Proposal for a Directive of the European Parliament and of the Council on specific stability requirements for ro-ro passenger ships

(2003/C 20 E/05)

(Text with EEA relevance)

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EXPLANATORY MEMORANDUM

GENERAL INTRODUCTION

1. Background

The stability following collision damage is an issue of prime importance for the survivability of ro-ro passenger ships, due to their particular design. It is obvious that in general, the longer the period a ship remains afloat in case of serious damage, the more efficient the eventual evacuation or search and rescue operations can be. In that perspective the stability requirements applicable to these ships influence directly the safety of passengers and crew. These considerations become even more important in view of the escalating size of ro-ro ships serving Community ports and the increasing number of passengers and crew they carry.

As both practise and research has demonstrated, the most dangerous problem for a ro-ro ship with an enclosed ro-ro deck is the one posed by the effect of a build-up of significant amount of water on that deck. However, with the application of the appropriate technical standards a damaged vessel may stay afloat even when a certain amount of water made its way to the ro-ro deck (the car deck). Research has clearly shown that the residual freeboard of the ship and the waves height in a particular sea area had a significant effect on the amount of water which may accumulate following collision damage.

The stability of ro-ro passenger ships has been addressed at international level by the International Maritime Organisation and specific standards have been established in that respect, particularly on the basis of the SOLAS 90 Convention [1] and Resolution A265. These standards, implicitly include the effect of water entering the ro-ro deck in a sea state in the order of 1,5 m significant wave height and have a phasing-in timetable for existing ships ranging from 1 October 1998 to 1 October 2010.

Following the Estonia disaster, eight European countries (Denmark, Finland, Germany, Ireland, Netherlands, Norway, Sweden and the United Kingdom) decided in February 1996 to require higher standards of damage stability for ro-ro passenger ships than those prescribed by SOLAS 90. These new standards were introduced in the context of the Stockholm Agreement (SA) to which the above eight countries became parties. The Stockholm Agreement stability requirements are complementary to the SOLAS 90 standard, aimed at increasing the survivability of the ro-ro vessels in sea states between 1,5 m and 4 m significant wave height. These complementary requirements take specifically into account the probability of water accumulation in the car deck, up to a height of 0,5 m. The Stockholm Agreement established a phasing-in period ranging from 1 April 1997 to 1 October 2002.

At the adoption of the Stockholm Agreement, noting its regional application, the Commission announced its intention to examine the prevailing local conditions, under which ro-ro passenger ferries sail in all European waters and that this examination would include the extent and effect of the application of the Agreement in the region covered by it. The statement concluded that in the light of this examination the Commission would take a decision with regard to the need for further initiatives.

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[1] International Convention for the Safety of Life at Sea as revised in 1990.

The Council entered a similar statement into the meeting of the 2074th Council meeting of 17 March 1998 at which Council Directive 98/18/EC on safety rules and standards for passenger ships was adopted ([1]). In this statement the need to ensure the same level of safety for all ro-ro passenger ferries operating in similar conditions was more precisely defined by referring to both international and domestic voyages. Directive 98/18/EC made mandatory the application of SOLAS 90 stability standards to domestic EU trades for new class A, B, C and D ships and existing class A and B ships ([2]).

Following the last serious accident involving a ro-ro passenger ship, the 'Express Samina' which occurred in Greece in September 2000, the European Parliament invited the Commission to examine the effectiveness of the Stockholm Agreement and other measures for improving the stability and safety of passenger vessels ([3]).

In this context and following a thorough analysis on the Stockholm Agreement, the Commission included this item in its work programme for 2001.

2. **The SOLAS stability requirements and the Stockholm Agreement**

2.1. The question of stability of passenger vessels has been addressed repeatedly by the International Maritime Organisation (IMO) in the context of the International Convention for the Safety of Life at Sea (SOLAS) and the first damage stability requirements were introduced in 1948 followed by improvements in 1960 and 1974. However, the major step in the development of stability standards for ro-ro ships came in 1990 with the introduction of a new section ([4]) in the SOLAS Convention. These requirements (known as SOLAS 90 stability standard) are internationally accepted and apply to passengers vessels involved in international voyages from/to EU ports, as well as to domestic trades within Member States by means of the Directive 98/18/EC. The SOLAS 90 standard implicitly include the effect of water entering the ro-ro deck in a sea state in the order of 1.5 m significant wave height.

The SOLAS 90 requirements have a phasing-in period for all existing ro-ro passenger ships with dates of compliance ranging from 1 October 1998 to 1 October 2010 depending on a combination of different factors ([5]).

2.2. In the aftermath of the Estonia disaster, 8 European countries (Denmark, Finland, Germany, Ireland, Netherlands, Norway, Sweden and the United Kingdom), agreed in February 1996 in Stockholm to require higher standards of damage stability for ro-ro passenger ships than what had been determined just a few years earlier by the IMO SOLAS 90 standard. The key idea behind this initiative was that a ship should be designed to resist capsize even when a certain quantity of water has made its way to the vehicle (ro-ro) deck.

The Stockholm Agreement (SA) was established in the context of IMO Resolution 14 of the 1995 SOLAS Conference, allowing contracting governments to conclude such an agreement if they consider that prevailing sea conditions and other local conditions require specific stability requirements in a designated area. It was notified to the IMO on 1 April 1996 in accordance with operative paragraph 3 of Resolution 14 and entered into force on 1 April 1997 in accordance with its article 10 ([6]). In simplified terms, the SA standards are complementary to SOLAS 90 standards with the addition of technical requirements to satisfy explicitly the 'water in the car deck' probability. Compliance with these requirements is measured whether on basis of numerical calculations defined in the Agreement or by performing model experiments in accordance with the model testing method of SOLAS 95 Resolution 14.

([1]) OJ L 144, 15.5.1998, p. 1.

([2]) These classes are defined in line with the type of sea area the ships operate, in accordance with article 4 of Council Directive 98/18/EC.

([3]) EP Resolution B5-0783, 0787 and 0791/2000 of 5 October 2000.

([4]) SOLAS Chapter II-1, part B.8 (Stability in damaged condition).

([5]) These factors are: the vessel's A/Amax value, the number of persons carried and its age. (The A/Amax calculation procedure is a simplified version of probabilistic damage stability calculation of ships, adopted by IMO as a means of trying to compare the survivability of one ship against another in order to achieve a hierarchy for phasing-in purposes. It is not a survivability standard.)

([6]) IMO Circular letter No 1891 of 29 April 1996.

According to the logic of the Agreement, the residual freeboard of the vessel and the significant wave height (hs) of the area where a ship operates determine the height of water on the car deck that would arise following the occurrence of an accidental damage. Consequently, a ship should be designed to withstand the significant wave heights that prevail in the routes, or areas, where she operates. Taking into account the above parameters, the result from the application of the SA stability requirements is that a vessel should resist capsize even with a flooded ro-ro deck up to a level of 0.5 metre. The maps indicating significant wave heights values by area that appear in the Stockholm Agreement, have been defined by the contracting governments and they are based on all year round statistics.

The specific stability requirements of the SA are applicable to ro-ro passenger ships regardless of flag, operating on regular international voyages carrying passengers between designated ports to or from designated ports in the area covered by the Agreement. As for their enforcement, the Agreement provided for a phasing-in period ranging from 1 April 1997 for ro-ro passenger ships with the lowest A/A_{max} values, to 1 October 2002 for ships already complying with the SOLAS 90 stability standard.

3. **The EU position towards the Stockholm Agreement**

3.1. At the conclusion of the Conference at which the Agreement was adopted, the Commission services issued a statement, taking note of the Agreement concluded and expressing the opinion that the same level of safety should be ensured for all ro-ro passenger ferries operating in similar conditions. Noting that the Agreement is not applicable in other parts of the European Union, the Commission announced its intention to examine the prevailing local conditions, under which ro-ro passenger ferries sail in all European waters and that this examination would include the extent and effect of the application of the Agreement in the region covered by it. The statement concluded that in the light of this examination the Commission would take a decision with regard to the need for further initiatives.

This Commission statement was confirmed at the 1907th meeting of the Council, on 11 March 1996, at which the outcome of the Stockholm Agreement was discussed by the Ministers of Transport.

The Council agreed to enter a similar statement into the meeting of the 2074th Council meeting of 17 March 1998 at which Council Directive 98/18/EC on safety rules and standards for passenger ships was adopted. In this statement the need to ensure the same level of safety for all ro-ro passenger ferries operating in similar conditions was more precisely defined by referring to both international and domestic voyages. Directive 98/18/EC made mandatory the application of SOLAS 90 stability standards to domestic EU trades for new class A, B, C and D ships and existing class A and B ships.

3.2. Furthermore, Directive 1999/35/CE on a system of mandatory surveys for the safe operation of regular ro-ro ferry and high speed passenger crafts, provides in its article 4.1.e that ro-ro ferries shall fulfil the specific stability requirements adopted at regional level, when operating in the region covered by such regional rules. This obliges host States to check that ro-ro ferries 'comply with specific stability requirements adopted at regional level, and transposed into their national legislation in accordance with the notification procedure laid down in Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations and of rules on information society services, when operating in that region a service covered by that national legislation, provided those requirements do not exceed those specified in the Annex of Resolution 14 (Stability Requirements Pertaining to the Agreement) of the 1995 SOLAS Conference and have been notified to the Secretary-General of the IMO, in accordance with the procedures specified in point 3 of that resolution'.

3.3. Following its earlier commitment the Commission contracted a study to examine the extent and effect of the application of the Stockholm Agreement concerning specific stability requirements for ro-ro passenger ships and the suitability of extending its scope of application to European waters not covered by it. Furthermore the economic impact of the application of the Stockholm Agreement has been analysed and found acceptable, as demonstrated in the following chapter.

3.4. The European Parliament with its Resolution B5-0783, 0787 and 0791/2000 of 5 October 2000, which followed the 'Express Samina' accident, stressed that it 'awaits the evaluation by the Commission of the effectiveness of the Stockholm Agreement and other measures for improving the stability and safety of passenger vessels'

3.5. Following the evaluation made by the Commission, based on consultation of interested parties and inputs from various sources including the findings of the above study, it is considered that a legislative initiative in the field covered by the Stockholm Agreement is justified.

JUSTIFICATION FOR THE PROPOSED COMMUNITY INITIATIVE

Research following the accidents of Herald of Free Enterprise and Estonia, demonstrated that the worst stability related danger for a ro-ro ship with an enclosed ro-ro deck is caused by the effect of a build-up of significant amount of water on that deck.

The current IMO damage stability requirements applicable to ro-ro passenger ships (SOLAS 90), which also apply to domestic EU trades by means of the Directive 98/18/EC, implicitly include the effect of water entering the ro-ro deck in a sea state in the order of 1,5 m significant wave height. However, the damage stability requirements defined by the Stockholm agreement increase the survivability of the vessels in more severe sea states, since they complement the SOLAS requirements to take into account the effect of water which could accumulate on the ro-ro deck following damage.

The Commission has declared that it could propose the application of these specific stability requirements for the entire EU after having studied the local conditions in the South European waters. Although the expert study of the Commission sustains that other safety critical conditions (as visibility or water temperatures) may be generally less severe in the South European waters, the significant wave heights values are comparable or even higher than those in the Baltic sea, whilst waves are known to be steeper in South European waters.

The analysis shows that the introduction of the SA in the North of Europe took place without particular trouble for the industry or the contracting governments. Based on a sample of 82 vessels, out of a total of 140 that needed to comply with the Agreement, it appears that 36 % of the vessels in that sample did not need any upgrade. Furthermore, 69 % of the total 140 vessels were upgraded for less than 1 million EURO. The estimated total cost of upgrade was around 85 mio Euro. However it is important to note that most of that cost is related to the accelerated compliance with SOLAS 90 standards (a necessary step before compliance with the Stockholm Agreement) rather than just to compliance with the Agreement as such.

The economic analysis in the study concludes that, given the common value of significant wave heights in the Southern EU waters is around 2,5 metres, the modification cost of the South European fleet for compliance with the provisions of the SA will be approximately the same as the associated cost for compliance with the requirements of the SOLAS 90 two compartment standard ([1]). Since full compliance with SOLAS Regulations is to take place by 2010, on the basis of the IMO timetable (international trades) and of Directive 98/18/CE (domestic EU trades) the industry should have already planned to invest in the coming years in the upgrade of the vessels concerned. The study states that 264, operating both in international and domestic trades, vessels will be affected from the SOLAS upgrade and that the cost of compliance will be among 106 and 250 million Euro (these figures do not take into account possible removals from service of aged ro-ro ships). As already mentioned, compliance of these ships with the specific stability requirements set out in the Stockholm Agreement will not increase their SOLAS compliance cost in a prohibitive way.

It appears therefore that the application of the SA stability requirements to the South European ro-ro passenger vessels will offer a uniformity of stability requirements and an increased level of survivability of ro-ro passenger ships throughout the EU, without increasing substantially the economic effort of the affected part of the industry, which has to comply anyway with the SOLAS 90 standard.

([1]) SOLAS 90 two compartment standard establishes that the ship can survive without capsizing with two main compartments flooded following damage.

In light of the above, the Commission is of the opinion that the division of north/south as regards stability requirements for ro-ro vessels in damaged condition (Stockholm Agreement standards in the North and SOLAS 90 standards in the South) does not seem justified on grounds of the safety parameters or for techno-economic reasons.

A European Parliament and Council Directive imposing the specific stability standards as defined in the Stockholm Agreement to all ro-ro passenger ships engaged in international voyages from/to EU ports is the right way forward. It is to be noted that newly built ferries, both for operation in Northern and in Southern Europe, generally comply with the aforementioned increased stability standards. The upgrading of existing ro-ro passenger ships operating in southern Europe will require a transitional period, as it was the case with the introduction of the Stockholm Agreement standards for the fleet operating in northern Europe.

Taking into account that operating conditions for ro-ro passenger ships in domestic voyages in the Member States are often similar to those in international voyages, the Commission proposal amending Council Directive 98/18/EC contains specific provisions to that respect. In fact it provides for the introduction of the same or equivalent stability standards for ro-ro ships operating in domestic voyages, as those proposed for ro-ro ships operating in international voyages.

CONTENT OF THE PROPOSED DIRECTIVE

The proposed Directive will introduce the specific stability requirements of the Stockholm Agreement to the entire EU, covering all ro-ro passenger ships operating from/to EU ports in international voyages.

The specific stability requirements are a complement to the present international IMO standard (SOLAS 90) and are already applicable to 7 northern EU Member States, which are parties to the Stockholm Agreement established in the context of the IMO Resolution 14 of the 1995 SOLAS Conference. This Directive will create a uniformity of stability requirements for ro-ro passenger vessels operating under same conditions and will introduce in the EU framework a regional Agreement agreed under IMO auspices.

The main advantage of the proposed stability requirements is their contribution to an improved survivability of this type of ships following collision damage and the direct connection of the applicable standard to the specific service the ships are engaged in. The requirements are indeed established on the basis of the values of the significant wave heights occurring in the sea areas the ships travel. Taking into account the operating conditions of the ship, the specific stability requirements guarantee the ship's stability in damaged condition with up to 0,5 metres of water accumulated in its ro-ro deck.

In view of the structural modifications that the existing ships may have to undergo in order to comply with the new stability requirements, the Directive introduces a phasing-in period, taking into account the compliance dates of SOLAS 90.

SPECIAL CONSIDERATIONS

Article 1

The purpose of this Directive is to lay down a uniform level of specific stability requirements for ro-ro passenger ships, which will improve the survivability of this type of vessels in case of collision damage and provide a higher level of safety for the passengers and the crew. In view of the fact that 7 northern EU Member States already apply these specific stability requirements by means of a regional Agreement, the proposed Directive will result at the introduction of this regional Agreement in the Community framework and its extension to the Southern European waters and the Atlantic coast.

Article 2

This article contains the definitions of the key terms used in the Directive and are based on the IMO SOLAS Convention (International Convention for the safety of life at sea) definitions, as well as existing Community legislation, particularly Directive 98/18/EC of 17 March 1998 on safety rules and standards for passenger ships.

Article 3

Article 3 defines the scope of the Directive. This will apply to all ro-ro passenger ships operating to or from a port of a Member State on a regular service, regardless of their flag, when engaged on international voyages.

Article 4

This article specifies that the value of the significant wave heights shall be used for determining the height of water on car deck when applying the specific stability standard.

Article 5

This Article specifies that in the light of Article 4, Member States have to establish the sea areas under their jurisdiction as well as the areas between Member State and Member States and third countries, where ro-ro passenger ships which serve the Community ports undertake voyages.

These areas and the corresponding significant wave heights will be notified to the Commission and be publicly available by the competent maritime authorities of Member States.

Article 6

This Article establishes the connection to the specific stability requirements set out in the Annex 1 of the Directive. These requirements will apply in addition to the requirements of SOLAS regulation II-1/8 on stability in damaged conditions.

The specific stability requirements are therefore complementary to the SOLAS 90 stability standard and take specifically into account the effect of water which could accumulate on the ro-ro deck following damage, in order to enable the ship to survive in more severe sea states than 1,5 m significant wave height.

The specific stability requirements introduced by this Directive are based on a mathematical formula which calculates the height of water on the ro-ro deck following a collision damage depending on two basic parameters: the ship's residual free board and the significant wave height in the sea area where the ship operates.

This article makes also reference to the guidelines to Member States for applying the specific stability requirements set out in Annex I, which are presented in the Annex II of the Directive. These guidance notes were presented to the International Maritime Organisation by the governments of Denmark, Finland, Sweden and the United Kingdom at the 40 session of the IMO sub-Committee on stability and Load Lines and Fishing vessels safety of 5 July 1996.

Article 7

Article 7 specifies that new ships will comply with the specific stability requirements as from 1 October 2004, while it introduces a phasing-in period for the compliance of existing ships. Such period has been considered necessary in view of the structural modifications the existing ships will have to undertake, in addition to the modifications which they will have to undertake on the basis of the SOLAS 90 requirements. A final deadline for compliance has been set on 1 October 2010. This timetable takes into account that the large majority of ro-ro passenger ships will have to comply with SOLAS stability standards by 1 October 2005 and that the final date of compliance under SOLAS is also 1 October 2010.

Article 8

Article 8 refers to the compliance certificate to be issued to all vessels falling under the scope of this Directive by the flag State Administration. Certificates of compliance issued by a Member State will be accepted by all Member states. Each Member State acting on its capacity as host state shall accept the operational certificate issued by a non Member State certifying that a ship complies with the specific stability requirements established in this Directive

Article 9

The provisions of that article authorise the specific treatment of ro-ro passenger ships operating only on seasonal basis in an area where the significant wave height during such season is of a lower value than that for a year round operation in the same area. In such case, the specific stability requirements introduced by this Directive will be based on the seasonal values of the significant wave heights to be defined by Member States. Such seasonal operation may offer certain flexibility to operators wishing to introduce additional ships on a high season, offering additional possibilities to the travelling public, without lowering at all the safety standard provided.

Article 10 and 11

Article 10 makes reference to the possible adaptation of the Annexes to the Directive, in the light of the technical progress, the experience gained or of regulatory developments in the international (IMO) level. As established in Article 11, in such case the Commission will be assisted by the Committee established pursuant to Article 12(1) of Directive 93/75/EC ([1]).

Article 12

Following this article, Member Sates shall lay down a system of dissuasive measures, penalties for breaching the national provisions adopted pursuant to this Directive. In view of the complex technical nature of the standards introduced, particular vigilance is requested by the Member States in their implementation.

Article 13

This article sets up a deadline for the transposition of this Directive in the national legislation of Member States, which is 1 January 2004.

Article 14

No comments.

Article 15

No comments.

([1]) Council Directive 93/75/EEC of 13 September 1993 concerning minimum requirements for vessels bound for or leaving Community ports and carrying dangerous or polluting goods.

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 80(2) thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the Economic and Social Committee,

Having regard to the opinion of the Committee of the Regions,

Acting in accordance with the procedure laid down in Article 251 of the Treaty,

Whereas:

(1) Within the framework of the common transport policy further measures must be taken to improve safety in maritime transport of passengers.

(2) The Community wishes to avoid by all appropriate means shipping accidents involving ro-ro passenger ships and resulting in loss of life.

(3) The survivability of ro-ro ships following collision damage, as determined by their damage stability standard, is an essential factor for the safety of passengers and crew and is particularly relevant for search and rescue operations; the most dangerous problem for the stability of a ro-ro ship with an enclosed ro-ro deck, following collision damage, is the one posed by the effect of a build up of significant amount of water on that deck.

(4) Persons using ro-ro passenger ships and crew employed on board such vessels throughout the Community, have the right to demand the same high level of safety regardless of the area in which ships operate.

(5) In view of the internal market dimension of maritime transport of passengers, action at Community level is the most effective way of establishing a common minimum level of safety for ships throughout the Community.

(6) Action at Community level is the best way to ensure the harmonised enforcement of principles agreed on within the International Maritime Organisation (IMO), thus avoiding distortions of competition between the operators of ro-ro passenger ships operating in the Community.

(7) General stability requirements for ro-ro passenger vessels in damaged conditions were established at international level by the 1990 SOLAS Conference and were included in the chapter II-1, Part B8 of the SOLAS Convention (SOLAS 90 standard). These requirements are applicable in the entire Community owing to the direct application to international voyages of the SOLAS Convention and the application to domestic voyages of Council Directive 1998/18/EC of 17 March 1998 on safety rules and standards for passenger ships ([1]).

(8) The damage stability standard of SOLAS 90 implicitly include the effect of water entering the ro-ro deck in a sea state in order of 1,5 m significant wave height.

(9) IMO Resolution 14 of the 1995 SOLAS Conference, allowed IMO members to conclude regional agreements if they consider that prevailing sea conditions and other local conditions require specific stability requirements in a designated area.

(10) Eight northern European countries, including seven Community Member States, agreed in Stockholm on 28 February 1996 to introduce a higher stability standard for ro-ro passenger vessels in damaged condition in order to take into account the effect of water accumulation on the ro-ro deck and to enable the ship to survive in more severe states than the SOLAS 90 standard, up to 4 m significant wave heights.

(11) Under this agreement, known as the Stockholm Agreement, the specific stability standard is directly related to the sea area in which the vessel operates and more particularly to the significant wave height recorded in the area of operation; the significant wave height of the area where the ship operates determines the height of water on the car deck that would arise following the occurrence of an accidental damage.

(12) At the conclusion of the Conference at which the Stockholm Agreement was adopted, the Commission noted that the Agreement was not applicable in other parts of the Community and announced its intention to examine the prevailing local conditions under which ro-ro passenger ships sail in all European waters and to take appropriate initiatives.

(13) The Council entered a statement in the minutes of the 2074th Council meeting of 17 March 1998 stressing the need to ensure the same level of safety for all passenger ferries operating in similar conditions, whether on international or on domestic voyages.

(14) In the aftermath of the 'Express Samina' accident, the European Parliament adopted on 5 October 2000, its resolution B5-0783, 0787 and 0791/2000 where it expressly stated that it awaited the evaluation by the Commission of the effectiveness of the Stockholm Agreement and other measures for improving the stability and safety of passenger ships.

(15) Following an expert study by the Commission, the wave height conditions in South European waters were found similar to those in the north; while general meteorological conditions may be generally more favourable in the south, the stability standard determined in the context of the Stockholm Agreement is based solely on the significant wave height parameter and the way this influences the accumulation of water on the ro-ro deck.

(16) The application of Community safety standards regarding the stability requirements for ro-ro passenger ships is essential for the safety of these vessels and has to be part of the common maritime safety framework.

(17) In the interest of improving safety and avoiding distortion of competition, the common safety standards regarding stability should apply to all ro-ro passenger ships, regardless of the flag that they fly, providing regular services to or from a port in the Member States on international voyages.

(18) The safety of ships is primarily the responsibility of flag States and therefore each Member State should ensure compliance with the safety requirements applicable to the ro-ro passenger ships flying the flag of that Member State.

(19) Member States should also be addressed in their capacity as host States; the responsibilities exercised in that capacity are based on specific port State responsibilities that are fully in line with the 1982 United Nations Convention on the Law of the Sea (UNCLOS).

(20) The specific stability requirements introduced by this Directive should be based on a method which calculates the height of water on the ro-ro deck following a collision damage in relation to two basic parameters: the ship's residual free board and the significant wave height in the sea area where the ship operates.

([1]) OJ L 144, 15.5.1998, p. 1.

(21) Member States should determine and publicise the significant wave heights in the sea areas under their jurisdiction; for international routes the significant wave heights should be established in agreement between the States at both ends of the route. Significant wave heights for seasonal operation in the same sea areas may also be determined.

(22) Every ro-ro passenger vessel engaged in voyages within the scope of this Directive, should fulfil the stability requirements in relation of the significant wave heights determined for its area of operation; it should carry a certificate of compliance issued by the flag Member State, which should be accepted by all other Member States.

(23) The SOLAS 90 stability standards provides equivalent level of safety to the specific stability requirements established by this Directive for ships operating in sea areas where the significant wave height is equal or less than 1,5 m.

(24) In view of the structural modifications that the existing ships may need to undergo in order to comply with the specific stability requirements, those requirements should be introduced over a period of years in order to allow sufficient time to the affected part of the industry to comply: to that end, a phasing-in timetable for existing ships should be provided.

(25) Since the measures necessary for the implementation of this Directive are measures of general scope within the meaning of Article 2 of Council Decision 1999/468/EC of 28 June 1999 laying down the procedures for the exercise of implementing powers conferred on the Commission [1], they should be adopted by use of the regulatory procedure provided for in Article 5 of that Decision.

(26) Since the objectives of the proposed action, namely to safeguard human life at sea by improving the survivability of ro-ro vessels in the event of damage, cannot be sufficiently achieved by the Member States and can therefore, by reason of the scale and effects of the action, be better achieved at Community level, the Community may adopt measures, in accordance with the principle of subsidiarity as set out in Article 5 of the Treaty. In accordance with the principle of proportionality, as set out in that Article, this Directive does not go beyond what is necessary in order to achieve those objectives,

HAVE ADOPTED THIS DIRECTIVE:

Article 1

Purpose

The purpose of this Directive is to lay down a uniform level of specific stability requirements for ro-ro passenger ships, which will improve the survivability of this type of vessels in case of collision damage and provide a higher level of safety for the passengers and the crew.

Article 2

Definitions

For the purpose of this Directive, the following definitions shall apply:

(a) 'ro-ro passenger ship' means a seagoing passenger vessel with facilities to enable road or rail vehicles to roll on and roll off the vessel, and carrying more than 12 passengers;

(b) 'new ship' means a ship the keel of which is laid or which is at a similar stage of construction on or after 1 October 2004: a similar stage of construction means the stage at which:

(i) construction identifiable with a specific ship begins; and

(ii) assembly of that ship has commenced comprising at least 50 tonnes or 1 % of the estimated mass of structural material, whichever is less;

(c) 'an existing ship' means a ship which is not a new ship;

(d) 'a passenger' is every person other than the master and the members of the crew or other persons employed or engaged in any capacity on board a ship on the business of that ship;

(e) 'International Conventions' means the 1974 International Convention for the Safety of Life at Sea (the 1974 SOLAS Convention), and the 1966 International Convention on Load Lines, together with Protocols and amendments thereto in force on the date of adoption of this Directive;

(f) 'regular service' means a series of ro-ro passenger ship crossings serving traffic between the same two or more ports, which is operated either:

(i) according to a published timetable; or

(ii) with crossings so regular or frequent that they constitute a recognisable systematic series;

(g) 'Stockholm Agreement' means the Agreement concluded at Stockholm on 27 and 28 February 1996 in pursuance of SOLAS 95 Conference Resolution 14 'Regional Agreements on Specific Stability Requirements for ro-ro Passenger Ships', adopted on 29 November 1995;

(h) 'administration of flag State' means the competent authorities of the State whose flag the ro-ro passenger ship is entitled to fly;

(i) 'host State' means a Member State to or from whose ports a ro-ro passenger ship is engaged on a regular service;

[1] OJ L 184, 17.7.1999, p. 23.

(j) 'international voyage' means a sea voyage from a port of a Member State to a port outside that Member State, or vice versa;

(k) 'specific stability requirements' means the stability requirements set out in Annex I;

(l) 'significant wave height' or ('hs') is the average height of the one third highest observed wave heights over a given period;

(m) 'residual freeboard' is the minimum distance between the damaged ro-ro deck and the waterline at the location of the damage, without taking into account the additional effect of the sea water accumulated on the damaged ro-ro deck.

Article 3

Scope

1. This Directive shall apply to all ro-ro passenger ships operating to or from a port of a Member State on a regular service, regardless of their flag, when engaged on international voyages.

2. Each Member State, in its capacity as host State, shall ensure that ro-ro passenger ships, flying the flag of a State which is not a Member State, comply fully with the requirements of this Directive before they may be engaged on voyages from or to ports of that Member State in accordance with the provisions of article 4 of Directive 1999/35/EC.

Article 4

Significant wave heights

The significant wave heights (hs) shall be used for determining the height of water on the car deck when applying the specific stability standard contained in Annex 1. The figures of significant wave heights shall be those which are not exceeded by a probability of more than 10 % on a yearly basis.

Article 5

Sea Areas

1. Member States shall establish, not later than six months before the date mentioned in Article 13, a list of sea areas under their jurisdiction and the corresponding values of significant wave heights.

2. The sea areas and the applicable values of the significant wave height in these areas shall be defined by agreement between the Member States or between Member States and third countries at both ends of the route. Where the ship's route crosses more than one sea area, the ship shall satisfy the specific stability requirements for the highest value of significant wave height identified for these areas.

3. The list shall be notified to the Commission and published in a public database available in the internet site of the competent maritime authority. The location of such information as well as any updates to the list and the reasons for such updates shall also be notified to the Commission.

Article 6

Specific stability requirements

1. Without prejudice to the requirements of regulation II-1/8 of the Safety of Life at Sea (SOLAS) Convention relating to watertight subdivision and stability in damaged condition, all ro-ro passenger ships referred to in Article 3(1) shall comply with the specific stability requirements set out in Annex I to this Directive.

2. For ro-ro passenger ships operating in sea areas where the significant wave height is equal to or lower than 1,5 metres, compliance with the requirements of regulation II-1/8 the Safety of Life at Sea (SOLAS) Convention shall be considered equivalent to compliance with the specific stability requirements set out in Annex I.

3. In applying the requirements set out in Annex I, Member States shall use the guidelines set out in Annex II, in so far this is practicable and compatible with the design of the ship in question.

Article 7

Introduction of the specific stability requirements

1. New ro-ro passenger ships shall comply with the specific stability requirements as set out in Annex I.

2. Existing ro-ro passenger ships shall comply with the specific stability requirements as set out in Annex I by not later than 1 October 2010.

Article 8

Certificates

1. All new and existing ro-ro passenger ships flying the flag of a Member State shall carry a certificate confirming compliance with the specific stability requirements established in Article 6 and Annex I.

This certificate shall be issued by the Administration of the flag State and will indicate the significant wave height up to which the ship can satisfy the specific stability requirements as well as the area for which the certificate has been originally issued.

The certificate shall remain valid as long as the vessel operates in the same area or in another area within which the same value of significant wave height has been registered.

2. Each Member State acting in its capacity as host State shall recognise the certificate issued by another Member State in pursuance of this Directive.

3. Each Member State acting in its capacity as host State shall accept the certificate issued by a non member country certifying that a ship complies with the specific stability requirements established.

Article 9

Seasonal operation

1. If a shipping company operating a regular scheduled service on a year round basis wishes to introduce additional ro-ro passenger ships to operate for a shorter season on that service, it shall notify the competent authority of the host state or states not later than three months before the said additional ships are operated on that service.

Where such seasonal operation takes place under conditions of lower significant wave height than those established for the same sea area for a year round operation, the seasonal significant wave height value may be used by the competent authority for determining the height of water when applying the specific stability standard contained in Annex I. The seasonal value of the significant wave height to apply shall be agreed between the Member States or between Member States and third countries at both ends of the route.

2. Following agreement of the competent authority of the host State or States for a seasonal operation within the meaning of paragraph 1, the ro-ro passenger ship which undertakes such seasonal operations shall have to carry a certificate of compliance with the provisions of this Directive, as provided for in Article 8(1).

Article 10

Adaptations

In order to take account of developments at international level and, in particular, in the International Maritime Organisation (IMO) or to improve the effectiveness of this Directive in the light of experience and of e technical progress, the Annexes may be amended in accordance with the procedure laid down in Article 11(2).

Article 11

Committee

1. The Commission shall be assisted by the Committee set up pursuant to Article 12(1) of Directive 93/75/EEC [1] composed of representatives of the Member States and chaired by the representative of the Commission.

2. Where reference is made to this paragraph, the regulatory procedure laid down in Article 5 of Decision 1999/468/EC shall apply, in compliance with Article 7(3) and Article 8 thereof.

3. The period provided for in Article 5(6) of Decision 1999/468/EC shall be of eight weeks.

Article 12

Penalties

Member States shall lay down the rules on penalties applicable to infringements of the national provisions adopted pursuant to this Directive and shall take all the measures necessary to ensure that they are implemented. The penalties provided for shall be effective, proportionate and dissuasive.

Article 13

Implementation

Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 1 January 2004 at the latest. They shall forthwith inform the Commission thereof.

When Member States adopt those provisions, they shall contain a reference to this Directive or be accompanied by such a reference on the occasion of their official publication. Member States shall determine how such reference is to be made.

Article 14

Entry into force

This Directive shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Communities*.

Article 15

Addressees

This Directive is addressed to the Member States.

[1] OJ L 247, 5.10.1993, p. 19.

ANNEX I

SPECIFIC STABILITY REQUIREMENTS FOR RO-RO PASSENGER SHIPS

(As referred to in Article 6)

1. In addition to the requirements of regulation II-1/8 of the Safety at Sea (SOLAS) Convention relating to watertight subdivision and stability in damaged condition, all ro-ro passenger ships referred to in Article 3 (1) shall comply with the requirements of this Annex.

1.1. The provisions of regulation II-1/8.2.3 shall be complied with when taking into account the effect of a hypothetical amount of sea water which is assumed to have accumulated on the first deck above the design waterline of the ro-ro cargo space or the special cargo space as defined in regulation II-2/3 assumed to be damaged (referred to as 'the damaged ro-ro deck' hereinafter). The other requirements of regulation II-1/B/8 need not be complied with in the application of the stability standard contained in this Annex. The amount of assumed accumulated sea water shall be calculated on the basis of a water surface having a fixed height above:

(a) the lowest point of the deck edge of the damaged compartment of the ro-ro deck, or

(b) when the deck edge of the damaged compartment is submerged then the calculation is based on a fixed height above the still water surface at all heel and trim angles;

as follows:

— 0,5 m if the residual freeboard (f_r) is 0,3 m or less;

— 0,0 m if the residual freeboard (f_r) is 2,0 m or more; and

— intermediate values to be determined by linear interpolation, if the residual freeboard (f_r) is 0,3 m or more but less than 2,0 m;

where the residual freeboard (f_r) is the minimum distance between the damaged ro-ro deck and the final waterline at the location of the damage in the damage case being considered without taking into account the effect of the volume of assumed accumulated water on the damaged ro-ro deck;

1.2. when a high-efficiency drainage system is installed, the Administration of the flag State may allow a reduction in the height of the water surface.

1.3. For ships in geographically defined restricted areas of operation, the Administration of the flag State may reduce the height of the water surface prescribed in accordance with paragraph 1.1 by substituting such height of the water surface by the following:

1.3.1. 0,0 m if the significant wave height (h_s) defining the area concerned is 1,5 m or less;

1.3.2. the value determined in accordance with 1.1 if the significant wave height (h_s) defining the area concerned is 4,0 m or above;

1.3.3. intermediate values to be determined by linear interpolation if the significant wave height (h_s) defining the area concerned is 1,5 m or more but less than 4,0 m;

provided that the following conditions are fulfilled:

1.3.4. the flag State Administration is satisfied that the defined area is represented by the significant wave height (h_s) which is not exceeded with a probability of more than 10 %; and

1.3.5. the area of operation and, if applicable, the part of the year for which a certain value of the significant wave height (h_s) has been established are entered into the certificates.

1.4. as an alternative to the requirements of subparagraphs 1.1 or 1.3, the flag State Administration may exempt application of the requirements of subparagraphs 1.1 or 1.3 and accept proof, established by model tests carried out for an individual ship in accordance with the model test method, which appears in Appendix, justifying that the ship will not capsize with the assumed extent of damage as provided in SOLAS regulation II-1/8.4 in the worst location being considered under 1.1, in an irregular seaway, and

1.5. reference to acceptance of the results of the model test as an equivalence to compliance with paragraphs 1.1 or 1.3 and the value of the significant wave height (h_s) used in the model tests shall be entered into the ship's certificates.

1.6. the information supplied to the master in accordance with SOLAS regulations II-1/8.7.1 and II-1/8.7.2, as developed for compliance with regulations II-1/8.2.3 to II-1/8.2.3.4, shall apply unchanged for ro-ro passenger ships approved according to these requirements.

2. For assessing the effect of the volume of the assumed accumulated sea water on the damaged ro-ro deck in paragraph 1, the following provisions shall prevail:

2.1. a transverse or longitudinal bulkhead shall be considered intact if all parts of it lie inboard of vertical surfaces on both sides of the ship, which are situated at a distance from the shell plating equal to one-fifth of the breadth of the ship, as defined in regulation II-1/2, and measured at right angles to the centreline at the level of the deepest subdivision load line.

2.2. in cases where the ship's hull is structurally partly widened for compliance with the provisions of this Annex, the resulting increase of the value of one-fifth of the breadth of it is to be used throughout, but shall not govern the location of existing bulkhead penetrations, piping systems, etc., which were acceptable prior to the widening.

2.3. the tightness of transverse or longitudinal bulkheads which are taken into account as effective to confine the assumed accumulated sea water in the compartment concerned in the damaged ro-ro deck shall be commensurate with the drainage system, and shall withstand hydrostatic pressure in accordance with the results of the damage calculation. Such bulkheads shall be at least 2,2 m in height. However, in case of a ship with hanging car decks, the minimum height of the bulkhead shall be not less than the height to the underside of the hanging deck when in its lowered position.

2.4. for special arrangements such as, e.g., full width hanging decks and wide side casings, other bulkhead heights may be accepted based on detailed model tests.

2.5. the effect of the volume of the assumed accumulated sea water need not be taken into account for any compartment of the damaged ro-ro deck, provided that such a compartment has on each side of the deck freeing ports evenly distributed along the sides of the compartment complying with the following:

2.5.1. $A \geq 0{,}3\ l$

where A is the total area of freeing ports on each side of the deck in m^2; and l is the length of the compartment in m;

2.5.2. the ship shall maintain a residual freeboard of at least 1,0 m in the worst damage condition without taking into account the effect of the assumed volume of water on the damaged ro-ro deck; and

2.5.3. such freeing ports shall be located within the height of 0,6 m above the damaged ro-ro deck, and the lower edge of the ports shall be within 2 cm above the damaged ro-ro deck; and

2.5.4. such freeing ports shall be fitted with closing devices or flaps to prevent water entering the ro-ro deck whilst allowing water which may accumulate on the ro-ro deck to drain.

2.6. when a bulkhead above the ro-ro deck is assumed damaged, both compartments bordering the bulkhead shall be assumed flooded to the same height of water surface as calculated in paragraphs 1.1 or 1.3 above.

3. When determining significant wave height, the wave heights given on the maps or list of sea areas established by Member States in line with Article 5 of this Directive shall be used.

3.1. For ships which are to be operated only for a shorter season, the host State Administration shall determine in agreement with the other country whose port is included in the ships route, the significant wave height to be used.

4. Model tests shall be conducted in accordance with Appendix 1.

Appendix

Model test method

1. *Objectives*

In the tests provided for in paragraph 1.4 of the stability requirements included in Annex I, the ship should be capable of withstanding a seaway as defined in paragraph 3 hereunder in the worst damage case scenario.

2. *Ship model*

2.1. The model should copy the actual ship for both outer configuration and internal arrangement, in particular all damaged spaces having an effect on the process of flooding and shipping of water. The damage should represent the worst damage case defined for compliance with regulation II-1/8.2.3.2 of the Safety at Sea Convention (SOLAS 90). An additional test is required at a level keel midship damage, if the worst damage location according to SOLAS 90 is outside the range ± 10 % Lpp from the midship. This additional test is only required when the ro-ro spaces are assumed to be damaged.

2.2. The model should comply with the following:

2.2.1. Length between perpendiculars (Lpp) is to be at least 3 m.

2.2.2. The hull is to be thin enough in areas where this feature has influence on the results.

2.2.3. The characteristics of motion should be modelled properly to the actual ship, paying particular attention to scaling of radii of gyration in roll and pitch motions. Draught, trim, heel and centre of gravity should represent the worst damage case.

2.2.4. Main design features such as watertight bulkheads, air escapes, etc., above and below the bulkhead deck that can result in asymmetric flooding should be modelled properly as far as practicable to represent the real situation.

2.2.5. The shape of the damage opening shall be as follows:

2.2.5.1. rectangular side profile with a width according to regulation II-1/8.4.1 of the Safety at Sea Convention and unlimited vertical extent;

2.2.5.2. isosceles triangular profile in the horizontal plane with a height equal to B/5 according to regulation II-1/8.4.2 of the Safety at Sea Convention.

3. *Procedure for experiments*

3.1. The model should be subjected to a long-crested irregular seaway defined by the JONSWAP spectrum with a significant wave height h_s defined in 1.3 of the stability requirements and having peak enhancement factor and peak period T_p as follows:

3.1.1. $T_p = 4\sqrt{H_s}$ with $\gamma = 3{,}3$; and

3.1.2. T_p equal to the roll resonant period for the damaged ship without water on deck at the specified loading condition but not higher than $6\sqrt{H_s}$ and with $\gamma = 1$.

3.2. The model should be free to drift and placed in beam seas (90° heading) with the damage hole facing the oncoming waves. The model should not be restrained in a manner to resist capsize. If the ship is upright in flooded condition, 1° of heel towards the damage should be given.

3.3. At least 5 experiments for each peak period should be carried out. The test period for each run shall be of such duration that a stationary state has been reached but should be run for not less than 30 min in full-scale time. A different wave realisation train should be used for each test.

3.4. If none of the experiments result in final inclination towards the damage, the experiments should be repeated with 5 runs at each of the two specified wave conditions or, alternatively, the model should be given an additional 1° angle of heel towards the damage and the experiment repeated with 2 runs at each of the two specified wave conditions. The purpose of these additional experiments is to demonstrate, in the best possible way, survival capability against capsize in both directions.

3.5. The tests are to be carried out for the following damage cases:

3.5.1. the worst damage case with regard to the area under the GZ curve according to the Safety at Sea Convention; and

3.5.2. the worst midship damage case with regard to the residual freeboard in the midship area if required by 2.1.

4. *Survival criteria*

The ship should be considered as surviving if a stationary state is reached for the successive test runs as required in 3.3, provided that angles of roll of more than 30° against the vertical axis, occurring more frequently than in 20 % of the rolling cycles or steady heel greater than 20° should be taken as capsizing events even if a stationary state is reached.

5. *Test approval*

5.1. Proposals for model test programmes should be submitted to the host State Administration to be approved in advance. It should also be borne in mind that lesser cases of damage may create a worst-case scenario.

5.2 The test should be documented by means of a report and a video or other visual record containing all relevant information on the ship and test results.

ANNEX II

INDICATIVE GUIDELINES TO NATIONAL ADMINISTRATIONS

(as referred to in Article 6.(3))

PART I

Application

In line with the provisions of Article 6(3), these guidelines shall be used by the national administrations of Member States in the application of the specific stability requirements set out in Annex I, in so far this is practicable and compatible with the design of the ship in question. The paragraph numbers appearing below correspond to those in Annex I.

Para 1

As a first step all ro-ro passenger ships referred to in Article 3(1) must comply with the 'SOLAS 90' standard of residual stability as it applies to all passenger ships constructed on or after 29 April 1990. It is the application of this requirement that defines the residual freeboard f_r, necessary for the calculations required in paragraph 1.1.

Para 1.1.

1. This paragraph addresses the application of a hypothetical amount of water accumulated on the bulkhead (ro-ro) deck. The water is assumed to have entered the deck via a damage opening. This paragraph requires that the vessel in addition to complying with the full requirements of the SOLAS '90 further complies with that part of the SOLAS '90 criteria contained in paragraphs 2.3 to 2.3.4 of regulation 8 of Chapter II-1 Part B of SOLAS with the defined amount of water on deck. For this calculation no other requirements of Chapter II-1 regulation 8 need be taken into account. For example the vessel does not, for this calculation, need to comply with the requirements for the angles of equilibrium or non-submergence of the margin line.

2. The accumulated water is added as a liquid load with one common surface inside all compartments which ate assumed flooded on the car deck. The height (h_w) of water on deck is dependent on the residual freeboard (f_r) after damage, and is measured in way of the damage (see fig 1). The residual freeboard, is the minimum distance between the damaged ro-ro deck and the final waterline (after equalisation measures if any have been taken) in way of the assumed damage after examining all possible damage scenarios in determining the compliance with SOLAS '90 as required in para 1 of Annex I. No account should be taken of the effect of the hypothetical volume of water assumed to have accumulated on the damaged ro-ro deck when calculating f_r.

3. If f_r is 2,0 m or more, no water is assumed to accumulate on the ro-ro deck. If f_r is 0,3 m or less, then height h_w is assumed to be 0,5 metres. Intermediate heights of water are obtained by linear interpolation (see fig 2).

Para 1.2.

Means for drainage of water can only be considered as effective if these means are of a capacity to prevent large amounts of water from accumulating on the deck ie many thousand of tonnes per hour which is far beyond the capacities fitted at the time of the adoption of these regulations. Such high efficiency drainage systems may be developed and approved in the future (based on guidelines to be developed by the International Maritime Organisation)

Para 1.3.

1. 1. The amount of assumed accumulated water-on — deck may, in addition to any reduction in accordance with paragraph 1.1, be reduced for operations in geographically defined restricted areas, These areas are designated in accordance with the significant wave height (h_s) defining the area in line with the provisions of Article 5.

2. If the significant wave height (h_s), in the area concerned, is 1,5 m or less then no additional water is assumed to accumulate on the damaged ro-ro deck. If the significant wave height in the area concerned is 4,0 m or more then the height of the assumed accumulated water shall be the value calculated in accordance with paragraph 1.1. Intermediate values to be determined by linear interpolation (see fig 3).

3. The height h_w is kept constant, therefore the amount of added water is variable as it is dependent upon the heeling angle and whether at any particular heeling angle the deck edge is immersed or not. (see fig 4). It should be noted that the assumed permeability of the car deck spaces is to be taken as 90 % (MSC/Circ.649 refers), whereas other assumed flooded spaces permeabilities are to be those prescribed in SOLAS.

4. If the calculations to demonstrate compliance with the Directive relate to a significant wave height less than 4,0 m that restricting significant wave height must be recorded on the vessel's passenger ship safety certificate.

Para 1.4./1.5.

As an alternative to complying with the new stability requirements in paragraphs 1.1 or 1.3 an Administration may accept proof of compliance via model tests. The model test requirements are detailed in the Appendix to Annex I. Guidance notes on the model tests are contained in part II of this Annex.

Para 1.6.

Conventionally derived SOLAS '90 limiting operational curve(s) (KG or GM) may not remain applicable in cases where 'water on deck' is assumed under the terms of the Directive and it may be necessary to determine revised limiting curve(s) which take into account the effects of this added water. To this effect sufficient calculations corresponding to an adequate number of operational draughts and trims must be carried out.

Note: Revised limiting operational KG/GM Curves may be derived by iteration, whereby the minimum excess GM resulting from damage stability calculations with water on deck is added to the input KG (or deducted from the GM) used to determine the damaged freeboards (f_r), upon which the quantities of water on deck are based, this process being repeated until the excess GM becomes negligible.

It is anticipated that operators would begin such an iteration with the maximum KG/minimum GM which could reasonably be sustained in service and would seek to manipulate the resulting deck bulkhead arrangement to minimise the excess GM derived from damage stability calculations with water on deck.

Para 2.1.

As for conventional SOLAS damage requirements bulkheads inboard of the B/5 line are considered intact in the event of side collision damage.

Para 2.2.

If side structural sponsons are fitted to enable compliance with this regulation, and as a consequence there is an increase in the breadth (B) of the ship and hence the vessel's B/5 distance from the ship's side, such modification shall not cause the relocation of any existing structural parts or any existing penetrations of the main transverse watertight bulkheads below the bulkhead deck (see fig 5).

Para 2.3.

1. Transverse or longitudinal bulkheads/barriers which are fitted and taken into account to confine the movement of assumed accumulated water on the damaged ro-ro deck need not be strictly 'watertight'. Small amounts of leakage may be permitted subject to the drainage provisions being capable of preventing an accumulation of water on the 'other side' of the bulkhead/barrier. In such cases where scuppers become inoperative as a result of a loss of positive difference of water levels other means of passive drainage must be provided.

2. The height (B_h) of transverse and longitudinal bulkheads/barriers shall be not less than ($8 \times H_w$) metres, where hw is the height of the accumulated water as calculated by application of the residual freeboard and significant wave height (paras 1.1. and 1.3 refers). However in no case is the height of the bulkhead/barrier to be less than the greatest of:

   (a) 2,2 metres; or

   (b) the height between the bulkhead deck and the lower point of the underside structure of the intermediate or hanging car decks, when these are in their lowered position. It should be noted that any gaps between the top edge of the bulkhead and the underside of the plating must be 'plated-in' in the transverse or longitudinal direction as appropriate (see fig 6).

   Bulkheads/barriers with a height less than that specified above, may be accepted if model tests are carried out in accordance with Part II of this Annex to confirm that the alternative design ensures appropriate standard of survivability. Care needs to be taken when fixing the height of the bulkhead/barrier such that the height shall also be sufficient to prevent progressive flooding within the required stability range. This range is not to be prejudiced by model tests.

   Note: The range may be reduced to 10 degrees provided the corresponding area under the curve is increased (MSC 64/22 refers)

Para 2.5.1.

The area 'A' relates to permanent openings. It should be noted that the 'freeing ports' option is not suitable for ships which require the buoyancy of the whole or part of the superstructure in order to meet the criteria. The requirement is that the freeing ports shall be fitted with closing flaps to prevent water entering, but allowing water to drain.

These flaps must not rely on active means. They must be self-operating and it must be shown that they do not restrict outflow to a significant degree. Any significant efficiency reduction must be compensated by the fitting of additional openings so that the required area is maintained.

Para 2.5.2.

For the freeing ports to be considered effective the minimum distance from the lower edge of the freeing port to the damaged waterline shall be at least 1,0 m. The calculation of the minimum distance shall not take into account the effect of any additional water on deck (see fig 7).

Para 2.5.3.

Freeing ports must be sited as low as possible in the side bulwark or shell plating. The lower edge of the freeing poet opening must be no higher than 2 cm above the bulkhead deck and the upper edge of the opening no higher than 0,6 m (see fig 8).

Note: Spaces to which paragraph 2.5 applies, ie those spaces fitted with freeing ports or similar openings, shall not be included as intact spaces in the derivation of the intact and damage stability curves.

Para 2.6.

1. The statutory extent of damage is to be applied along the length of the ship. Depending on the subdivision standard the damage may not affect any bulkhead or may only affect a bulkhead below the bulkhead deck or only bulkhead above the bulkhead deck or various combinations.

2. All transverse and longitudinal bulkheads/barriers which constrain the assumed accumulated amount of water must be in place and secured at all times when the ship is at sea.

3. In those cases where the transverse bulkhead/barrier is damaged the accumulated water-on-deck shall have a common surface level on both sides of the damaged bulkhead/barrier at the height h_w (see fig 9).

PART II

Model testing

The purpose of these guidelines is to ensure uniformity in the methods employed in the construction and verification of the model as well as in the undertaking and analyses of the model tests, while appreciating that available facilities and costs will affect in some way this uniformity.

The content of paragraph 1 of the Appendix to Annex I is self explanatory.

Paragraph 2 — Ship model

2.1. The material of which the model is made is not important in itself, provided that the model both in the intact and damaged condition is sufficiently rigid to ensure that its hydrostatic properties are the same as those of the actual ship and also that the flexural response of the hull in waves is negligible.

It is also important to ensure that the damaged compartments are modelled as accurately as practicably possible to ensure that the correct volume of flood water is represented.

Since ingress of water (even small amounts) into the intact parts of the model will affect its behaviour, measures must be taken that this ingress does not occur.

2.2. Model particulars

2.2.1. In recognising that scale effects play an important role in the behaviour of the model during tests, it is important to ensure that these effects are minimised as much as practically possible. The model should be as large as possible since details of damaged compartments are easier constructed in larger models and the scale effects are reduced. It is therefore recommended that the model length is not less than that corresponding to 1:40 scale. However it is required that the model is not less than 3 meters long at the subdivision load line.

2.2.2. (a) The model in way of the assumed damages must be as thin as practically possible to ensure that the amount of flood water and its centre of gravity is adequately represented. It is recognised that it may not be possible for the model hull and the elements of primary and secondary subdivision in way of the damage to be constructed with sufficient detail and due to these constructional limitations it may not be possible to calculate accurately the assumed permeability of the space.

(b) It has been found during tests that the vertical extent of the model can affect the results when tested dynamically. It is therefore required that the ship is modelled to at least three super structure standard heights above the bulkhead (freeboard) deck so that the large waves of the wave train do not break over the model.

(c) It is important that not only the draughts in the intact condition are verified, but also that the draughts of the damaged model are accurately measured for correlation with those derived from the damaged stability calculation. After measuring the damaged draughts it may be found necessary to make adjustments to the permeability of the damaged compartment by either introducing intact volumes or by adding weights. However it is also important to ensure that the centre of gravity of the flood water is accurately represented. In this case any adjustments made must err on the side of safety.

(d) If the model is required to be fitted with barriers on deck and the barriers are less than the height required as per paragraph 2.3 of Annex 1 of this Directive the model is to be fitted with CCTV so that any 'splashing over' and any accumulation of water on the undamaged area of the deck can be monitored. In this case a video recording of the event is to form part of the tests records.

2.2.3. In order to ensure that the model motion characteristics represent those of the actual ship it is important that the model is both inclined and rolled in the intact condition so that the intact GM and the mass distribution are verified.

The transverse radius of gyration of the actual ship is not to be taken as being greater than 0,4 B and the longitudinal radius of gyration is not to be taken as being more than 0,25 L.

The transverse rolling period of the model is to be obtained by:

$$\frac{2\pi \times 0{,}4\ B}{\sqrt{gGM\lambda}}$$

Where

GM: metacentric height of the actual (intact) ship

g: acceleration due to gravity

λ: scale of model

B: breadth of actual ship

Note

While inclining and rolling the model in the damage condition may be accepted as a check for the purpose of verifying the residual stability curve such tests are not to be accepted in lieu of the intact tests.

Nevertheless the damaged model must be rolled in order to obtain the rolling period required to perform the tests as per paragraph 3.1.2.

2.2.4. The contents of this paragraph are self explanatory. It is assumed that the ventilators of the damage compartment of the actual ship are adequate for unhindered flooding and movement of the flood water. However in trying to scale down the ventilating arrangements of the actual ship undesirable scale effects may be introduced. In order to ensure that these do not occur it is recommended to construct the ventilating arrangements to a larger scale than that of the model, ensuring that this does not affect the flow of water on the car deck.

2.2.5.2. The isosceles triangular profile of the prismatic damage shape is that corresponding to the load waterline.

Additionally in cases where side casings of width less than B/5 are fitted and in order to avoid any possible scale effects, the damage length in way of the side casings must not be less than (2) metres.

Paragraph 3 — Procedure for experiments

3.1. — Wave Spectra

The JONSWAP spectrum it to be used as this describes fetch and duration limited seas which correspond to the majority of the conditions world-wide. In this respect it is important that not only the peak period of the wave train is verified but also that the zero crossing period is correct.

3.1.1. Corresponding to a peak period of $4\sqrt{h_s}$ and given that the enhancement factor γ is 3.3, the zero crossing period is not to be greater than:

$\{T_p/(1{,}20 \text{ to } 1{,}28)\} \pm 5\ \%$;

3.1.2. The zero crossing period corresponding to a peak period equal to the rolling period of the damaged model and given that the factor γ is to be 1, is not to be greater than:

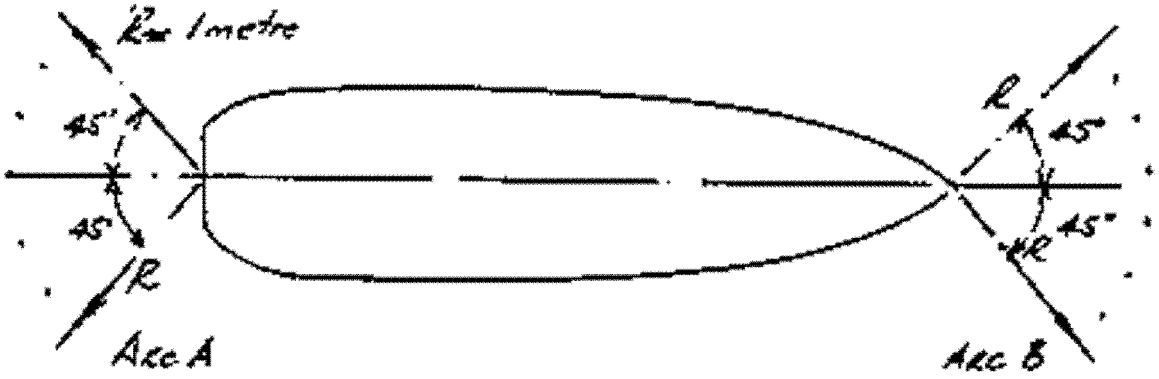
$\{T_p/(1{,}3 \text{ to } 1{,}4)\} \pm 5\ \%$.

noting that if the rolling period of the damaged model is greater than $6\sqrt{h_s}$, the peak period is to be limited to $6\sqrt{h_s}$.

Note

It has been found that it is not practical to set limits for zero crossing periods of the model wave spectra according to the nominal values of the mathematical formulae. Therefore an error margin of 5 % is allowed.

It is required that for every test run the wave spectrum is recorded and documented. Measurements for this recording are to be taken in the immediate vicinity of the model (but not on the leeside) — see figure a below — and also near the wave-making machine. It is also required that the model is instrumented so that its motions (roll, heave and pitch) as well as its attitude (heel, sinkage and trim) are monitored and recorded though out the test.



The 'near the model' wave measuring probe to be positioned either on arc A or arc B (Figure (a)).

3.2., 3.3., 3.4.

The contents of these paragraphs are considered self explanatory.

3.5. — Simulated damages

Extensive research carried out for the purpose of developing appropriate criteria for new vessels has clearly shown that in addition to the GM and freeboard being important parameters in the survivability of passenger ships, the area under the residual stability curve up to the angle of maximum GZ is also an other major factor. Consequently in choosing the worst SOLAS damage for compliance with the requirement of paragraph 3.5.1 the worst damage is to be taken as that which gives the least area under the residual stability curve up to the angle of the maximum GZ.

Paragraph 4 — Survival criteria

The contents of this paragraph are considered self explanatory.

Paragraph 5 — Test approval

The following documents are to be part of the report to the Administration:

(a) damage stability calculations for worst SOLAS and mid-ship damage (if different);

(b) general arrangement drawing of the model together with details of construction and instrumentation;

(c) inclining experiment and rolling test reports;

(d) calculations of actual ship and model rolling periods; and

(e) nominal and measured wave spectra (near the wave-making machine and near the model respectively)

(f) representative record of model motions, attitude and drift

(g) relevant video recordings.

Note

All tests must be witnessed by the Administration.

Figures referred to in Annex 2

(Indicative Guidelines to National Administrations)

Figure 1

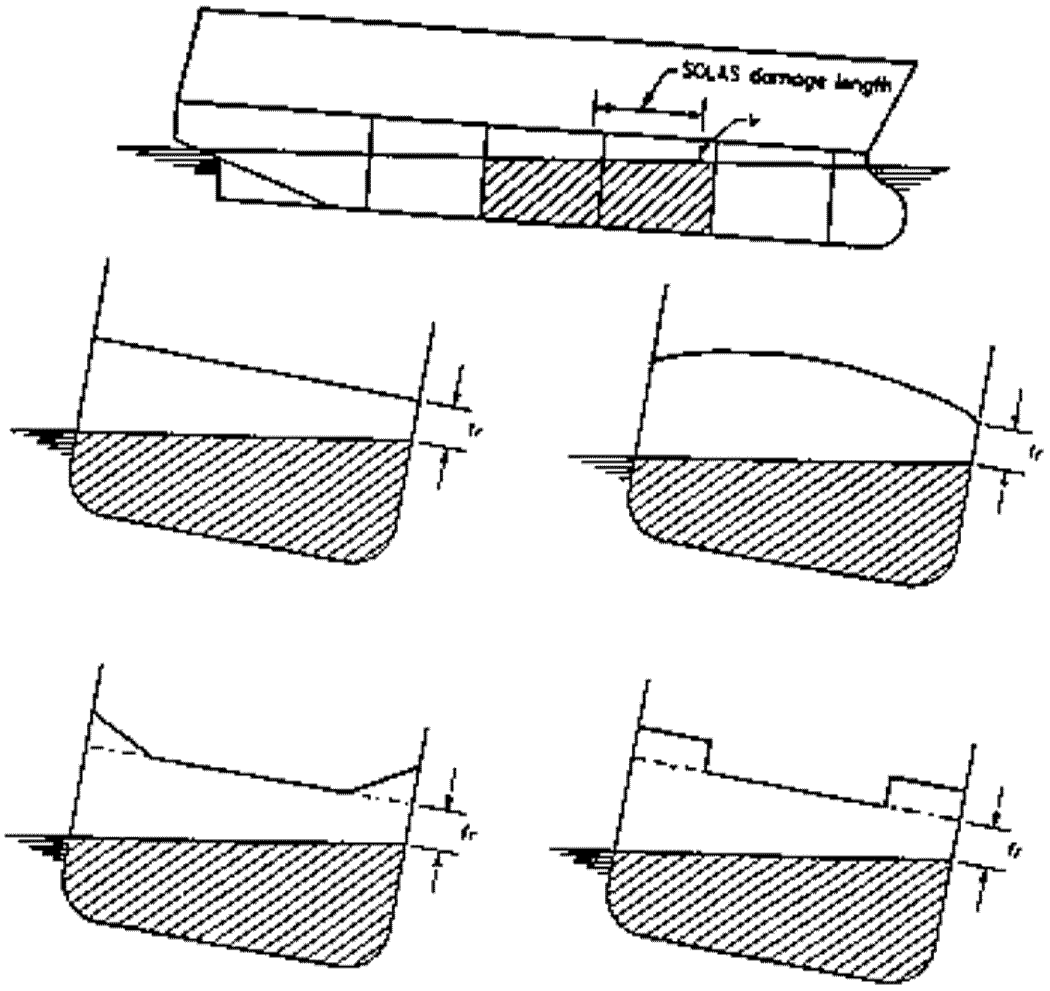
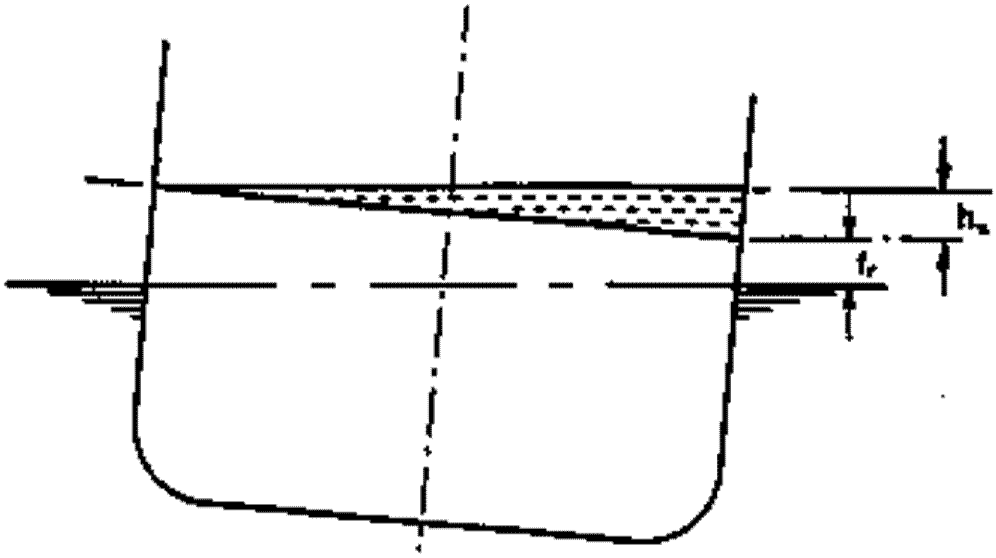


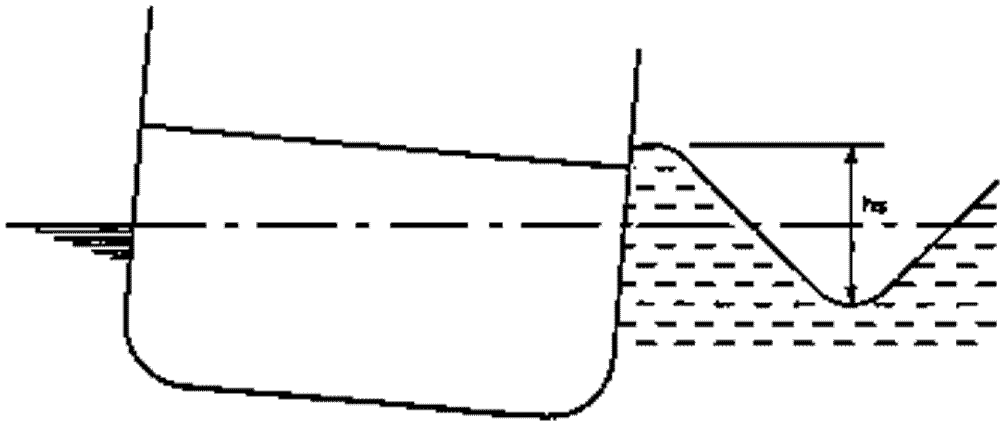
Figure 2



1. If $f_r \geq 2{,}0$ metres, height of water on deck (h_w) = 0,0 metres

2. If $f_r \leq 0{,}3$ metres, height of water on deck (h_w) = 0,5 metres

Figure 3



1. If $h_s \geq 4{,}0$ metres, height of water on deck is calculated as per fig 3

2. If $h_s \leq 1{,}5$ metres, height of water on deck (h_w) = 0,0 metres

For example

If f_r = 1,15 metres and h_s = 2,75 metres, Height h_w = 0,125 metres

Figure 4

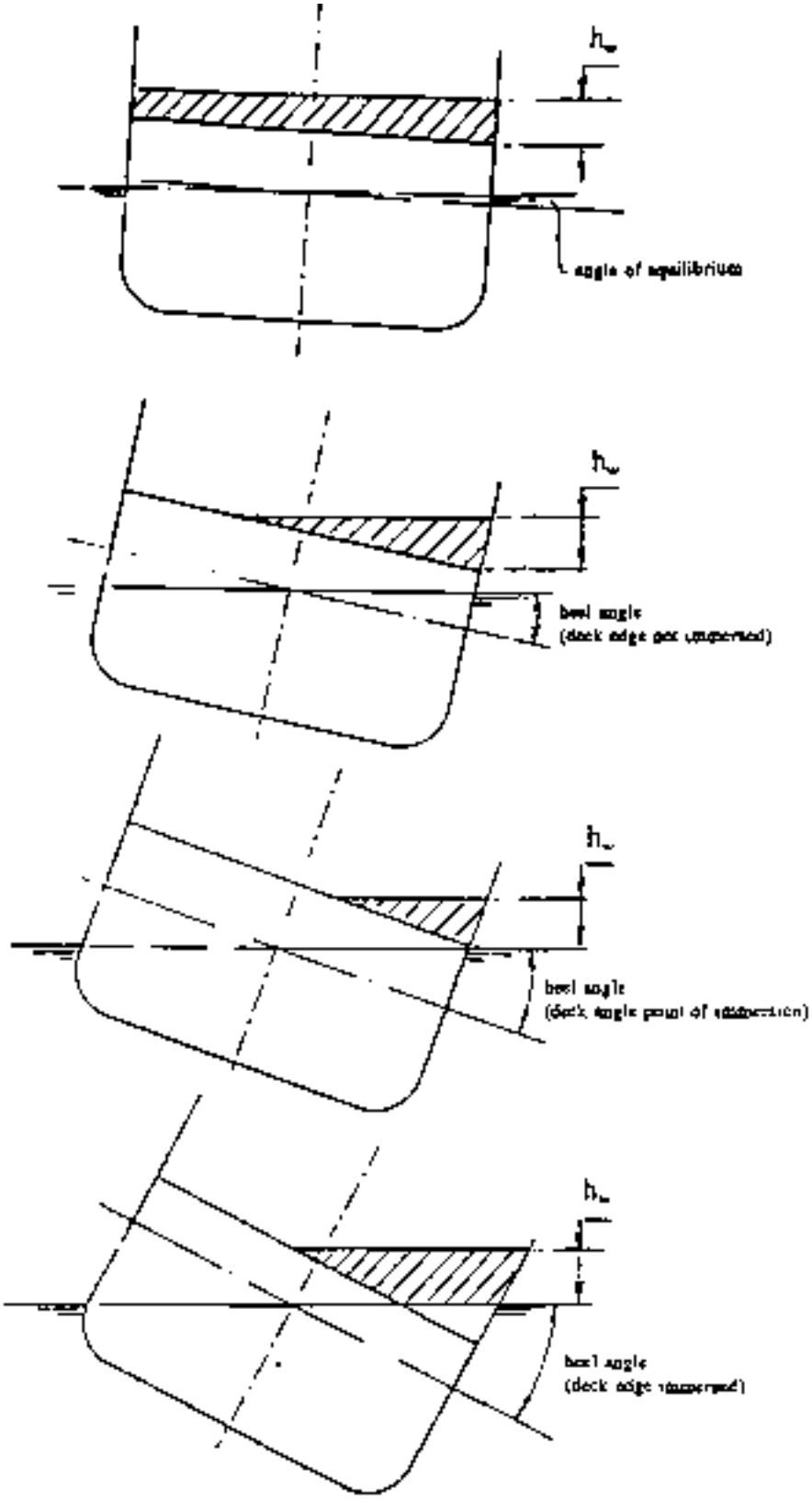

angle of equilibrium
heel angle
(deck edge not immersed)
heel angle
(deck edge point of immersion)
heel angle
(deck edge immersed)

Figure 5

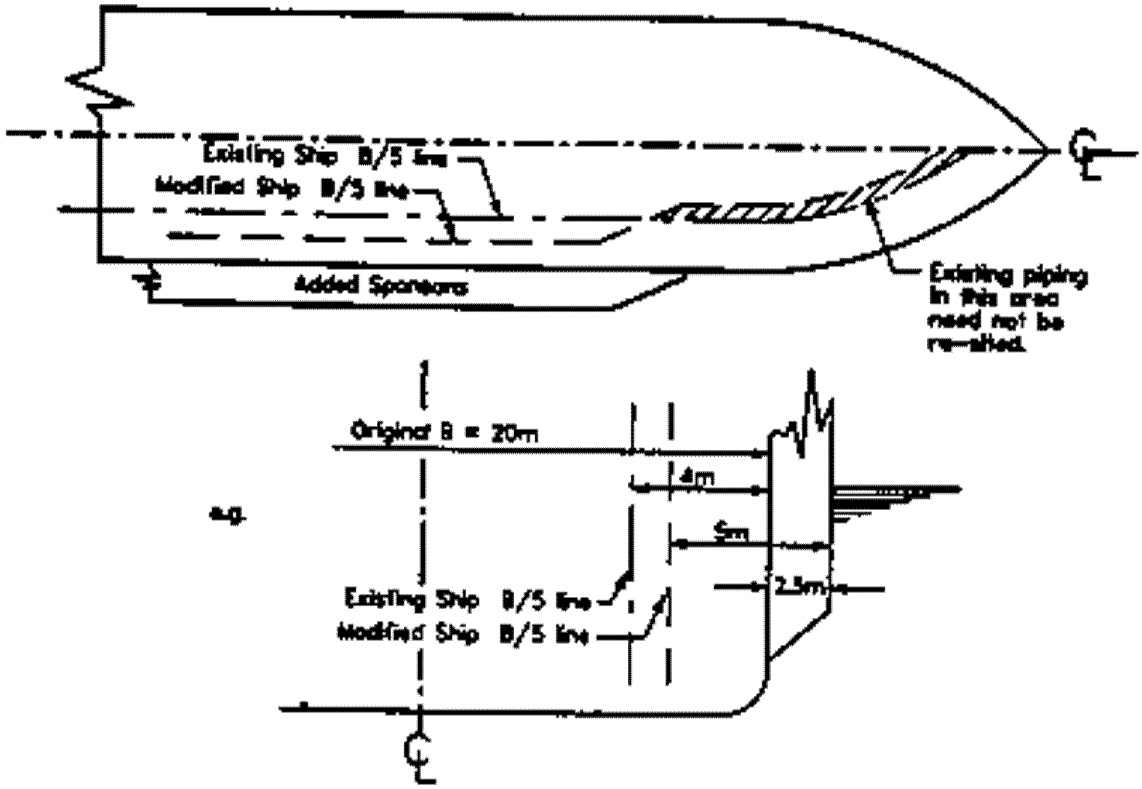

Existing Ship B/5 line
Modified Ship B/5 line
Added Spaceers
Existing piping in this area need not be re-allied.
e.g.
Original B = 20m
4m
5m
2.5m
Existing Ship B/5 line
Modified Ship B/5 line

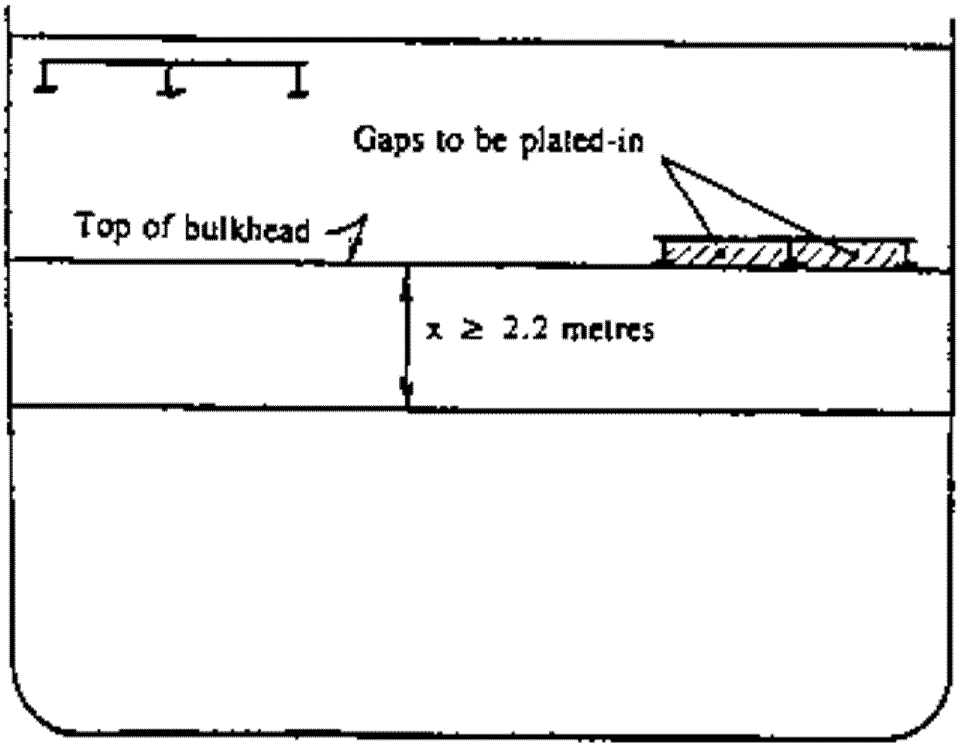
Figure 6

Ship without hanging car decks

Example 1

Height of water on deck = 0,25 metres

Minimum required height of barrier = 2,2 metres



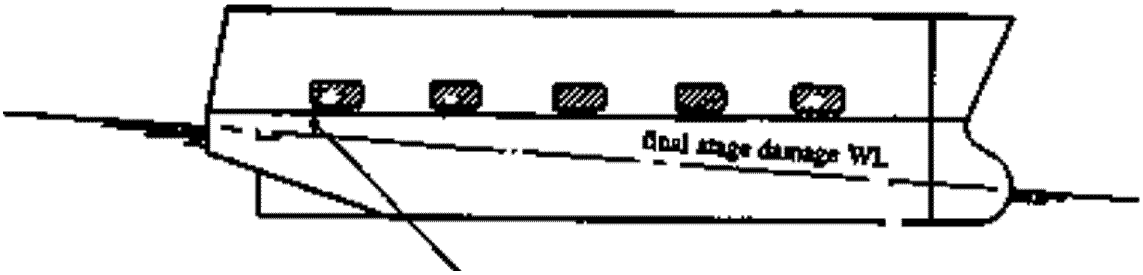
Ship with hanging deck (in way of the barrier)

Example 2

Height of water on deck (hw) = 0,25 metres

Minimum required height of barrier = x

Figure 7



Minimum required freeboard to freeing port = 1,0 m

Figure 8

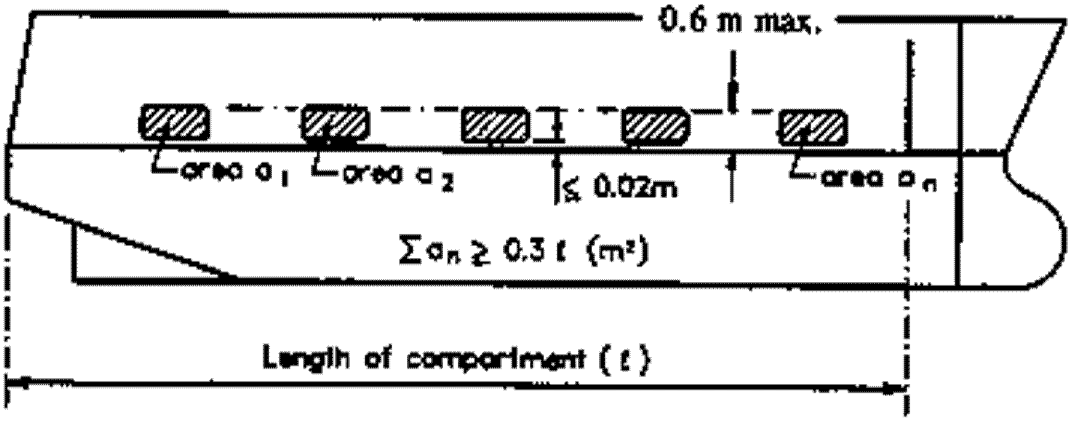
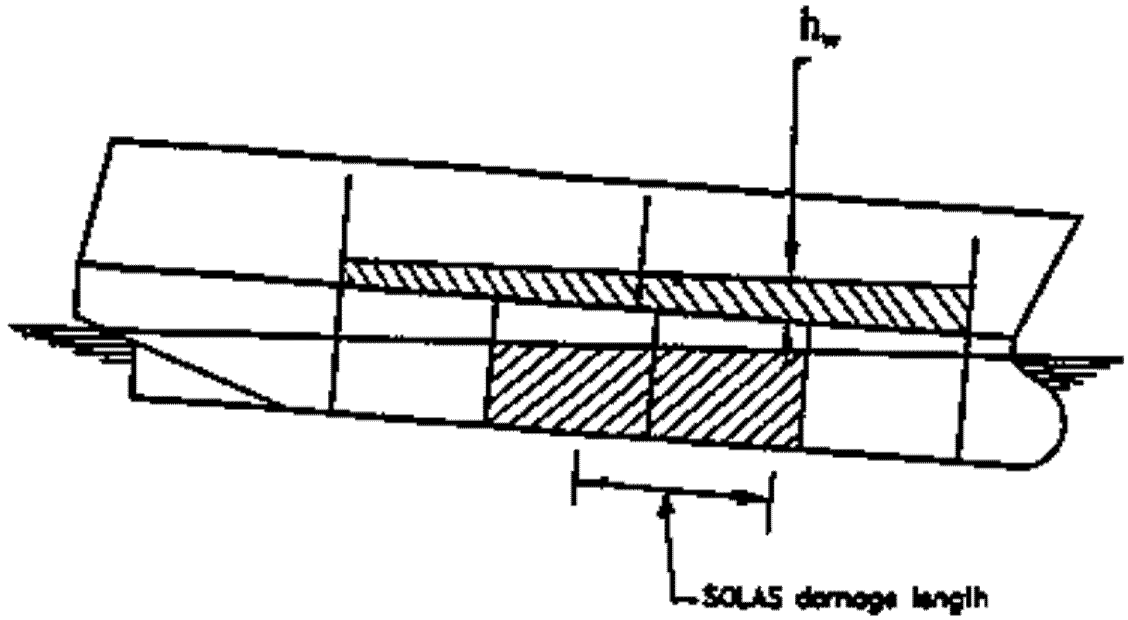
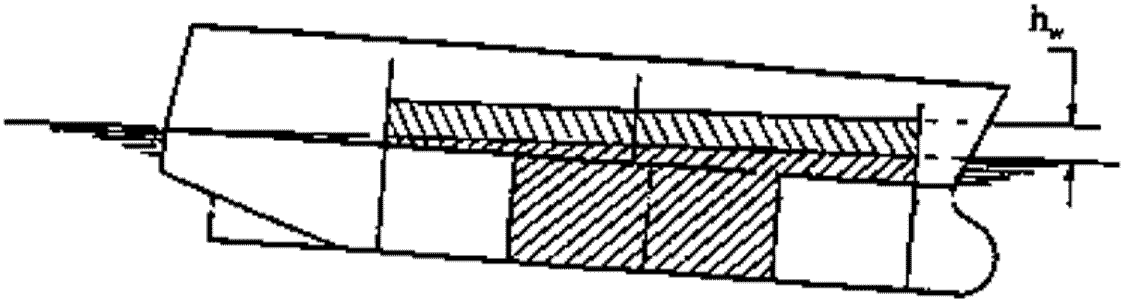


Figure 9



Deck edge not immersed



Deck edge immersed

IMPACT ASSESSMENT FORM

THE IMPACT OF THE PROPOSAL ON BUSINESS WITH SPECIAL REFERENCE TO SMALL AND MEDIUM-SIZED ENTERPRISES (SMEs)

Title of proposal

Proposal for a Directive of the European Parliament and of the Council on specific stability requirements for ro-ro passenger ships.

Document reference number

COM(2002) 158 — 2002/0074(COD)

The proposal

1. *Taking account of the principle of subsidiarity, why is Community legislation necessary in this area and what are its main aims?*

The obligations of the Community in this context are the improvement of safety in maritime transport as provided for in Article 80(2) of the Treaty. The objective of the action proposed is the establishment of harmonised safety requirements regarding the stability of ro-ro passenger ships operating on international voyages from/to EU ports.

Referring to the principle of subsidiarity, it will be the responsibility of the Community to ensure a framework of rules providing a harmonised level of safety for passenger ships operating under the same conditions throughout the EU. The responsibility of the Member States is to adopt within their own national legislation measures which will ensure the effective application of the Directive.

The impact on business

2. *Who will be affected by the proposal?*

— *which sectors of business*

— *which sizes of business (what is the concentration of small and medium-sized firms)*

— *are there particular geographical areas of the Community where these businesses are found.*

The business sector which will be affected by this proposal are entities operating ro-ro passenger ships to and from Community ports. A vast majority of passenger ships sailing in Community waters are operated by medium-sized and large enterprises. Taking into account that the specific stability requirements introduced by this Directive are already in place in seven northern EU Member States which apply the Stockholm Agreement, the proposal will have in practise implications only for the companies operating such type of vessels in the Mediterranean sea. Since the 70 % of the ro-ro passenger ships operating in this area are under the Greek and the Italian flag, it is expected that there will be economic impact mainly for companies operating vessels under these two flags. Nevertheless, the large majority of ro-ro passenger ships trading in the south European waters operate in domestic voyages, and thus outside the scope of this Directive. Their case is addressed by the proposal revising Council Directive 98/18/EC. It has generally been noted that following the introduction of the Stockholm Agreement, new ro-ro passenger vessels are built with the aim to satisfy the specific stability requirements even when these are built for trading in the South EU waters.

3. *What will business have to do to comply with the proposal?*

Member States shall bring into force the laws, regulations and administrative procedures so that operators of ro-ro passenger ships comply with the specific stability requirements. The application of these requirements will oblige the operators of existing ships (those trading in the areas under the Directive) to proceed with structural modifications on these ships in order to upgrade them up to the level established by this Directive. A first step for business will be to subject their ships to the model test of compliance in order to check the need for an upgrade.

4. *What economic effects is the proposal likely to have?*

— *on employment*

— *on investment and the creation of new businesses*

— *on the competitiveness of businesses.*

No impact is expected on employment following the introduction of the requirements of this Directive. The phasing-in timetable for existing ships, provided for in the Directive, will give sufficient time to the shipping companies to upgrade their ships. Taking into account the running SOLAS upgrade time-table, the Directive gives a sufficient period to comply with the additional stability requirements.

The analysis conducted by the Commission demonstrates that the introduction of the SA in the North of Europe took place without particular trouble for the industry or the contracting governments. Based on a sample of 82 vessels, out of a total of 140 that needed to comply with the Agreement, it appears that 36 % of the vessels in that sample did not need any upgrade. Furthermore, 69 % of the total 140 vessels were upgraded for less than 1 million Euro. The estimated total cost of upgrade was around 85 mio Euro. However it is important to note that most of that cost related to the accelerated compliance with SOLAS 90 standards (a necessary step before compliance with the Stockholm Agreement) rather than just to compliance with the Agreement as such.

Given the common value of significant wave heights in the Southern EU waters is around 2,5 metres, the modification cost of the South European fleet for compliance with the provisions of the SA will be approximately the same as the associated cost for compliance with the requirements of the SOLAS 90 two compartment standard [1]. Since full compliance with SOLAS Regulations is to take place by 2010, on the basis of the IMO timetable (international trades) and of Directive 98/18/CE (domestic EU trades) the industry should have already planned to invest in the coming years in the upgrade of the vessels concerned. The study states that 264 vessels trading in the South European waters (international and domestic) will be affected from the SOLAS upgrade and that the cost of compliance will be among 106 and 250 million Euro (these figures do not take into account possible removals from service of aged ro-ro ships). As already mentioned, compliance of these ships with the specific stability requirements set out in the Stockholm Agreement will not increase their SOLAS compliance cost in a prohibitive way.

It appears therefore that the application of the SA stability requirements to the South European ro-ro passenger vessels will offer a uniformity of stability requirements and an increased level throughout the EU, without increasing substantially the economic effort of the affected part of the industry, which has to comply anyway with the SOLAS 90 standard.

The proposal is likely to have a beneficial impact on the competitive position of the business, since it will harmonise the stability standards applied to ro-ro passenger vessels trading in the EU creating a global market which will make possible the operation of these ships to all EU trades where the same significant wave height conditions are met. By establishing a harmonised safety regime for all ro-ro passenger ships serving EU ports, regardless of flag, a level playing field will be created for all operators involved, minimising the risks for distortion of competition by operators trying to gain a competitive edge by economising on the safety standard.

5. *Does the proposal contain measures to take account of the specific situation of small and medium-sized firms (reduced or different requirements etc.)?*

Fulfilling the requirements of the proposal should not constitute insurmountable financial burdens for the affected companies. The experience from the introduction of these standards in the Northern European waters demonstrated that the financial implications for the industry were reasonable.

Consultation

6. *List the organisations which have been consulted about the proposal and outline their main views.*

The Commission held a consultation meeting on 25 October 2001 with parties interested on this issue, which was attended by representatives of shipowners (ECSA, ICS, BIMCO), seafarers (ETF), classification societies (IACS), shipbuilders (CESA) and disabled (European Disabilities Forum-EDF).

The proposed action was met with scepticism by the shipowner representatives, particularly in view of the cost implications this will have for existing ships. These representatives felt that general weather conditions in the South did not justify the generalisation by EU Law of the regional requirements defined in the Stockholm Agreement. However, the measure was clearly supported by the seafarers representatives and the users organisation present at the meeting on the grounds that it will offer additional safety to the travelling public and the crew. These two organisations found essential that ships operating under similar significant wave height conditions had to comply with the same safety standard.

[1] The SOLAS 90 two compartment standard establishes that the ship can survive without capsizing with two main compartments flooded following damage.