



MARITIME SAFETY COMMITTEE
76th session
Agenda item 5

MSC 76/WP.16
11 December 2002
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BULK CARRIER SAFETY

Report of the Working Group

GENERAL

1 The Working Group on Bulk Carrier Safety met from 4 to 10 December 2002 under the chairmanship of Mr. I. Ponomarev (Russian Federation).

2 The group was attended by representatives from the following Member Governments:

CANADA	NEW ZEALAND
CHINA	NORWAY
CROATIA	PANAMA
CYPRUS	POLAND
DENMARK	QATAR
FRANCE	REPUBLIC OF KOREA
GERMANY	ROMANIA
GREECE	RUSSIAN FEDERATION
INDIA	SINGAPORE
JAPAN	SOUTH AFRICA
LIBERIA	SPAIN
MALAYSIA	TURKEY
MALTA	UKRAINE
MARSHALL ISLANDS	UNITED KINGDOM
NETHERLANDS	UNITED STATES

by the following Associate Member of IMO:

HONG KONG, CHINA

by a representative from the following United Nations and specialized agency:

WORLD METEOROLOGICAL ORGANIZATION (WMO)

and by observers from the following intergovernmental organizations in consultative status:

INTERNATIONAL CHAMBER OF SHIPPING (ICS)
INTERNATIONAL SHIPPING FEDERATION LTD (ISF)
INTERNATIONAL UNION OF MARINE INSURANCE (IUMI)
INTERNATIONAL CONFEDERATION OF FREE TRADE UNIONS (ICFTU)
BIMCO
INTERNATIONAL ASSOCIATION OF CLASSIFICATION SOCIETIES (IACS)
INTERNATIONAL ASSOCIATION OF INSTITUTES OF NAVIGATION (IAIN)

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INTERNATIONAL FEDERATION OF SHIPMASTERS' ASSOCIATION (IFSMA)
INTERNATIONAL ASSOCIATION OF DRY CARGO SHIPOWNERS (INTERCARGO)
INTERNATIONAL BULK TERMINALS ASSOCIATION (IBTA)
THE ROYAL INSTITUTION OF NAVAL ARCHITECTS (RINA)

TERMS OF REFERENCE

3 The group was instructed by plenary as follows:

with respect to the FSA studies on bulk carrier safety:

- .1 taking into account any decisions taken and comments made in plenary, to consider documents MSC 76/5, MSC 76/5/1, MSC 76/5/2, MSC 76/5/3, MSC 76/5/4, MSC 76/5/5, MSC 76/5/6, MSC 76/5/8, MSC 76/5/9, MSC 76/5/11, MSC 76/5/12, MSC 76/5/13, MSC 76/5/14, MSC 76/5/15, MSC 76/5/16, MSC 76/5/17, MSC 76/5/18, MSC 76/5/19, MSC 76/INF.3, MSC 76/INF.5, MSC 76/INF.6, MSC 76/INF.7, MSC 76/INF.8, MSC 76/INF.9, MSC 76/INF.10, MSC 76/INF.11, MSC 76/INF.12, MSC 76/INF.17 and MSC 76/INF.21, with a view to:
 - .1.1 examining the preliminary list of recommendations for decision-making agreed at MSC 75 (MSC 76/5), together with comments thereon and proposed new recommendations submitted to this session;
 - .1.2 developing an agreed draft final list of recommendations for decision-making, trying to combine the recommendations addressing common issues and which may complement each other and considering first those measures which would provide the highest reduction of risk, starting with new ships;
 - .1.3 identifying the IMO bodies which should undertake any regulatory action emanating from each of the agreed recommendations; and
 - .1.4 preparing a work schedule specifying the number of sessions needed by each of the IMO bodies identified under subparagraph .1.3 above and a proposed target date for submission of their findings to the Committee for consideration;

with respect to the amendments to the 1988 LL Protocol:

- .2 taking into account any decisions made in plenary on the subject, to consider documents MSC 76/12 (paragraph 2.3), MSC 76/12/2 and Corr.1, MSC 76/12/3 and Corr.1, MSC 76/12/4, MSC 76/12/5 and MSC 76/5/20, referring where necessary to documents MSC 76/INF.10, MSC 76/INF.11 and MSC 76/INF.12, with a view to:
 - .2.1 arriving at agreed design wave load values for hatch cover strength under draft regulation 16-1, using the proposals contained in document MSC 76/12/2 as the basis for the wave load values;
 - .2.2 developing an agreed expression to replace the words "in any sea conditions" in draft regulation 16-1(8); and
 - .2.3 considering the matter of reserve buoyancy under draft regulation 39 and advising plenary accordingly;

with respect to document MSC 76/5/7:

- .3 to consider whether a performance standard for the hold, ballast and dry space water ingress alarms required by new SOLAS regulation XII/12 is needed and advise plenary accordingly; and
- .4 to submit a report to plenary by Wednesday, 11 December 2002.

FSA STUDIES ON BULK CARRIER SAFETY

General

4 The group considered, separately at first, the preliminary recommendations for decision-making agreed at MSC 75 (MSC 76/5, paragraph 5), together with all the comments thereon submitted to this session and the observations made in plenary, and also the additional recommendations presented to this session in documents MSC 76/5/5, MSC 76/5/8, MSC 76/5/16 and MSC 76/5/17. Where possible, consideration was given first to the application of each recommendation to new ships (i.e., ships constructed on or after the date of entry into force of the eventual requirement in question) and then to existing ships. Subsequently, some of the agreed recommendations sharing common or related risk control measures were combined into single recommendations.

Consideration of the preliminary list of recommendations

Double hull (B5): Double side-skin construction

New ships

5 The group reviewed the recommendation to require double side skin construction for all new bulk carriers of 150m in length and upwards, taking also into account comments made on the subject in documents MSC 75/5/2, MSC 76/5/4, MSC 76/5/5, MSC 76/5/6, MSC 76/5/9 and MSC 76/5/17 and other observations made orally, and agreed by clear majority to the recommendation, which should be implemented by amending the relevant provisions in SOLAS chapter XII and other chapters as necessary. Although not opposing the above majority decision, a few delegations, however, did not agree to making double side skin construction mandatory mainly because there were still some technical requirements which should be further considered. In arriving at the conclusion opting for double side skin construction, the group agreed that the principle of one compartment standard should be preserved and that there was a need to develop uniform international technical standards for double side skin construction and for coatings (see also paragraph 8 below), preferably in collaboration with IACS, as well as to consider the width of the double hull space as it affects the provision of adequate access for inspection and maintenance.

6 The group agreed also that when developing the relevant requirements, consideration should be given to the impact of other related issues, such as the role of the double hull spaces and their treatment, strength of the inner skin and others, and invited the Committee to request the DE Sub-Committee to develop the necessary draft amendments to the SOLAS Convention, taking into consideration the group's related concerns as reflected in the previous paragraph.

Improved coating (A6/B7): Controls and/or performance standards for protective coatings in relation to compatibility with cargoes

New ships

7 In considering this risk control measure, the group noted that SOLAS regulation II-1/3-2 made the coating of dedicated seawater ballast tanks mandatory for oil tankers and bulk carriers, with reference to the Guidelines for the selection, application and maintenance of corrosion prevention systems of such tanks (resolution A.798(19)), and admitted that by extending that requirement to cargo holds, serious problems could be introduced, bearing in mind that cargoes can react distinctly to different coatings.

8 Therefore, the group agreed that new ships (of double side skin construction, if the previous recommendation was accepted by the Committee) should only be required to have their dedicated seawater ballast tanks and void spaces within double hull spaces coated according to current SOLAS requirements for ballast spaces and leave the coating of cargo holds to be addressed by class and the ship owner. Notwithstanding the aforementioned Guidelines, the group considered that there was a need for international performance standards for coatings, as referred to in paragraph 5 above, and invited the Committee to request the DE Sub-Committee to develop the mentioned standards, to which IACS and other interested Members and international organizations would be invited to contribute.

Existing ships

9 With respect to existing ships, the group, recognizing the importance of maintaining the coatings, if applied, in good condition throughout the commercial life of the ship, acknowledged that at present there was sufficient control over the condition of coatings through the enhanced survey programme (resolution A.744(18), as amended). Therefore, the group agreed that this risk control measure should be addressed by class and the ship owner.

Steel repair standards (B10): Tighter controls on grades of steel and welding rods used for in-service repairs. Suggestion to establish internationally recognized colour-code for steel primer coatings

New and existing ships

10 In reviewing this recommendation, the group noted that, although there were industry shipbuilding and repair standards available, these were only utilized when the repairs were carried out under class supervision. On some occasions, however, ships were being repaired without notifying class (despite the owner's obligation to do so), with no records documenting when or where the repairs had been carried out or whether the ship was afloat or in dry dock.

11 Subsequently, the group agreed that ship owners and operators should be reminded of their obligations by means of an MSC circular referring to their responsibilities under SOLAS regulation II-1/3-1, concerning, *inter alia*, the provision that ships shall be maintained in accordance with the structural requirements of recognized classification societies, and other related management obligations under the ISM Code. The Committee was invited to request the DE Sub-Committee to prepare a draft MSC circular on the subject.

Additional corrosion margin of hold frames (Japan RCO16): Corrosion margins of hold frames are to be sufficient to compensate a possible loss of fillet welding and face/web plate thickness during the ship's life taking various types of corrosions identified in the historical casualty record into account

New ships

12 Recalling its earlier recommendation to require double side-skin construction for all new bulk carriers, the group considered that this risk control measure was not relevant to double hull bulk carriers since the hold frames would face the double hull space and not be in contact with the cargo. Therefore, the group agreed that no action should be taken on this recommendation.

Forecastle (IACS): Superstructure at fore end

New ships

13 The group noted information provided by IACS on the on-going development of Unified Requirement S28, requiring the fitting of a forecastle on bulk carriers contracted for construction on or after 1 January 2004 with the purpose of protecting foredeck fittings against green sea loads and minimizing the impact of such loads on fore hatch covers.

14 The group also noted that, while the fitting of a forecastle as such was not an IMO requirement, draft LL Protocol regulation 39 - "Minimum bow height and reserve buoyancy" would require additional reserve buoyancy forward consistent with the provision of some sheer and/or a forecastle.

Bulwark/Breakwater (A8): Structures designed to reduce the impact of green sea loads away from vulnerable hatches and foredeck equipment

Existing ships

15 The group considered that this risk control measure was not applicable to new ships and neither was cost effective for existing ships. Therefore the group agreed that it should not be recommended.

Ballast system capacity (C11): Redesign of ballast systems to incorporate pumping capacities that enable the ship to maintain hull stress at permissible levels taking account of the loading rates possible in terminals

New and existing ships

16 The group recognized that new bulk carriers, with their double hulls, would be more tolerant in keeping any stresses induced by loading operations at permissible levels and, therefore, this would be less of a problem for new ships. In the case of existing ships, though, it was important to take into account the compatibility of loading rates in modern terminals with the ship's de-ballasting capability. However, redesigning of the ballast system in existing ships would not be cost-effective and, therefore, the group agreed that this risk control measure should not be recommended. Instead, these potential problems should be addressed by improving ship/shore communications in advance (see also paragraph 30).

17 In that connection, the group noted that IACS would be issuing UR S25 to establish harmonized notations and corresponding design loading conditions with appropriate safety margins.

Protection of foredeck fittings (A46): Reposition vents and foredeck fittings close to bulwarks to provide protection from mountainous seas, extending existing bulwarks where necessary

18 This recommendation was considered in conjunction with a related risk control measure emanating from the FSA conducted by IACS (see paragraph 22).

Hold frames equivalent to UR S12 (IACS): Hold frames of existing bulk carriers that do not comply with UR S12 should be strengthened equivalent to UR S12

Coating of internal side skin (Japan RCO51): Corrosion progress control of hold frames by coating, with regular maintenance and repainting when it deteriorates to a poor condition

Corrosion control of hold frames (Japan RCO52): Hold frames should be replaced earlier than is current practice, using reduced diminution allowances for existing frames

Existing ships only

19 Given that the above three risk control measures address inter-related issues, the group decided to consider them together, paying special attention to the first one, since it embraces the main features of the other two.

20 The group noted that IACS had just issued UR S31 containing renewal criteria for side shell frames in single side skin bulk carriers not built in accordance with UR S12 as revised, and being advised that it did not conflict with resolution A.744(18) but that it supplemented it with respect to side shell frames, agreed that application of UR S31 should be recommended. As in previous risk control measures (see paragraphs 14 and 22), in order to cater also for the ships not classed by IACS members, Governments should be urged to ensure that UR S31 is applied to ships flying their flags, whether or not they are classed with a classification society being member of IACS. In this respect, the group invited the Committee to instruct the DE Sub-Committee to include also UR S31 in the draft MSC resolution referred to in paragraph 22.

Hatch cover equivalent to UR S21 (IACS) (also A1): Replacement or reinforcement of hatch covers forward of 0.25L of existing bulk carriers to be equivalent to UR S21

Existing ships

21 The group considered that this risk control measure was not cost effective for existing ships and, therefore, agreed that it should not be recommended.

Fore deck fittings (IACS): Strength of stud pipes for air and vent pipes to be sufficient to withstand horizontal forces of green sea loading. Closing devices and strength of small hatches to be sufficient to withstand vertical and horizontal green sea loading in accordance with standards being developed by IACS

New and existing ships

22 The group noted that this risk control measure had been adopted by IACS through Unified Requirements S26 and S27 and agreed that its application should be recommended. The group further agreed that Governments should be urged to ensure that the appropriate URs are applied to ships flying their flags, whether or not they are classed by a classification society being member of IACS. In this respect, the group invited the Committee to instruct the DE Sub-Committee to develop an MSC resolution to that effect. This recommendation was considered in conjunction with that referred to in paragraph 18 above.

Redesign/reinforcement of hatch cover (A3): Redesign of hatch covers and securing mechanisms to withstand both vertical and horizontal loads

Existing ships

23 While recognizing that replacing hatch covers in existing ships would not be cost-effective, the group agreed that more attention should be paid to hatch cover securing mechanisms and the issue of horizontal loads only, especially with regard to maintenance and frequency of inspection. Consequently, the group agreed further that ship owners and operators should be made aware of the need to implement regular maintenance and inspection procedures for closing mechanisms in existing bulk carriers in order to ensure proper operation and efficiency at all times, and invited the Committee to instruct the DE Sub-Committee to develop standards for hatch cover securing arrangements for existing ships and that IACS UR S21 and Recommendation 14 could be used as a starting point for discussion.

Hatch cover/Access closed indication (A20): Positive indication system enabling status of hatch covers and/or accesses to be monitored from a permanently manned space

New and existing ships

24 The group discussed at some length the practicalities of installing a hatch cover status indication system in both, new and existing ships and, although some modern closing devices, such as auto-cleating systems, incorporated indication capability, these were rare by comparison with the traditional manually-operated systems. On the other hand, retrofitting of indication systems on existing hatch covers was considered to pose problems relating, among other things, to the ability of the retrofitted device to withstand the harsh environment. Therefore, noting that indication of water entry would otherwise be provided under new regulation XII/12 and that this would afford effective warning (see also paragraph 25 below), the group agreed that this risk control measure should not be recommended.

Water ingress alarm (A50): Provision of early warning system detecting water ingress into cargo holds and dry spaces forward with visual and audible alarms in permanently manned spaces

New and existing ships

25 The group noted that new SOLAS regulation XII/12 – “Hold, ballast and dry space water ingress alarms”, which would apply to bulk carriers regardless of their date of construction, was due for adoption by the Committee at this session and, therefore, was satisfied that the above risk control measure would be implemented once regulation XII/12 entered into force on 1 July 2004. However, the group felt that there was a need for performance standards against which the operation and efficiency of the water ingress alarms could be measured and, at the same time, it was conscious of the urgent need to develop the standards in good time before the above entry-into-force date.

26 The group, therefore, invited the Committee to instruct the DE Sub-Committee to start developing the performance standards at its forthcoming session (DE 46 – 10 to 14 March 2003), and submit a report on the outcome of its deliberations to MSC 77 with a view to adopting the performance standards at that session. To that end, the group also asked the Committee to invite interested members and international organizations to submit relevant proposals to DE 46, requesting it further to consider relaxing the deadline for submissions of such proposals to 31 January 2003, given the short period of time remaining before the next ordinary deadline (3 January 2003, for non-bulky documents).

Immersion suits (Norway/ICFTU): Personal immersion suits for all personnel on board

New and existing ships

27 After some debate, the group agreed that this risk control measure could be recommended for both new and existing ships, although it recognized that the measure would be more cost-effective for existing ships, given all the safety features being introduced for new ships, but decided to propose it also for new ships to avoid possible confusion among crews moving from an existing ship to a new one and vice-versa. Thus, the group invited the Committee to instruct the DE Sub-Committee to develop relevant draft amendments to SOLAS chapter III and/or the LSA Code accordingly.

Free-fall lifeboats (with a float-free mode) (E1) (Norway/ICFTU): Single free-fall survival craft with float-free capability enabling rapid evacuation of crew from ship

New ships

28 In discussing the application of this risk control measure to new bulk carriers, some delegations, although recognizing the advantages of free-fall lifeboats with float-free capability, felt that the measure should remain an option as currently provided in SOLAS chapter III, adducing that this should be considered in conjunction with other agreed measures and not in isolation. Other delegations, though, advocated for the adoption of the recommended measure, maintaining that the cost of one free-fall lifeboat was comparable to that of the alternative two traditional lifeboats, with the added advantages of speed of evacuation and float-free capability which would assist those already in the water. At the end of the debate, the group agreed to accept the recommendation for new ships and invited the Committee to instruct the DE Sub-

Committee to develop relevant draft amendments to SOLAS chapter III and/or the LSA Code accordingly.

Existing ships

29 The group considered that this risk control measure was not cost effective for existing ships and, therefore, agreed that it should not be recommended.

Terminal interface improvement (A16/C8/C10): Improvement of ship/shore communications, training of stevedores and terminal operators and better control of loading capabilities

New and existing ships

30 In discussing this recommended measure, the group noted that there already existed regional training programmes for terminal operators in some parts of the world, but that there was a need for harmonization worldwide, albeit this was outside IMO's remit. The group also noted that, by making the Code of practice for the safe loading and unloading of bulk carriers (BLU Code) mandatory, some of the concerns, such as ship/shore communications and the control of loading capabilities, would be addressed. Another venue worth exploring would be to address this risk control measure in the proposed Manual on loading and unloading of solid bulk cargoes for terminal representatives, which the DSC Sub-Committee was currently considering for development, pending a decision by the Committee.

31 In conclusion, the group invited the Committee to request the DSC Sub-Committee to prepare an MSC circular urging Governments, ship owners and operators and terminal operators to apply the BLU Code and/or, if a decision is taken to go ahead with the development of the above-mentioned Manual, to request the DSC Sub-Committee to address the concerns embodied in this risk control measure.

Risk-based ESP targeting (A25): Targeting of inspections towards areas of established high risk

New and existing ships

32 The group, in acknowledging that targeting of inspections during surveys under resolution A.744(18) was very much a class function, noted that IACS had undertaken much work on this subject, with the collaboration of all its members, aimed at rationalizing the enhanced survey programme, including targeting, and that it intended to keep IMO informed of progress made. Consequently, the group agreed that the action being taken by IACS would satisfy the objectives of this risk control measure and invited the Committee to concur.

PSC training (A24): Provision of specialised training for port State control inspectors in bulk carrier design and operation, with particular emphasis on areas of vulnerability

New and existing ships

33 The group readily agreed that this was an important matter that needed addressing as soon as possible and invited the Committee to strongly recommend port States and the various PSC Memoranda of Understanding established world-wide to develop specialized training for port

State control officers in bulk carrier design and operation, pinpointing the vulnerable areas within the structure, in particular of older ships. The FSI Sub-Committee could possibly be instructed to develop an MSC circular to this effect.

Weather routing (A26): Standardized minimum requirements for weather routing that are compliant with SOLAS passage planning requirements and load line zones

New and existing ships

34 The group noted the work done by the Organization in this respect, in particular that the Committee was understood to have approved at this session an MSC circular on Participation by ships in weather routing services and weather observation programmes, and decided that no further action was required at this state. The Committee was invited to concur with this decision.

Improved loading/stability information (C13): Provision of detailed, comprehensive and user-friendly information covering stability and stress characteristics of the ship's hull

New ships

35 The group noted that this risk control measure was more relevant for smaller ships with respect to stability and for larger ships with respect to structural strength, and recognized that in the light of recent developments within the maritime industry, the situation had changed for the better, although the quality of the data used still needed further improvement. The group also recognized that, instead of increasing the volume of information, attention should be paid to its user-friendliness and agreed that this measure should be applied to all new ships.

36 In concluding, the group invited the Committee to instruct the SLF and DE Sub-Committees to develop guidelines for the provision of detailed, comprehensive and user-friendly information covering stability and longitudinal stress characteristics of the ship's hull during loading and unloading, with the former Sub-Committee as co-ordinator of the work.

Mandatory BC Code (B8): Making the BC Code mandatory and incorporating a bulk carrier endorsement for officers' qualifications

New and existing ships

37 The group noted that the proposed measure consisted of two independent parts, i.e.:

- mandating the BC Code; and
- bulk carrier endorsement for officers' qualifications.

38 With regard to making the BC Code mandatory, the group, after debating the issue at length, decided that it did not have sufficient expertise on the subject and, bearing in mind the current work being undertaken by the DSC Sub-Committee on the revision of the BC Code, invited the Committee to refer this part of the risk control measure to that Sub-Committee, instructing it to consider the feasibility of making the Code mandatory.

39 On the part referring to the incorporation of a bulk carrier endorsement in officer's qualifications, the group noted that MSC 70 had adopted amendments to Tables A-II/1 and A-II/2 of the STCW Code addressing officer's competence for the safe operation of bulk carriers, which would enter into force on 1 January 2003. Therefore, the group agreed that there was no

need to take any further action on this part of the recommended measure and invited the Committee to concur.

Early implementation of SOLAS chapter XII using 10 years instead of 15 years for existing ships

Existing ships

40 The group noted that IACS had introduced Unified Requirement S23 (Rev. 3), effectively bringing forward the reinforcement of the corrugated transverse bulkhead between the two foremost cargo holds with respect to the requirements of SOLAS regulations XII/3 and XII/6. Agreeing that this was an IACS initiative, which merely accelerated the application of the mentioned SOLAS regulation to ships classed by IACS members, the group concluded that there was no need for IMO to take action on the recommended risk control measure.

New recommendations submitted to MSC 76

Alternate hold loading (B9)

Existing ships

41 The group considered at length the possible benefits deriving from banning alternate hold loading of high density cargoes in the full load condition, in particular the resulting reduction in shear forces and bending moments when loading homogeneously in all holds, and agreed that, notwithstanding a final decision on whether to accept the risk control measure or not, it should not apply to new ships or to existing ships under 10 years of age.

42 Subsequently, noting that the risk reduction calculated for the measure if applied to existing ships was the second highest of all those considered, the group agreed that it would be worth implementing it to such ships from a certain age onwards, but could not decide on whether to make it applicable to bulk carriers 10 years old and above, or 15 years old and above but subject to successful completion of a condition assessment. Thus, the group invited the Committee to request the DE and DSC Sub-Committees, with the former as co-ordinator, to consider the two options and provide advice thereon, prior to undertaking any relevant regulatory action.

Application of bulkhead structural standards in SOLAS chapter XII (B3)

New ships

43 The group agreed that new ships of 150m in length and upwards, which would be of double side skin construction, should also comply with all the structural strength provisions of regulation XII/5 requiring that the ship shall have sufficient strength to withstand flooding of any one cargo hold, and proposed to amend this regulation by removing the words “of single side skin construction”, thus making it applicable to double side skin ships also. In this respect, the group invited the Committee to request the DE Sub-Committee to incorporate the above proposed amendment in its work on development of amendments to SOLAS chapter XII.

Existing ships

44 With regard to existing ships, the group concluded that this risk control measure would not be cost effective, although the possibility of restricting heavy cargoes should be explored. The Committee was, therefore, invited to request the DE Sub-Committee to consider possibilities and provide relevant advice prior to undertaking any regulatory action.

*Shipbuilding practices**New ships*

45 Although this proposed measure had not emanated from an FSA study but from the investigation into the **Lake Carling** casualty, the group saw merit in taking the recommendations into account to address structural detail design and shipbuilding practice when preparing the MSC circular addressing the obligations of ship owners and operators when their ships undergo steel repairs, as explained in paragraph 11. This approach also reflected views expressed in document MSC 76/5/10 with regard to the building of robust ships. The Committee was invited to instruct the DE Sub-Committee accordingly. The Committee was further invited to request IACS to keep it informed of any developments on the subject.

*Early abandonment**Existing ships*

46 The group considered the proposal to develop an MSC circular to urging ship owners to issue guidance to ship's personnel on the possible need for early abandonment of a bulk carrier that has any single hold flooded, and agreed that a circular should be prepared addressing bulk carriers which may not withstand flooding of any cargo hold and containing information on the action to be taken in case of flooding of such holds, making sure that the professional judgement of the master is not undermined, for possible posting in the bridge. The group invited the Committee to instruct the DE and NAV Sub-Committees to develop an MSC circular to that effect, and also to draw attention to the obligations of shipping companies under the ISM Code and of Administrations under SOLAS regulation II-1/23-1, with the former Sub-Committee as co-ordinator.

Bulk carrier endorsement (A14/C2)

47 The group considered a proposed risk control measure aimed at introducing a bulk carrier endorsement for crews and, recalling that this matter had been dealt with under a previous recommendation (see paragraph 39), agreed that there was no need to take further action.

Definition of "bulk carrier"

48 On the premise that the proposal to make double side skin construction mandatory for new ships would be accepted by the Committee, the group agreed that the definition of bulk carrier as it stands at present in SOLAS needed to be revised and invited the Committee to instruct the DE Sub-Committee to develop a new definition when undertaking its work on amending SOLAS chapter XII and other chapters, bearing in mind that the design of new double side skin bulk carriers may differ substantially from that of bulk carriers satisfying the current definition.

General statement on FSA procedures

49 The delegation of Liberia stressed their strong support for the initiatives to enhance the safety of bulk carriers and the positive impact that FSA has in the IMO rule making process. However, Liberia expressed concern regarding the need for better background discussion of RCOs prior to recommending adoption by the Committee.

Liberia brought the group's attention to Step 5 of the FSA approach: the decision-making process. Decision-making was based upon the results of the FSA and other factors that may influence the decision. In order for decision makers to properly consider an RCO assumption, uncertainties, methodologies, and any other important factors that may influence the decisions should be properly summarized and communicated both verbally and in writing. Liberia would hope that this issue will be properly considered for future FSA's to allow for greater transparency and facilitate the decision making process.

Agreed list of recommendations

50 The group listed the agreed recommendations for decision-making and decided to rank them according to the area addressed, i.e. operation; hull envelope; closing appliances; and evacuation, and also giving an indication in each case as to the target event, i.e. prevention; mitigation; and response. This ranking, however, was not meant to denote priority. The results of this exercise are presented in tabulated form in annex 1, for consideration by plenary for approval.

AMENDMENTS TO THE 1988 LL PROTOCOL

51 The group considered this matter with the assistance of a splinter group of load line experts and took action as indicated hereunder.

Design wave loads on hatch covers

52 Under this heading, the group considered documents MSC 76/12/2 and Corr.1, MSC 76/12/4, MSC 76/5/20, MSC 76/INF.10, MSC 76/INF.11 and MSC 76/INF.12. Concerning document MSC 76/12/2 and Corr.1, the group recalled that plenary had decided that the draft regulation 16-1 under 1988 Load Line Protocol would apply only to new ships.

53 On the matter of hatch cover design loads, the group, following the instructions given by plenary, used the proposals contained in document MSC 76/12/2 as the basis for discussion. The group debated the flooding scenarios used in determining the hatch cover loads applicable to reduced freeboard ships as proposed in that document, which consist of forepeak only flooded in extreme sea conditions (20-year North Atlantic storm), and the foremost cargo hold only flooded in those extreme sea conditions. It was recognized that the latter condition determined the design wave loads. The group noted an observation made by IACS and supported by a number of delegations, that the requirement of double hull construction would greatly decrease the possibility of flooding of the foremost cargo hold in extreme sea conditions. Nevertheless, in order to reach a higher level of safety, the group decided to adhere to the most rigorous flooding scenario, and thus adopted the design wave loads as proposed in the above document.

54 Subsequently, the group, having incorporated a revised and simplified formula for design wave loads, amended draft regulation 16-1, as shown in annex 2.

55 The IACS observer introduced document MSC 76/5/20 and gave a detailed presentation on the painstaking development of the load model in UR S21, Rev.2, which fully utilizes the extensive information on green sea loads derived from the Marin model tests in a physically sound manner. The load model accounts for vessel speed, block coefficient, hatch cover position in terms of relative height and distance aft of the FP, as well as ship length. In particular, the model incorporates the effects of relative motion on the hatch cover loads determined from the model tests.

56 IACS advised that it was continuing its assessment of damage flooding scenarios utilizing the Marin model tests, which could not be completed prior to MSC 76 owing to the complexity of the issues involved. The utility of continuing this effort may need to be re-considered in light of the outcome of MSC 76. Anticipated inclusion of damage flooding cases in the revised UR accounted, in part, for the higher allowable stress in UR S21, Rev.2. This was seen to be in line with the proposal of the United Kingdom for treating damage flooding cases in paragraph 10 of document MSC 76/12/2.

57 The IACS observer expressed regret that UR S21, Rev. 2 and the continuing IACS work on damage flooding cases could not be utilized in amending the hatch cover requirements of the 1988 LL Protocol. IACS indicated that it expects to reassess UR S21, Rev.2 in the light of the outcome of MSC 76 with a view, if practicable, to utilizing its detailed structural assessment criteria, and its requirements pertaining to hatch coamings, securing and structural details of hatch covers in conjunction with the amended requirements of the LL Protocol.

58 The group noted with appreciation the continuing efforts by IACS and agreed to recommend the Committee to invite them to submit this work for consideration in due course, taking into account the issues raised in paragraph 53 above.

59 Furthermore, some delegations, including Germany and Norway, expressed concern that the hatch cover loads applicable to ships of 100 metres in length indicated in document MSC 76/12/2, were lower than those typically applied in practice. Following some discussion, the group agreed to revise the hatch cover loads applicable to ships of 100 m in length from 4.0 t/m² to 5.0 t/m² at the forward perpendicular, and adhere to the format for draft regulation 16-1 as proposed in said document and reflected in annex 2.

Consideration of the expression ‘[in any sea conditions]’

60 The group agreed to remove the square brackets around the expression ‘[in any sea conditions]’ in draft regulation 16-1(8), as the wording was considered adequate and would include the most realistically onerous sea conditions.

Reserve buoyancy

61 Under this heading, the group considered documents MSC 76/12/3 and Corr.1 and MSC 76/12/5. With respect to the former document and additional information provided orally by some delegations, the group agreed to replace the value of the coefficient ‘5.475’ in the formula of required projected area in regulation 39(5) with the figure ‘4.0’. Further, in view of the importance attributed to reserve buoyancy forward, the group agreed to renumber paragraph (5) of draft regulation 39, as proposed by SLF 45, as paragraph (3) and relocate under paragraph (2) of the same regulation, modified to indicate that the provisions therein would apply only to bow height and not to reserve buoyancy.

62 The text of the proposed amended regulation 39 is set out in annex 2, together with proposed amended regulation 16-1.

ACTION REQUESTED OF THE COMMITTEE

63 The Committee is invited to approve the report of the group in general and, in particular, to:

with respect to the FSA studies on bulk carrier safety:

- .1 note the outcome of the consideration of the preliminary list of recommendations for decision-making agreed at MSC 75 and those submitted to this session; concur with the group's conclusions; and approve the list of recommendations agreed by the group together with the course of action suggested for each one of them (paragraphs 4 to 50 and annex 1);
- .2 consider instructing the DE, DSC, NAV and SLF Sub-Committees as proposed in paragraphs 6, 8, 11, 20, 22, 23, 26, 27, 28, 31, 33, 36, 42, 43, 44, 45, 46 and 48, according to the number of sessions needed and target completion dates indicated in annex 1, as well as inviting Members and international organizations to submit relevant proposals to the appropriate sub-committees in accordance with the Guidelines on the organization and method of work;
- .3 with particular reference to the action requested under paragraph 26, consider relaxing the deadline for submission of non-bulky documents to DE 46 (3 January 2003) to 31 January 2003 in order to enable interested Members and international organizations to submit proposals for the development of performance standards for water ingress alarms, given the urgency attached to this particular item (paragraphs 25 and 26);
- .4 invite IACS to keep the Committee informed of developments with respect to those recommendations on which the group agreed that the action being taken by IACS would satisfactorily address the risk control measure in question (paragraphs 9, 17, 32 and 40);

with respect to the amendments to the 1988 LL Protocol:

- .5 noting the outcome of the consideration of this matter by the group, consider the modified draft LL regulations 16-1 and 39 with a view to approval together with the rest of the revised Annex B to the 1988 LL Protocol (paragraphs 52 to 62 and annex 2);
- .6 invite IACS to submit, in due course, information on their expected reassessment of UR S21 (Rev.2) in the light of new LL regulation 16-1 (paragraphs 57 and 58); and

with respect to document MSC 76/5/7:

- .7 note that this matter has been addressed when considering the recommendation on water ingress alarm (paragraphs 25 and 26 and annex 1).

ANNEX 1

**AGREED DRAFT RECOMMENDATIONS FOR DECISION-MAKING
WORK SCHEDULE**

No.	Area addressed	Target event	Paragraphs in report	Recommendation	Application		IMO Body	Sessions needed	Target completion date
					New	Existing			
1	Operation	Prevention	30, 31	Ship/terminal interface improvement	Yes	Yes	DSC	1	2003
2	“	Prevention	35, 36	Improved loading/stability information	Yes	No	SLF/DE	2	2004
3	“	Prevention	38	Mandatory BC Code	To be further considered		DSC	1	2003
4	“	Mitigation	41, 42	Alternate hold loading ban	No	Yes	DE/DSC	2	2004
5	“	Response	46	Guidance on early abandonment	Yes	Yes	DE/NAV	1	2003
6	“	Response	33	PSC officer training	Yes	Yes	FSI	1	2004
7	Hull envelope	Prevention	5, 6	Double side skin construction	Yes	No	DE	2	2004
8	“	Prevention	7, 8	Performance standards for protective coatings	Yes	No	DE	2	2004
9	“	Prevention	20	Strengthening of hold frames to be equivalent to UR S12 by means of UR S31	No	Yes	DE	1	2003
10	“	Prevention	22	Protection of fore deck fittings and small hatches	Yes	Yes	DE	1	2003
11	“	Mitigation	43, 44	Application of structural standards in SOLAS chapter XII	Yes	No	DE	2	2004
12	“	Mitigation	10, 11	Steel repair standards and shipbuilding practices	Yes	Yes	DE	1	2003
13	Closing appliances	Prevention	23	Standards for hatch cover securing mechanisms	Yes	Yes	DE	1	2003
14	Evacuation	Response	25, 26	Performance standards for water ingress alarms	Yes	Yes	DE	1	2003
15	“	Response	27	Immersion suits	Yes	Yes	DE	1	2003
16	“	Response	28	Free-fall lifeboats with float-free capability	Yes	No	DE	2	2004

ANNEX 2

**PROPOSED MODIFICATIONS TO DRAFT REGULATIONS 16-1 AND 39 OF THE
1988 LL PROTOCOL**

1 Draft LL Protocol regulation 16-1 is modified as shown below:

“Regulation 16-1 - Hatch covers

(1) All hatchways in positions 1 and 2 shall be fitted with hatch covers of steel or other equivalent material. Except as provided in regulation 14(2) such covers shall be weathertight and fitted with gaskets and clamping devices. The means for securing and maintaining weathertightness shall be to the satisfaction of the Administration. The arrangements shall ensure that the tightness can be maintained in any sea conditions, and for this purpose tests for tightness shall be required at the initial survey, and may be required at renewal and annual surveys or at more frequent intervals.

Hatch cover minimum design loads

(2) For ships of 100 m in length and above

- ~~(a) Position 1 hatch covers located in the forward quarter of ship's length shall be designed for wave loads of [7.67][4] t/m² at the forward perpendicular and reduced linearly to 3.5 t/m² at the end of the forward quarter's length as shown in table 16-1.1. The design load used for each hatch cover panel shall be that determined at its midpoint location.~~
- ~~(b) All other position 1 hatch covers shall be 3.5 t/m².~~
- ~~(c) Position 2 hatch covers shall be designed to 2.6 t/m².~~
- ~~(d) Where a position 1 hatchway is located at least one superstructure standard height higher than the freeboard deck, it may be designed to 3.5 t/m².~~

- (a) Position 1 hatch covers located in the forward quarter of ship's length shall be designed for wave loads at the forward perpendicular, calculated from the following equation:

$$\text{Load} = 5.0 + (L_H - 100)a \text{ t/m}^2$$

where :

- L_H is L for ships of not more than 340 m but not less than 100 m in length;
 L is the length of the ship (metres), as defined in regulation 3;
 L_H equals 340 m for ships of more than 340 m in length;
 a is given in table 16-1.1,

and reduced linearly to 3.5 t/m² at the end of the forward quarter's length, as shown in table 16-1.2. The design load used for each hatch cover panel shall be that determined at its midpoint location.

- (b) All other position 1 hatch covers shall be designed to 3.5 t/m²
- (c) Position 2 hatch covers shall be designed to 2.6 t/m².
- (d) Where a position 1 hatchway is located at least one superstructure standard height higher than the freeboard deck, it may be designed to 3.5 t/m².

	a
Type B Freeboard ships	0.0074
Ships assigned reduced freeboard by regulations 27(9) or (10)	0.0363

Table 16 –1.1

- (3) ~~For ships assigned reduced freeboard according to regulations 27(9) or (10)~~
 - (a) ~~Position 1 hatch covers located in the forward quarter of ship's length shall be designed for wave loads of [9] [6] t/m² at the forward perpendicular and reduced linearly to 3.5 t/m² at the end of the forward quarter's length. The design load used for each hatch cover panel shall be that determined at its midpoint location.~~
 - (b) ~~All other position 1 hatch covers shall be designed to 3.5 t/m².~~
 - (c) ~~Position 2 hatch covers shall be designed to 2.6 t/m².~~
- (43) For ships 24 m in length
 - (a) Position 1 hatch covers located in the forward quarter of ship's length shall be designed for wave loads of [3.43] [2.43] t/m² at the forward perpendicular and reduced linearly to 2.0 t/m² at the end of the forward quarter's length as shown in table 16-1.12. The design load used for each hatch cover panel shall be that determined at its midpoint location.
 - (b) All other position 1 hatch covers shall be designed to 2.0 t/m².
 - (c) Position 2 hatch covers shall be designed to 1.5 t/m².
 - (d) Where a position 1 hatchway is located at least one superstructure standard height higher than the freeboard deck, it may be designed to 2.0 t/m².
- (54) For ships between 24 m and 100 m in length wave loads shall be obtained by linear interpolation as shown in table 16-1.24.

	Position 1 longitudinal position		Position 2
	FP-0.25L	Aft of 0.25 L	
L=100m and above			
Freeboard deck	[7.67][4] - 3.5 t/m ²	3.5 t/m ²	
Superstructure deck	3.5 t/m ²		2.6 t/m ²
L = 24m			
Freeboard deck	[3.43][2.43] - 2 t/m ²	2 t/m ²	
Superstructure deck	2 t/m ²		1.5 t/m ²

	Position 1 Longitudinal position			Position 2
	FP	0.25L	Aft of 0.25L	
L>100 m				
Freeboard deck	Equation in 16-1(2)(a)	3.5 t/m ²	3.5 t/m ²	
Superstructure deck	3.5 t/m ²			2.6 t/m ²
L=100 m				
Freeboard deck	5.0 t/m ²	3.5t/m ²	3.5 t/m ²	
Superstructure deck	3.5 t/m ²			2.6 t/m ²
L=24 m				
Freeboard deck	2.43 t/m ²	2.0 t/m ²	2.0 t/m ²	
Superstructure deck	2.0 t/m ²			1.5 t/m ²

Table 16-1.21

Values of wave load for ship lengths between 24 m and 100 m, and for positions between FP and 0.25 L, shall be obtained by linear interpolation.

- (65) All hatch covers shall be designed such that:
- (a) The product of the maximum stress determined in accordance with the above loads and the factor of 1.25 shall not exceed the minimum upper yield point strength of the material in tension and the critical buckling strength in compression.
 - (b) The deflection is limited to not more than 0.0056 times the span.
 - (c) Steel plating forming the tops of covers shall be not less in thickness than 1% of the spacing of stiffeners or 6 mm if that be greater.
 - (d) An appropriate corrosion margin is incorporated.

Alternative securing arrangements

- (76) The means for securing and maintaining weathertightness by other means than gaskets and clamping shall be to the satisfaction of the Administration.

(87) Hatch covers which rest on coamings shall be located in their closed position by means capable of withstanding horizontally acting loads in any sea conditions.”

2 Draft regulation LL Protocol regulation 39 is modified as shown below:

“Regulation 39 - Minimum bow height and reserve buoyancy

(1) The bow height (F_b), defined as the vertical distance at the forward perpendicular between the waterline corresponding to the assigned summer freeboard and the designed trim and the top of the exposed deck at side, shall be not less than:

$$F_b = (6075(L/100) - 1875(L/100)^2 + 200(L/100)^3) \times (2.08 + 0.609C_b - 1.603C_{wf} - 0.0129(L/d_1))$$

where:

- F_b is the calculated minimum bow height, in mm;
 L is the length, as defined in regulation 3, in m;
 B is the moulded breadth, as defined in regulation 3, in m;
 d_1 is the draught at 85% of the depth D , in m;
 C_b is the block coefficient, as defined in regulation 3;
 C_{wf} is the waterplane area coefficient forward of $L/2$: $C_{wf} = A_{wf} / \{(L/2) \times B\}$; and
 A_{wf} is the waterplane area forward of $L/2$ at draught d_1 , in m^2 .

For ships to which timber freeboards are assigned, the summer freeboard (and not the timber summer freeboard) is to be assumed when applying paragraph (1).

(2) Where the bow height required in paragraph (1) is obtained by sheer, the sheer shall extend for at least 15% of the length of the ship measured from the forward perpendicular. Where it is obtained by fitting a superstructure, such superstructure shall extend from the stem to a point at least 0.07L abaft the forward perpendicular, and shall be enclosed as defined in regulation 3(11).

(3) Ships which, to suit exceptional operational requirements, cannot meet the requirements of paragraphs (1) and (2) of this regulation may be given special consideration by the Administration.

(34) (a) The sheer of the forecastle deck may be taken into account, even if the length of the forecastle is less than 0.15L, but greater than 0.07L, provided that the forecastle height is not less than one half of standard height of superstructure as defined in regulation 33 between 0.07L and the forward terminal.

(b) Where the forecastle height is less than one half of standard height of superstructure, as defined in regulation 33, the credited bow height may be determined as follows (figures 39.1 and 39.2 illustrate the intention of (i) and (ii) respectively):

(i) Where the freeboard deck has sheer extending from abaft 0.15L, by a parabolic curve having its origin at 0.15L abaft the forward terminal at a height equal to the midship depth of the ship, extended through the point of intersection of forecastle bulkhead and deck, and up to a point at the forward

terminal not higher than the level of the forecastle deck. However, if the value of the height denoted h_t , on figure 39.1 is smaller than the value of the height denoted h_b , then h_t may be replaced by h_b in the available bow height.

- (ii) Where the freeboard deck has sheer extending for less than $0.15L$ or has no sheer, by a line from the forecastle deck at side at $0.07L$ extended parallel to the base line to the forward terminal.

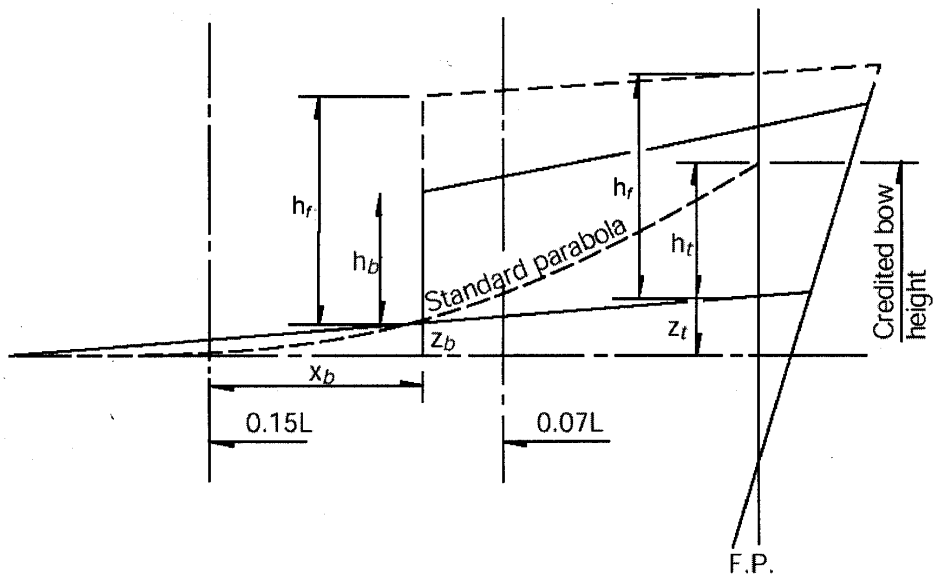


Figure 39.1

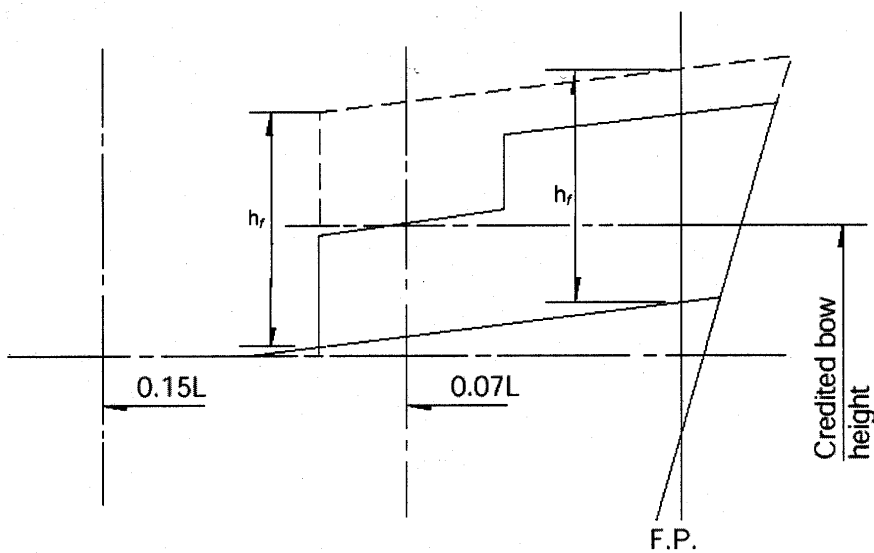


Figure 39.2

h_f = Half standard height of superstructure as defined in regulation 33.

$$h_t = Z_b \left(\frac{0.15L}{x_b} \right)^2 - Z_t$$

(45) All ships assigned a type 'B' freeboard, other than oil tankers*, chemical tankers* and gas carriers*, shall have additional reserve buoyancy in the fore end equivalent to that obtained between the summer load waterline and the standard shear curve. Within the range of 0.15L abaft of the forward perpendicular, the sum of the projected area between the summer load waterline and the deck at side (A1 and A2 in figure 39.3) and the projected area of an enclosed superstructure, if fitted, (A3) shall not be less than:
 $(0.15F_{\min} + 5.4754.0(L/3 + 10))L/1000 \text{ m}^2$

where:

- F_{\min} is calculated by: $F_{\min} = (F_0 \times f_1) + f_2$;
- F_0 is the tabular freeboard, in mm, taken from table 28.2, corrected for regulation 27(9) or 27(10), as applicable;
- f_1 is the correction for block coefficient given in regulation 30; and
- f_2 is the correction for depth, in mm, given in regulation 31 .

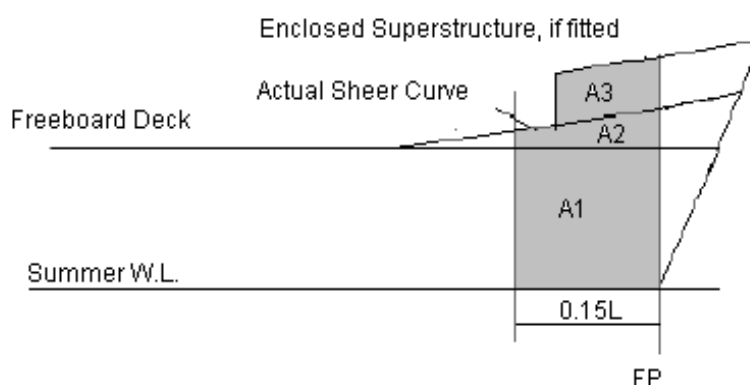


Figure 39.3

~~(5) Ships which, to suit exceptional operational requirements, cannot meet the requirements of this regulation may be given special consideration by the Administration."~~

* Oil tankers, chemical tankers and gas carriers as defined in SOLAS regulations II-1/2.12, VII/8.2 and VII/11.2, respectively.