions.

9 Fire protection requirements

9.1. The fire protection system for open-top container holds shall be based on the philosophy of containing the fire in the bay of origin and to cool adjacent areas to prevent structural damage.

9.2. Open-top container holds shall be protected by a fixed water spray system. The system shall be capable of spraying water into the cargo hold from deck level downward. The system shall be designed and arranged to take account of the specific hold and container configuration. If found necessary, the Administration may require a full-scale test.

9.3. The water spray system should be able to effectively contain a fire in the container bay of origin. The spray system shall be subdivided, with each subdivision to consist of a ring-line at deck level in an open cargo hold around a container bay.

9.4. The water spray system shall be capable of spraying the outer vertical boundaries of each container bay in an open cargo hold and of cooling the adjacent structure. The uniform application density should be not less than 1.1 litres/min/m^2. At least one dedicated fire extinguishing pump for the hold water spray system with a capacity to serve all container bays in any one open-top container hold simultaneously shall be provided. The pump(s) shall be installed outside the open-top area. The availability of water to the water spray system shall be at least 50 per cent of the total capacity, with adequate spray patterns in the open-top container hold, and with any one dedicated pump inoperable. For the case of a single dedicated water spray pump this may be accomplished by an interconnection to an alternative source of water. The extinguishing system shall be supplemented by hose supply from the weather deck.

9.5. Whenever a fire detection system is required in the open hold area, the fire detection system shall be designed and arranged to take account of the specific hold and container configuration and ventilation arrangement.

10 Dangerous goods

10.1. Dangerous goods for which ñon deck only" stowage is specified in the IMDG Code, should not be carried in or vertically above open-top container holds.

10.2. In addition to the provisions of paragraph 10.1, containers with dangerous goods extending more than 1 m above the top of the watertight upper boundary around an open-top container hold and containing liquids, gases or vapours heavier than air and for which ñon deck only" stowage is specified, should not be carried within one container space [see footnote] horizontally from the boundary of the open-top container holds.

10.3. Dangerous goods other than those described in 10.1 should not be carried in or vertically above open-top container holds unless such holds are in full compliance with regulation II-2/54 of SOLAS 1974, as amended, applicable to enclosed container cargo spaces, as appropriate for the cargo carried.

10.4. Containers with dangerous goods extending more than 1 m above the top of the watertight upper boundary around an open-top container hold should not be carried within one container space[see footnote], horizontally from the boundary of an open-top container hold unless that hold is in full compliance with regulation II-2/54 of SOLAS 1974, as amended, applicable to enclosed container cargo spaces, as appropriate for the cargo carried.

11 Segregation of dangerous goods

. Instead of the table of segregation of freight containers on board containerships contained in section 15.3.2 of the IMDG Code, the table contained in the appendix hereto should be applied for segregation of dangerous goods for open-top container holds.

Appendix

Table 7 Table of segregation of freight containers for open-top containership holds

SEGREGATION REQUIREMENT	VERTICAL				HORIZONTAL					
	CLOSED VERSUS CLOSED	CLOSED VERSUS OPEN	OPEN VERSUS OPEN		CLOSED VERSUS CLOSED		CLOSED VERSUS OPEN		OPEN VERSUS OPEN	
					ON DECK	UNDER DECK	ON DECK	UNDER DECK	ON DECK	UNDER DECK
ñAWAY FROMñ1	ONE ON TOP OF THE OTHER PERMITTED	OPEN ON TOP PERMITTED	NOT IN THE SAME VERTICAL LINE	FORE AND AFT	NO RESTRICTION	NO RESTRICTION	NO RESTRICTION	NO RESTRICTION	ONE CONTAINER SPACE	ONE CONTAINER SPACE OR ONE BULKHEAD
		OTHERWISE AS FOR OPEN VERSUS OPEN		ATHWARTð SHIPS	NO RESTRICTION	NO RESTRICTION	NO RESTRICTION	NO RESTRICTION	ONE CONTAINER SPACE	ONE CONTAINER SPACE
ñSEPARATED FROMò 2	NOT IN THE SAME VERTICAL LINE	AS FOR OPEN VERUS OPEN		FORE AND AFT	ONE CONTAINER SPACE	ONE CONTAINER SPACE OR ONE BULKHEAD	ONE CONTAINER SPACE	ONE CONTAINER SPACE OR ONE BULKHEAD	ONE CONTAINER SPACE AND NOT ABOVE SAME HOLD	ONE BULKHEAD
				ATHWARTð SHIPS	ONE CONTAINER SPACE	ONE CONTAINER SPACE	TWO CONTAINER SPACES	TWO CONTAINER SPACES	TWO CONTAINER SPACES AND NOT ABOVE SAME HOLD	ONE BULKHEAD

ñSEPARATED BY A COMPLETE COMPARTMENT OR HOLD FROMò 3				FORE AND AFT	ONE CONTAINER SPACE AND NOT ABOVE SAME HOLD	ONE BULKHEAD	ONE CONTAINER SPACE AND NOT ABOVE SAME HOLD	ONE BULKHEAD	TWO CONTAINER SPACES AND NOT ABOVE SAME HOLD	TWO BULKHEADS
				ATHWARTð SHIPS	TWO CONTAINER SPACES AND NOT ABOVE SAME HOLD	ONE BULKHEAD	TWO CONTAINER SPACES AND NOT ABOVE SAME HOLD	ONE BULKHEAD	THREE CONTAINER SPACES AND NOT ABOVE SAME HOLD	TWO BULKHEADS
ñSEPARATED LONGATUDINALLY BY AN INTERVIENING COMPLETE COMPARTMENT OR HOLD FROMò 4	PROHIBITED			FORE AND AFT	MINIMUM HORIZONTAL DISTANCE OF 24m AND NOT ABOVE SAME HOLD	ONE BULKHEAD AND MINIMUM HORIZONTAL DISTANCE OF 24m	MINIMUM HORIZONTAL DISTANCE OF 24m AND NOT ABOVE SAME HOLD	TWO BULKHEADS	MINIMUM HORIZONTAL DISTANCE OF 24m AND NOT ABOVE SAME HOLD	TWO BULKHEADS
				ATHWARTð SHIPS	PROHIBITED	PROHIBITED	PROHIBITED	PROHIBITED	PROHIBITED	PROHIBITED

* Containers not less than 6 m from intervening bulkhead.

Note: All bulkheads and decks should be resistant to fire and liquid

Footnote

Defined in 15.3.1.2 of the General Introduction of the IMDG Code.