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SUB-COMMITTEE ON SHIP DESIGN AND
EQUIPMENT
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REPORT TO THE MARITIME SAFETY COMMITTEE

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1 GENERAL

Introduction

1.1 The Sub-Committee held its forty-ninth session from 20 to 24 February 2006 under the chairmanship of Mrs. Anneliese Jost (Germany) who was elected Chairman at the start of the meeting, since the former Chairman, Mr. I. Ponomarev (Russian Federation), following his election as Chairman of the MSC, was no longer available to chair the Sub-Committee. The Vice-Chairman, Mrs. Xiang Yang (China), was also present.

1.2 The session was attended by delegations from the following Member Governments:

ALGERIA	JAPAN
ARGENTINA	LATVIA
AUSTRALIA	LIBERIA
BAHAMAS	MALAYSIA
BOLIVIA	MALTA
BRAZIL	MARSHALL ISLANDS
CANADA	MEXICO
CHILE	MOROCCO
CHINA	NETHERLANDS
COLOMBIA	NIGERIA
CROATIA	NORWAY
CUBA	PANAMA
CYPRUS	PERU
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA	PHILIPPINES
DENMARK	POLAND
DOMINICA	PORTUGAL
DOMINICAN REPUBLIC	REPUBLIC OF KOREA
ECUADOR	ROMANIA
EGYPT	RUSSIAN FEDERATION
FINLAND	SAUDI ARABIA
FRANCE	SINGAPORE
GABON	SOUTH AFRICA
GERMANY	SPAIN
GREECE	SWEDEN
ICELAND	TURKEY
INDONESIA	TUVALU
IRAN (ISLAMIC REPUBLIC OF)	UNITED KINGDOM
IRELAND	UNITED STATES
ISRAEL	URUGUAY
ITALY	VANUATU
	VENEZUELA

and the following Associate Member of IMO:

HONG KONG, CHINA

1.3 The session was also attended by observers from the following intergovernmental organization:

EUROPEAN COMMISSION (EC)

and the following non-governmental organizations in consultative status:

INTERNATIONAL CHAMBER OF SHIPPING (ICS)
INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)
INTERNATIONAL CONFEDERATION OF FREE TRADE UNIONS (ICFTU)
BIMCO
INTERNATIONAL ASSOCIATION OF CLASSIFICATION SOCIETIES (IACS)
EUROPEAN CHEMICAL INDUSTRY COUNCIL (CEFIC)
OIL COMPANIES INTERNATIONAL MARINE FORUM (OCIMF)
INTERNATIONAL MARITIME PILOTS' ASSOCIATION (IMPA)
INTERNATIONAL ASSOCIATION OF DRILLING CONTRACTORS (IADC)
INTERNATIONAL ASSOCIATION OF INSTITUTES OF NAVIGATION (IAIN)
INTERNATIONAL FEDERATION OF SHIPMASTERS' ASSOCIATION (IFSMA)
INTERNATIONAL LIFE-SAVING APPLIANCES MANUFACTURERS'
ASSOCIATION (ILAMA)
COMMUNITY OF EUROPEAN SHIPYARDS' ASSOCIATIONS (CESA)
INTERNATIONAL ASSOCIATION OF INDEPENDENT TANKER OWNERS
(INTERTANKO)
INTERNATIONAL COUNCIL OF CRUISE LINES (ICCL)
INTERNATIONAL ASSOCIATION OF DRY CARGO SHIPOWNERS
(INTERCARGO)
THE INSTITUTE OF MARINE ENGINEERING, SCIENCE AND TECHNOLOGY
(IMarEST)
THE INTERNATIONAL MARINE CONTRACTORS ASSOCIATION (IMCA)
INTERNATIONAL HARBOUR MASTERS' ASSOCIATION (IHMA)
THE ROYAL INSTITUTION OF NAVAL ARCHITECTS (RINA)
INTERFERRY

Opening address

1.4 In welcoming the participants on behalf of the Secretary-General, Mr. K. Sekimizu, Director, Maritime Safety Division, referred to the loss of more than 900 lives in the accident involving the ro-ro ferry **al-Salam Boccaccio 98** in the Red Sea two weeks ago. He shared the view of the Secretary-General that it was most regrettable that this accident occurred during what was supposed to be a routine voyage between two ports of neighbouring countries and that it was extremely sad that these kinds of accidents still happened, despite the extensive work done by IMO on the safety of ro-ro passenger ships. He expressed hope that the investigation into the accident would identify the causes of the casualty and bring to light any areas where remedial action might be required, in which case IMO would move fast to act as necessary.

The Director drew attention to the Council's decision of last November that the theme for this year's World Maritime Day should be "**Technical Co-operation: IMO's response to the 2005 World Summit**", with special emphasis on the maritime needs of Africa. He pointed out that this important theme has given the Organization the opportunity to contribute to the fulfilment of the Millennium Development Goals, set by the 2000 Millennium Summit and re-affirmed at the 2005 World Summit, as the world community's response to identify new needs and challenges presented by the fact that hundreds of millions of people are left defenceless against hunger, disease and environmental degradation, even though the means to protect them against these are available. He emphasized that maritime activity had a key role to play in meeting these goals and already provides the mechanism to promote economic development, being an important source of invisible income to many developing countries. He hoped that the Organization could count on

the support and contribution of all the components of shipping to achieve the noble goals the world community had set for the current Millennium.

Referring to the most important safety issues before the Sub-Committee this week, he singled out passenger ship safety and performance standards for protective coatings and mentioned environment-related issues assigned to the Sub-Committee by the MEPC, namely amendments to the Condition Assessment Scheme (CAS) and the revision of the Guidelines for systems for handling oily wastes in machinery spaces of ships (MEPC/Circ.235).

With regard to the work on passenger ship safety, the Director observed that the MSC had assigned to the Sub-Committee various tasks of the highest importance, including matters related to alternative designs and arrangements, life-saving appliances and protection of essential systems for safe return to port and orderly evacuation and abandonment. Ensuring that passenger ship safety standards were high enough to adequately serve not only today's but also future challenges was vital and the Sub-Committee's contribution to the MSC's proactive work in this area was of the utmost importance.

Referring to the intensive debate on the development of requirements for protective coatings, the Director noted that a correspondence group had developed draft performance standards for protective coatings, for consideration at this session in the light of the numerous submissions made on the subject. Besides the detailed technical requirements for dedicated seawater ballast tanks and double-side skin spaces of bulk carriers, the Sub-Committee was expected to discuss the scope of application of the performance standards, the scope of the Coating Technical File and the applicability of test procedures for alternative and equivalent coating systems, so that the MSC could take a decision on the related application provisions.

Other important tasks included the review of the 2000 HSC Code and of amendments to the DSC Code and the 1994 HSC Code which were also expected to be finalized, and the review of the SPS and MODU Codes and the Code on Alarms and Indicators, which needed to be brought in line with the latest developments in design and technology. However, tasks such as provisions for gas-fuelled ships, mandatory emergency towing systems in ships other than tankers of not less than 20,000 dwt, inspection and survey requirements for accommodation ladders, the review of requirements on relevant equipment for the revision of the Intact Stability Code and the consideration of IACS unified interpretations were all equally important.

The Director then invited the Sub-Committees' attention to two issues of a general nature. As the Audit Scheme was now ready for implementation, the Director indicated that the Secretary-General would appreciate receiving favourable responses from Members: firstly, that they would offer themselves for audit, as requested by the Assembly in resolution A.974(24); secondly, nominate auditors to enable him to select audit teams to conduct the audit; and thirdly, nominate qualified auditors to participate in the regional training courses the Organization was planning. He stated that the Secretary-General had pledged his personal commitment to the Scheme and would appreciate the support and co-operation of everyone in a position to contribute to the wide and effective implementation of the Scheme.

Concerning the planned refurbishment of the Headquarters Building, which would be closed for approximately 12 months between the summers of 2006 and 2007, the Director informed that the Secretariat would move temporarily to offices in London provided by the Host Government and the meetings of the committees and sub-committees would be held elsewhere in London and abroad. He expressed hope that Members would be prepared to face with resolute spirit and good humour any discomfort and disruption from normal operations. He informed that the next meeting of the Sub-Committee in 2007 is planned to be held in London.

Statement by the delegation of Panama

1.5 The delegation of Panama expressed its sorrow regarding the terrible accident involving the ferry **al-Salam Boccaccio 98** off the coast of Egypt which caused loss of life and grief to the families of those affected. The delegation also thanked IMO for their involvement in connection with this tragic event.

Chairman's remarks

1.6 The Chairman, in thanking Mr. Sekimizu, stated that the Secretary-General's words of encouragement as well as the advice and requests would be given every consideration by the Sub-Committee.

Adoption of the agenda

1.7 The Sub-Committee adopted the agenda for the forty-ninth session (DE 49/1) and agreed to be guided in its work, in general, by the annotations contained in document DE 49/1/1. The agenda, as adopted, with the list of documents considered under each agenda item, is set out in document DE 49/INF.10.

2 DECISIONS OF OTHER IMO BODIES

2.1 The Sub-Committee noted the decisions and comments pertaining to its work made by FSI 13, BLG 9, MSC 80, NAV 51, MEPC 53, SLF 48, DSC 10, FP 50 and STW 37, as reported in documents DE 49/2, DE 49/2/1, DE 49/2/2 and DE 49/2/3, and took them into account in its deliberations when dealing with relevant agenda items.

Agenda items transferred to other sub-committees

2.2 The Sub-Committee noted that, in view of the need to reduce the workload of the Sub-Committee at this session, MSC 80 had agreed to move, on an *ad hoc* basis for 2006 only, the following items of the provisional agenda for this session to the provisional agenda for FP 50:

- .1 measures to prevent accidents with lifeboats;
- .2 compatibility of life-saving appliances;
- .3 inconsistencies in IMO instruments regarding requirements for life-saving appliances;
- .4 test standards for extended service intervals of inflatable liferafts; and
- .5 amendments to resolution A.761(18);

and the following items to the provisional agenda for BLG 10:

- .6 safety aspects of ballast water management; and
- .7 guidelines on equivalent methods to reduce on-board NO_x emission.

3 AMENDMENTS TO RESOLUTION A.744(18)

General

3.1 The Sub-Committee noted that MSC 80 had adopted amendments to the Guidelines on the enhanced programme of inspections during surveys of oil tankers and bulk carriers (ESP Guidelines) (resolution A.744(18), as amended), concerning the introduction of survey requirements for double-hull oil tankers, as prepared by DE 47 and approved by MSC 79, by resolution MSC.197(80). The amendments are expected to enter into force on 1 January 2007.

3.2 The Sub-Committee recalled that DE 48 had agreed to further consider the following issues concerning amendments to the ESP Guidelines at this session:

- .1 survey requirements for double-side skin bulk carriers (DE 48/3);
- .2 procedural requirements for surveyor monitoring of thickness measurements (DE 49/3); and
- .3 requirements for provision and maintenance of as-built drawings covering items such as machinery installations, electrical installations and control systems, etc.

and also the following issues concerning amendments to the Condition Assessment Scheme (CAS) at this session:

- .4 proposals by Japan concerning inspection of fillet weld between deck plates and longitudinals (DE 48/3/1 and DE 48/3/2) and guidelines on major repair work of hull girders (DE 48/3/3); and
- .5 a proposal by the Marshall Islands (DE 48/WP.8) concerning issues affecting flag Administration procedures on the occasion of a change of flag during the course of a CAS survey.

3.3 The Sub-Committee noted that MEPC 53 had noted document MEPC 53/6/4 (Marshall Islands), following up on their proposal to amend CAS as contained in document DE 48/WP.8 with the intention to raise the awareness of the Committee and of the shipping community, in general, with regard to the serious problems a flag State may face when a change of flag occurs in the midst of the CAS proceedings, given the fact that this matter could not be considered in depth at DE 48 due to time constraints. MEPC 53, recalling that this issue was currently under discussion in the Sub-Committee, reminded interested delegations to submit their comments to DE 49 noting that, should the proposed amendments to CAS be agreed at that session, they could be approved by MEPC 54 in March 2006.

Amendments to the ESP Guidelines (resolution A.744(18))

3.4 The Sub-Committee considered documents DE 49/3 and DE 49/3/2 (IACS), submitting the text of IACS Procedural Requirement No.19 – Procedural requirements for surveyor monitoring of thickness measurements and informing of revisions to UR Z10.5 (Hull surveys of double skin bulk carriers), which had been submitted to DE 48 as document DE 48/3, as well as URs Z10.1 (Hull surveys of oil tankers), Z10.2 (Hull surveys of bulk carriers) and Z10.4 (Hull surveys of double hull oil tankers).

3.5 The delegation of Japan expressed its concern that the above mentioned IACS URs contained significant changes to the present ESP Guidelines, in particular on the judgement of the critical coating condition, and requested IACS to provide a clear justification for the changes. The Sub-Committee agreed that this concern should be addressed by the correspondence group (see paragraph 3.7 below).

3.6 The Sub-Committee recalled that it had invited IACS to submit the above-mentioned procedural requirements for surveyor monitoring of thickness measurements and also the procedures for hull surveys of double-skin bulk carriers so that their inclusion in the ESP Guidelines could be considered. The Sub-Committee also recalled its agreement at DE 48 to further consider requirements for provision and maintenance of as-built drawings covering items such as machinery installations, electrical installations and control systems, etc. The Sub-Committee noted that no concrete proposals from Member Governments concerning the inclusion of these three items in the ESP Guidelines had been received for this session.

3.7 The Sub-Committee agreed, in principle, that the three issues mentioned above should be included in the ESP Guidelines and, in view of the volume of work involved, decided to establish a correspondence group under the co-ordination of Japan* with the following terms of reference:

- .1 to prepare concrete proposals for draft amendments to the ESP Guidelines (resolution A.744(18)), based on the relevant IACS UR and taking into account comments and proposals made at DE 49, concerning:
 - .1.1 procedural requirements for surveyor monitoring of thickness measurements;
 - .1.2 procedures for hull surveys of double skin bulk carriers; and
 - .1.3 requirements for provision and maintenance of as-built drawings covering items such as machinery installations, electrical installations and control systems, etc.; and
- .2 to submit a report to DE 50.

3.8 Noting that the target completion date for the item was 2006, the Sub-Committee agreed to invite the Committee to extend the item to 2007 so that the outcome of the correspondence group could be considered at DE 50.

Amendments to the Condition Assessment Scheme (CAS) (resolution MEPC.94(46))

3.9 The Sub-Committee recalled that DE 48 had agreed to further consider documents DE 48/3/1, DE 48/3/2 and DE 48/3/3 by Japan, proposing amendments to CAS, including two sets of guidelines concerning major repair work of hull girders and inspection of fillet weld

* **Co-ordinator:** Mr. Koichi Yoshida
Principal Research Co-ordinator
National Maritime Research Institute
6-38-1 Shinkawa
Mitaka 181-0004
Japan
Tel.: +81 422 41 3615
Fax: +81 422 41 3247
E-mail: koichiy@nmri.go.jp

between deck plates and longitudinals, at this session, as well as the proposal by the Marshall Islands (DE 48/WP.8 and MEPC 53/6/4) concerning issues affecting flag Administration procedures on the occasion of a change of flag, recognized organization, ship ownership or ISM Code company during the course of a CAS survey or after the issue of a Statement of Compliance.

3.10 The Sub-Committee considered document DE 49/3/1 (Japan), providing their latest proposal which replaces the proposals in documents DE 48/3/1, DE 48/3/2 and DE 48/3/3, for amendments to CAS concerning thickness measurements and related draft guidelines on inspection requirements for fillet weld between deck plates and longitudinals. There was general agreement with the proposal, and the Sub-Committee established a drafting group to finalize the text of the draft amendments and the guidelines.

3.11 The Sub-Committee then considered document MEPC 53/6/4 (Marshall Islands), proposing amendments to CAS for cases where a change of flag occurs during CAS surveys. As there was general support for the proposal, the Sub-Committee agreed that the draft amendments to CAS as proposed by the Marshall Islands should be finalized by the aforementioned drafting group.

Establishment of the drafting group

3.12 Having established the drafting group, the Sub-Committee instructed the group, taking into account comments and proposals made in plenary, to:

- .1 finalize the text of the draft amendments to CAS and the related draft Guidelines on inspection requirements for fillet weld between deck plates and longitudinals, on the basis of document DE 49/3/1; and
- .2 finalize the text of the draft amendments to CAS for cases where a change of flag recognized organization, ship ownership or ISM Code company occurs during the course of a CAS survey or after the issue of a Statement of Compliance to an oil tanker, on the basis of document MEPC 53/6/4.

Report of the drafting group

3.13 Having received the report of the drafting group (DE 49/WP.4), the Sub-Committee approved it in general and took action as outlined in the following paragraphs.

3.14 The Sub-Committee agreed to the text of:

- .1 the draft amendments to the Condition Assessment Scheme and an associated draft MEPC resolution, set out in annex 1; and
- .2 the draft Guidelines on assessment of the residual fillet weld between deck plating and longitudinals and an associated draft MEPC resolution, set out in annex 2,

for submission to MEPC 54 for consideration and action as appropriate.

3.15 The Sub-Committee endorsed the drafting group's view that thickness measurement of residual fillet weld between deck plating and longitudinals during the course of a CAS survey can be used on an optional and voluntary basis by attending surveyors if and when they deem it necessary.

4 PASSENGER SHIP SAFETY

General

4.1 The Sub-Committee recalled that DE 48 had prepared draft amendments to SOLAS chapters II-1 and III for alternative design and arrangements and draft performance standards for essential systems on passenger ships, taking into account the instructions of MSC 78 and MSC 79, and, having re-established the Correspondence Group on Passenger Ship Safety with the terms of reference set out in paragraph 4.30 of document DE 48/25, had instructed it to submit a report to DE 49.

4.2 In considering the outcome of MSC 80, NAV 51, SLF 48 and FP 50 (DE 49/2/2, DE 49/4 and DE 49/4/3), the Sub-Committee noted that:

- .1 MSC 80, in considering the outcome of STW 36, FP 49, COMSAR 9 and DE 48 for matters related to the work on passenger ship safety, had agreed to a revised work plan, which is set out in the annex to document DE 49/4;
- .2 in considering matters related to the “3-hour timeframe for habitability”, MSC 80 had instructed the FP and SLF Sub-Committees to prepare an additional casualty scenario, for design purposes, to support the aforementioned goal, taking into account the definitions of “casualty threshold” and “time for orderly evacuation and abandonment” prepared at MSC 80 (MSC 80/WP.11 and Corr.1 and Add.1/Rev.1);
- .3 NAV 51 had prepared amendments to the draft Performance standards for essential systems on passenger ships prepared at DE 48, which are set out in annex 13 to document NAV 51/19;
- .4 SLF 48 had agreed to develop mandatory requirements for water ingress detection and flooding level monitoring systems, taking into account the best industry practice presented by ICCL (MSC 77/4/1), with a view to providing the master with real time information on the progression of flooding and invited the DE Sub-Committee to consider technical aspects under its purview;
- .5 in considering matters related to the draft Performance standards for essential systems and equipment on passenger ships as prepared at DE 48, SLF 48 recommended that flooding detection systems, if installed, should be included in the standards for safe return to port and that bilge systems should be included in the standards for evacuation and abandonment; and
- .6 FP 50 had completed its work on the amendments to SOLAS chapter II-2 and the FSS Code for matters related to prevention of fires, safe return to port and the time for abandonment, taking into account the recommendations of DE 48 and SLF 48.

Report of the correspondence group

4.3 Having considered the report of the Correspondence Group on Passenger Ship Safety (DE 49/4/1 and Corr.1) and relevant comments by Japan (DE 49/4/2 and DE 49/INF.4) on matters related to the performance standards for life-saving appliances, the Sub-Committee approved the report in general and took action as indicated in paragraphs 4.4 to 4.8 below.

Alternative design and arrangements

4.4 The Sub-Committee considered the draft amendments to SOLAS chapters II-1 and III and the supporting guidelines for matters related to alternative design and arrangements, as set out in annexes 4, 5 and 6 to document DE 49/4/1, and instructed the working group to finalize the aforementioned draft amendments and supporting guidelines at this session.

4.5 In considering the comments made by the delegations of Norway and the United Kingdom that SOLAS chapters II-1 and III should be amended to include purpose statements and functional requirements for each regulation (similar to SOLAS chapter II-2) to provide a consistent set of performance criteria, the Sub-Committee recalled its decision at DE 48 (DE 48/25, paragraph 4.15) that such requirements were not considered necessary since the engineering analysis required by the aforementioned provisions require that the intent of the prescriptive requirements be used as a basis for setting such criteria.

4.6 The delegation of Norway reserved its position on the above decision and expressed the view that leaving the development of the goals, objectives and performance criteria to the engineering analysis team in each case may lead to different practices amongst Administrations.

Performance standards for life-saving appliances

4.7 The Sub-Committee discussed the draft amendments to SOLAS chapter III set out in annex 2 to document DE 49/4/1 and instructed the working group, when considering the correspondence group's proposals in detail, to take into account the 5-day time to recover lifeboats agreed by MSC 79.

4.8 In considering the submissions by Japan (DE 49/4/2 and DE 49/INF.4), proposing a comprehensive review of the requirements for life-saving appliances, the Sub-Committee agreed that such a review was outside the scope of this agenda item and invited the delegation of Japan to submit their proposal to the Committee in accordance with the Guidelines on the organization and method of work.

Establishment of the working group

4.9 Recognizing the necessity to finalize work on this item and recalling its relevant decisions at DE 48, the Sub-Committee re-established the Working Group on Passenger Ship Safety and, taking into account the comments and decisions made in plenary and the report of the correspondence group (DE 49/4/1 and Corr.1), instructed it to:

- .1 finalize the draft amendments to SOLAS chapters II-1 and III on alternative design and arrangements and the related guidelines, using annexes 4, 5 and 6 to document DE 49/4/1 as a basis;
- .2 finalize the draft performance standards for essential systems and equipment on passenger ships for safe return to port and abandonment, using annexes 5 and 6 to document DE 48/WP.4 as a basis, and taking into account the outcome of NAV 51, SLF 48 and FP 50 (DE 49/2/2, DE 49/4 and DE 49/4/3);
- .3 finalize the draft amendment to SOLAS regulation II-1/41 relevant to auxiliary cabin lighting, based on the text set out in annex 7 to document DE 48/WP.4;

- .4 finalize the draft amendment to SOLAS regulation III/21.1.4 relevant to the time for abandonment, based on the text set out in annex 7 to document DE 48/WP.4;
- .5 finalize matters related to the performance standards for life-saving systems, taking into account annex 2 to document DE 49/4/1 and the 5-day time to recover agreed by MSC 79; and
- .6 consider any remaining issues related to this subject and advise the Sub-Committee, as appropriate.

Report of the working group

4.10 Having received the report of the working group (DE 49/WP.1), the Sub-Committee approved it in general and took action as outlined hereunder.

Alternative design and arrangements

4.11 The Sub-Committee considered draft amendments, concerning alternative design and arrangements, to SOLAS chapters II-1 and III as prepared by the group and agreed to the draft amendments, set out in annex 3, for submission to MSC 81 for consideration and action as appropriate.

4.12 The Sub-Committee considered the draft Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III as prepared by the group and, after having made minor modifications, agreed to the draft Guidelines, set out in annex 4, for submission to MSC 81 for consideration and action as appropriate.

4.13 Having considered the above matters, the Sub-Committee noted the group's view that the above draft SOLAS amendments and supporting guidelines were not intended for the type approval of individual materials, components or portable equipment and, in this regard, the group recommended that guidelines for the type approval of individual materials, components or portable equipment should be developed by the Sub-Committee, taking into account the relevant parts of resolution A.520(13) and similar guidelines, if the above draft amendments are adopted by the Committee.

Performance standards for essential systems and services

4.14 The Sub-Committee considered the draft performance standards for essential systems and services prepared by the group and agreed to:

- .1 the draft Performance standards for the systems and services to remain operational on passenger ships for safe return to port after a casualty, as specified in SOLAS regulations II-2/21.4 and II-2/21.5.1.2, set out in annex 5; and
- .2 the draft Performance standards for the systems to remain capable of operation on passenger ships for orderly evacuation and abandonment, as specified in SOLAS regulation II-2/21.6.2, set out in annex 6,

for submission to MSC 81 for consideration and action as appropriate.

Auxiliary cabin lighting

4.15 The Sub-Committee agreed to the draft amendment to SOLAS regulation II-1/41 for auxiliary cabin lighting, as set out in annex 7, for submission to MSC 81 for consideration and action as appropriate.

Clarification of SOLAS regulation III/21.1.4

4.16 Having noted that the draft amendment to SOLAS regulation III/21.1.4 had been prepared to clarify the existing time requirement for the boarding and launching of survival craft, the Sub-Committee agreed to the draft amendments to SOLAS regulation III/21.1.4, as set out in annex 8, for submission to MSC 81 for approval and subsequent adoption, together with the draft amendments to SOLAS chapter III prepared by FP 50 (FP 50/21, annex 9), taking into account the need to resolve this matter expeditiously to facilitate consistent implementation of the aforementioned regulation.

Performance standards for survival craft

4.17 The Sub-Committee endorsed the group's view that the existing requirements of SOLAS chapter III adequately covered matters related to climatic conditions and the time to recover (5 days) agreed by MSC 79.

4.18 In the context of the item, the Sub-Committee noted that the group endorsed the views of Japan (DE 49/4/2 and DE 49/INF.4) and the United Kingdom that the present requirements for life-saving appliances and arrangements in SOLAS chapter III should undergo a comprehensive review to better reflect today's needs and address any consequential work from this initiative related to life-saving appliances. In this regard, the delegation of Japan indicated that it would submit a relevant document to a future session of the Committee in accordance with the Guidelines on the organization and method of work.

Any other matters

Recovering persons from survival craft and the water

4.19 Having noted the draft functional requirements to SOLAS chapter III for means of rescue prepared by the COMSAR Correspondence Group on Passenger Ship Safety, as indicated in paragraph 5.58 of document COMSAR 10/11/1, the Sub-Committee agreed, in principle, to the aforementioned correspondence group's recommendation, bearing in mind that COMSAR 10 still has to consider the above proposal in detail and, as such, the proposed recovery rates are not yet fixed.

4.20 In considering the rates of recovery specified in the aforementioned paragraph 5.58, the Sub-Committee endorsed the group's views that the recovery rate should take into account the capabilities of existing recovery and rescue systems and that testing and demonstration criteria should be developed by the Sub-Committee to support paragraph 5.58.7 of document COMSAR 10/11/1, if approved by COMSAR 10 and MSC 81.

Working definition for damage control

4.21 The Sub-Committee noted that the group considered the draft proposed working definition for the damage control concept prepared by the correspondence group (DE 49/4/1, annex 3) and took it into account in the course of its deliberations on matters related to essential systems (see paragraph 4.14 above).

Completion of the work on this item

4.22 Having considered the above issues, the Sub-Committee agreed to invite the Committee to delete this item from its work programme since the work on this matter has been concluded, bearing in mind that any consequential work from other bodies can be dealt with under existing work programme items.

5 REVIEW OF THE 2000 HSC CODE AND AMENDMENTS TO THE DSC CODE AND THE 1994 HSC CODE

General

5.1 The Sub-Committee recalled that DE 48 had re-established the correspondence group under the co-ordination of Australia and instructed it to continue preparing amendments to the 2000 and 1994 HSC Codes and the DSC Code, based on the report of the correspondence group to DE 48 (DE 48/11) and taking into account decisions made in plenary and also incorporating the contributions from the other sub-committees involved in the review (COMSAR, FP, NAV and SLF Sub-Committees) as and when they were ready. DE 48 also agreed to earmark a working group at this session to finalize the draft amendments to the 1994 and 2000 HSC Codes and the DSC Code.

5.2 The Sub-Committee noted document DE 49/5/1 (Secretariat), reporting on the outcome of FP 49, COMSAR 9, NAV 51, SLF 48 and DSC 10 with regard to the agenda item, and, in particular, that NAV 51 had approved draft amendments to the 2000 HSC Code, chapter 13, to implement a phased carriage requirement for ECDIS on high-speed craft, for submission to MSC 81 for approval with a view to adoption. NAV 51 was of the opinion that the 1994 HSC Code and the DSC Code should also be amended accordingly.

Report of the correspondence group

5.3 In considering the report of the correspondence group (DE 49/5, submitted by Australia), the Sub-Committee:

- .1 agreed, in principle, to the draft amendments to the 2000 HSC Code, as set out in annex 1 to the group's report, and referred them to the working group for finalization;
- .2 noted that the existing interpretations to the 2000 HSC Code as contained in MSC/Circ.1102 had been incorporated in the above draft amendments and that the unified interpretation in MSC/Circ.1177 had been referenced in a footnote (because of its volume it could not be included);
- .3 instructed the working group to ensure that, in general, substantive amendments only apply to new craft;
- .4 endorsed the proposals of the group regarding the incorporation of provisions for radiocommunications in the 1994 and 2000 HSC Codes and the DSC Code;
- .5 agreed, in principle, to the draft amendments to the 1994 HSC Code, as set out in annex 2 to the group's report, and referred them to the working group for finalization;

- .6 agreed, in principle, to the draft amendments to the DSC Code, as set out in annex 3 to the group's report, and referred them to the working group for finalization; and
- .7 instructed the working group to finalize all three sets of amendments at this session.

Guidelines for the conduct of high-speed craft model tests

5.4 The Sub-Committee considered document DE 49/5/2 (Netherlands and ITTC), containing a draft revision of the Interim Guidelines for the conduct of high-speed craft model tests (MSC/Circ.1029), following MSC's agreement at the approval of the Interim Guidelines in 2002 that they should be reviewed within four years, and proposing to replace the Interim Guidelines with definite Guidelines and to include a reference to these Guidelines in a footnote to paragraph 2.2.3.2.2 of the 2000 HSC Code.

5.5 Following consideration of the matter and taking into account the recommendations of the working group (DE 49/WP.2), the Sub-Committee agreed to the draft MSC circular on Guidelines for the conduct of high-speed craft model tests, set out in annex 9, for submission to MSC 81 for approval, bearing in mind that the working group also prepared the text of a relevant footnote to paragraph 2.2.3.2.2 of the 2000 HSC Code.

Definition of operating limits of high-speed craft

5.6 The Sub-Committee considered document DE 49/5/3 (RINA), proposing amendments to the 2000 HSC Code concerning the definition of operating limits of high-speed craft and the inclusion of a new annex on "Factors to be considered in determining craft operating limitations" in the Code. For the longer term, RINA proposed the development of an MSC circular to guide Administrations in determining the operating limitations in a consistent manner. In this context, document DE 49/INF.5 (RINA) provided additional background information in relation to the setting of operating limitations for high-speed craft on a consistent basis.

5.7 There was general agreement with the proposed amendments, and the Sub-Committee instructed the working group to include them in the draft amendments to the 2000 HSC Code. Concerning the proposal for further work on the determination of operating limits, the Sub-Committee instructed the working group to prepare a justification for the inclusion of a new item in the work programme of the Sub-Committee, in accordance with the Guidelines on the organization and method of work.

Establishment of the working group

5.8 The Sub-Committee, as agreed at DE 48, established a working group and instructed it, taking into account comments and decisions made in plenary, to:

- .1 finalize the draft amendments to the 1994 and 2000 HSC Codes and the DSC Code, on the basis of the report of the correspondence group (DE 49/5) and the amendments prepared by the Netherlands and ITTC (DE 49/5/2) and RINA (DE 49/5/3); and
- .2 prepare the justification for a new work programme item on the determination of operating limits of high-speed craft.

Report of the working group

5.9 Having received the report of the working group (DE 49/WP.2 and Corr.1), the Sub-Committee approved it in general and took specific action as outlined in the following paragraphs.

Proposed amendments to the 2000 HSC Code

5.10 Having considered the group's decisions as outlined in paragraphs 5 to 13 of document DE 49/WP.2, the Sub-Committee agreed to the draft amendments to the 2000 HSC Code, as set out in annex 10, for submission to MSC 81 for approval with a view to subsequent adoption.

5.11 The Sub-Committee noted in particular that, in the course of the preparation of the draft amendments, the group had recalled that it was instructed to develop amendments to the Code rather than produce the text of a new Code as had resulted from the corresponding review in 2000. Having been concerned at the potential impact of the amendments on existing craft, the group finalized the proposed amendments on the basis that the application of those amendments would be limited to new craft constructed on or after the date of their entry into force unless specifically stated otherwise, similar to SOLAS amendments.

5.12 The Sub-Committee further noted that, in light of this decision, the group had reviewed the proposed amendments to the Code and had concluded that a small number of them should be applied to existing craft covered by the Code as well as new craft. Accordingly, the words "on all craft" were inserted in paragraphs 1.2.2 (asbestos), 1.8.1 (carriage of certificates), 1.9.1.1 (transit voyages without Permit to Operate), 2.7.2 (measurement of lightship where inclining experiment impractical) and 14.15.10 (testing and maintenance of satellite EPIRBs) of the draft amendments.

5.13 In respect of the application of the above-mentioned clauses to existing craft, the delegation of Greece recorded its strong support for the application of the amendments to be limited to new craft only.

5.14 The Sub-Committee noted that, in view of the large number and complexity of amendments involved and the anticipated difficulty of Code users in following those amendments from a separate document, the group was of the opinion that a high priority should be given to publication of a consolidated edition of the Code and that it would be especially useful if the current amendments were highlighted in such a consolidated edition.

5.15 The Spanish delegation pointed out that the use of asbestos is prohibited on health grounds under its national legislation, and that therefore the use of that should not be considered under the provisions of new paragraph 1.2.2 of the draft amendments to the 1994 HSC Code (annex 3 of document DE 49/WP.2). Spain reserved its position regarding adoption of the draft amendments.

Justification for a new work programme item

5.16 Having considered the above issues, the Sub-Committee noted that the group had considered proposals to incorporate a new requirement and annex consolidating all of the Code requirements to be taken into consideration in establishing the worst operating conditions and operating limitations, which are shown on the craft's Permit to Operate, and concurred with the group's view that an MSC circular should be prepared to guide Administrations in determining operational limitations in a consistent manner and to clarify the intent of Annex 9 of the Code.

Consequently, the Sub-Committee agreed to a justification for a proposed new work programme item on “Guidelines for uniform operating limitations of high-speed craft” prepared in accordance with the provisions of the Guidelines on the organization and method of work (MSC/Circ.1099), as set out in annex 11, for submission to MSC 81 for consideration and action as appropriate.

Proposed amendments to the 1994 HSC Code

5.17 Having noted the actions taken by the group in deciding to implement the decisions of COMSAR 9 by reference to chapter 14 of the 2000 HSC Code, as amended, rather than by repeating the relevant text, the Sub-Committee agreed to the proposed amendments to the 1994 HSC Code prepared by the group, as set out in annex 12, for submission to MSC 81 for approval with a view to subsequent adoption.

Proposed amendments to the DSC Code

5.18 Having noted the action taken by the group in updating the radio requirements of chapter 13 by reference to the latest amendments to SOLAS, the Sub-Committee agreed to the proposed amendments to the DSC Code prepared by the group, as set out in annex 13, for submission to MSC 81 for approval with a view to subsequent adoption.

Completion of the item

5.19 Since work on the item has been completed, the Sub-Committee agreed to invite the Committee to delete it from the Sub-Committee’s work programme.

6 PERFORMANCE STANDARDS FOR PROTECTIVE COATINGS

6.1 The Sub-Committee recalled that MSC 79 had adopted revised SOLAS chapter XII (Additional safety measures for bulk carriers) which is due to enter into force on 1 July 2006 and that regulation 6.3 of this chapter refers to performance standards for protective coatings to be adopted by the Organization. In this connection, the Sub-Committee noted that MSC 79 had agreed that the performance standards, when finalized, should be made mandatory by suitably modifying the relevant SOLAS regulations.

6.2 The Sub-Committee further recalled that DE 48, after an intensive debate, had agreed that the coating performance standards should apply to all ballast and void spaces on all types of ships; that the target coating life should be 15 years; that the concept of a Coating Technical File could be supported; and that verification and inspection issues and requirements for steel primers should be further considered. DE 48 subsequently established a correspondence group to further develop the draft performance standards for protective coatings.

6.3 The Sub-Committee noted that MSC 80 had agreed to the expansion of the scope of the item as suggested by DE 48 and further instructed the Sub-Committee and its correspondence group to consider incorporating, in the performance standards, methods and a scheme of verification and survey for protective coatings; to take into account that performance standards for protective coating systems for seawater ballast tanks should be different from those for void spaces into which seawater normally does not enter; and to consider developing consequential amendments to SOLAS, as appropriate. The Sub-Committee also noted that the correspondence group had taken the additional instructions by MSC 80 into account in its work.

6.4 The Sub-Committee had for its consideration the report of the correspondence group (DE 49/6, submitted by China), containing, in annex 1, draft performance standards for protective coatings; in annex 2, draft basic coating system requirements for void spaces; and, in annex 3, proposed draft amendments to SOLAS regulation II-1/3-2, and the documents commenting thereon submitted by China (DE 49/6/17), Greece (DE 49/6/18), Japan (DE 49/6/9, DE 49/6/10, DE 49/6/11, DE 49/6/12, DE 49/6/13 and DE 49/6/14), the Republic of Korea (DE 49/6/5, DE 49/6/6, DE 49/6/7, DE 49/6/15, DE 49/6/16, DE 49/6/19, DE 49/INF.8 and DE 49/INF.9), BIMCO (DE 49/6/2), IACS (DE 49/6/8), CESA (DE 49/6/4 and DE 49/INF.6), INTERTANKO (DE 49/6/3) and the Secretariat (DE 49/6/1).

Report of the correspondence group

6.5 The Sub-Committee briefly discussed the report of the correspondence group and, having approved the report in general, took specific action as indicated in paragraphs 6.6 to 6.13, bearing in mind that the outcome of the group will be considered in detail by the working group.

Scope of application of the performance standard

6.6 The Sub-Committee agreed with the proposal of the correspondence group to complete, at this session, the draft standards for dedicated seawater ballast tanks for all types of ships and for double-side skin spaces of bulk carriers and to develop requirements for protective coatings for all void spaces separately at a later stage.

6.7 The Sub-Committee noted, in this connection, that since SOLAS regulation XII/6.3, concerning the application of performance standards for protective coatings for dedicated seawater ballast tanks on bulk carriers, is due to enter into force on 1 July 2006, the development of an MSC circular, urging Member Governments to apply the provisions of the performance standards before their formal entry into force, might be appropriate.

6.8 In this regard, the delegation of Japan expressed its concerns regarding the preparation period for implementing the new mandatory requirements for protective coatings and suggested that the effective date of the amendments to SOLAS should be determined taking into account the time needed for preparation, such as surveyors' training and establishment of new working facilities and procedures.

Application of the performance standard to combined tanks

6.9 The Sub-Committee agreed with the proposal of the correspondence group that for combined tanks the standard would be recommendatory, not mandatory, but that this matter should be further considered in more detail once the performance standards for coatings for dedicated seawater ballast tanks had been finalized. The Sub-Committee invited Member Governments and international organizations to submit comments on the issue to DE 50.

Scope of the Coating Technical File (CTF)

6.10 The Sub-Committee considered whether the CTF should only be prepared at the new ship construction stage or whether it should also record relevant activities for maintenance and re-coating and agreed that information on maintenance activities should be included in the CTF. However, it was also agreed that this issue needed further consideration by the working group which was instructed especially to consider the scope of maintenance activities to be included.

Verification: type approval and inspection

6.11 The Sub-Committee discussed briefly which entity should have the responsibility for implementing and ensuring compliance with the performance standard and agreed that the matter should be considered in more detail in the working group.

Test procedures for alternative and equivalent coating systems

6.12 The Sub-Committee considered whether the test procedure should be included in the draft performance standard or whether it should be developed separately at a later stage and, having agreed that the test procedure should be included in the performance standard, decided that it should apply only to alternative systems.

Other issues

6.13 The Sub-Committee agreed that the detailed technical requirements concerning, *inter alia*, dry film thickness, job specification, soluble salt limit, pre-washing, steel condition, surface treatment, surface treatment after erection and dust grade be discussed and agreed in the working group for final consideration by plenary when the report of the group is received.

Establishment of the working group

6.14 As agreed at DE 48, the Sub-Committee established the Working Group on Protective Coatings and instructed it, taking into account decisions, comments and proposals made in plenary, to:

- .1 finalize the draft performance standard for protective coatings of dedicated seawater ballast tanks of all types of ships and of double-side skin spaces of bulk carriers on the basis of annex 1 to the report of the correspondence group (DE 49/6);
- .2 finalize consequential draft amendments to SOLAS regulation XII/6.3;
- .3 consider consequential draft amendments to SOLAS regulation II-1/3.2 on the basis of annex 3 to the report of the correspondence group (DE 49/6); and
- .4 prepare draft terms of reference for a correspondence group, as appropriate, for consideration by the Sub-Committee.

Report of the working group

6.15 Having received the report of the working group (DE 49/WP.3), the Sub-Committee approved it in general and took action as outlined in the following paragraphs.

General

6.16 The delegation of China expressed their belief that, in developing the mandatory performance standard for protective coatings, both the effect of technical provisions therein on the real improvement of the performance and quality of coatings, as well as the consequential impact of its implementation to the maritime industry must be adequately considered. China pointed out that document DE 49/INF.9 (Republic of Korea) provides that when some factors in the technical provisions go beyond certain levels, as indicated in Figure 2 of the document, in the pursuit of the higher standard, even the relevant costs doubled, the actual improvement of the

performance of coating will be very marginal. Therefore, an unreasonable and unjustified standard would not only lead to a dramatic increase in the cost of shipbuilding which contributes very little to the improvement of the performance and quality of coatings, but also have a significant impact on the world shipbuilding industry. Table 1 on page 3 of the same document lists the impacts of the suggested technical provisions in the draft standard on costs, shipbuilding and the improvement of coating performance. In China's view, all those findings should be given full consideration in the development of the coating standard for the reason that the performance standard for protective coating should be science-based, reasonable, justified and practicable. With regard to the performance standard of coatings for void spaces, China was of the view that the compelling need for a mandatory performance standard for coating of void spaces for all types of ship had not yet been evaluated, and that enough time should be allowed for preparing for and gathering experience with the implementation of the performance standard for protective coatings, before embarking on the development standard for void spaces.

6.17 The delegation of Greece was of the opinion that the higher standard should be implemented for three simple reasons: firstly, it was a safety measure that would in the long term significantly improve the safety of ships; secondly, it was a measure that shipowners themselves had asked IMO to implement, and it was not very often that industry insisted on a higher safety standard for which they would have to pay themselves; and thirdly, it was not something new, but a standard that industry was familiar with and which had been already applied in most shipyards. Greece had expected something more robust and believed that the opposition raised lowered the initial IACS industry proposal, based on TSCF 15. However, in the IMO spirit of co-operation and compromise, Greece was willing to support most of the results of the working group so as not to delay the procedure and clarified that MSC 81 should approve the new standard without any unjustified delays, otherwise all the effort and hard work would be wasted. Coating performance was one of the main components that formed the basis of the IACS Common Structural Rules for tankers and bulk carriers and IACS members had to approve plans for new tankers and bulk carriers according to the standard in place after 1 April 2006. There were still many open items in square brackets and they supported the most robust possible standard, within the options established in the working group and could not accept any further lowering of the standard.

The Greek delegation further stated that in their view there were two particular issues. The first was maintenance and Greece could not see any reason to incorporate in this standard any maintenance issues after the delivery of the ship. It was a building standard that would apply to new buildings. Maintenance was a clear statutory requirement and it was for the managing company to prepare and implement the programmed maintenance system according to the ISM Code, and maintenance was also already covered by other instruments. Moreover, there was a specific IACS recommendation (no.87) which the industry was already using. The second issue was the involvement of the recognized organization (RO) that issues the ship certificates at the end of the construction. Greece could not see any reason why the RO should not be involved in the approval and application of the coating, which was not a decorative attire, but a mandatory statutory safety measure. The RO was on board from the first day of the construction, approved the plans, surveyed the hull construction and verified and certified the implementation of the statutory requirements. It should be noted that IACS members were currently approving and certifying the coating system and its application.

6.18 The delegation of Japan reconfirmed its basic position to actively contribute to the development of the highest practicable performance standard for protective coatings. The delegation fully understood the views expressed by the delegations of China and the Republic of Korea. The specification of coating and surface preparation very seriously influenced the productivity of shipyards and a compromise was necessary. In the view of the delegation, the

shipbuilding industry had been willing to compromise in the working group. Coating manufacturers and shipyards had many tasks, such as conducting qualification tests, training inspectors and investing in coating facilities. Therefore, considerable time was needed to prepare for the implementation of the coating standards. The intention of the shipbuilding countries was not to lower the level of the standard, but to make practicable rules. Japan invited all delegations to give due consideration to the implementation of the standard, because impracticable rules or a too early application could undermine the consistency of IMO as well as the framework of unified international regulations.

6.19 The delegation of the Marshall Islands stated that, although they were satisfied that the performance standard for protective coatings should now move forward, they wished to note for future reference that when the Ballast Water Management Convention would enter into force, the coating standard may need to be reviewed in relation to those BWM systems that could involve the use of certain active substances and that such systems may also be limited in use by the capacity of existing coatings to withstand certain active substances.

6.20 The delegation of Panama, supported by the delegation of Norway, stressed that they could not support any further lowering of the performance standard for protective coatings. They reminded the Sub-Committee that cost was not necessarily the prime factor to be taken into account as the shipping industry had repeatedly stressed its acceptance that higher building standards would be reflected in increased costs of new buildings.

6.21 The delegation of the Republic of Korea expressed its deep appreciation to the working group and its Chairman, Mr. M. Hunter from the United Kingdom, for their hard work. Concerning the draft performance standard, they stated that many technical points had not been agreed and were still in square brackets. Having been instructed by the Maritime Safety Committee to finalize the performance standard at this session, there had been restricted time to consider the report of the correspondence group thoroughly in order to agree on all the delicate issues, based on technical and scientific data and best practice. They stressed that, in this technical Sub-Committee, decisions should be made based on scientific and professional judgment while considering the feasibility of the new requirements. The performance standard needed further consideration based on a technical debate. It should also be borne in mind that the Tanker Safety Co-operative Forum (TSCF) 15 guidelines, which were frequently quoted during the development of the draft standard, had so far not been fully applied to any vessel and their validity had yet to be verified.

6.22 The observer from ICS, speaking also for BIMCO, INTERTANKO and INTERCARGO, expressed appreciation to the Chairman and Secretary of the working group for their efforts, without which the draft standard developed could not have reached the advanced stage presented for consideration. The industry considered the standard developed by the working group as appropriate and gave it its full support, but felt that it needed to be recognized that discussions during MSC 81 should not allow any reduction in the requirements of this basically agreed standard, otherwise the already agreed coating target life could not be maintained. The industry expressed some concern about the draft text regarding in-service maintenance and also the possibility that the text developed could be interpreted as to mandating this new construction standard to recoating requirements for ships in service, and confirmed the intention to raise these concerns to the attention of the Committee during the MSC 81 discussions.

Scope of application of the Performance standard

6.23 The Sub-Committee noted that the group, having considered the scope of application of the Performance standard for protective coatings, had agreed that the Performance standard

should be applied to all dedicated seawater ballast tanks constructed of steel on all new ships of 500 gross tonnage and over and double-side skin spaces of new bulk carriers of 150 m in length and upwards.

Amendments to SOLAS regulations II-1/3-2 and XII/6

6.24 With regard to the draft amendments to SOLAS regulations II-1/3-2 and XII/6, the Sub-Committee, in order to make the Performance standard mandatory, noting that the group had decided to merge regulation XII/6.3 into regulation II-1/3-2 to harmonize the two regulations, agreed to the draft amendments to SOLAS regulations II-1/3-2 and XII/6, as set out in annex 14, for submission to MSC 81 for approval with a view to subsequent adoption.

Test procedures for alternative coating systems

6.25 The Sub-Committee noted that the group had considered the issue of test procedures for alternative coating systems and agreed that the procedure should be more stringent for alternative coating systems.

Scope of the Coating Technical File (CTF)

6.26 The Sub-Committee noted that the group had agreed that maintenance should be included in the CTF in the case of significant repair and re-coating.

Technical issues

6.27 The Sub-Committee, noting that the group had considered various options of dry film thickness, namely nominal dry film thickness (NDFT) 335 µm together with 90/10 rule and NDFT 300 µm together with 90/10 rule, agreed to refer the matter to the Committee for decision.

6.28 Regarding job specification, the Sub-Committee noted that the group had agreed to two stripe and two spray coats, and that the second stripe coat by way of welded seams only could reduce the scope, depending on dry film thickness (DFT).

6.29 With respect to pre-washing, the Sub-Committee noted that the group, recognizing that it is sufficient if limits of contaminating substances are stated, had agreed to delete the requirements for pre-washing.

6.30 The Sub-Committee noted that the group had also considered the soluble salt limit and agreed to a figure of soluble salt limit of 50 mg/m² of sodium chloride. However, some delegations preferred to express the limit in terms of total soluble salts and preferred a level of 70 mg/m².

6.31 The Sub-Committee further noted that the group had agreed to dust quantity rating “2” for dust size class “0”, “1” or “2”. However, some delegations expressed concern that this issue should be determined based on scientific evidence, taking into account the practicability at shipyards. Therefore, other options of dust quantity rating “3” and “4” for dust size classes “0”, “1” or “2” were also added in square brackets.

Surface treatment after erection

6.32 With regard to surface treatment after erection (Table 1, .3.e), the Sub-Committee noted that the group had agreed to the following requirement:

“Butts and small damages up to 3% of total area of the tank, St 3 or for butts Sa 2½ where practicable. In case where more than 3% of total area of the tank, then Sa 2½.”

Draft Performance standard for protective coatings of dedicated seawater tanks and double-side skin spaces of bulk carriers

6.33 Following the above consideration, the Sub-Committee agreed to the draft Performance standard for protective coatings of dedicated seawater ballast tanks on all new ships and of double-side skin spaces of bulk carriers and an associated draft MSC resolution, as set out in annex 15, for submission to MSC 81 for approval and appropriate further action. In this respect, the Committee was invited to note that there is still text in square brackets for the Committee to take action as appropriate.

Early implementation of the Performance standard

6.34 The Sub-Committee, realizing that the revised SOLAS regulation XII/6.3 would enter into force on 1 July 2006 and recognizing the need to implement the Performance standard from that day for dedicated seawater ballast tanks and double-side spaces of new bulk carriers of 150 m in length and upwards, agreed to a draft MSC circular on Application of SOLAS regulation XII/6.3 on corrosion prevention of double-side skin spaces and dedicated seawater ballast tanks of bulk carriers and application of the Performance standard for protective coatings for dedicated seawater ballast tanks on all new ships and double-side skin spaces of bulk carriers, as set out in annex 16, for submission to MSC 81 for approval taking into account paragraphs 6.24 and 6.33.

Establishment of a correspondence group

6.35 The Sub-Committee agreed to establish the correspondence group, under the co-ordination of China*, to progress the work on this issue intersessionally, with the following terms of reference:

The correspondence group, taking into account all relevant information and the outcome of the discussion of the working group at DE 49, should consider the draft performance standard for protective coatings of void spaces of all types of ships, based on document DE 49/6, and, in particular:

- .1 identify and define those void spaces to which the Performance standard for protective coatings should apply, considering as a priority tankers and bulk carriers;
- .2 identify and define those void spaces to which a different standard could apply and to develop a draft standard for such spaces for tankers and bulk carriers;
- .3 identify and define those void spaces to which a different standard could apply for other types of ship; and
- .4 submit a report to DE 50.

* **Co-ordinator:** Mrs. Xiang Yang
Room 908, A Bldg., Century Square
99 Wangfujing Avenue
Beijing, China
Tel.: +86 10 651 36633-384
Fax: +86 10 651 36678
E-mail: imocgcoating@ccs.org.cn

(Note: In general, the correspondence group should consider a void space to be a space in a ship that is designed to be dry and completely empty at all times and is not used to carry cargo or ballast water.)

Extension of target completion date

6.36 Subsequently, the Sub-Committee agreed to recommend to the Committee an extension of the target completion date for the item to 2007.

7 MANDATORY EMERGENCY TOWING SYSTEMS IN SHIPS OTHER THAN TANKERS OF NOT LESS THAN 20,000 DWT

7.1 The Sub-Committee recalled that DE 48 had established a correspondence group under the co-ordination of Germany and instructed it to prepare a proposal for draft amendments to SOLAS regulation II-1/3-4 on Emergency towing arrangements on tankers, and related guidelines for the assessment of deck equipment to be used in emergency towing, taking into account comments and proposals made in plenary.

7.2 The Sub-Committee had for its consideration the report of the correspondence group (DE 49/7) and also document DE 49/INF.3 (both by Germany). The Sub-Committee noted that, due to a lack of commonly agreed scope and content of the procedures, the correspondence group had not been able to develop specific wording for the SOLAS amendments and the related guidelines as requested in its terms of reference. The report contains, in annex 1, an outline for the draft amendments and related comments and, in annex 2, a rough outline for guidelines and related comments. Document DE 49/INF.3 contains the report of a shipmaster on the connection of two tugs using both anchor chains under SW monsoon conditions and the subsequent towing of the vessel, intended to illustrate the issue under discussion.

Establishment of the drafting group

7.3 Following a general discussion, the Sub-Committee agreed to establish the drafting group to progress the work, and instructed it, taking into account the comments and decisions made in plenary, to:

- .1 further develop the draft amendments to SOLAS regulation II-1/3-4 on Emergency towing arrangements on tankers, on the basis of the report of the correspondence group (annex 1 to document DE 49/7);
- .2 develop guidelines for owners/operators on the development of emergency towing procedures that will provide information to the master on how to prepare the ship to be taken under tow (from the bow) for foreseeable scenarios, bearing in mind that:
 - .1 such a document will be carried aboard the ship and be available in emergency situations;
 - .2 it will be based on an expert evaluation of existing arrangements and equipment available on board the ship;
 - .3 it will furnish appropriate information on how that equipment should be assembled; and

- .4 it will include advice on other preparations that should be made for towing;
- .3 advise the Sub-Committee whether a correspondence group should be established and, if so, prepare draft terms of reference for consideration by the Sub-Committee; and
- .4 give an oral report on the work done until the end of the week, if necessary, and submit a written report of the drafting group to DE 50.

7.4 The group was also instructed by the Sub-Committee to take into consideration the following:

- .1 the draft amendments should be applicable to new and existing ships (other than tankers subject to existing SOLAS regulation II-1/3-4), with an assumed entry-into-force date of 1 July 2008;
- .2 the emergency towing procedures should be verified by the ship's flag Administration; and
- .3 the emergency towing procedures should be added to the list of documents to be carried aboard all ships (FAL.2/Circ.87 – MEPC/Circ.426 – MSC/Circ.1151).

Report of the drafting group

7.5 Having received the report of the drafting group (DE 49/WP.5), the Sub-Committee approved it in general and took action as outlined in the following paragraphs.

Amendments to SOLAS regulation II-1/3-4

7.6 The Sub-Committee agreed, in principle, to the draft amendments to SOLAS regulation II-1/3-4, as set out in annex 17, for further consideration at DE 50, noting that the amendments take into account comments made in plenary to focus on functional requirements for procedures rather than requiring additional equipment.

7.7 In the context of the possible application of the proposed draft SOLAS amendments and in view of the decision made earlier to apply the proposed amendments to cargo ships above 500 gross tonnage and all passenger ships, the Sub-Committee noted possible difficulties regarding the application to existing ships, in particular that in existing ships certain information may not always be available, e.g. capacity of bollards. However, the Sub-Committee agreed that the proposed draft SOLAS amendments should apply to existing ships and the above-mentioned difficulties could be taken into account when developing the guidelines for procedures. Bearing in mind that one date of coming into force for all ships, both new and existing, could lead to a bottleneck in developing the required procedures, the Sub-Committee agreed to split the date of entry into force into two phases: one date for new ships, existing cargo ships of not less than 20,000 dwt, and existing passenger ships; and another date for existing cargo ships of less than 20,000 dwt two years later.

7.8 Noting that SOLAS regulation II-1/3-4 requires emergency towing arrangements on tankers of not less than 20,000 dwt, the Sub-Committee discussed the application of emergency towing procedures also to such tankers. Noting further that the existing SOLAS requirements as well as the Guidelines on emergency towing arrangements for tankers, adopted by

resolution MSC.35(63), do not explicitly contain requirements for procedures, but on the other hand most of those ships are provided with respective procedures anyway, the Sub-Committee agreed to apply the new procedures also to tankers of not less than 20,000 dwt.

7.9 The Sub-Committee noted the comments made during previous meetings and in the correspondence group and discussed the exemption of ships fitted with redundant propulsion systems. Some delegations were of the opinion that having a redundant propulsion would significantly reduce the likelihood of a ship facing such emergency situations and, consequently, such additional investments in the ship's safety should be encouraged by exemptions, while other delegations felt that emergency towing procedures would be beneficial also for ships having redundant propulsion. However, after further discussion, the Sub-Committee agreed not to provide for exemption of ships having redundant propulsion systems. In case of, for example, offshore supply vessels, it was mentioned that, in particular, such ships could be used for towing and, subsequently, it could be of additional value to reflect this different view in their onboard procedures.

7.10 Regarding the question as to whether to limit the procedures to towing over the bow only or not, aside from possible misinterpretations in case of, for example, double ended ferries, the Sub-Committee was of the opinion that there would be no benefits in such a limitation, in particular as the additional burden to extend the considerations for establishment of emergency towing procedures to towing over the aft would be minor. Subsequently, no such limitation to one end of a ship was included in the draft SOLAS amendments.

7.11 With regard to the draft SOLAS amendments, a certain affinity to the ISM requirements was noted and it was discussed whether the proposed text would be more suitable as part of SOLAS chapter IX. However, having in mind the different concept in ship management requirements, it was agreed that detailed requirements closely related to technical equipment should better remain in SOLAS chapter II-1 and to refer to implications regarding ISM Code matters with a clear reference in the guidelines to be developed.

7.12 The delegation of Greece stated that, in their view, paragraph 2.2 of the proposed draft SOLAS amendments concerning the contents of the emergency towing procedures should be deleted because it was for the managing company of the ship to prescribe these procedures, taking into account the ship type. The requirement as drafted could be confusing as it did not cover other important items, such as ship type, weather conditions and the SMS of the company.

Certificates and documents required to be carried on board ships

7.13 The Sub-Committee discussed the term "verified" (see paragraph 7.4.2 above) and concluded that this should be considered as a verification that such procedures are available on board, rather than an approval or verification of the content. The Sub-Committee considered that such availability on board could sufficiently be granted by inclusion of the emergency towing procedures in FAL.2/Circ.87 – MEPC/Circ.426 – MSC/Circ.1151, and agreed that the emergency towing procedures should be added to the list of documents to be carried on board ships, in due course, following their completion and approval by the Committee.

Other ship types

7.14 The Sub-Committee, noting the special characteristics and operational environment of high-speed craft, agreed to instruct the correspondence group (see paragraph 7.16) to consider the need of such procedures for high-speed craft, including the implications this might have for other instruments like the HSC Code.

7.15 Furthermore, the Sub-Committee noted possible implications on navigational issues and instructed the Secretariat to inform the NAV Sub-Committee about the ongoing work on emergency towing procedures in the Sub-Committee.

Establishment of a correspondence group

7.16 In order to progress the work on the item intersessionally, the Sub-Committee agreed to establish a correspondence group under the co-ordination of Germany* and instructed it, taking into account comments and proposals made in plenary, to:

- .1 finalize the related guidelines for owners/operators on the development of emergency towing procedures, on the basis of the report of the correspondence group (annex 2 to document DE 49/7) and the report of the drafting group (DE 49/WP.5), and taking into account the progress made in the drafting group after their report had been submitted (see paragraph 7.17); and
- .2 submit a report to DE 50.

Oral report of the Chairman of the drafting group

7.17 As the drafting group had continued its work after finalizing its report, the Sub-Committee noted a brief oral statement of the Chairman of the group on the progress made. The discussions within the group had focused on the guidelines for owners/operators on the development of emergency towing procedures and the group amalgamated the results of the work of the correspondence group and the conclusions reached by the drafting group during DE 49. As instructed by plenary, the discussions had concentrated on procedures only and all references to additional equipment had been removed. Considering possible emergency scenarios, the group had identified and described three umbrella situations, which cover the most common and important scenarios. The group also considered relevant technical drawings and their requirements; towing points, their definitions and methods of usage; and the communication between the distressed ship, its owner and the towing company and its ship. The Sub-Committee noted that the results of these discussions would be submitted by the Chairman of the group to DE 50.

Extension of the target completion date

7.18 The Sub-Committee agreed to recommend to the Committee an extension of the target completion date for the item to 2007 in order to complete the work at the next session.

8 INSPECTION AND SURVEY REQUIREMENTS FOR ACCOMMODATION LADDERS

8.1 The Sub-Committee recalled that DE 48 had discussed the development of amendments to SOLAS to require inspections of the means of crew access to and egress from the ship, such as gangways and accommodation ladders as part of the survey of the ship's equipment. DE 48 agreed that this was not mainly a design and specification issue, but very much related to

* **Co-ordinator:** Dipl.-Ing. Stephan P. Assheuer
Head of Dept. Flag State Affairs
Germanischer Lloyd
Vorsetzen 35
20459 Hamburg, Germany
Tel: +49 40 36149-455
E-mail: ash@gl-group.com

maintenance and that a number of national and international standards, including an ISO standard, addressing the matter, already existed. It was also agreed that pilot ladders should be considered under the item. DE 48 had subsequently invited Member Governments and international organizations to submit concrete proposals on inspection and survey requirements for accommodation and pilot ladders to this session.

8.2 The Sub-Committee had for its consideration documents DE 49/8 (Republic of Korea), containing proposals for a draft new SOLAS regulation II-1/3-9 on Means of access to and egress from ships (annex 1) and related guidelines for inspection and survey for accommodation and pilot ladders (annex 2) and DE 49/8/1 and DE 49/INF.7 (Australia), containing a proposal for a draft new SOLAS regulation on Gangways and accommodation ladders and presenting the results of an international survey of harbourmasters concerning incidents with gangways and pilot ladders.

8.3 During the discussion, there was general support for the proposals and the following views were expressed:

- .1 ISO is currently developing and revising relevant standards for accommodation and pilot ladders and should be informed of this discussion and be requested to give a progress report on the status of their work;
- .2 the location of ladders was important and maintenance needed to be adequate, including adequate storing facilities;
- .3 the application of any new provisions to existing arrangements needs to be clarified;
- .4 the need for improvement is urgent since world-wide surveys have shown significant levels of defects to ladders and associated fittings;
- .5 pilot ladders should be replaced after a specified period of time; and
- .6 PSC MOUs should pay particular attention to the examination of pilot ladders.

8.4 Following discussion, the Sub-Committee invited the delegations of Australia and the Republic of Korea to submit a joint proposal for inspection and survey requirements for accommodation and pilot ladders to DE 50. Interested parties were invited to participate in the work by contacting Australia or the Republic of Korea*.

8.5 Having recognized that the development of the requirements referred to in paragraph 8.4 would take some time, the Sub-Committee agreed to prepare a draft MSC circular for approval by MSC 81, drawing the attention of Member Governments to the need for adequate

* **Focal points:**

Rob Gehling	Choong-Hee Kim
Principal Adviser	General Manager
Technical Marine Standards	Rule Development Team
Maritime Safety & Environmental Strategy	Korean Register of Shipping
Australian Maritime Authority	54 Sinseongro
Level 1, 25 Constitution Avenue	23-7 Jang-dong Yuseong-gu
GPO Box 2181	Daejeon
Canberra ACT 2601, Australia	Republic of Korea
Tel: +61 2 6279 5696	Tel: +82 42 869 9251
E-mail: rcg@amsa.gov.au	E-mail: chkim@krs.co.kr

maintenance and inspection of accommodation and pilot ladders, pending finalization of the aforementioned requirements. Having considered a proposal by an informal group (DE 49/WP.9), the Sub-Committee, having made editorial modifications, agreed to a draft MSC circular on Means of embarkation on and disembarkation from ships, set out in annex 18, for submission to MSC 81 for approval.

8.6 Being concerned about the number of accidents involving pilot ladders, some of which have resulted in fatalities, the Sub-Committee agreed to invite IMPA to submit, to DE 50, statistical data on accidents caused by faulty pilot ladders.

8.7 In view of the above decisions, the Sub-Committee agreed to request the MSC to extend the target completion date for the item to 2007.

9 REVISION OF THE GUIDELINES FOR SYSTEMS FOR HANDLING OILY WASTES IN MACHINERY SPACES OF SHIPS (MEPC/CIRC.235)

9.1 The Sub-Committee recalled that DE 48 had considered a submission by Japan (DE 48/18), containing a proposal for a revised text of circular MEPC/Circ.235, incorporating guidelines for integrated bilge water treatment systems (IBTS). Following debate, DE 48 agreed to further consider the proposed revised text of circular MEPC/Circ.235 at this session. The delegation of Japan expressed its intention to further develop the draft amendments to circular MEPC/Circ.235, on the basis of the comments and proposals made in plenary.

9.2 The Sub-Committee had for its consideration document DE 49/9 (Japan), containing the draft revision of the Guidelines for systems for handling oily wastes in machinery spaces of ships (MEPC/Circ.235), incorporating the design concept of integrated bilge water treatment systems (IBTS).

9.3 During the discussion, while the draft revised circular was supported in principle, views were expressed that large quantities of waste water generated by automatic back-flushing oil had not been addressed and that difficulties could be expected concerning the storage, incineration and discharge ashore of slops with a very high water content.

9.4 With regard to the flow diagram of IBTS (annex 1 to document DE 49/9), the Sub-Committee agreed to include clean water tanks in the diagram.

9.5 Following debate, the Sub-Committee agreed to the draft MEPC circular on Revised Guidelines for systems for handling oily wastes in machinery spaces of ships incorporating Guidance Notes for an integrated bilge water treatment system (IBTS), set out in annex 19, for submission to MEPC 54 for approval.

9.6 The Sub-Committee considered that work on the item had been completed and agreed to recommend to the MEPC the deletion of the item from the Sub-Committee's work programme.

10 DEVELOPMENT OF PROVISIONS FOR GAS-FUELLED SHIPS

10.1 The Sub-Committee recalled that DE 48 had agreed that mandatory regulations for gas-fuelled ships should be developed and should not only cover natural gas but also other potential gas fuels such as hydrogen and propane. Following discussion, DE 48 had agreed to consider the draft provisions for gas-fuelled ships further at this session, together with the outcome of the consideration of the item by the BLG and FP Sub-Committees, and invited Members and international organizations to submit relevant comments and proposals.

10.2 The Sub-Committee noted that BLG 9, having recognized that gas as fuel was becoming increasingly more interesting as an alternative to conventional fuels since it produces low emissions, such as those of SO_x, NO_x and other particulate matter, had agreed that it should take an active role in the development of the draft provisions for gas-fuelled ships, given the environmental benefits of using gas as fuel. Consequently, BLG 9 had established a correspondence group and instructed it to prepare appropriate provisions of draft guidelines for gas-fuelled ships for matters under the Sub-Committee's purview, which has submitted its report to BLG 10 (BLG 10/6).

10.3 The Sub-Committee also noted that FP 50 had considered submissions by Norway (FP 50/6), containing draft proposals for fire-related provisions for gas-fuelled ships, and Germany (FP 50/6/1), commenting on document FP 50/6, and, taking into account views expressed to delay work on this matter until BLG 10 had considered the report of its correspondence group (BLG 10/6), invited Member Governments and international organizations to submit comments and proposals to FP 51, which should take into account the outcome of DE 49 and BLG 10 on this matter.

10.4 The Sub-Committee considered documents DE 49/10 (Secretariat), reporting on the outcome of BLG 9 and FP 50 on the matter and DE 49/10/1 (IACS), containing comments on provisions for gas-fuelled ships, as outlined in documents DE 48/19 and DE 48/19/1, in particular drawing attention to the need to ensure that the safety level of the arrangements on gas-fuelled ships is equal to that of ships with diesel engine installations; advocating the establishing of a goal-based system approach; and recommending that the experience gained by the offshore industry in the operation of gas-fuelled installations should be utilized.

10.5 Following a brief discussion, the Sub-Committee agreed to invite BLG 10 to take into account the comments made by IACS in document DE 49/10/1, and Member Governments and international organizations were invited to submit, to DE 50, comments and proposals on the development of provisions for gas-fuelled ships, taking into account the outcome of BLG 10, as appropriate.

11 CONSIDERATION OF IACS UNIFIED INTERPRETATIONS

11.1 The Sub-Committee recalled that DE 48, with a view to ensuring a uniform approach towards the application of the provisions of SOLAS chapters II-1 and XII, had prepared unified interpretations of the provisions of SOLAS chapters II-1 and XII and the Technical provisions for means of access for inspections, based on IACS' Unified Interpretations SC136 and SC180. MSC 80 approved the unified interpretations for circulation as MSC/Circ.1176.

11.2 The Sub-Committee, recalling that document DE 49/11/1 had been dealt with under agenda item 3, considered the following three remaining submissions by IACS under the item:

- .1 document DE 49/11, containing the text of revised Unified Interpretations SC136 and SC180, developed based on the experience gained by IACS members concerning the implementation of SOLAS regulations XII/12 and II-1/41 and proposing subsequent changes to MSC/Circ.1176;
- .2 document DE 49/11/2 concerning revision 2 of IACS Unified Interpretation SC191, prepared based on experience gained in the application of UI SC191, Rev.1, which is contained in MSC/Circ.1176, and proposing a corresponding draft revision to MSC/Circ.1176; and

- .3 document DE 49/11/3, recommending that paragraph 2.2 of Unified Interpretation SC123 be incorporated in the interpretation to SOLAS regulation II-1/26.11 contained in MSC/Circ.1176 in order to also cover arrangements of ships having machinery capable of running with two types of fuel.

11.3 The Sub-Committee discussed the changes to MSC/Circ.1176 proposed by IACS in the above documents and took the following decisions:

- .1 in paragraph 5.3 of MSC/Circ.1176, the title should refer to SOLAS regulation II-1/41.5.1.3, not II-1/41.4, and in the text of the interpretation the word “and” should be changed to “or”;
- .2 in paragraph 10.4 of MSC/Circ.1176, the words “all foreseeable”, “and earth fault”, “excessive runtime” and “I/O unit failure” should be deleted;
- .3 in paragraph 1.5 of MSC/Circ.1176, new text as proposed in the annex to document DE 49/11/2 with regard to rafting should be added to the interpretation; and
- .4 in paragraph 3.2 of MSC/Circ.1176, paragraph 2.2 of SC123 as set out in the annex to document DE 49/11/3 with regard to equivalent arrangements should be incorporated in the interpretation.

11.4 Following the above decisions, the Sub-Committee requested the Secretariat to prepare the draft text of the amendments agreed by plenary (see also paragraph 19.7.3) and, having considered the draft text of the amendments (DE 49/WP.6), agreed to a draft MSC circular on Amendments to unified interpretations to SOLAS chapters II-1 and XII approved by MSC/Circ.1176, set out in annex 20, for submission to MSC 81 for approval.

12 REVIEW OF THE SPS CODE

12.1 The Sub-Committee recalled that MSC 78 had considered the need to update the Code of Safety for Special Purpose Ships (SPS Code) to reflect recent amendments to SOLAS chapter III and the adoption of the LSA Code, also recalling that, since the SPS Code was adopted in 1983, many requirements of the SOLAS Convention had been amended and considerable experience had been gained in the Code’s application. Therefore, MSC 78 considered that this might be a good opportunity for a review of the whole of the SPS Code and agreed to include a high priority item on “Review of the SPS Code”, with two sessions needed to complete the item, in the work programmes of the DE (co-ordinator), COMSAR, DSC, FP, NAV and SLF Sub-Committees.

12.2 The Sub-Committee had for its consideration document DE 49/12/1 (Secretariat), reporting on the outcome of NAV 51, SLF 48 and FP 50 with regard to the item and document DE 49/12 (Norway), recommending amendments to the SPS Code that would define “training ships” in a broader sense than is currently the case, would explicitly include “trainees” in the category of special personnel, and would define the term “training programme”.

12.3 While a number of delegations supported the Norwegian proposals, some other delegations expressed concerns that the proposed definition for “trainee” could be misused since it was too open for interpretation and requested that the definition be re-considered in order to make it clearer and more concise.

12.4 Following debate and noting that no other concrete proposals for amendments to the SPS Code had been received, the Sub-Committee established a correspondence group, under the co-ordination of Norway*, with the following terms of reference:

- .1 to develop draft amendments to the SPS Code, which should also include:
 - .1.1 amendments already approved by the Committee as contained in MSC/Circ.446, MSC/Circ.478, MSC/Circ.739 and resolution MSC.183(79);
 - .1.2 draft amendments following the proposals in document DE 49/12, taking into account the comments made in plenary (paragraph 12.3);
 - .1.3 draft amendments as may be finalized by the other sub-committees involved in the review; and
 - .1.4 rectification of out-of-date SOLAS references; and
- .2 to submit a report to DE 50.

13 REVISION OF THE CODE ON ALARMS AND INDICATORS

13.1 The Sub-Committee recalled that MSC 79 had considered document MSC 79/20/1 (Russian Federation and IACS), proposing to revise the Code on Alarms and Indicators, with a view to updating the provisions of the Code, ensuring its compliance with the current IMO requirements which have been amended since the Code was adopted and eliminating contradiction, ambiguity and unnecessary redundancy in the Code. Subsequently, MSC 79 included in the work programme of the Sub-Committee a high priority item on “Revision of the Code on Alarms and Indicators”, with two sessions needed to complete the item, in co-operation with appropriate sub-committees, as necessary and when requested by the Sub-Committee.

13.2 The Sub-Committee had for its consideration document DE 49/13 (Germany), informing on the progress made by the correspondence group on the revision of Integrated Navigation System (INS) and Integrated Bridge System (IBS) performance standards, and the development of performance standards for bridge alarm management system, established by NAV 51, which had also been instructed to liaise with the DE Sub-Committee to ensure consistent treatment of alarm management when reviewing the Code on Alarms and Indicators; and document DE 49/13/1 (United Kingdom), supporting the proposals in document DE 49/13 to classify alarms on the basis of the urgency of the required response and suggesting common definitions between the INS activity and the revision of the Code and the inclusion of some aspects of alarms that are outside the scope of performance standards which are under development by the NAV Sub-Committee.

* **Co-ordinators:** Mr. Sigurd Gude
Deputy Director General of Shipping & Navigation
Norwegian Maritime Directorate
P.O. Box 8123 Dep
N-0032 Oslo, Norway
Tel: +47 22 45 46 83
Fax: +47 22 45 47 70
Mobile: +47 90 15 92 05
E-mail: sgu@sjofartsdir.no

13.3 Following a brief discussion on the matter, the Sub-Committee invited Member Governments and international organizations to submit, to DE 50, proposals for amendments to the Code on Alarms and Indicators, taking into account the outcome of NAV 52's considerations.

14 AMENDMENTS TO THE MODU CODE

14.1 The Sub-Committee recalled that MSC 79 had considered document MSC 79/22/3 (Secretariat), informing it of amendments to Annex 14 – Aerodromes, Volume II – Heliports, of the Convention on International Civil Aviation, adopted by the ICAO Council on 27 February 2004, which impact on the provisions for helicopter facilities as contained in chapter 13 of the MODU Code. MSC 79 had further considered document MSC 79/22/9 (IADC), providing their views on revising the MODU Code to reflect recent and anticipated amendments to the aforementioned Annex 14. Consequently, MSC 79 included in the work programme of the Sub-Committee and the provisional agenda for this session an item on “Amendments to the MODU Code”. MSC 79 noted in this connection that a number of references to SOLAS regulations in the MODU Code were no longer correct due to amendments to SOLAS adopted in recent years and instructed the Sub-Committee to also take care of this matter when preparing amendments to the MODU Code.

14.2 The Sub-Committee noted that SLF 48, with regard to proposed amendments to the 1988 LL Protocol, had considered documents SLF 48/9 (IADC) and SLF 48/9/2 (IACS) concerning special consideration for self-elevating MODUs (SEDUs). SLF 48 supported, in principle, the concept of providing relaxation for SEDUs in respect of certain provisions of the 1988 LL Protocol. Recognizing that these matters would be more appropriately dealt with in the MODU Code, which is under review by this Sub-Committee, SLF 48 referred these documents to DE 49 for consideration and appropriate action.

14.3 The Sub-Committee had for its consideration document DE 49/14 (Liberia, Marshall Islands, Vanuatu and IADC), containing proposals for amendments to the MODU Code, including proposals for the type of language to be used in the revised Code, and proposing the establishment of a correspondence group to further develop the proposed amendments; and document DE 49/14/1 (Secretariat), reporting on the outcome of SLF 48 as outlined in paragraph 14.2.

14.4 In discussing the proposal in annex 1 to document DE 49/14 concerning the use of certain language with a view to assisting in identifying those provisions of the Code which should be met for certification, the Sub-Committee was of the view that the current IMO style used for non-mandatory instruments should be applied, i.e. using “should” throughout, since the MODU Code is not a mandatory instrument.

14.5 Having agreed to the proposal in document DE 49/14 regarding the correspondence group, the Sub-Committee established the group under the co-ordination of Liberia* with the following terms of reference:

- .1 taking into account comments and proposals made in plenary, to further develop the draft amendments to the MODU Code on the basis of document DE 49/14, giving also consideration to:

* **Co-ordinator:** Mr. Anthony Dupree
Liberian International Ship & Corporate Registry
8619 Westwood Centre Drive
Vienna, Virginia 22182, USA
E-mail: Technical@LISCR.com
TDupree@LISCR.com
Alan.Spackman@IADC.org

- .1.1 the proposal in documents SLF 48/9 (IADC) and SLF 48/9/2 (IACS); and
- .1.2 developments in ICAO concerning helicopter facilities on board ships;
- .2 to consider whether other sub-committees should be requested to review certain parts of the Code where their expertise was required and advise the Sub-Committee accordingly; and
- .3 to submit a report to DE 50.

15 REVIEW OF REQUIREMENTS ON RELEVANT EQUIPMENT FOR THE REVISION OF THE INTACT STABILITY CODE

15.1 The Sub-Committee recalled that MSC 80, when considering the SLF Sub-Committee's work on the revision of the Intact Stability (IS) Code, had agreed, as requested by SLF 47, to include in the Sub-Committee's work programme and the provisional agenda for this session a new high priority item on "Review of requirements on relevant equipment for the revision of the Intact Stability Code" with a target completion date of 2006.

15.2 The Sub-Committee noted that SLF 48, when considering the draft revised IS Code as prepared by its Intact Stability Working Group (SLF 48/WP.2), had agreed that Part B, chapter 4 (Stability calculations performed by stability instruments) of the draft revised Code should be referred to the Sub-Committee for review and comments with a view to possible harmonization with other relevant onboard instruments (e.g. loading instruments) and for its information in the development/revision of relevant IMO instruments.

15.3 The Sub-Committee considered document DE 49/15 (Secretariat), containing at annex the draft text of the aforementioned chapter 4 of the IS Code as prepared by the IS Working Group at SLF 48 and had the following comments:

- .1 as a general observation, the Sub-Committee was of the view that the words "approved by the Administration" should be followed by the words "or an organization recognized by the Administration";
- .2 concerning paragraph 4.1.3, last sentence, concerns were expressed regarding the provision that the results of direct calculations performed by the stability instrument could be accepted by the Administration even if they differed from the required minimum GM;
- .3 concerning paragraph 4.1.6.1, regarding the type approval of onboard computers, views were expressed that the type approval for hardware was not necessary;
- .4 concerning paragraph 4.1.7, regarding the user manual, it was observed that the manual should be written in a language that is understood by the user or in the working language of the ship. Also, the manual could be made available in an electronic format;
- .5 concerning paragraph 4.1.8, regarding installation testing, views were expressed that the term "special survey" should be replaced by "intermediate" or "annual" survey, as appropriate; and

- .6 concerning paragraph 4.1.10 regarding other requirements, in the second subparagraph the words “The program” should be replaced by the words “A separate (e.g. backup) program” because in case of malfunction the installed program might not be able to detect the fault in the first instance, nor would detect when it is being incorrectly or abnormally used, whereas a separate program would; and the words “or check” should be included between the words “alarms” and “when”.

15.4 The Sub-Committee requested the Secretariat to forward the comments on chapter 4 of the draft revised IS Code, as set out in paragraph 15.3 above, to SLF 49.

15.5 Since work on the item has been completed, the Sub-Committee agreed to recommend to the Committee the deletion of the item from its work programme.

16 CASUALTY ANALYSIS

16.1 The Sub-Committee recalled that MSC 80, when receiving updated information from ICS concerning the work of the Inter-Industry Working Group (IIWG) established to study reported incidents of explosions on chemical and product carriers, had invited the IIWG to submit its interim report to FP 50, STW 37, DE 49 and BLG 10, and instructed these Sub-Committees to submit their comments on the interim report to MSC 81.

16.2 The Sub-Committee noted document DE 49/16 (CEFIC, IACS, IAPH, ICS, INTERTANKO, IPTA and OCIMF), informing it that, during the deliberations of the IIWG, it was agreed that, in view of the complexity of the casualties and the time taken to complete the investigations, it would be premature to make interim recommendations to the relevant Sub-Committees. It further noted information by ICS that, in the meantime, the IIWG had completed its report, which had been submitted to MSC 81 for appropriate action (MSC 81/8/1 and MSC 81/INF.8). In view of the above, the Sub-Committee agreed that no action on the subject was necessary at this point in time.

17 WORK PROGRAMME AND AGENDA FOR DE 50

Terms of reference of the Sub-Committee

17.1 The Sub-Committee noted its terms of reference, as approved by MSC 80 and MEPC 53, set out in annex 21, keeping in mind the instruction of the Committee that the sub-committees should periodically review their terms of reference to ensure that they accurately reflect the work being carried out.

Work programme of the Sub-Committee and provisional agenda for DE 50

17.2 The Sub-Committee revised its work programme (DE 49/WP.7) based on that approved by MSC 80 (DE 49/2, annex 1) and, taking into account the progress made during this session as well as the recommendations made by FP 50 with regard to items related to life-saving appliances (see paragraph 3 of document DE 49/2/3), prepared a draft revised work programme and draft provisional agenda for DE 50. While reviewing the work programme, the Sub-Committee agreed to invite the Committee and the MEPC, as appropriate, to:

- .1 delete the following work programme items, as work on them has been completed:

- .1.1 item H.3 – Passenger ship safety;
- .1.2 item H.5 – Review of the 2000 HSC Code and amendments to the DSC Code and the 1994 HSC Code;
- .1.3 item H.10 – Inconsistencies in IMO instruments regarding requirements for life-saving appliances;
- .1.4 item H.12 – Revision of the Guidelines for systems for handling oily wastes in machinery spaces of ships (MEPC/Circ.235);
- .1.5 item H.14 – Amendments to resolution A.761(18); and
- .1.6 item H.20 – Review of requirements on relevant equipment for the revision of the Intact Stability Code;
- .2 extend the target completion dates of the following work programme items:
 - .2.1 item H.1 – Amendments to resolution A.744(18), to 2007;
 - .2.2 item H.3 – Measures to prevent accidents with lifeboats, to 2008;
 - .2.3 item H.6 – Performance standards for protective coatings, to 2007;
 - .2.4 item H.7 – Inspection and survey requirements for accommodation ladders, to 2007;
 - .2.5 item H.8 – Mandatory emergency towing systems in ships other than tankers of not less than 20,000 dwt, to 2007; and
 - .2.6 item H.9 – Compatibility of life-saving appliances, to 2008;
- .3 replace the number of sessions needed for completion with the target completion date for the following work programme items as they have been selected for inclusion in the provisional agenda for DE 50:
 - .3.1 item H.17 – Amendments to the Guidelines for ships operating in Arctic ice-covered waters 2008;
 - .3.2 item L.1 – Revision of resolution A.760(18) 2008;
- .4 include the following new item in the Sub-Committee’s work programme:
 - .4.1 item H.15 – Guidelines for uniform operating limitations of high-speed craft (see annex 11) 2009;
- .5 renumber the work programme items accordingly.

17.3 The Committee was invited to approve the draft revised work programme and draft provisional agenda for DE 50, set out in annex 22.

Arrangements for the next session

17.4 The Sub-Committee agreed to establish at its next session working/drafting groups on the following subjects:

- .1 performance standards for protective coatings;
- .2 amendments to resolution A.744(18);
- .3 mandatory emergency towing systems in ships other than tankers of not less than 20,000 dwt;
- .4 amendments to the MODU Code; and
- .5 review of the SPS Code.

17.5 The Sub-Committee established correspondence groups on the following subjects, due to report to DE 50:

- .1 performance standards for protective coatings;
- .2 amendments to resolution A.744(18);
- .3 mandatory emergency towing systems in ships other than tankers of not less than 20,000 dwt;
- .4 amendments to the MODU Code; and
- .5 review of the SPS Code.

17.6 The Sub-Committee noted that its fiftieth session had been tentatively scheduled to take place from 5 to 9 March 2007 in London, at a venue to be announced in due course.

18 ELECTION OF CHAIRMAN AND VICE-CHAIRMAN FOR 2007

18.1 In accordance with the Rules of Procedure of the Maritime Safety Committee, the Sub-Committee unanimously re-elected Mrs. Anneliese Jost (Germany) as Chairman and Mrs. Xiang Yang (China) as Vice-Chairman, both for 2007.

Expressions of appreciation

18.2 The Sub-Committee, noting that Mr. I. Ponomarev, the former Chairman of the Sub-Committee, had been elected Chairman of the Maritime Safety Committee, expressed its appreciation for his excellent services to the Sub-Committee over the last three years and wished him all success in his new and heavy responsibilities.

19 ANY OTHER BUSINESS

Revision of circular SLS.14/Circ.115 on Issue of Exemption Certificates

19.1 The Sub-Committee recalled that MSC 78, following a request by DE 46, had instructed the Sub-Committee to revise circular SLS.14/Circ.115 on Issue of Exemption Certificates under

the 1974 SOLAS Convention and amendments thereto, to reflect recent amendments to SOLAS chapter III. Following consideration, DE 48 had instructed the Secretariat to prepare relevant amendments to SLS.14/Circ.115 for consideration at this session.

19.2 The Sub-Committee considered document DE 49/19 (Secretariat), containing draft amendments to SLS.14/Circ.115, prepared by the Secretariat in pursuance of the above instructions of DE 48, and, following discussion, agreed to the draft addendum to SLS.14/Circ.115, set out in annex 23, for submission to the Committee for approval.

Consequential amendments to SOLAS regulations XII/12.1.2 and XII/13.1 and the form of Safety Certificate for Nuclear Passenger Ships

19.3 The Sub-Committee recalled that MSC 80 had instructed it to consider amendments to SOLAS regulations XII/12.1.2 and XII/13.1 and the form of Safety Certificate for Nuclear Passenger Ships consequential to the amendments to SOLAS chapter II-1, parts A, A-1, B and C, adopted by resolution MSC.194(80), and considered document DE 49/19/1 (Secretariat), containing the said consequential amendments as prepared by the drafting group on amendments to mandatory instruments at MSC 80.

19.4 Following consideration, the Sub-Committee agreed to the draft amendments to SOLAS regulations XII/12.1.2 and XII/13.1 and the form of Safety Certificate for Nuclear Passenger Ships, set out in annex 24, for submission to MSC 81 for approval with a view to adoption.

Applicability of SOLAS regulation II-1/3-6 in the case of single-hull tankers converting to double-hull tankers

19.5 The Sub-Committee noted document DE 49/19/2 (Secretariat), informing it that SLF 48, in the context of its agenda item on “Revision of MSC/Circ.650”, had considered document SLF 48/17/1 in which IACS, referring to the implementation of MARPOL regulations I/13G and I/13H, envisaged a potential increase in single-hull tankers converting to double-hull tankers. Considering that there is a need to determine the applicability of SOLAS regulation II-1/3-6 (Access to and within spaces in, and forward of, the cargo area of oil tankers and bulk carriers) to such a conversion, IACS was of the opinion that regulation II-1/3-6 should not be applied retroactively in cases of ships modified to comply with MARPOL regulations I/13G and I/13H.

19.6 Following discussion, SLF 48 had concluded that it would be appropriate for the DE Sub-Committee to consider the proposal and requested DE 49 to deal with the matter and take action as appropriate. SLF 48 had also invited the Committee to note this course of action.

19.7 Following consideration, the Sub-Committee agreed that:

- .1 SOLAS regulation II-1/3-6 should not apply to tankers converting from single-hull to double-hull;
- .2 however, if, in the course of conversion, substantial new structures are added, these new structures should comply with the regulation;
- .3 for the case of existing tankers converting to FPSOs/FSUs, the regulation would likewise not apply. Consequently, the Sub-Committee agreed to include the following text in the draft MSC circular on amendments to MSC/Circ.1176, agreed under agenda item 11 (see also paragraph 11.4):

“Regulation II-1/3-6 is applicable to new, purpose-built FPSO or FSU if they are subject to the scope of the ESP Guidelines (resolution A.744(18), as amended). Considering that the principles of the Technical provisions for means of access for inspections (resolution MSC.158(78)) recognize that permanent means of access should be considered and provided for at the design stage so that, to the maximum extent possible, they can be made an integral part of the designed structural arrangement, regulation II-1/3-6 is not considered applicable to an FPSO/FSU that is converted from an existing tanker.”,

and requested the Secretariat to bring this view to the attention of the Committee and the MEPC for their consideration and action as deemed appropriate.

Vague expression in SOLAS chapter II-1 part C

19.8 The Sub-Committee considered document DE 49/19/3 (Germany), expressing concerns regarding relaxations granted with respect to SOLAS regulation II-1/32.1 which states the specific need for redundancy of safety valves for steam boiler and boiler feed systems. Germany invited the Sub-Committee’s attention to the fact that there was no guidance for a relaxation of the explicit SOLAS requirement for a redundancy.

19.9 Following discussion, the Sub-Committee agreed on the need for guidance in the matter and invited the delegation of Germany to submit an interpretation to regulation II-1/32.1 to DE 50 for consideration.

Results of tests on search and rescue radar transponders for survival craft

19.10 The Sub-Committee noted document DE 49/INF.2 (Japan), reporting on the results of tests on search and rescue radar transponders (SARTs) for survival craft, carried out in Japan and, in particular, the conclusion that some of the certified equipment currently in use is not in compliance with IEC standard 1097-1 which specifies performance standards and type testing of SARTs and is indirectly referred to in SOLAS regulation III/6.2.2.

Expressions of appreciation

19.11 The Sub-Committee expressed appreciation to the following delegates, who had recently relinquished their duties, retired or were transferred to other duties, for their invaluable contribution to its work and wished them a long and happy retirement or, as the case might be, every success in their new duties:

- .1 Captain Eduardo Castro Rivas (Argentina), on return home;
- .2 Captain Luis Fernando Resano (Brazil), on return home;
- .3 Commander Carlos Ríos Varela (Chile), on return home;
- .4 Mr. Hu Jinglu (China), on return home;
- .5 Captain (HCG) Nikolaos Nesteroulis (Greece), on return home;
- .6 Mr. Trygve Scheel (Norway), on retirement;
- .7 Mr. Mathew Lee (Singapore), on return home;

- .8 Mr. Tom Allan (United Kingdom), Chairman of the MSC, on retirement;
- .9 Mr. Simon Milne (United Kingdom), on transfer to other duties; and
- .10 Capt. Raymond Petow (United States), on retirement.

20 ACTION REQUESTED OF THE COMMITTEES

20.1 The Maritime Safety Committee, at its eighty-first session, is invited to:

- .1 note the course of action taken with regard to amendments to resolution A.744(18) (paragraphs 3.4 to 3.8);
- .2 consider the outcome of the Sub-Committee regarding passenger ship safety and take action as appropriate (paragraphs 4.11, 4.12, 4.14 and 4.15 and annexes 3 to 7);
- .3 approve the draft amendments to SOLAS regulation III/21.1.4 to clarify the existing time requirement for the boarding and launching of survival craft, with a view to adoption together with the set of draft amendments to SOLAS chapter III prepared by FP 50 (paragraph 4.16 and annex 8);
- .4 approve the draft MSC circular on Guidelines for the conduct of high-speed craft model tests (paragraph 5.5 and annex 9);
- .5 approve the draft amendments to the 2000 HSC Code with a view to subsequent adoption (paragraph 5.10 and annex 10);
- .6 approve the draft amendments to the 1994 HSC Code with a view to subsequent adoption (paragraph 5.17 and annex 12);
- .7 approve the draft amendments to the DSC Code with a view to subsequent adoption (paragraph 5.18 and annex 13);
- .8 approve the draft amendments to SOLAS regulations II-1/3-2 and XII/6, concerning the mandatory Performance standard for protective coatings and take further action as appropriate (paragraph 6.24 and annex 14);
- .9 approve the draft MSC resolution on Performance standard for protective coatings of dedicated seawater ballast tanks on all new ships and of double-side skin spaces of bulk carriers and take further action as appropriate (paragraph 6.33 and annex 15);
- .10 approve, subject to relevant decisions under subparagraphs .8 and .9 above, the draft MSC circular on Application of SOLAS regulation XII/6.3 on corrosion prevention of double-side skin spaces and dedicated seawater ballast tanks of bulk carriers and application of the performance standard for protective coatings for dedicated seawater ballast tanks on all new ships and double-side skin spaces of bulk carriers (paragraph 6.34 and annex 16);
- .11 note the outcome of the development of provisions for mandatory emergency towing systems in ships other than tankers of not less than 20,000 dwt (paragraphs 7.1 to 7.18);

- .12 note the progress made in the development of inspection and survey requirements for accommodation ladders (paragraphs 8.1 to 8.7);
- .13 approve the draft MSC circular on Means of embarkation on and disembarkation from ships (paragraph 8.5 and annex 18);
- .14 approve the draft MSC circular on Amendments to unified interpretations to SOLAS chapters II-1 and XII approved by MSC/Circ.1176 (paragraphs 11.4 and 19.7.3 and annex 20); and
- .15 approve the proposed revised work programme of the Sub-Committee and the provisional agenda for DE 50 (paragraph 17.3 and annex 22); and
- .16 approve the draft amendments to SOLAS regulations XII/12.1.2 and XII/13.1 and the form of Safety Certificate for Nuclear Passenger Ships with a view to adoption (paragraph 19.4 and annex 24).

20.2 The Maritime Safety Committee, at its eighty-second session, is invited to:

- .1 note the course of action taken with regard to the development of provisions for gas-fuelled ships (paragraph 10.5);
- .2 note the progress made concerning the review of the SPS Code (paragraphs 12.1 to 12.4);
- .3 note the course of action taken with regard to the development of amendments to the MODU Code (paragraphs 14.4 and 14.5);
- .4 note that the Sub-Committee's comments on chapter 4 (Stability calculations performed by stability instruments) of the draft revised Intact Stability (IS) Code have been referred to SLF 49 and that work on the item has been completed (paragraphs 15.3 and 15.4);
- .5 approve the draft addendum to SLS.14/Circ.115 on Issue of Exemption Certificates (paragraph 19.2 and annex 23);
- .6 endorse, subject to the MEPC's concurrent decision, the view of the Sub-Committee, concerning the applicability of SOLAS regulation II-1/3-6 to single-hull tankers being converted to double-hull tankers, that the regulation should not apply to tankers converting from single-hull to double-hull or tankers converting to FPSOs/FSUs, however, if in the course of the conversion substantial new structures are added, these new structures should comply with the aforementioned regulation (paragraph 19.7); and
- .7 approve the report in general.

20.3 The Marine Environment Protection Committee is invited to:

- .1 consider the draft amendments to the Condition Assessment Scheme and take action as appropriate (paragraph 3.14.1 and annex 1);

- .2 adopt the draft MEPC resolution on Guidelines on assessment of the residual fillet weld between deck plating and longitudinals (paragraph 3.13.2 and annex 2);
- .3 endorse the view of the Sub-Committee that thickness measurement of the residual fillet weld between deck plating and longitudinals during the course of a CAS survey can be used on an optional and voluntary basis by attending surveyors if and when they deem it necessary (paragraph 3.15);
- .4 approve the draft MEPC circular on Revised Guidelines for systems for handling oily wastes in machinery spaces of ships incorporating Guidance Notes for an integrated bilge water treatment system (IBTS) (paragraph 9.5 and annex 19); and
- .5 endorse, subject to the MSC's concurrent decision, the view of the Sub-Committee, concerning the applicability of SOLAS regulation II-1/3-6 to single-hull tankers being converted to double-hull tankers, that the regulation should not apply to tankers converting from single-hull to double-hull or tankers converting to FPSOs/FSUs, however, if in the course of the conversion substantial new structures are added, these new structures should comply with the aforementioned regulation (paragraph 19.7).

ANNEX 1**DRAFT AMENDMENTS TO THE CONDITION ASSESSMENT SCHEME (CAS)****DRAFT RESOLUTION MEPC.[...](55)****Adopted on [... October 2006]****AMENDMENTS TO THE CONDITION ASSESSMENT SCHEME (CAS)**

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee (the Committee) conferred upon it by international conventions for the prevention and control of marine pollution,

NOTING article 16 of the International Convention for the Prevention of Pollution from Ships, 1973 (hereinafter referred to as the "1973 Convention") and article VI of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (hereinafter referred to as the "1978 Protocol") which together specify the amendment procedure of the 1978 Protocol and confer upon the appropriate body of the Organization the function of considering and adopting amendments to the 1973 Convention, as modified by the 1978 Protocol (MARPOL 73/78),

NOTING ALSO that regulation 13G of Annex I of MARPOL 73/78 specifies that the Condition Assessment Scheme, adopted by resolution MEPC.94(46), may be amended provided such amendments shall be adopted, brought into force and take effect in accordance with the provisions of article 16 of the 1973 Convention relating to amendment procedures applicable to an appendix to an Annex,

NOTING FURTHER resolutions MEPC.99(48), MEPC.112(50) and MEPC.131(53) by which the Committee adopted amendments to the Condition Assessment Scheme, in accordance with the provisions of article 16 of the 1973 Convention relating to amendment procedures applicable to an appendix to an Annex,

RECOGNIZING the convenience to amend the Condition Assessment Scheme in respect of the requirements for thickness measurement during the CAS survey as well as for the purpose of addressing issues associated with changes of flag, ownership, management and/or recognized organization during the CAS survey, or when an oil tanker is awaiting the issuance of a Statement of Compliance following a CAS survey;

HAVING CONSIDERED, at its [fifty-fifth] session, the proposed amendments to the Condition Assessment Scheme,

1. ADOPTS, in accordance with article 16(2)(d) of the 1973 Convention, the amendments to the Condition Assessment Scheme, the text of which is set out at Annex to the present resolution;
2. DETERMINES, in accordance with article 16(2)(f)(iii) of the 1973 Convention, that the amendments shall be deemed to have been accepted on [... August 2007], unless, prior to that date, not less than one third of the Parties to MARPOL 73/78 or Parties the combined merchant

fleets of which constitute not less than 50 per cent of the gross tonnage of the world's merchant fleet, have notified to the Organization their objections to the amendments;

3. INVITES Parties to MARPOL 73/78 to note that, in accordance with article 16(2)(g)(ii) of the 1973 Convention, the said amendments shall enter into force on [... February 2008] upon their acceptance in accordance with paragraph 2 above;
4. REQUESTS the Secretary-General, in conformity with article 16(2)(e) of the 1973 Convention, to transmit to all Parties to MARPOL 73/78 certified copies of the present resolution and the text of the amendments contained in the Annex;
5. REQUESTS FURTHER the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization which are not Parties to MARPOL 73/78;
6. INVITES the Maritime Safety Committee to note the amendments to the Condition Assessment Scheme.

ANNEX

**AMENDMENTS TO CAS
(RESOLUTION MEPC.94(46), AS AMENDED)**

1 In Table 7.3.3, at the end of the entry “.1 Each deck plate”, the following text is added: “(see note)”.

2 A note is added below Table 7.3.3 as follows:

“Note:

In conjunction with thickness measurement procedures, in case of concern regarding residual throat thickness of the fillet weld between the deck plate and deck longitudinals or possible detachment of a deck longitudinal member, the attending surveyor may refer to the Guidelines on the assessment of residual fillet weld between deck plating and longitudinals adopted by resolution MEPC.[...](54)”.

3 The annex to resolution MEPC.94(46), as amended, is further amended by deleting and replacing the existing paragraphs 13.8, 13.9 and 13.10 with the following new paragraphs:

“13.8 The flag Administration may consider and declare that the Statement of Compliance of a ship entitled to fly its flag remains valid and in full force and effect if:

- .1 a change in ownership of the ship should occur; or
- .2 the classification of the ship is transferred under the terms of a Transfer of Class Agreement that provides procedures acceptable to the Administration for the transfer of CAS survey work to an RO of the Administration other than the one that performed the original CAS survey and submitted the CAS Final Report that was reviewed and accepted for the issue of the Statement of Compliance by the Administration; or
- .3 the safe operation and maintenance of the ship is assumed by a Company, as defined in SOLAS chapter IX, other than the one that was operating the ship at the time of the completion of the CAS survey; or
- .4 any combination of 13.8.1, 13.8.2 and 13.8.3 should simultaneously occur;

provided the Administration:

- .5 maintains the same period of validity; and
- .6 co-ordinates the transmittal of specific information, requirements, and procedures concerning the maintenance of the validity of the CAS Statement of Compliance in question to the new owner and/or Company, which shall remain those adopted by the Administration at the time of the issue of the original Statement of Compliance.

13.9 The Administration shall suspend and/or withdraw the Statement of Compliance of a ship if it is no longer considered to be compliant with the requirements of the CAS.

13.10 The Administration may reinstate a suspended and/or withdrawn Statement of Compliance when it is satisfied that the requirements of the CAS are again being met, but not beyond the limits of the period and the terms and conditions of validity of the Statement of Compliance previously established by the Administration.

13.11 The Administration shall withdraw the Statement of Compliance of a ship if it is no longer entitled to fly its flag.

13.12 If a ship to which a valid Statement of Compliance has already been issued is transferred to the flag of another Party, the new Administration may consider issuing a new Statement of Compliance to that ship on the basis of the Statement of Compliance issued by the previous Administration, provided that the new Administration obtains from the previous Administration:

- .1 a certified copy of the Statement of Compliance that the ship was issued with at the time of the transfer;
- .2 a statement certifying that the RO, which provided the CAS Final Report to the previous Administration, is an RO authorized to act on its behalf;
- .3 a status report from the RO that provided the CAS Final Report to the previous Administration that, at the time of transfer, all the terms and conditions justifying the issuance of the Statement of Compliance to that ship are still valid and being maintained; and
- .4 a copy of both the CAS Final Report and the complete Review Record of all the CAS documentation relating to that ship, which the previous Administration has compiled for the issue or renewal and the maintenance of the validity of the Statement of Compliance that the ship was issued with at the time of the transfer.

13.13 With a change of flag, for the issuance of an Interim Statement of Compliance issued for a period of not more than 90 days to allow the continued operation of the ship while the new Administration performs a technical review and assessment of the CAS Final Report and Review Record, the new Administration shall need only to depend upon the certifications and status report referred to in paragraph 13.12 and provided by the previous Administration and the responsible RO.

13.14 On satisfactory completion of the technical review and assessment of the CAS Final Report and Review Record by the new Administration, under the circumstance of a change of flag as described in paragraph 13.12, a full term Statement of Compliance may be issued by the new Administration limited to the period and no less than the terms and conditions of validity of the Statement of Compliance issued by the previous Administration. In the event the review is unsatisfactory, the new Administration shall revert to the provisions of paragraphs 13.9 and 13.10.

13.15 Should a change of flag take place during the course of a CAS survey, the new Administration shall determine at what point in the CAS Schedule provided in annex 3 to MEPC/Circ.390 and under what conditions it will assume responsibility for and allow the CAS survey to continue. Sufficient documentation should be provided by the shipowner and the responsible RO to the new Administration upon which to make its decision.”

ANNEX 2**DRAFT RESOLUTION MEPC.[...(54)]****Adopted on [... March 2006]****GUIDELINES ON THE ASSESSMENT OF RESIDUAL FILLET WELD
BETWEEN DECK PLATING AND LONGITUDINALS**

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee (the Committee) conferred upon it by international conventions for the prevention and control of marine pollution,

RECALLING the Condition Assessment Scheme, as a mandatory requirement for oil tankers operating under the provisions of regulations 13G and 13H of MARPOL Annex I (regulations 20 and 21 of the revised MARPOL Annex I), adopted by resolution MEPC.94(46), as amended,

RECOGNIZING the convenience to provide guidance for inspection of fillet weld between deck plating and longitudinals in connection with thickness measurements requirements as called for in paragraph 7.3.3 and table 7.3.3 of the Condition Assessment Scheme adopted by resolution MEPC.94(46), as amended,

HAVING CONSIDERED, at its fifty-fourth session, the recommendation made by the Sub-Committee on Ship Design and Equipment to adopt the Guidelines on the assessment of residual fillet weld between deck plating and longitudinals,

1. ADOPTS the Guidelines on the assessment of residual fillet weld between deck plating and longitudinals, as an optional provision referred to in Table 7.3.3 of the Condition Assessment Scheme, the text of which is set out in the annex to this resolution;
2. INVITES Governments to bring the Guidelines to the attention of surveyors, recognized organizations and any other interested parties when carrying out thickness measurements during the conduct of CAS surveys.

ANNEX

GUIDELINES ON THE ASSESSMENT OF RESIDUAL FILLET WELD BETWEEN DECK PLATING AND LONGITUDINALS

1 General

The purpose of the guidelines is to provide an evaluation method and criteria for residual throat thickness for the fillet weld between the deck plate and deck longitudinals in order to prevent collapse accidents of aged oil tankers. To ensure that evaluation of the ship's longitudinal strength is recognized as valid, the fillet weld between longitudinals and deck should be in sound condition.

2 Extent of measurement

Thickness measurement on deck should be carried out according to paragraph 3 of these guidelines i.e. in every other deck longitudinal for three transverse sections, within the cargo area, as given in Table 7.3.3, paragraph 1.2, of the Condition Assessment Scheme (resolution MEPC.94(46), as amended). For areas in tanks where environmental conditions seem to be similar, the extent of this thickness measurement may be specially considered by the attending surveyor.

3 Local thickness measurement and criteria

3.1 Method of local thickness measurement

3.1.1 The extent of local measurement should be set within approximately 50 mm of each side of the baseline, as shown in Figure 1.

3.1.2 Within the extent of local measurement, at least five points should be arranged, including one point on the baseline and with approximately 25 mm spacing at maximum. Thereby, the local thickness distribution for the deck plate can be obtained for the target longitudinal.

3.1.3 From the measured thickness distribution, a representative thickness diminution (Δt), defined by the following equation (1), should be estimated from the measured data on the baseline and the minimum thickness value among the other points:

$$\Delta t = t_0 - \text{Min.}\{t_1, t_2, t_3, t_4\} \quad (1)$$

Where:

t_0 : measured thickness on the baseline which is nearly equal to original thickness minus corrosion diminution for deck upper surface (Δt_0) as shown in Figure 1;

t_1, t_2, t_3, t_4 : thickness on each measuring point; and

Δt : representative thickness diminution, which is assumed to be nearly equal to the diminution of the fillet weld throat thickness.

3.1.4 An estimated residual throat thickness is determined by:

$$r_{\text{residual}} = r_{\text{original}} - \Delta t$$

where r_{original} is the original throat thickness at the weld.

3.2 Criteria

When the estimated residual throat thickness is zero or less than zero, repair or renewal of the weld should be considered also based on the result of the close-up survey.

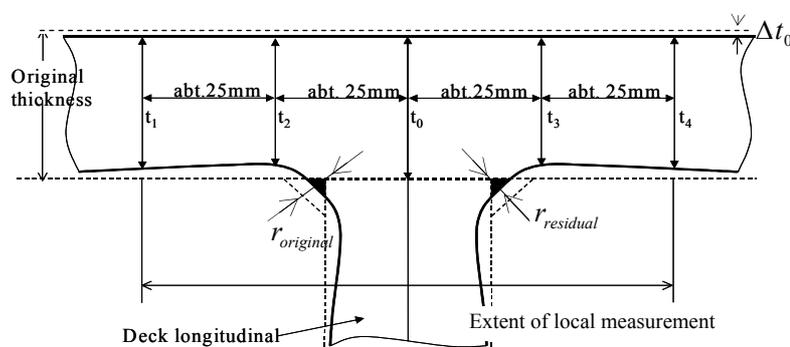


Figure 1 – Thickness measurement at deck plate from upper side

4 Alternative method

Detachment of the deck longitudinal member can also be checked using the following procedures. In cases where the longitudinal member is attached in sound condition, when the probe of the ultrasonic equipment is moved from the baseline to the outer side over the welding part, the ultrasonic echo from the bottom surface of the deck plate is not observed just over the welding part. However, in cases where the longitudinal member is detached from the deck plate, when the probe of the ultrasonic equipment is moved from the baseline to the outer side beyond the welding part, the ultrasonic signal echo can be observed continuously, even if the probe is on the detached welding part as shown in Figure 2.

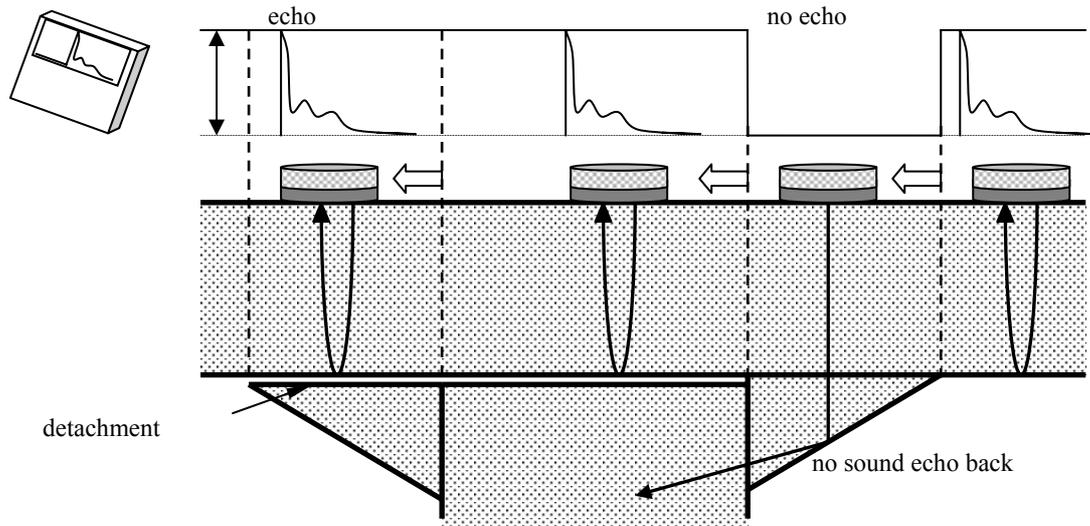


Figure 2 – Alternative method

ANNEX 3**DRAFT AMENDMENTS TO SOLAS CHAPTERS II-1 AND III
FOR ALTERNATIVE DESIGN AND ARRANGEMENTS****CHAPTER II-1
CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY,
MACHINERY AND ELECTRICAL INSTALLATIONS**

- 1 The following new part F is added after regulation 54:

**“PART F
ALTERNATIVE DESIGN AND ARRANGEMENTS****Regulation 55
Alternative design and arrangements****1 Purpose**

The purpose of this regulation is to provide a methodology for alternative design and arrangements for machinery and electrical installations.

2 General

2.1 Machinery and electrical installation design and arrangements may deviate from the requirements set out in parts C, D and E, provided that the alternative design and arrangements meet the intent of the requirements concerned and provide an equivalent level of safety to SOLAS chapter II-1.

2.2 When alternative design or arrangements deviate from the prescriptive requirements of parts C, D and E of this chapter, an engineering analysis, evaluation and approval of the design and arrangements shall be carried out in accordance with this regulation.

3 Engineering analysis

The engineering analysis shall be prepared and submitted to the Administration, based on the guidelines developed by the Organization* and shall include, as a minimum, the following elements:

- .1 determination of the ship type, machinery, electrical installations and space(s) concerned;
- .2 identification of the prescriptive requirement(s) with which the machinery and electrical installations will not comply;

* Refer to the guidelines to be developed by the Organization.

- .3 identification of the reason the proposed design will not meet the prescriptive requirements supported by compliance with other recognized engineering or industry standards;
- .4 determination of the performance criteria for the ship, machinery, electrical installation or the space(s) concerned addressed by the relevant prescriptive requirement(s):
 - .4.1 performance criteria shall provide a level of safety not inferior to the relevant prescriptive requirements contained in parts C, D and E of this chapter; and
 - .4.2 performance criteria shall be quantifiable and measurable;
- .5 detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions;
- .6 technical justification demonstrating that the alternative design and arrangements meet the safety performance criteria; and
- .7 risk assessment based on identification of the potential faults and hazards associated with the proposal.

4 Evaluation of the alternative design and arrangements

- 4.1 The engineering analysis required in paragraph 3 shall be evaluated and approved by the Administration, taking into account the guidelines developed by the Organization.*
- 4.2 A copy of the documentation, as approved by the Administration, indicating that the alternative design and arrangements comply with this regulation, shall be carried on board the ship.

5 Exchange of information

The Administration shall communicate to the Organization pertinent information concerning alternative design and arrangements approved by them for circulation to all Contracting Governments.

6 Re-evaluation due to change of conditions

If the assumptions and operational restrictions that were stipulated in the alternative design and arrangements are changed, the engineering analysis shall be carried out under the changed condition and shall be approved by the Administration.”

* Refer to the guidelines to be developed by the Organization.

CHAPTER III LIFE-SAVING APPLIANCES AND ARRANGEMENTS

Regulation 4 – Evaluation, testing and approval of life-saving appliances and arrangements

- 2 Paragraph 3 is deleted and the remaining paragraphs renumbered accordingly.
- 3 The following new part C is added after regulation 37:

“Part C Alternative design and arrangements

Regulation 38 Alternative design and arrangements

1 Purpose

The purpose of this regulation is to provide a methodology for alternative design and arrangements for life-saving appliances and arrangements.

2 General

2.1 Life-saving appliances and arrangements may deviate from the requirements set out in part B, provided that the alternative design and arrangements meet the intent of the requirements concerned and provide an equivalent level of safety to SOLAS chapter III.

2.2 When alternative design or arrangements deviate from the prescriptive requirements of part B of this chapter, an engineering analysis, evaluation and approval of the design and arrangements shall be carried out in accordance with this regulation.

3 Engineering analysis

The engineering analysis shall be prepared and submitted to the Administration, based on the guidelines developed by the Organization* and shall include, as a minimum, the following elements:

- .1 determination of the ship type and the life-saving appliance and arrangements concerned;
- .2 identification of the prescriptive requirement(s) with which the life-saving appliance and arrangements will not comply;
- .3 identification of the reason the proposed design will not meet the prescriptive requirements supported by compliance with other recognized engineering or industry standards;

* Refer to the guidelines to be developed by the Organization.

- .4 determination of the performance criteria for the ship and the life-saving appliance and arrangements concerned addressed by the relevant prescriptive requirement(s):
 - .4.1 performance criteria shall provide a level of safety not inferior to the relevant prescriptive requirements contained in part B of this chapter; and
 - .4.2 performance criteria shall be quantifiable and measurable;
- .5 detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions;
- .6 technical justification demonstrating that the alternative design and arrangements meet the safety performance criteria; and
- .7 risk assessment based on identification of the potential faults and hazards associated with the proposal.

4 Evaluation of the alternative design and arrangements

- 4.1 The engineering analysis required in paragraph 3 shall be evaluated and approved by the Administration, taking into account the guidelines developed by the Organization.*
- 4.2 A copy of the documentation, as approved by the Administration, indicating that the alternative design and arrangements comply with this regulation, shall be carried on board the ship.

5 Exchange of information

The Administration shall communicate to the Organization pertinent information concerning alternative design and arrangements approved by them for circulation to all Contracting Governments.

6 Re-evaluation due to change of conditions

If the assumptions and operational restrictions that were stipulated in the alternative design and arrangements are changed, the engineering analysis shall be carried out under the changed condition and shall be approved by the Administration.”

* Refer to the guidelines to be developed by the Organization.

ANNEX 4

**DRAFT GUIDELINES ON ALTERNATIVE DESIGN AND ARRANGEMENTS
FOR SOLAS CHAPTERS II-1 PARTS C, D AND E, AND III****1 Application**

1.1 These guidelines are intended for application of safe engineering design to provide technical justification for alternative design and arrangements to SOLAS chapters II-1 and III. The guidelines serve to outline the methodology for the engineering analysis required by Part F of SOLAS regulation II-1 and Part C of SOLAS chapter III “Alternative design and arrangements”, applying to a specific safety system, design or arrangements for which the approval of an alternative design deviating from the prescriptive requirements of SOLAS chapters II-1 and III is sought.

1.2 These guidelines are not intended to be applied to the type approval of individual materials, components or portable equipment.

1.3 These guidelines are not intended to serve as a stand-alone document, but should be used in conjunction with the appropriate engineering design guides and other literature.

1.4 For the application of these guidelines to be successful, all interested parties, including the Administration or its designated representative, owners, operators, designers and classification societies, should be in continuous communication from the onset of a specific proposal to utilize these guidelines. This approach usually requires significantly more time in calculation and documentation than a typical regulatory prescribed design because of increased engineering rigor. The potential benefits include more options, cost effective designs for unique applications and an improved knowledge of loss potential.

2 Definitions

For the purposes of these guidelines, the following definitions apply:

2.1 *Alternative design and arrangements* means measures which deviate from the prescriptive requirement(s) of SOLAS chapters II-1 or III, but are suitable to satisfy the intent of that chapter. The term includes a wide range of measures, including alternative shipboard structures and systems based on novel or unique designs, as well as traditional shipboard structures and systems that are installed in alternative arrangements or configurations.

2.2 *Design casualty* means an engineering description of the development and severity of a casualty for use in a design scenario.

2.3 *Design casualty scenario* means a set of conditions that defines the development and severity of a casualty within and through ship space(s) or systems and describes specific factors relevant to a casualty of concern.

2.4 *Functional requirements* explain, in general terms, what function the system under consideration should provide to meet the safety objectives of SOLAS.

2.5 *Performance criteria* are measurable quantities to be used to evaluate the adequacy of trial designs.

2.6 *Prescriptive based design or prescriptive design* means a design of safety measures which comply with the regulatory requirements set out in parts C, D, and E of SOLAS chapter II-1 and/or chapter III, as applicable.

2.7 *Safety margin* means adjustments made to compensate for uncertainties in the methods and assumptions used to evaluate the alternative design, e.g. in the determination of performance criteria or in the engineering models used to assess the consequences of a casualty.

2.8 *Sensitivity analysis* means an analysis to determine the effect of changes in individual input parameters on the results of a given model or calculation method.

2.9 *SOLAS* means the International Convention for the Safety of Life at Sea, 1974, as amended.

3 Engineering analysis

3.1 The engineering analysis used to show that the alternative design and arrangements provide the equivalent level of safety to the prescriptive requirements of SOLAS chapters II-1 and III should follow an established approach to safety design. This approach should be based on sound science and engineering practice incorporating widely accepted methods, empirical data, calculations, correlations and computer models as contained in engineering textbooks and technical literature.

3.2 Other safety engineering approaches recognized by the Administration may be used.

4 Design team

4.1 A design team acceptable to the Administration should be established by the owner, builder or designer and may include, as the alternative design and arrangements demand, a representative of the owner, builder or designer, and expert(s) having the necessary knowledge and experience in safety, design, and/or operation as necessary for the specific evaluation at hand. Other members may include marine surveyors, vessel operators, safety engineers, equipment manufacturers, human factors experts, naval architects and marine engineers.

4.2 The level of expertise that individuals should have to participate in the team may vary depending on the complexity of the alternative design and arrangements for which approval is sought. Since the evaluation, regardless of complexity, will have some effect on a particular field of safety, at least one expert with knowledge and experience in appropriate safety field should be included as a member of the team.

4.3 The design team should:

- .1 appoint a co-ordinator serving as the primary contact;
- .2 communicate with the Administration for advice on the acceptability of the engineering analysis of the alternative design and arrangements throughout the entire process;
- .3 determine the safety margin at the outset of the design process and review and adjust it as necessary during the analysis;

- .4 conduct a preliminary analysis to develop the conceptual design in qualitative terms. This includes a clear definition of the scope of the alternative design and arrangements and the regulations which affect the design; a clear understanding of the intent requirements of the relevant regulations; the development of appropriate casualty scenarios if necessary, and trial alternative designs. This portion of the process is documented in the form of a report that is reviewed and agreed by all interested parties and submitted to the Administration before the quantitative portion of the analysis is started;
- .5 conduct a quantitative analysis to evaluate possible trial alternative designs using quantitative engineering analysis. This consists of the specification of design thresholds, development of performance criteria based upon the performance of an acceptable prescriptive design and evaluation of the trial alternative designs against the agreed performance criteria. From this step the final alternative design and arrangements are selected and the entire quantitative analysis is documented in a report; and
- .6 prepare documentation, specifications, and a life-cycle maintenance programme. The alternative design and arrangements should be clearly documented, approved by the Administration, and a comprehensive report describing the alternative design and arrangements and required maintenance programme should be kept on board the ship. An operations and maintenance manual should be developed for this purpose. The manual should include an outline of the design conditions that should be maintained over the life of the ship to ensure compliance with the approved design.

5 Preliminary analysis in qualitative terms

5.1 Definitions of scope

5.1.1 The ship, ship system(s), component(s), space(s) and/or equipment subject to the analysis should be thoroughly defined. This includes the ship or system(s) representing both the alternative design and arrangements and the regulatory prescribed design. Depending on the extent of the desired deviation from prescriptive requirements, some of the information that may be required includes: detailed ship plans, drawings, equipment information and drawings, test data and analysis results, ship operating characteristics and conditions of operation, operating and maintenance procedures, material properties, etc.

5.1.2 The regulations affecting the proposed alternative design and arrangements, along with their functional requirements, should be clearly understood and documented in the preliminary analysis report (see paragraph 5.4). This should form the basis for the comparative analysis referred to in paragraph 6.4.

5.2 Development of casualty or operational scenarios

Casualty or operational scenarios should provide the basis for analysis and trial alternative design evaluation and, therefore, are the backbone of the alternative design process. Proper casualty or operational scenario development is essential and depending on the extent of deviation from the prescribed design, may require a significant amount of time and resources. This phase should outline why an alternative design may be beneficial. For life saving arrangements, this may focus on casualty scenarios where an alternative design or arrangement will provide an

equivalent (or greater) level of safety. Mechanical or electrical arrangements may focus on an operational scenario that will provide an equivalent level or safety, but may increase efficiencies or reduce cost to the operator.

5.3 *Casualty Scenario Development can be broken down into four areas:*

- .1 identification of hazards;
- .2 enumeration of hazards;
- .3 selection of hazards; and
- .4 specification of design casualty scenarios.

5.3.1 Identification of hazards

This step is crucial in the casualty scenario development process as well as in the entire alternative design methodology. If a particular hazard or incident is omitted, then it will not be considered in the analysis and the resulting final design may be inadequate. Hazards may be identified using historical and statistical data, expert opinion and experience and hazard evaluation procedures. There are many hazard evaluation procedures available to help identify the hazards including HAZOP, PHA, FMEA, “what-if”, etc. As a minimum, the following conditions and characteristics should be identified and considered:

- .1 pre-casualty situation: ship, platform, compartment, available potential and kinetic energy, environmental conditions;
- .2 potential initiating events, causes;
- .3 detailed technical information and properties of potential hazards;
- .4 secondary hazards that might be subject to effects of initial hazard;
- .5 extension potential: beyond compartment, structure, area (if in open);
- .6 target locations: note target items or areas associated with the performance parameters;
- .7 critical factors relevant to the hazard: ventilation, environment, operational, time of day, etc.; and
- .8 relevant statistical data: past casualty history, probability of failure, frequency and severity rates, etc.

5.3.2 Enumeration of hazards

All of the hazards identified above should be grouped into one of three incident classes: localized, major, or catastrophic. A localized incident consists of a casualty with a localized affect zone, limited to a specific area. A major incident consists of a casualty with a medium affect zone, limited to the boundaries of the ship. A catastrophic incident consists of a casualty with a large affect zone, beyond the ship and affecting surrounding ships or communities. In the

majority of cases, only localized and/or major incidents need to be considered. Examples where the catastrophic incident class may be considered would include transport and/or offshore production of petroleum products or other hazardous materials where the incident effect zone is very likely to be beyond the ship vicinity. The hazards should be tabulated for future selection of a certain number of each of the incident classes.

5.3.3 Selection of hazards

The number and type of hazards that should be selected for the quantitative analysis is dependent on the complexity of the trial alternative design and arrangements. All of the hazards identified should be reviewed for selection of a range of incidents. In determining the selection, frequency of occurrence does not need to be fully quantified, but it can be utilized in a qualitative sense. The selection process should identify a range of incidents which cover the largest and most probable range of enumerated hazards. Because the engineering evaluation relies on a comparison of the proposed alternative design and arrangements with prescriptive designs, demonstration of equivalent performance during the major incidents should adequately demonstrate the design's equivalence for all lesser incidents and provide the commensurate level of safety. In selecting the hazards it is possible to lose perspective and to begin selecting highly unlikely or inconsequential hazards. Care should be taken to select the most appropriate incidents for inclusion in the selected range of incidents.

5.3.4 Specification of design casualty scenarios

Based on the hazards selected, the casualty scenarios to be used in the quantitative analysis should be clearly documented. The specification should include a qualitative description of the design casualty (e.g., initiating and subsequent chain of events, location, etc.), description of the vessel, compartment or system of origin, safeguard systems installed, number of occupants, physical and mental status of occupants and available means of escape. The casualty scenarios should consider possible future changes to the hazards (increased or decreased) in the affected areas. The design casualty or casualties will be characterized in more detail during the quantitative analysis for each trial alternative design.

Operational Scenario Development for a mechanical or electrical alternative design or arrangement should include the operating scenarios under which the alternative will be utilized.

5.4 *Development of trial alternative designs*

At this point in the analysis, one or more trial alternative designs should be developed so that it can be compared against the developed performance criteria. The trial alternative design should also take into consideration the importance of human factors, operations, and management. It should be recognized that well defined operations and management procedures may play a big part in increasing the overall level of safety.

5.5 *Preliminary analysis report*

5.5.1 A report of the preliminary analysis should include clear documentation of all steps taken to this point, including identification of the design team, their qualifications, the scope of the alternative design analysis, the functional requirements to be met, the description of the casualty scenarios and trial alternative designs selected for the quantitative analysis.

5.5.2 The preliminary analysis report should be submitted to the Administration for formal review and agreement prior to beginning the quantitative analysis. The report may also be submitted to the port State for informational purposes, if the intended calling ports are known during the design stage. The key results of the preliminary analysis should include:

- .1 a secured agreement from all parties to the design objectives and engineering evaluation;
- .2 specified design casualty scenario(s) acceptable to all parties; and
- .3 trial alternative design(s) acceptable to all parties.

6 Quantitative analysis

6.1 The quantitative analysis is the most labour intensive from an engineering standpoint. It consists of quantifying the design casualty scenarios, developing the performance criteria, verifying the acceptability of the selected safety margins and evaluating the performance of trial alternative designs against the prescriptive performance criteria.

6.1.1 The quantification of the design casualty scenarios may include calculating the effects of casualty detection systems, alarm and mitigation methods, generating time lines from initiation of the casualty until control or evacuation, and estimating consequences in terms of damage to the vessel, and the risk of harm to passengers and crew. This information should then be utilized to evaluate the trial alternative designs selected during the preliminary analysis.

6.1.2 Risk assessment may play an important role in this process. It should be recognized that risk cannot ever be completely eliminated. Throughout the entire performance based design process, this fact should be kept in mind. The purpose of performance design is not to build the fail safe design, but to specify a design with reasonable confidence that it will perform its intended function(s) when necessary and in a manner equivalent to or better than the prescriptive requirements of SOLAS chapters II-1 and III.

6.2 Quantification of design casualty scenarios

6.2.1 After choosing an appropriate range of incidents, quantification of the casualties should be accomplished for each of the incidents. Quantification will require specification of all factors that may affect the type and extent of the hazard. The casualty scenarios should consider possible future changes to the affected systems and areas. This may include calculation of specific casualty parameters, vessel damage, passenger exposure to harm, time-lines, etc. References on suggested example correlations and models that may be of use are listed in appendix C. It should be noted that when using any specific tools, the limitations and assumptions of these models should be well understood and documented. This becomes very important when deciding on and applying safety margins. Documentation of the alternative design should explicitly identify the models used in the analysis and their applicability. Reference to the literature alone should not be considered as adequate documentation. The general procedure for specifying design casualties includes casualty scenario development completed during the preliminary analysis, time-line analysis and consequence estimation which is detailed below.

6.2.2 For each of the identified hazards, a range of casualty scenarios should be developed. Because the alternative design approach is based on a comparison against the regulatory prescribed design, the quantification can often be simplified. In many cases, it may only be necessary to analyse one or two scenarios if this provides enough information to evaluate the level of safety of the alternative design and arrangements against the required prescriptive design.

6.2.3 A time-line should be developed for each of the casualty scenarios beginning with initiation. Time-lines should include the entire chain of relevant events up to and including escape times (to assembly stations, evacuation stations and lifeboats as necessary). This time line should include personnel response, activation of damage control systems or active damage control measures, untenable conditions, etc. The time-line should include a description of the extent of the casualty throughout the scenario, as determined by using the various correlations, models and data from the literature or actual tests.

6.2.4 Consequences of various casualty scenarios should be quantified in relevant engineering terms. This can be accomplished by using existing correlations and calculation procedures for determining the characteristics of a casualty. In certain cases, live testing and experimentation may be necessary to properly predict the casualty characteristics. Regardless of the calculation procedures utilized, a sensitivity analysis should be conducted to determine the effects of the uncertainties and limitations of the input parameters.

6.3 *Development performance criteria*

6.3.1 Performance criteria are quantitative expressions of the intent of the requirements of the relevant SOLAS regulations. The required performance of the trial alternative designs are specified numerically in the form of performance criteria. Performance criteria may include tenability limits or other criteria necessary to ensure successful alternative design and arrangements.

6.3.2 Compliance with the prescriptive regulations is one way to meet the stated functional requirements. The performance criteria for the alternative design and arrangements should be determined, taking into consideration the intent of the regulations.

6.3.3 If the performance criteria for the alternative design and arrangements cannot be determined directly from the prescriptive regulations because of novel or unique features, they may be developed from an evaluation of the intended performance of a commonly used acceptable prescriptive design, provided that an equivalent level of safety is maintained.

6.3.4 Before evaluating the prescriptive design, the design team should agree on what specific performance criteria and safety margins should be established. Depending on the prescriptive requirements to which the approval of alternative design or arrangements is sought, these performance criteria could fall within one or more of the following areas:

- .1 Life safety criteria – These criteria address the survivability of passengers and crew and may represent the effects of heat, smoke, toxicity, reduced visibility and evacuation time.
- .2 Criteria for damage to ship structure and related systems – These criteria address the impact that casualty might have on the ship structure, mechanical systems, electrical systems, fire protection systems, evacuation systems, propulsion and manoeuvrability, etc. These criteria may represent physical effects of the casualty.

- .3 Criteria for damage to the environment – These criteria address the impact of the casualty on the atmosphere and marine environment.

6.3.5 The design team should consider the impact that one particular performance criterion might have on other areas that might not be specifically part of the alternative design. For example, the failure of a particular safeguard may not only affect the life safety of passengers and crew in the adjacent space, but it may result in the failure of some system affecting the overall safety of the ship.

6.3.6 Once all of the performance criteria have been established, the design team can then proceed with the evaluation of the trial alternative designs (see section 6.4).

6.4 *Evaluation of trial alternative designs*

6.4.1 All of the data and information generated during the preliminary analysis and specification of design casualty should serve as input to the evaluation process. The evaluation process may differ depending on the level of evaluation necessary (based on the scope defined during the preliminary analysis), but should generally follow the process illustrated in Figure 6.4.1.

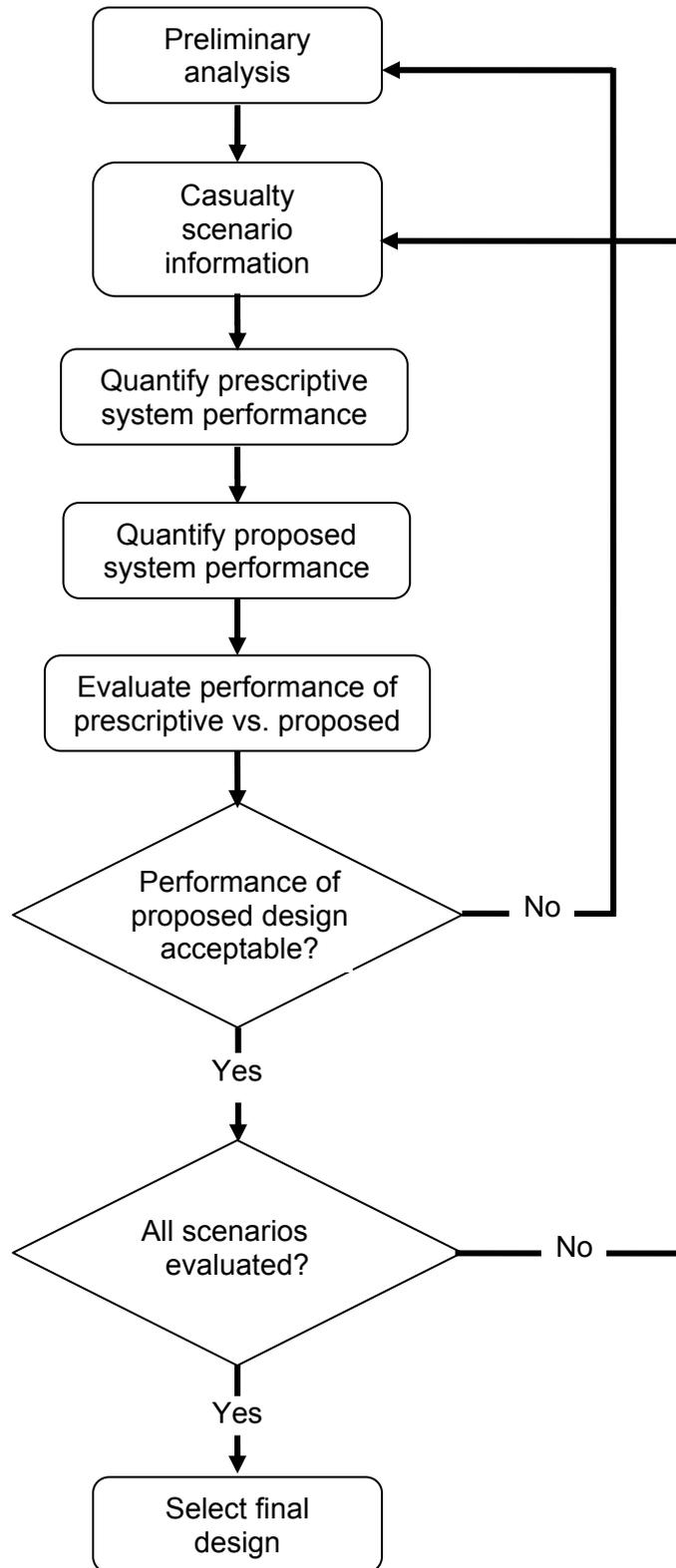


Figure 6.4.1 Alternative design and arrangements process flowchart

6.4.2 Each selected trial alternative design should be analysed against the selected design casualty scenarios to demonstrate that it meets the performance criteria with the agreed safety margin, which in turn demonstrates equivalence to the prescriptive design.

6.4.3 The level of engineering rigor required in any particular analysis will depend on the level of analysis required to demonstrate equivalency of the proposed alternative design and arrangements to the prescriptive requirements. Obviously, the more components, systems, operations and parts of the ship that are affected by a particular alternative design, the larger the scope of the analysis.

6.4.4 The final alternative design and arrangements should be selected from the trial alternative designs that meet the selected performance criteria and safety margins.

7 Documentation

7.1 Because the alternative design process may involve substantial deviation from the regulatory prescribed requirements, the process should be thoroughly documented. This provides a record that will be required if future design changes to the ship are proposed or the ship transfers to the flag of another State and will also provide details and information that may be adapted for use in future designs. The following information should be provided for approval of the alternative design or arrangements:

- .1 scope of the analysis or design;
- .2 description of the alternative design(s) or arrangements(s), including drawings and specifications;
- .3 results of the preliminary analysis, to include:
 - .3.1 members of the design team (including qualifications);
 - .3.2 description of the trial alternative design and arrangements being evaluated;
 - .3.3 discussion of affected SOLAS chapter II-1 regulations and their functional requirements;
 - .3.4 hazard identification;
 - .3.5 enumeration of hazards;
 - .3.6 selection of hazards; and
 - .3.7 description of design casualty scenarios;
- .4 results of quantitative analysis:
 - .4.1 design casualty scenarios:
 - .4.1.1 critical assumptions;
 - .4.1.2 initial conditions;
 - .4.1.3 engineering judgements;

- .4.1.4 calculation procedures;
- .4.1.5 test data;
- .4.1.6 sensitivity analysis; and
- .4.1.7 time-lines;
- .4.2 performance criteria;
- .4.3 evaluation of trial alternative designs against performance criteria;
- .4.4 description of final alternative design and arrangements;
- .4.5 test, inspection and maintenance requirements; and
- .4.6 references.

7.2 Documentation of approval by the Administration and the following information should be maintained onboard the ship at all times:

- .1 scope of the analysis or design, including the critical design assumptions and critical design features;
- .2 description of the alternative design and arrangements, including drawings and specifications;
- .3 listing of affected SOLAS chapter II-1 regulations;
- .4 summary of the results of the engineering analysis and basis for approval; and
- .5 test, inspection and maintenance requirements.

7.3 *Reporting and approval forms*

7.3.1 When the Administration approves alternative design and arrangements under these guidelines, pertinent technical information about the approval should be summarized on the reporting form given in appendixes A or B, as appropriate, and should be submitted to the International Maritime Organization for circulation to the Member Governments.

7.3.2 When the Administration approves alternative design and arrangements under these guidelines, documentation should be provided as indicated in appendixes C or D, as appropriate. The documentation should be in the language or languages required by the Administration. If the language is neither English, French or Spanish, a translation into one of those languages should be included.

7.4 *Reference in SOLAS certificates*

A reference to the approved alternative design and arrangements should be included in the appropriate SOLAS certificate.

APPENDIX A

**REPORT ON THE APPROVAL OF ALTERNATIVE DESIGN AND ARRANGEMENTS
FOR MACHINERY AND ELECTRICAL INSTALLATIONS**

The Government of has approved on an alternative design and arrangement in accordance with provisions of regulation II-1/55.5 of the International Convention for Safety of Life at Sea (SOLAS), 1974, as amended, as described below:

Name of ship
Port of registry
Ship type
IMO Number

- 1. Scope of the analysis or design, including the critical design assumptions and critical design features:**
- 2. Description of the alternative design and arrangements:**
- 3. Conditions of approval, if any:**
- 4. Listing of affected SOLAS chapter II-1 regulations in parts C, D and E:**
- 5. Summary of the result of the engineering analysis and basis for approval, including performance criteria and design casualty scenarios:**
- 6. Test, inspection and maintenance requirements:**

APPENDIX B

**REPORT ON THE APPROVAL OF ALTERNATIVE DESIGN AND ARRANGEMENTS
FOR LIFE-SAVING APPLIANCES AND ARRANGEMENTS**

The Government of has approved on an alternative design and arrangement in accordance with provisions of regulation III/38.5 of the International Convention for Safety of Life at Sea (SOLAS), 1974, as amended, as described below:

Name of ship
Port of registry
Ship type
IMO Number

- 1. Scope of the analysis or design, including the critical design assumptions and critical design features:**
- 2. Description of the alternative design and arrangements:**
- 3. Conditions of approval, if any:**
- 4. Listing of affected SOLAS chapter III regulations:**
- 5. Summary of the result of the engineering analysis and basis for approval, including performance criteria and design casualty scenarios:**
- 6. Test, inspection and maintenance requirements:**

APPENDIX C

**DOCUMENT OF APPROVAL OF ALTERNATIVE DESIGN AND ARRANGEMENTS
FOR MACHINERY AND ELECTRICAL INSTALLATIONS**

**Issued in accordance with provisions of regulation II-1/55.4 of the International Convention
for Safety of Life at Sea (SOLAS), 1974, as amended, under the authority of the
Government of by**
(name of State) (person or organization authorized)

Name of ship
Port of registry
Ship type
IMO Number

**THIS IS TO CERTIFY that the following alternative design and arrangement applied to
the above ship had been approved under the provisions of SOLAS regulation II-1/55.**

- 1. Scope of the analysis or design, including the critical design assumptions and critical design features:**
- 2. Description of the alternative design and arrangements:**
- 3. Conditions of approval, if any:**
- 4. Listing of affected SOLAS chapter II-1 regulations:**
- 5. Summary of the result of the engineering analysis and basis for approval, including performance criteria and design casualty scenarios:**
- 6. Test, inspection and maintenance requirements:**
- 7. Drawings and specifications of the alternative design and arrangement:**

Issued at on

.....
(signature of authorized official
issuing the certificate)

(Seal or stamp of issuing authority, as appropriate)

APPENDIX D

**DOCUMENT OF APPROVAL OF ALTERNATIVE DESIGN AND ARRANGEMENTS
FOR LIFE-SAVING APPLIANCES AND ARRANGEMENTS**

Issued in accordance with provisions of regulation III/38.4 of the International Convention for Safety of Life at Sea (SOLAS), 1974, as amended, under the authority of the Government of by
(name of State) (person or organization authorized)

Name of ship
Port of registry
Ship type
IMO Number

THIS IS TO CERTIFY that the following alternative design and arrangement applied to the above ship had been approved under the provisions of SOLAS regulation III/38.

- 1. Scope of the analysis or design, including the critical design assumptions and critical design features:**
- 2. Description of the alternative design and arrangements:**
- 3. Conditions of approval, if any:**
- 4. Listing of affected SOLAS chapter III regulations:**
- 5. Summary of the result of the engineering analysis and basis for approval, including performance criteria and design casualty scenarios:**
- 6. Test, inspection and maintenance requirements:**
- 7. Drawings and specifications of the alternative design and arrangement:**

Issued at on

.....
(signature of authorized official
issuing the certificate)

(Seal or stamp of issuing authority, as appropriate)

ANNEX 5**DRAFT PERFORMANCE STANDARDS FOR THE SYSTEMS AND SERVICES
TO REMAIN OPERATIONAL ON PASSENGER SHIPS FOR SAFE RETURN
TO PORT AFTER A CASUALTY, AS SPECIFIED IN SOLAS
REGULATIONS II-2/21.4 AND II-2/21.5.1.2****General**

1 These performance standards provide additional guidance for the uniform implementation of SOLAS regulations II-2/21.4 and II-2/21.5.1.2, which require that, after a fire or flooding casualty, basic services be provided to all persons on board and that certain systems remain operational for safe return to port.

Systems for fill, transfer and service of fuel oil

2 Systems for internal fill, transfer and service of fuel oil should be capable of fuel transfer to active propulsion and power generation equipment.

Fire main system

3 The fire main should remain operational in all main vertical zones not directly affected by the casualty. Water for fire-fighting and damage control purposes should be available to all areas of the ship.

Fire and smoke detection systems

4 The fire detection system should remain operational in all spaces not directly affected by the casualty.

Fixed fire-extinguishing systems (gaseous and water)

5 The automatic sprinkler system, or any other fixed fire-extinguishing system designed to protect an entire space, should be operational in all spaces not directly affected by the casualty.

Bilge and ballast systems

6 The bilge pumping systems and all associated equipment essential for its operation should be available in all spaces not directly affected by the casualty.

Steering systems and steering-control systems

7 Steering systems and steering-control systems should be capable of manoeuvring the ship.

Navigation systems

8 Equipment essential for navigation, position fixing and detection of risk of collision should be available. The ship should be capable of displaying the proper light configuration in compliance with the International Regulations for Preventing Collisions at Sea.

Propulsion systems and their necessary auxiliaries and control systems

9 Propulsion machinery and auxiliary machinery essential for the propulsion of the ship should remain operable for safe return to port.

Internal communications system

10 A means should be provided for communicating orders to the damage control teams and personnel in charge of evacuation and abandonment. In addition, a reliable means of communication, as specified in SOLAS regulation II-1/50, should be provided from the navigation position to the position in the machinery spaces or the control rooms from which the speed and direction are normally controlled.

External communications

11 The ship should be capable of communicating with any necessary entities for emergency assistance.

Ship's electrical-generation systems and their auxiliaries vital to the vessel's survivability and safety

12 Electrical power should be available and sustainable for all essential services specified in SOLAS regulations II-2/21.4 and II-2/21.5.2, with due regard to such services as may be operated simultaneously. Electrical power should also be available for essential navigation systems.

Power operated watertight doors

13 Power operated watertight doors should be capable of being remotely closed in all spaces not directly affected by the casualty.

[Other systems integral to damage control efforts

14 This includes any system that the Administration determines is vital to damage control pertaining to fire or flooding including, but not limited to, counter flooding systems, control and monitoring systems and watertight enclosures.]*

Basic services to safe areas

15 The basic services specified in SOLAS regulation II-2/21.5.1.2 should be available to all safe areas, as defined in SOLAS regulation [II-2/3.51]**.

* This paragraph has been left in square brackets pending MSC 81's consideration of draft SOLAS regulation II-2/21.4.13, which was prepared by FP 50.

** This regulation has been left in square brackets pending MSC 81's approval of the definition for "safe areas".

ANNEX 6

DRAFT PERFORMANCE STANDARDS FOR THE SYSTEMS TO REMAIN CAPABLE OF OPERATION ON PASSENGER SHIPS FOR ORDERLY EVACUATION AND ABANDONMENT, AS SPECIFIED IN SOLAS REGULATION II-2/21.6.2

General

1 These performance standards provide additional guidance for the uniform implementation of SOLAS regulation II-2/21.6.2, which requires that certain systems remain operational to support orderly evacuation and abandonment of the ship in the event of a fire.

Fire-main systems

2 The fire main should remain operational in all main vertical zones not directly affected by the casualty. Water for fire-fighting and damage control purposes should be available to all areas of the ship.

Bilge and ballast systems

3 The bilge pumping systems and all associated equipment essential for its operation should be available in all spaces not directly affected by the casualty.

Internal communications systems

4 A means should be provided for communicating orders to the damage control teams and personnel in charge of evacuation and abandonment.

External communications

5 The ship should be capable of communicating with any necessary entities for emergency assistance.

Ship's power for damage control and abandonment

6 Electrical power should be available for the abandonment of the ship, including lighting to assembly stations and life-saving appliances and arrangements and damage control systems referred to in this standard, with due regard being paid to such services as may be operated simultaneously.

ANNEX 7

DRAFT AMENDMENT TO SOLAS CHAPTER II-1

**CHAPTER II-1
CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY
AND ELECTRICAL INSTALLATIONS**

Regulation 41 – Main source of electrical power and lighting systems

1 The following new paragraph is added after paragraph 5:

“6 In passenger ships, auxiliary lighting shall be provided in all cabins to clearly indicate the exit so that occupants will be able to find their way to the door. Such lighting shall automatically illuminate when power to the normal cabin lighting is lost and remain on for a minimum of 30 min.”

ANNEX 8

DRAFT AMENDMENT TO SOLAS CHAPTER III

**CHAPTER III
LIFE-SAVING APPLIANCES AND ARRANGEMENTS**

Regulation 21 – Survival craft and rescue boats

1 In paragraph 1.4, the words “after all persons have been assembled, with lifejackets donned” are added at the end of the paragraph.

ANNEX 9**DRAFT MSC CIRCULAR****GUIDELINES FOR THE CONDUCT OF HIGH-SPEED CRAFT MODEL TESTS**

1 The Maritime Safety Committee, at its seventy-third session, adopted, by resolution MSC.97(73), the International Code of Safety for High-Speed Craft, 2000 (the Code) which, following the entry into force of the 2000 SOLAS amendments, adopted by resolution MSC.98(73), became mandatory as from 1 July 2002.

2 While the provisions of paragraph 2.2.3.1 of the Code require the fitting of an inner bow door on ro-ro high-speed craft fitted with bow loading opening, the Code recognizes that exemption from this requirement may be granted in a number of cases which are stated in paragraph 2.2.3.2 of the Code. One of these alternatives is set out in paragraph 2.2.3.2.2 of the Code which states that, if it can be demonstrated that a craft complies with certain residual stability criteria, even if water accumulates on the vehicle deck as a result of failure of the bow shell door, it may qualify for such an exemption. Model testing is identified in the Code as one of the options for determining the quantity of water that the craft in question may accumulate.

3 The Committee, at its seventy-fifth session (15 to 24 May 2002), approved Interim Guidelines for the conduct of high-speed craft model tests (MSC/Circ.1029) which were intended to ensure that the aforementioned model tests would be sufficient and adequate so that requests for exemption are considered and granted in a consistent and safe manner without jeopardizing the safety of the craft and to enable the Administration to consult with each of the port States between which the craft may operate.

4 The Committee further agreed that:

- .1 the Interim Guidelines should be applied with a view to verification and further development in the light of experience, and should be revisited after a period of time not exceeding four years following the date of entry into force of the Code;
- .2 comparative model tests should be conducted and the results of such tests should be submitted to the Organization, so as to validate and further refine the Interim Guidelines; and
- .3 Member Governments should undertake to seek the comments on, and evaluation of, the Interim Guidelines from the International Towing Tank Conference (ITTC) and, subsequently, collect information from the ITTC, in particular the results of their experience, and submit it to the Organization for consideration with a view to improving the Interim Guidelines.

5 The Committee, at its [eighty-first session (10 to 19 May 2006)], approved Guidelines for the conduct of high-speed craft model tests, prepared by the Sub-Committee on Ship Design and Equipment at its forty-ninth session, revising the Interim Guidelines, as set out in the annex.

6 Member Governments are invited to make use of the annexed Guidelines and bring them to the attention of craft designers, craft owners and other parties concerned, as appropriate, when considering the provisions of paragraph 2.2.3.2.2 of the Code.

7 This circular supersedes the Interim Guidelines for the conduct of high-speed craft model tests (MSC/Circ.1029).

ANNEX

GUIDELINES FOR MODEL TESTING

1 INTRODUCTION

1.1 The exemption from the requirement to fit an inner bow door now incorporated in the 2000 HSC Code (paragraph 2.2.3.2.2) may be invoked if a craft can be shown to comply with certain residual stability criteria even if water accumulates on the vehicle deck(s) as a result of failure of the bow shell door. Model testing is one option for determining the quantity of water that accumulates.

1.2 These Guidelines are intended to ensure that such model tests would be sufficient and adequate so that the exemption would be applied safely and consistently, and so that the safety of the craft would not be endangered.

1.3 Terms used in these Guidelines are as defined in the 2000 HSC Code.

1.4 The aim of the model tests is to determine the answers to two questions:

.1 whether waves reach the bow loading door; and if so

.2 what volume of water would accumulate.

1.5 To meet these aims, the following is described in these Guidelines:

.1 the use of towed or self-propelled models;

.2 physical tests at heading increments of 45° relative to the waves at zero and at forward speed;

.3 tests to establish whether water reaches the bow openings, and if so tests to determine the amount of water that may accumulate; and

.4 direct measurement of the accumulated volume of water at the end of each test run, or determination of the volume by calculation from measurements of relative water level within the vehicle space.

2 MODEL DESIGN AND CONSTRUCTION

2.1 Type and size

2.1.1 *Type of test facility*

2.1.1.1 The tests described by these Guidelines are intended to be undertaken in either a manoeuvring basin or in head and following waves in a conventional towing tank. The model may either be:

- .1 towed from a carriage (preferably equipped with the capability for free-to-surge under constant towing force), with freedom to heave, pitch and roll; or
- .2 self-propelled and remotely controlled, either by radio or by a lightweight umbilical attachment.

2.1.1.2 The wave making facility should be capable of generating the requisite specific wave spectra with accuracy within + 2.5% on significant height, $\pm 2.5\%$ on T_p , and $\pm 5\%$ on T_z .

2.1.2 Scale

The model scale should be as large as practicable with respect to the test facility employed, but the model should not be less than 1.5 m in length, and be:

- .1 appropriate to enable the requisite full scale significant wave height to be generated; and
- .2 capable of providing the equivalent of at least 1 min duration of operation at full scale per tank run at the maximum speed to be tested.

2.2 Construction

2.2.1 General

The model should comply with the following:

- .1 be capable of operating in both displacement mode and where appropriate in the non-displacement mode at a running attitude (trim and sinkage) appropriate to the full scale craft;
- .2 any lift devices (e.g., fans, foils, flaps, flexible seals, wings, etc.) should generate forces, pressures and volumetric flows resulting in the same running attitude in calm water, as specified above, ensuring a bow height accuracy within 5%. Actively controlled stabilizing or ride-control devices should be assumed to be in a fixed pre-set or passive mode;
- .3 the hull should be suitably thin ($0.01L_{\text{model}}$ with a minimum of 2 mm is recommended) in floodable spaces;
- .4 be equipped with all main design features such as watertight bulkheads, air escapes, freeing ports, access trunks, etc corresponding to the full scale vehicle spaces, and modelled properly to represent the real situation as far as practicable;
- .5 be constructed with superstructures to the extent needed to ensure a realistic response in waves;
- .6 be suitably constructed to permit monitoring of the interior of the floodable spaces, using video cameras;

- .7 be equipped with external appendages such as bilge keels, spray rails, lift devices or fendering as may reasonably be expected to influence the results of the tests;
- .8 be provided with a bow aperture to accurately model the full scale craft after the bow loading door(s) may have been lost, special attention being paid to the freeboard at the lowest point;
- .9 be equipped with fast-closing watertight shutters to the bow aperture(s) and any drainage openings that can be remotely opened and closed at the beginning and end of the test period during each run;
- .10 prior to ballasting, the model should be equipped with all the necessary instrumentation; and
- .11 freeing ports and other means of drainage should be closed at all times during the tests.

2.2.2 Permeability of vehicle spaces

The reduction of permeability of the vehicle spaces due to the presence of cargo should not be represented.

2.2.3 Accuracy

2.2.3.1 The mass of the model after ballasting to the directly scaled design waterline should be within $\pm 1\%$ of that representing the full scale craft.

2.2.3.2 The longitudinal centre-of-gravity after ballasting to the directly scaled design waterline should result in a static trim attitude within 0.2° of that representing the full scale craft.

2.2.3.3 The volume of the vehicle spaces to the first downflooding opening derived when the craft is at the designed trim attitude should be within $\pm 2\%$ of that representing the full scale craft. Where open vehicle spaces are modelled, the volume should be measured up to the level at which water might first begin to spill out, or alternatively the deck area should be within $\pm 2\%$ of that representing the full scale craft (commensurate with hull thickness as specified in 2.2.1.3).

2.2.3.4 The freeboard from the directly scaled design waterline (at zero speed) to the lowest point of the bow loading opening should be within $+0$ to -1% of that representing the full scale craft.

2.3 Model loading

2.3.1 Ballasting particulars should be developed for one loading condition prior to testing, viz: maximum operational weight (as defined in the 2000 HSC Code), combined with the most onerous bow down running trim or the condition with the bow aperture closest to the water in the running trim.

2.3.2 The ballasting particulars should be such as to achieve:

- .1 a mass corresponding to the loading conditions defined above;

- .2 a vertical centre-of-gravity position corresponding to the maximum allowable in service (limiting KG) for the respective operational weight, or alternatively the maximum predicted operational KG plus a margin of 10%;
- .3 longitudinal centre-of-gravity positions corresponding to the nominal and most forward and most aft positions envisaged by the loading restrictions contained in the craft operating manual;
- .4 a longitudinal radius of gyration equivalent to that calculated for the full-scale craft $\pm 8\%$, or (where this information is not available) within the range 0.23 to 0.27L, where L is as defined in the 2000 HSC Code; and
- .5 a roll radius of gyration equivalent to that calculated for the full-scale craft $\pm 8\%$, or (where this information is not available) within the range 0.35 to 0.40 B, where B is as defined in the 2000 HSC Code,

after ballasting for each condition:

- .6 the total model mass should be verified by weighing;
- .7 the actual vertical centre-of-gravity and longitudinal trim should be verified by physical inclining in air and/or water;
- .8 the longitudinal and roll radii of gyration should be verified in air; and
- .9 the natural roll period should be measured by a roll decrement test with the model at rest in calm water.

3 ENVIRONMENTAL CONDITIONS

3.1 Waves

3.1.1 Two sea states should be used. The model should be tested in a long-crested irregular seaway at maximum significant wave steepness of $H_s/(gT_p^2/(2\pi))=0.05$. In the absence of information on specific spectrum data, JONSWAP type spectra should be used with a peak enhancement factor $\gamma=3.3$. In the first sea state, H_s should be the maximum significant wave height for the area of operation, which is not exceeded by a probability of more than 10% on a yearly basis, but limited to a maximum of 4 m. In the second sea state H_s should represent the significant wave height corresponding to the most onerous relative bow motion (worst intended conditions).

3.1.2 Generation of the waves should be such that each wave realization results in a non-repeating wave train during the model test.

3.2 Wind

Wind should not be represented during the tests.

4 INSTRUMENTATION, CALIBRATION AND DATA RECORDING

4.1 Model instrumentation

4.1.1 The following model instrumentation should be provided as a minimum: one relative water level sensor located in front of the opening at the port and starboard extremities of the opening (i.e. 2 sensors).

4.1.2 If the water volume is to be estimated using water height measurements, 15 water level sensors should be used at the following locations (where l = the length of the floodable vehicle space):

- .1 at 10% of l from the bow loading opening, at the watertight boundary on the port and starboard sides and centreline (h_{FP} , h_{FS} and h_{FC} respectively);
- .2 at 30% of l from the bow loading opening, at the watertight boundary on the port and starboard sides and centreline (h_{FMP} , h_{FMS} and h_{FMC} respectively);
- .3 at 50% of l from the bow loading opening, at the watertight boundary on the port and starboard sides and centreline (h_{MP} , h_{MS} and h_{MC} respectively);
- .4 at 30% of l from the aft limit of the vehicle space, at the watertight boundary on the port and starboard sides and centreline (h_{AMP} , h_{AMS} and h_{AMC} respectively);
and
- .5 at 10% of l from the aft limit of the vehicle space, at the watertight boundary on the port and starboard sides and centreline (h_{AP} , h_{AS} and h_{AC} respectively).

4.1.3 A drawing of the positions of the water height sensors should be provided.

4.1.4 Instrumentation to measure roll and pitch angles and heave motion is recommended.

4.1.5 If the testing is conducted solely to demonstrate that water does not reach the bow loading opening, then all items except 4.1.1 may be omitted.

4.1.6 As an alternative to the use of water level sensors described in 4.1.2 above, the volume of water accumulated during a test run may be determined by direct collection and weighing of the water inside the model.

4.2 Facility instrumentation

The following instrumentation should be provided in the model basin:

- .1 one static wave height probe located clear of tank end effects;
- .2 one moving wave height probe mounted so that it approximately matches the mean model position;
- .3 mean forward speed of the model;

- .4 video camera(s) to monitor the interior of the vehicle spaces; and
- .5 video camera(s) to monitor the exterior of the model, especially the bow aperture.

4.3 Data recording

Continuous records should be obtained for all the media required by 4.1 and 4.2 for each test run, with a sampling rate at model scale of not less than 25 Hz.

5 TEST PROCEDURE

5.1 Preparation

5.1.1 The model should be prepared in accordance with 2.2, 2.3 and 4.1 above, and all verification checks required by 2.1 to 2.3 should be completed before testing commences.

5.1.2 The wave spectra should be run and verified for compliance with the requirements in 2.1.1.

5.2 Craft speed and operating mode

5.2.1 Where a craft normally operates in a non-displacement mode, tests should be conducted in both zero speed (displacement mode) and maximum operating forward speed (non-displacement mode). Where a non-displacement mode is tested, any lift devices should be employed as specified in 2.2.1.1.

5.2.2 Prior to the testing, an estimate should be made by the owner and/or builder as to the maximum speed of the full scale craft into head seas (V_W) that would be practically attainable in the specific loading condition (powering considerations) or be structurally permissible (e.g.: by the classification society). Where a craft may be operated in both displacement and non-displacement modes, separate values of V_W should be derived for the two modes.

5.2.3 In head seas the speed of the model should not exceed V_W , but may be reduced to not less than 65% of V_W , provided that if a reduced speed is necessary to satisfy the terms of the exemption, the maximum permissible speed in the relevant wave height is incorporated in the Permit to Operate and in the craft operating manual.

5.3 Test run procedure

5.3.1 Once the craft has reached the required test speed during a tank run, the watertight bow aperture(s) are to be rapidly opened and are to remain open until the point at which the model is decelerated at the end of the run. At that point the watertight shutters are to be rapidly closed to trap the water collected inside the model. This water is to be measured directly after the tank run (section 5.5.3) and the water is to be removed from the model after each run.

5.3.2 A weight made of high density material, such as lead or steel, equal to the mass of water collected at the end of each tank run is then to be placed on the vehicle deck, on the centreline of the craft and at the longitudinal mid point of the vehicle deck. This weight should be cuboid in shape, with length and beam selected to fit the available deck space, aiming not to restrict the water flow on the vehicle deck. This may allow for more water to accumulate on the ro-ro deck

than what would be the case in one continuous run but this error is likely to be small and on the side of safety.

5.3.3 This process is to be repeated for each run of a test case.

5.4 Test programme

5.4.1 General

5.4.1.1 The test programme should be witnessed by an Administration (whenever known, this should be the flag Administration), surveyors nominated by them for the purpose or by organizations recognized by them.

5.4.1.2 The test programme should be conducted for the craft operating in each of the sea states stipulated in 3.1 above through direct physical testing at zero and forward speed on five headings relative to the wave direction, between head and following seas in 45 degrees increments.

5.4.2 Duration and repetition of test runs

5.4.2.1 For test runs at zero speed, each run should have a duration of 10 min (full scale). Each test case at each heading should consist of a set of three tank runs with different wave realizations.

5.4.2.2 Each tank run at forward speed should be of the maximum practical duration, in any case not less than the equivalent of 1 min at full scale, with the bow opening shutter being opened and closed at the beginning and end of the test period of each run. Each test run should comprise successive tank runs to represent not less than 10 min of continuous full scale operation in one wave realization at a given heading angle.

5.4.2.3 Each test case per heading angle (at forward speed) should consist of an ensemble of test runs with different wave realizations. The number of associated wave realizations should depend on the heading angle as follows:

- .1 three wave realization trains in head and bow quartering seas;
- .2 four wave realization trains in beam seas; and
- .3 five separate wave realization trains in following and stern quartering seas.

5.4.2.4 Each wave realization train will be of at least 10 min full scale total duration, each such wave train being taken from the required wave spectrum.

5.4.3 Tests in waves at all heading angles

5.4.3.1 As a minimum the following tests should be conducted: at a speed of V_w and design LCG, tests in waves specified in section 3.1.

5.4.3.2 If the craft does not comply with the water volume required to meet the exemption, then the tests can be repeated at lower speed to a minimum of 65% V_w .

5.5 Test results

5.5.1 General

The tests are required to determine the answers to two questions:

- .1 whether the bow loading door is reached by the waves; and if so
- .2 what volume of water would accumulate.

5.5.2 Determination of whether water reaches the bow opening

If, during the constant speed portion of ANY of the test runs required by these guidelines, water is observed or measured as having exceeded the lower edge of the bow opening, then the requirement of the 2000 HSC Code, paragraph 2.2.3.2.2.1 (objective 5.5.1.1) should be deemed NOT to have been satisfied. In the event this is not satisfied, then an exemption may still be possible by further tests to demonstrate compliance with the 2000 HSC Code, paragraph 2.2.3.2.2.2 (objective 5.5.1.2).

5.5.3 Determination of volume of water

From the model tests the accumulated volume of water for each heading angle may be determined by:

- .1 direct measurement of the accumulated volume of water by collecting the trapped water on the vehicle deck in a measurement receptacle (preferred method). The water volume collected during each (10 min) test run should be based on the sum of volumes recorded for each successive tank run. For each test case at a given heading angle the volume should be averaged over the volumes of the different test runs (wave realizations) to give a collected volume for a 10 min (full scale) time period; or
- .2 determination of the volume by calculation from measurements of water level within the vehicle space, using the method of 5.5.4 below. The position of the solid weight after each run should be positioned to minimize interference with the water height measurement probes.

5.5.4 Calculation of volume of water accumulating on the vehicle deck

5.5.4.1 When the volume of water accumulated on the vehicle deck is estimated from water height sensors, it should be calculated as follows. The mean volume of water during each successive tank run should be determined from the fifteen sensors as defined in section 4.1.2.1 to 4.1.2.2. The mean heights of water measured at these locations should be scaled to full scale before calculating the volume of water as follows (where the symbol h' denotes the water height scaled as described above).

5.5.4.2 Volume of water during tank run i:

$$\text{Vol}_i = A_{\text{VD}} (h'_{\text{FS}} + 2h'_{\text{FC}} + h'_{\text{FP}} + h'_{\text{FMS}} + 2h'_{\text{FMC}} + h'_{\text{FMP}} + h'_{\text{MS}} + 2h'_{\text{MC}} + h'_{\text{MP}} + h'_{\text{AMS}} + 2h'_{\text{AMC}} + h'_{\text{AMP}} + h'_{\text{AS}} + 2h'_{\text{AC}} + h'_{\text{AP}}) / 20 \quad (\text{m}^3)$$

where A_{VD} = plan area of vehicle deck capable of being flooded (m^2 at full scale).

5.5.4.3 The volume of water accumulated during a test run is given by the sum of Vol_i for each successive tank run.

5.5.5 *Volume of water to be used in calculating residual stability*

The volume of water resulting from the most onerous condition (i.e., heading angle) obtained from 5.5.3.1 or .2 is to be used for calculating the stability properties for demonstrating compliance with the 2000 HSC Code, paragraph 2.2.3.2.2.2.

5.6 Test report

The test report should include the following information as a minimum:

- .1 general arrangement drawing of the craft, showing the spaces that might be flooded as a result of failure of the bow loading door;
- .2 general arrangement drawing of the model, showing the scale ratio and details of the construction and instrumentation;
- .3 calculations to show the derivation of the maximum operational and minimum operational weights and corresponding limiting KG positions;
- .4 tests conducted to verify the mass, centre-of-gravity position and radii of gyration;
- .5 where appropriate, calculations to show that the elements necessary to achieve the non-displacement mode have been appropriately scaled;
- .6 the nominal and measured wave spectra (at the fixed wave probe location); and
- .7 records for each test case:
 - .7.1 wave elevation at model position;
 - .7.2 relative wave height at the opening; and
 - .7.3 internal water volume measurements.

ANNEX 10

DRAFT AMENDMENTS TO THE 2000 HSC CODE

Chapter 1 – General comments and requirements

1 The existing paragraph under 1.2 – General requirements – is numbered as 1.2.1 and a new paragraph 1.2.2 is added as follows:

“1.2.2 On all craft new installation of materials containing asbestos used for the structure, machinery, electrical installations and equipment of a craft to which this Code applies shall be prohibited except for:

- .1 vanes used in rotary vane compressors and rotary vane vacuum pumps;
- .2 watertight joints and linings used for the circulation of fluids when, at high temperature (in excess of 350°C) or pressure (in excess of 7×10^6 Pa), there is a risk of fire, corrosion or toxicity; and
- .3 supple and flexible thermal insulation assemblies used for temperatures above 1,000°C.”

2 In paragraph 1.3.4.1, the words “operational speed” are replaced by the words “90% of maximum speed”.

3 In paragraph 1.3.4.2, the words “operational speed” are replaced by the words “90% of maximum speed”.

4 In paragraph 1.4.16 the words “(main displays and controls for equipment specified in 13.2 to 13.7)” are inserted after “navigating equipment”.

5 In paragraph 1.4.29, the word “food” is inserted between “cooking or” and “heating”.

6 Replace paragraph 1.4.35 with the following:

“1.4.35 *Machinery spaces* are spaces containing internal combustion engines either used for main propulsion or having an aggregate total power output of more than 110 kW, generators, oil fuel units, major electrical machinery and similar spaces and trunks to such spaces.”

7 Existing paragraph 1.4.44 is deleted and the existing paragraphs 1.4.32 to 1.4.43 are renumbered accordingly as 1.4.33 to 1.4.44, with a new paragraph 1.4.32 being inserted as follows:

“1.4.32 *IMDG Code* means the International Maritime Dangerous Goods (IMDG) Code as defined in chapter VII of the Convention.”

8 At end of paragraph 1.4.53, the following new sentence is inserted:

“Such spaces containing no cooking appliances may contain:

- .1 coffee automat, toaster, dish washer, microwave oven, water boiler and similar appliances, each of them with a maximum power of 5 kW; and
- .2 electrically heated cooking plates and hot plates for keeping food warm, each of them with a maximum power of 2 kW and a surface temperature not above 150°C.”

9 In paragraph 1.4.54, the text after “the average” is deleted and replaced by the following:

“crest-to-trough height of the highest one third of the zero-upcrossing waves in a specified period.”

10 At end of paragraph 1.8.1, the following text is inserted:

“On all craft, all certificates issued under this chapter, or certified copies thereof, shall be carried on the craft. Except where the flag State is a Party to the 1988 SOLAS Protocol, a copy of each of these certificates shall be posted up in a prominent and accessible place in the craft.”

11 In paragraph 1.9.1, the second sentence is deleted and a new subparagraph 1.9.1.1 is inserted as follows:

“1.9.1.1 On all craft, transit voyages may be undertaken without a valid Permit to Operate High-Speed Craft provided the craft is not operating commercially with passengers or cargo on-board. For the purpose of this provision, a transit voyage includes delivery voyages, i.e. builder’s port to base port, and voyages for repositioning purposes, i.e. change of base port and/or route. A transit voyage, which may involve long trans-ocean passage operating for periods in excess of those set out in this Code, e.g. 1.3.4, must not be undertaken unless the:

- .1 The craft has a valid High-Speed Craft Safety Certificate or similar before the start of such a voyage;
- .2 The operator has developed a safety plan for the voyage including any temporary accommodation and all relevant matters listed in 18.1.3 to ensure that the craft is capable of safely completing the transit voyage;
- .3 The master of the craft is provided with the materials and information necessary to operate the craft safely during the transit voyage; and
- .4 The Administration is satisfied that arrangements have been made for the safe conduct of the voyage.”

- 12 Add a new paragraph 1.9.7, after the existing paragraph 1.9.6 as follows:

“1.9.7 In determining the worst intended conditions and the operational limitations on all craft for insertion in the Permit to Operate, Administrations shall give consideration to all the parameters listed in annex 12. The limitations assigned shall be those that enable compliance with all of these factors.”

- 13 In paragraph 1.15.1 the words “four years” are replaced by the words “six years”.

Chapter 2 – Buoyancy, stability and subdivision

- 14 Existing text of paragraph 2.1.3.1 is deleted and replaced with the following:

“.1 *Downflooding point* means any opening, irrespective of size, that would permit passage of water through a water/weathertight structure (e.g., opening windows), but excludes any opening kept closed to an appropriate standard of water/weathertightness at all times other than when required for access or for operation of portable submersible bilge pumps in an emergency (e.g. non-opening windows of similar strength and weathertight integrity to the structure in which they are installed).”

- 15 In paragraph 2.1.3, existing subparagraphs .2 to .6 are renumbered .3 to .7 and a new subparagraph .2 is inserted after subparagraph .1 as follows:

“.2 *Elsewhere* when applied to sill and coaming heights in 2.2.7 and 2.2.8 is taken as applying to all weathertight and watertight closures located on or below the datum.”

- 16 The following new paragraph 2.1.5 is inserted and the existing paragraphs 2.1.5 and 2.1.6 are renumbered as 2.1.6 and 2.1.7:

“2.1.5 The adequacy of mathematical simulations must first be demonstrated by correlation with full-scale or model tests for the appropriate type of craft. It may be appropriate to use mathematical simulations to help to identify the more critical scenarios for subsequent physical testing.

Some mathematical simulation methods are not well suited to accurate modelling of extreme events.

For safety level 3 or 4 it may be appropriate to use model testing as a precursor to or instead of full-scale testing.”

- 17 The following text is inserted at the end of paragraph 2.1.7:

“Where calculations are employed, it shall first be shown that they correctly represent dynamic behaviour within the operational limitations of the craft.”

18 The third and subsequent sentences of paragraph 2.2.9.3 are replaced with the following:

“In unmanned machinery spaces, main and auxiliary sea inlets and discharges in connection with the operation of machinery shall either:

- .1 be located at least 50% of the significant wave height corresponding to the worst intended conditions above the deepest flooded waterline following damage specified in paragraphs 2.6.6 to 2.6.10; or
- .2 be operable from the operating compartment.”

19 In paragraph 2.3.4, the content of Table 2.3.4 is replaced as follows:

“Table 2.3.4 – Application of annexes 7 and 8 to monohull and multihull craft

GM _T	Angle of maximum GZ	
	≤ 25°	> 25°
≤ 3.0	annex 7 or annex 8	annex 8
> 3.0	annex 7	annex 7 or annex 8

20 In paragraph 2.3.4, the definitions of B_{WL} , A_{WP} and ∇ which appear after “where:” are deleted and the definition “GZ = righting lever” inserted to replace them.

21 In paragraph 2.4.2, the words “chapter 18” are replaced by the words “chapters 17 and 18”.

22 A new subparagraph .5 is inserted after subparagraph 2.6.5.4 as follows:

“.5 void spaces filled with foam or modular buoyancy elements or any space without a venting system are considered to be void spaces for the purposes of this paragraph, provided such foam or elements fully comply with 2.6.4.”

23 In paragraph 2.6.6, the final sentence is deleted.

24 A new section of text is added in continuation of paragraph 2.6.7 after subparagraph 2.6.7.3 as follows:

“The damages described in this paragraph shall be assumed to have the shape of a parallelepiped (a parallelepiped is defined as “a solid contained by parallelograms” and a parallelogram is defined as “a four-sided rectilinear figure whose opposite sides are parallel”). Applying this to 2.6.7 a, the inboard face at its mid-length shall be tangential to, or otherwise touching in a least 2 places, the surface corresponding to the specified transverse extent of penetration, as illustrated in Figure 2.6.7 a.

Side damage shall not transversely penetrate a greater distance than the extent of $0.2\nabla^{1/3}$ at the design waterline, except where a lesser extent is provided for in 2.6.7.2. Refer to Figures 2.6.7 b and c.

If considering a multihull, the periphery of the craft is considered to only be the surface of the shell encompassed by the outboard surface of the outermost hull at any given section.

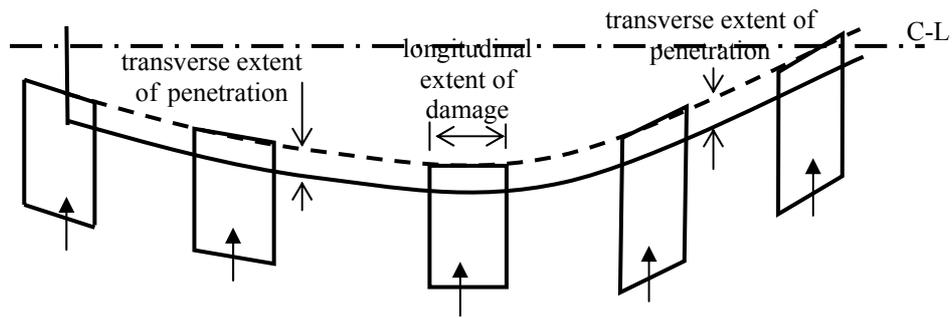


Figure 2.6.7 a

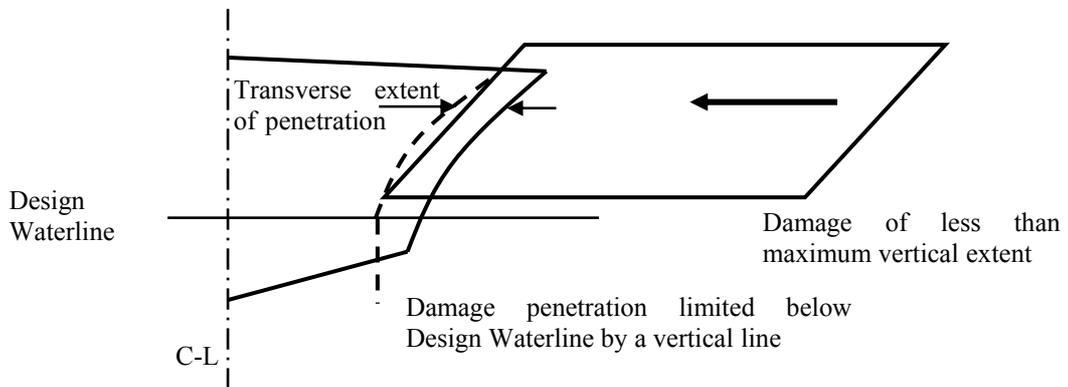


Figure 2.6.7 b

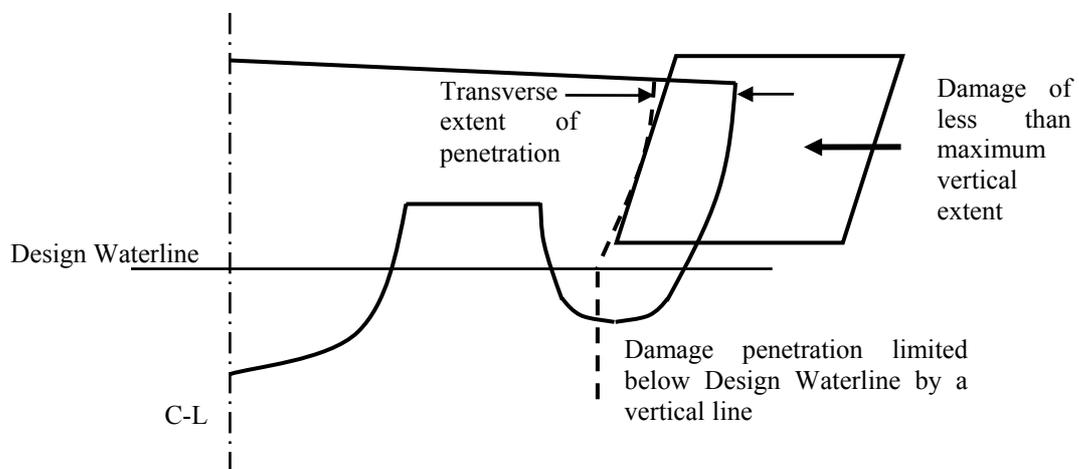


Figure 2.6.7 c''

25 In paragraph 2.6.7, the word “damages” is replaced by the word “damage”.

26 Existing paragraphs 2.6.8 to 2.6.12 are renumbered as 2.6.9 to 2.6.13 and a new paragraph 2.6.8 is inserted after paragraph 2.6.7 as follows:

“2.6.8 *Extent of bow and stern damage*

2.6.8.1 The following extents of damage are to be applied to bow and stern, as illustrated in Figure 2.6.8:

- .1 at the fore end, damage to the area defined as A_{bow} in 4.4.1, the aft limit of which being a transverse vertical plane, provided that this area need not extend further aft from the forward extremity of the craft’s watertight envelope than the distance defined in 2.6.7.1; and
- .2 at the aft end, damage to the area aft of a transverse vertical plane at a distance $0.2\nabla^{1/3}$ forward of the aft extremity of the watertight envelope of the hull.

2.6.8.2 The provisions of 2.6.6 in relation to damage of lesser extent remain applicable to such damage.

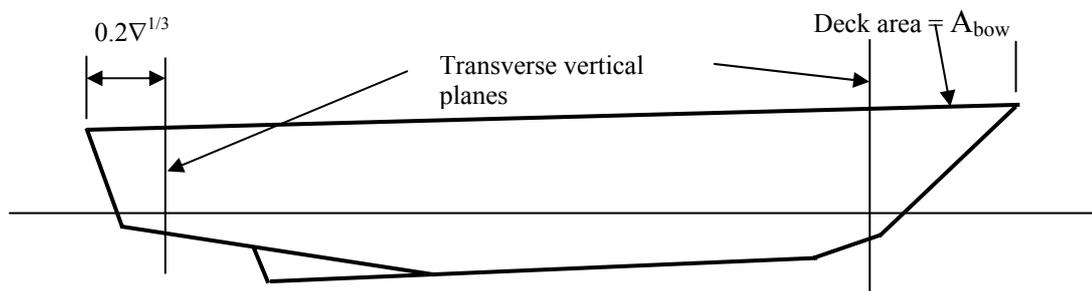


Figure 2.6.8”

27 In paragraph 2.6.9.1.1.1, the words “operational speed” are replaced by the words “90% of maximum speed”.

28 In paragraph 2.6.9.1.2, the following text is inserted at the end of the definition of “T”:

“, provided that structures such as single plate skegs or solid metal appendages should be considered to be non-buoyant and thus excluded.”

29 A new paragraph 2.6.9.2.3 is inserted after the existing paragraph 2.6.9.2.2 as follows:

“2.6.9.2.3 The shape of damage shall be assumed to be rectangular in the transverse plane as illustrated in Figure 2.6.9.2 below. Damage is to be assumed at a series of sections within the defined longitudinal extent in accordance with Figure 2.6.9.2, the mid-point of the damaged girth being maintained at a constant distance from the centreline throughout that longitudinal extent.

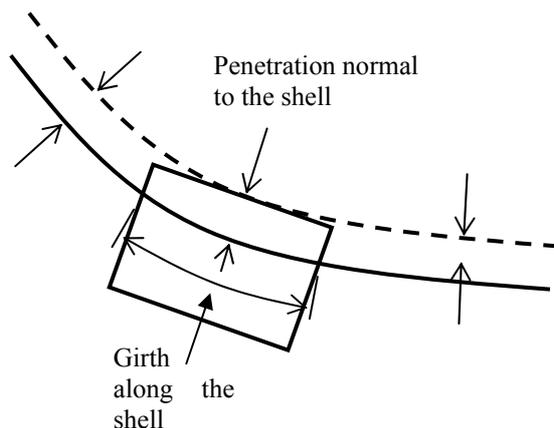


Figure 2.6.9.2”

30 In paragraph 2.6.10.1, the words “below the design waterline” are inserted between “hull(s)” and “which”.

31 In paragraph 2.6.10.2, a new subparagraph .4 is inserted after subparagraph 2.6.10.2.3 as follows:

“.4 the shape of damage should be assumed to be rectangular in the plane of the shell of the craft, and rectangular in the transverse plane as illustrated in Figure 2.6.9.2.”

32 Existing paragraphs 2.7.2 to 2.7.8 are renumbered as 2.7.3 to 2.7.9 and the following new paragraph 2.7.2 is inserted after paragraph 2.7.1:

“2.7.2 On all craft where an accurate inclining experiment is impractical owing to the height of the centre-of-gravity (VCG or KG) being less than one third of the transverse metacentric height (GM_T), the Administration may accept estimation of KG by detailed calculation in place of an inclining experiment. In such cases a displacement check shall be undertaken to confirm the calculated lightship characteristics, including LCG, which may be accepted if the measured lightship displacement and LCG are respectively within 2% and 1% L relative to the estimate.”

33 In paragraph 2.7.7, the following new sentence is inserted at the end:

“For amphibious air-cushion vehicles this may be achieved by the use of draught gauges in conjunction with deck datum plates.”

34 In paragraph 2.10, the following new subparagraphs .7 to .10 are inserted after subparagraph .6 as follows:

“.7 Passengers assumed to be occupying seats shall be taken as having a vertical centre-of-gravity corresponding to being seated, with all others standing.

.8 On the decks where assembly stations are located, the number of passengers on each should be that which generates the maximum heeling moment. Any remaining passengers should be assumed to occupy decks adjacent to those on which the assembly stations are located, and positioned such that the combination of number on each deck and total heeling moment generate the maximum static heel angle.

- .9 Passengers should not be assumed to gain access to the weather deck nor be assumed to crowd abnormally towards either end of the craft unless this is a necessary part of the planned evacuation procedure.
- .10 Where there are seats in areas occupied by passengers, one passenger per seat should be assumed, passengers being assigned to the remaining free areas of deck (including stairways if appropriate) at the rate of four per square metre.”
- 35 A new paragraph 2.12.3 is inserted after paragraph 2.12.2 as follows:
- “2.12.3 Demonstrating the effect of the passenger heeling moment calculated as given by 2.10 above, or a defined beam wind pressure when at speed, shall be established by conducting a trial or model test with an equivalent heeling moment applied by test weights. Passenger movement may only be neglected on craft where the safety announcement (see 8.4.1 and 18.7) expressly requires passengers to remain seated throughout the voyage.”

Chapter 4 – Accommodation and escape measures

- 36 In paragraph 4.3.4, the words “two-thirds of operational speed” are replaced by the words “60% of maximum speed”.
- 37 In paragraph 4.3.7, the words “operational speed” are replaced by the words “90% of maximum speed”.
- 38 In paragraph 4.4.1, the words “operational speed” are replaced by the words “90% of maximum speed”.
- 39 Amend table 4.4.2, under Design Level 2, as follows:
- .1 the existing text of paragraph 1.1 is replaced as follows:
- “1.1 Seatbacks with protective deformation and padding.”; and
- .2 the text “unless satisfactorily tested without belts in that orientation and arrangement” is inserted at the end of paragraph 1.4.
- 40 A new sentence is inserted at the end of paragraph 4.4.5, stating:
- “The armrests and backrests of seats furnished appropriately in public spaces may serve as handholds.”
- 41 In paragraph 4.6.1, “3g” is replaced by “3”.
- 42 In paragraph 4.7.10, the second sentence is replaced with the following:
- “Clear markings, including the location of the fire control plan, shall be provided for the guidance of rescue personnel outside the craft.”

43 In paragraph 4.7.12, the following text is added at the end:

“Doors providing escape from a space shall, where possible, be situated at opposite ends of the space. Where the doors providing escape from a space are situated in the same end of the space, the distance between those doors shall be greater than the maximum length of the space.”

44 In paragraph 4.7.13, the following text is added at the end:

“Requirements of this paragraph do not apply to aisles (fore-aft passageways separating seating areas) or to spaces between adjacent rows of seats. However, the width of aisles and the seat pitch should be such as to allow the craft to comply with the provisions of section 4.8 on evacuation.”

45 Existing paragraphs 4.7.14 to 4.7.16 are renumbered 4.7.15 to 4.7.17 respectively, and the following new paragraph 4.7.14 is inserted:

“4.7.14 Special category spaces used for stowage of motor vehicles should be provided with walkways leading to a safe means of escape, having a width of at least 600 mm.”

46 In paragraph 4.7.17, the following new sentence is added at the end:

“At least one means of escape from a machinery space shall consist of either a ladder leading to a door or hatch (not being a horizontal flush-hatch) or a door located in the lower part of that space and giving access to an adjacent compartment from which a safe means of escape is provided.”

47 A new paragraph 4.7.18 is inserted as follows:

“4.7.18 Spaces that are only entered occasionally by crew members may have only one means of escape provided that it is independent of watertight doors.”

48 In paragraph 4.8.1, the following new sentence is added at the end:

“In determining the evacuation time, all means of escape are to be considered serviceable and they need not be dimensioned to take into account any additional number of persons that might be diverted from other means of escape if one or more of those other means of escape are lost or rendered unserviceable.”

49 Paragraphs 4.8.10 and 4.8.11 are renumbered as paragraphs 4.8.11 and 4.8.12 and a new paragraph 4.8.10 inserted as follows:

“4.8.10 Where the Administration is satisfied that the evacuation time determined in accordance with 4.8.1 to 4.8.9 can thereby be accurately estimated, the Administration may accept an evacuation demonstration in which persons are not required to descend through MES or equivalent means of evacuation, provided the time required to embark into the survival craft can be determined using:

- .1 data obtained from the type-approval tests of the equipment; or
- .2 time extrapolated from trials using a limited number of participants; or
- .3 a combination of 1 and 2.”

Chapter 6 – Anchoring, towing and berthing

50 A new paragraph 6.1.4 is inserted as follows:

“6.1.4 Under any operating load up to the breaking strength of the anchor cable or mooring lines, the loads on the bits, bollards, etc. shall not result in damage to the hull structure that will impair its watertight integrity. A strength margin of at least 20% above the resultant load based on the minimum specified breaking strength of the relevant cable or warp shall be required.”

Chapter 7 – Fire safety

51 In paragraph 7.3.1.2, in the first bullet point, the term “1.4.4” is replaced with “1.4.5”.

52 In paragraph 7.3.1.3, in the first bullet point, the term “1.4.5” is replaced with “1.4.6”.

53 In paragraph 7.3.1.4, the words “as defined in 1.4.15” are replaced with the words “as defined in 1.4.16”.

54 Existing paragraph 7.3.2 is renumbered as 7.3.3 and the following new paragraph 7.3.2 is inserted:

“7.3.2 In relation to the classification of spaces in 7.3.1, the following additional criteria shall be applied:

- .1 If a space is divided by partial bulkheads into two (or more) smaller areas such that they form enclosed spaces, then the enclosed spaces shall be surrounded by bulkheads and decks in accordance with tables 7.4-1 and 7.4-2, as applicable. However, if the separating bulkheads of such spaces are at least 30% open, then the spaces may be considered as the same space.
- .2 Cabinets having a deck area of less than 2 m² may be accepted as part of the space they serve, provided they have open ventilation to the space and do not contain any material or equipment that could be a fire risk.
- .3 Where a space has the special characteristics of two or more space groupings, the structural fire protection time of the divisions shall be the highest for the space groupings concerned. For example, the structural fire protection time of the divisions of emergency generator rooms shall be of the highest value for the space when the space is considered as being a control station (D) and a machinery space (A).”

55 The following new paragraphs 7.3.4 to 7.3.6 and associated Figures 7.3.4 a, 7.3.4 b and 7.3.6 are inserted after paragraph 7.3.3:

“7.3.4 To prevent heat transmission at intersections and terminal points, the insulation of the deck or bulkhead shall be carried past the intersection or terminal point for a distance of at least 450 mm in the case of steel or aluminium structures (refer to Figures 7.3.4 a and 7.3.4 b).

7.3.5 If a space is divided by a deck or bulkhead and the fire insulation required for each space is different, the insulation with the higher structural fire protection time shall continue on the deck or bulkhead with the insulation of the lesser structural fire protection time for a distance of at least 450 mm beyond the boundary between the spaces.

7.3.6 Where the lower part of the fire insulation has to be cut for drainage, the construction shall be in accordance with the structural details shown in Figure 7.3.6.”

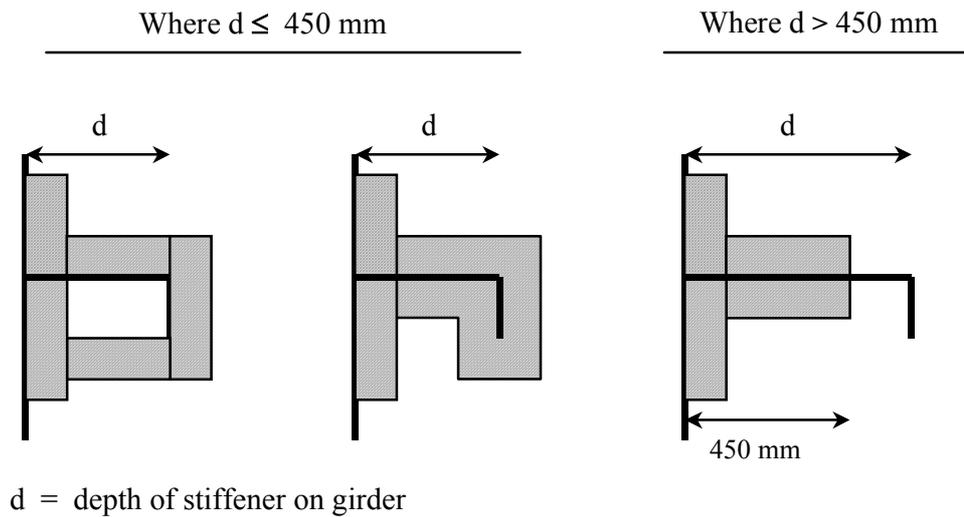


Figure 7.3.4 a

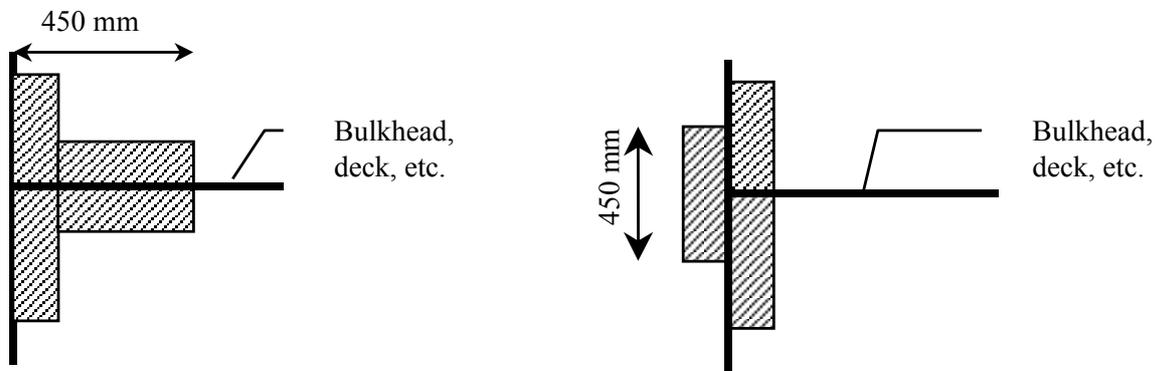


Figure 7.3.4 b

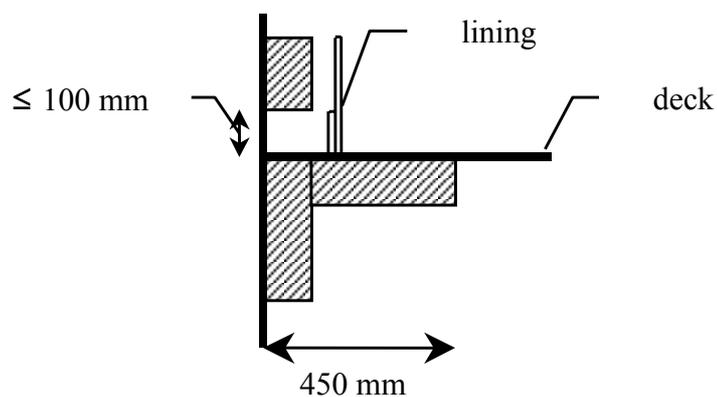


Figure 7.3.6

56 A new paragraph 7.4.1.4 is inserted after existing paragraph 7.4.1.3 as follows:

“7.4.1.4 Paragraph 7.4.1.3 does not apply to appendages such as air propellers, air ducts to propellers, transmission shafts, rudders and other control surfaces, struts, spars, flexible skirts, etc. which do not comprise part of the main structure of the craft.”

57 In tables 7.4-1 and 7.4-2, Note 1 is replaced by the following:

“1 The upper side of decks within spaces protected by fixed fire-extinguishing systems need not be insulated.”

58 In paragraph 7.4.2.1, in the second sentence, the words “at the lightweight condition” are replaced with the words “at least 300 mm below the craft’s waterline in the lightweight condition in displacement mode”.

59 At the end of paragraph 7.4.2.6, a new sentence is added as follows:

“Where machinery shafts penetrate fire-resisting watertight divisions, arrangements shall be made to ensure that the required watertight and fire-resisting integrity of the division is not impaired.”

60 A new paragraph 7.4.2.7 is inserted after existing paragraph 7.4.2.6 as follows:

“7.4.2.7 Ventilation openings may be accepted in entrance doors to public toilets, provided they are positioned in the lower portion of the door and fitted with closable grilles made of non-combustible or fire-restricting material and operable from outside the space.”

61 At the end of paragraph 7.4.3.2, the following sentence is added:

“The fire insulation in such spaces may be covered by metal sheets (not perforated) or by vapour proof glass cloth accurately sealed at the joint.”

62 In paragraph 7.4.3.3.1, the words “e.g. desks, wardrobes, dressing tables, bureaux and dressers” are inserted after the words “case furniture”.

63 In paragraph 7.4.3.4, the words “Subject to paragraph 7.4.3.5” are inserted at the beginning of the paragraph.

64 The following new paragraph 7.4.3.5 is inserted after existing paragraph 7.4.3.4 and existing paragraphs 7.4.3.5 to 7.4.3.10 renumbered accordingly as 7.4.3.6 to 7.4.3.11:

“7.4.3.5 Paragraph 7.4.3.4 does not apply to partitions, windows and sidescuttles made of glass which are deemed to be non-combustible and to comply with the requirements for low-flame spread surfaces or to items and materials referred to in 7.4.3.3.”

65 The last sentence of paragraph 7.4.4.1 is deleted.

66 The following new paragraph 7.4.4.2 is added after paragraph 7.4.4.1 and existing paragraphs 7.4.4.2 and 7.4.4.3 are renumbered as 7.4.4.3 and 7.4.4.4:

“7.4.4.2 Stairways may be fitted in the open in a public space consisting of only two decks, providing they lie wholly within such public space and the following conditions are met:

- .1 all levels are used for the same purpose;
- .2 the area of the opening between the lower and upper part of the space is at least 10% of the deck area between the upper and lower part of the space;
- .3 the design is such that persons within the space should be generally aware, or could easily be made aware of, a developing fire or other hazardous situation located within that space;
- .4 sufficient means of escape are provided from both levels of the space directly leading to an adjacent safe area or compartment; and
- .5 the whole space is served by one section of the sprinkler system.”

67 The second sentence of paragraph 7.4.4.4 is replaced with the following:

“Draught stops are not required in public spaces of Category A craft having only one public space and on other craft in spaces with open ceilings (perforated ceilings) where the opening is 40% or more and the ceiling is arranged in such a way that a fire behind the ceiling can be easily seen and extinguished.”

68 The following sentence is added at the end of paragraph 7.5.2:

“The use of aluminium in lubricating oil sump tanks for engines, or in lubricating oil filter housings fitted integral with the engines, is accepted.”

69 In paragraph 7.6.1, the following sentence is inserted between the two existing sentences:

“The controls shall be easily accessible as well as prominently and permanently marked and shall indicate whether the shut-off is open or closed.”

70 In paragraph 7.6.3.2, the words “(the junction between the duct and the galley range hood)” are inserted after the words “lower end of the duct”.

71 In paragraph 7.6.3.4, the word “means” is replaced with the words “a remote means located with the above controls”.

72 The following sentence is added at the end of paragraph 7.6.3.5:

“At minimum, one hatch shall be provided close to the exhaust fan and others located in areas of high grease accumulation such as the lower end of the duct as referred to in 7.6.3.2.”

73 The following text is added at the end of paragraph 7.6.4:

“Fire and smoke dampers shall be arranged so as to be readily accessible. Where placed behind ceilings or linings, they shall be provided with an inspection door marked to identify the damper. Such identification shall also be placed on any required remote controls.”

74 In paragraph 7.6.6, the following sentence is inserted before the last sentence:

“Manual closing may be achieved by mechanical means of release or by remote operation of the fire or smoke damper by means of a fail-safe electrical switch or pneumatic release (i.e. spring-loaded, etc.).”

75 In paragraph 7.7.1, the following sentence is inserted after the first sentence:

“Control stations not normally occupied (e.g. emergency generator rooms) need not be provided with manually operated call points.”

76 In paragraph 7.7.1.1.4, the words “, each of which shall comprise a group of fire detectors and manually operated call points as displayed at the indicating unit(s) required by this paragraph.” are added at the end of the first sentence.

77 In paragraph 7.7.1.1.9, in the first sentence, the text after “7.11.1” is deleted and a new sentence is added at the end of the paragraph as follows:

“Notwithstanding the preceding requirements of this paragraph, the Administration may accept that the same section of detectors may serve spaces on more than one deck if such spaces are located in the fore or aft end of the craft or they are so arranged that they constitute common spaces on different decks (e.g. fan rooms, galleys, public spaces, etc.).”

78 The following sentence is added at the end of paragraph 7.7.1.1.10:

“In the case of a fire detection system with remotely and individually identifiable fire detectors, this requirement is met if no machinery spaces of a major fire hazard are included in a loop (electrical circuit linking detectors of various sections in a sequence and connected (input and output) to the indicating unit(s)) covering accommodation spaces, service spaces and control stations.”

79 In paragraph 7.7.1.1.14, the text following the words “except that” is replaced with the following:

“the control panel may be used to activate one or more of:

- .1 paging system;
- .2 fan stops;
- .3 closure of fire doors;
- .4 closure of fire and smoke dampers; and
- .5 sprinkler system.”

- 80 In paragraph 7.7.1.1.15, the text of the chapeau is replaced with the following:
“Fire-detection systems in which all fire detectors are individually identifiable (i.e. having zone address identification capability) shall be so arranged that:”
- 81 In paragraph 7.7.1.1.15.1, the following words are added at the end of the paragraph:
“and no loop shall pass through a space twice. When this is not practical (e.g. for large public spaces), the part of the loop which by necessity passes through the space for a second time shall be installed at the maximum possible distance from the other parts of the loop.”
- 82 In paragraph 7.7.1.1.15.2, the word “not” is inserted between the words “shall” and “render”.
- 83 A new paragraph 7.7.1.1.16 is inserted as follows:
“The fire detection system in vehicle deck spaces, excluding manual call points, may be switched off with a timer during loading/unloading of vehicles.”
- 84 The last sentence of paragraph 7.7.1.2.3 is replaced with the following:
“Detectors which are located in the overhead shall be a minimum distance of 0.5 m away from bulkheads, except in corridors, lockers and stairways.”
- 85 The following sentence is added at the end of paragraph 7.7.3.1:
“The system shall be remotely controlled in such a way that it is fully serviceable from the operating compartment without any intervention of personnel outside that space in normal conditions.”
- 86 The following new paragraph 7.7.3.2 is inserted after paragraph 7.7.3.1 and existing paragraphs 7.7.3.2 and 7.7.3.3 are renumbered accordingly as 7.7.3.3 and 7.7.3.4:
“Any fixed fire-extinguishing system fitted to the craft is to meet the requirements of this sub-section, whether or not the system is required by 7.7.”
- 87 In paragraph 7.7.3.3.3, the following text is added after the first sentence:
“Pipelines may pass through accommodation spaces, provided they are of substantial thickness and their tightness is verified with a pressure test, after their installation, at a pressure head not less than 5 N/mm². In addition, pipelines passing through accommodation areas shall only be joined by welding and should not be fitted with drains or other openings within such spaces. Pipelines shall not pass through refrigerated spaces.”
- 88 The following sentence is added at the end of paragraph 7.7.3.3.5:
“Openings that may admit air to, or allow gas to escape from, a protected space shall be capable of being closed from outside the protected space.”

89 The following text is added at the end of paragraph 7.7.3.3.6:

“corresponding to the gross volume of the machinery space being increased by the volume of air receivers converted to free air volume. Alternatively, a discharge pipe connected to a safety valve may be fitted to each air receiver, provided it leads directly to the open air.”

90 In paragraph 7.7.3.3.7, the words “which personnel can be expected to enter (e.g. ro-ro spaces) and where their access is facilitated by doors or hatches” are inserted after the words “work or” in the first sentence. In the second sentence, the word “operate” is replaced with the words “automatically operate (e.g. by opening of the release cabinet door)”.

91 The following text is added at the end of paragraph 7.7.3.3.10:

“Spaces are considered as separated where divisions comply with tables 7.4-1 and 7.4-2, as appropriate, or the divisions are of steel construction.”

92 The following text is added at the end of paragraph 7.7.3.3.12:

“without moving the containers completely from their fixing position.”

93 Paragraph 7.7.3.3.14 is replaced with the following:

“7.7.3.3.14 When the fire-extinguishing medium is stored outside a protected space, it shall be stored in a room which shall be situated in a safe and readily accessible position. For the purpose of the application of tables 7.4-1 and 7.4-2, such storage rooms shall be treated as control stations. The following requirements are applicable only for the storage rooms for fire-extinguishing media of fixed gas fire-extinguishing systems:

- .1 the storage room shall not be used for any other purposes;
- .2 if the storage space is located below deck, it shall be located no more than one deck below the open deck and shall be directly accessible by a stairway or ladder from the open deck;
- .3 spaces which are located below deck or spaces where access from the open deck is not provided, shall be fitted with a mechanical ventilation system designed to take exhaust air from the bottom of the space and shall be sized to provide at least 6 air changes per hour; and
- .4 access doors shall open outwards, and bulkheads and decks including doors and other means of closing any opening therein, which form the boundaries between such rooms and adjacent enclosed spaces shall be gas tight.”

94 The following text is added at the end of paragraph 7.7.4:

“Each portable fire extinguisher shall:

- .1 not exceed 23 kg in total mass;
- .2 have a capacity of at least 5 kg if of powder or carbon dioxide type;

- .3 have a capacity of at least 9 litres if of foam type;
- .4 be examined annually by a competent person;
- .5 be provided with a sign indicating the date when was last examined;
- .6 be hydraulic pressure tested (cylinders and propellant bottles) every 10 years;
- .7 not be placed in accommodation spaces if of carbon dioxide type;
- .8 where located in control stations and other spaces containing electrical or electronic equipment or appliances necessary for the safety of the craft, be provided with extinguishing media which are neither electrically conductive nor harmful to the equipment and appliances;
- .9 be ready for use and located in easily visible places such that it can be reached quickly and easily at any time in the event of a fire;
- .10 be located such that its serviceability is not impaired by the weather, vibration or other external factors; and
- .11 be provided with a device to identify whether it has been used.”

95 In paragraph 7.7.5.1, the words “independently driven pumps” are replaced with the words “pumps powered by independent sources of power”.

96 The following sentence is inserted before the last sentence of paragraph 7.7.5.3:

“The fire main shall be capable of being drained and fitted with valves arranged so that fire main branches can be isolated when the main is used for purposes other than fire-fighting.”

97 The following text is added at the end of paragraph 7.7.5.4:

“One hydrant shall be located in the vicinity of and outside each entrance to a machinery space.”

98 In paragraph 7.7.5.5, the text after the words “non-perishable material” is replaced with the following:

“Fire hoses shall have a length of:

- .1 at least 10 m;
- .2 not more than 15 m in machinery spaces; and
- .3 not more than 20 m for other spaces and open decks.”

99 In paragraph 7.8.1.1, the words “Subject to 7.8.1.2” are inserted at the beginning and the second sentence is deleted. The words “, including open ro-ro space,” are inserted after the words “ro-ro space”.

100 A new paragraph 7.8.1.2 is added as follows and existing paragraphs 7.8.1.2 and 7.8.1.3 are renumbered accordingly as 7.8.1.3 and 7.8.1.4:

“7.8.1.2 The vehicle deck of a special category space or a ro-ro space, including an open ro-ro space, need only be insulated on the underside if required. Vehicle decks located totally within ro-ro spaces may be accepted without structural fire protection, provided these decks are not part of, or do not provide support to, the craft’s main load-carrying structure and provided satisfactory measures are taken to ensure that the safety of the craft, including fire-fighting abilities, integrity of fire resisting divisions and means of evacuation, is not affected by a partial or total collapse of these internal decks.”

101 Insert the following text at the end of paragraph 7.8.2:

“7.8.2.1 The pumps of the system shall be capable of maintaining:

- .1 half the total required application rate with any one pump unit out of function, for category A craft; and
- .2 the total required application rate with any one pump unit room out of function, for category B craft.

7.8.2.2 Fixed fire-extinguishing systems shall fulfil the following requirements:

- .1 the valve manifold should be provided with a pressure gauge and each of the valves should be marked;
- .2 instructions for maintenance and operation of the installation shall be set up in the room where the valves are located; and
- .3 the piping system shall be provided with a sufficient number of drainage valves.”

102 The following text is added at the end of paragraph 7.8.4.1:

“ – a water fog applicator consists of a metal L-shaped pipe, the long limb being approximately 2 m in length and capable of being fitted to a fire hose, and the short limb being approximately 250 mm in length and fitted with a fixed water fog nozzle or capable of being fitted with a water spray nozzle.”

103 The following text is added at the end of paragraph 7.8.4.3:

“In addition to complying with 7.7.4, fire extinguishers shall be suitable for A and B class fires and have a capacity of 12 kg dry powder or equivalent.”

104 Paragraph 7.8.6 is renumbered as 7.8.6.1 and the words “scuppers shall be fitted so” in the first sentence are replaced with the words “pumping and drainage arrangements should be such as to prevent such accumulation. Scuppers fitted for this purpose shall be so arranged”.

105 A new paragraph 7.8.6.2 is inserted as follows:

“7.8.6.2 In respect of scuppers and drainage pumps fitted in accordance with 7.8.6.1:

- .1 the amount of water for which drainage is provided shall take into account the capacity of both the water spraying system pumps and required number of fire hose nozzles;
- .2 the drainage system shall have a capacity of not less than 125% of the capacity specified in .1 above; and
- .3 bilge wells shall be of sufficient holding capacity and shall be arranged at the side shell of the ship at a distance from each other of not more than 40 m in each watertight compartment.”

106 In paragraph 7.8.7.1, the text after the first sentence is replaced by the following:

“Electrical equipment installed more than 450 mm above the deck or platform shall be of a type enclosed and protected by an enclosure having an ingress protection based on an international standard acceptable to the Organization.* However, if the installation of electrical equipment and wiring less than 450 mm above the deck or platform is necessary for the safe operation of the craft, such electrical equipment and wiring may be installed provided that the equipment is certified “safe type” based on an international standard acceptable to the Organization.**

* Refer to IEC publication 529 – Degrees of protection provided by enclosures, in particular, refer to the standards for an ingress protection of at least IP 55 or Refer to IEC publication 79 – Electrical apparatus for explosive gases suitable, in particular, refer to the standards for protection by an apparatus for use in zone 2 areas.

** Refer to IEC publication 79 – Electrical apparatus for explosive gases suitable, in particular, refer to the standards for equipment and wiring to be suitable for use in zone 1 areas.”

107 The existing text of paragraph 7.8.7.2 is replaced as follows:

“7.8.7.2 If installed in an exhaust ventilation duct, electrical equipment shall be certified “safe type”. The equipment and wiring, if fitted, shall be suitable for use in zone 1 areas as defined in IEC publication 79 and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition.”

108 In paragraph 7.10.1.2, the words “complying with the requirements of 7.8.4.1.” are inserted after the words “water fog applicator”.

109 In paragraph 7.10.2, the words “or sets of personal equipment shall be so stored as” are replaced with the words “and sets of personal equipment shall be stored in permanently and clearly marked locations arranged so as”.

110 In paragraph 7.10.3.1.2, the words “and gloves” are deleted.

111 In paragraph 7.10.3.1.4, the word “type” is replaced with the words “explosion-proof type certified to gas group II A and temperature class T 3”.

112 The words “having handle provided with high-voltage insulation.” are added at the end of paragraph 7.10.3.1.5.

113 Paragraphs 7.10.3.2 and 7.10.3.2.1 are deleted, the remaining paragraph 7.10.3.2.2 is renumbered as 7.10.3.2 and the words “of an approved type” are inserted after the words “breathing apparatus”.

114 The second sentence of paragraph 7.10.3.2 is replaced with the following:

“Two spare charges suitable for use with the apparatus shall be provided for each required apparatus.”

115 In paragraph 7.10.3.3, the words “sufficient length” are replaced with the words “approximately 30 m in length” and the following new sentence is added at the end:

“The lifeline shall be subjected to a test by static load of 3.5 kN for 5 min.”

116 In paragraph 7.11.1.3, the words “within the structural fire protection time for areas of major fire hazard.” are added at the end.

117 In paragraph 7.13.1, the following sentence is inserted after the first sentence:

“A stairway open at one deck shall be considered part of the space to which it is open and consequently shall be protected by any sprinkler system provided for that space.”

118 In paragraph 7.13.3, the words “operational speed” are replaced by the words “90% of maximum speed”.

119 The following sentence is inserted before the first sentence of paragraph 7.17.1:

“7.17.1 The carriage of dangerous goods in packaged form shall be in accordance with the relevant provisions of the IMDG Code.”

120 The existing text of paragraph 7.17.2.2 is replaced with the following:

“.2 purpose-built container craft and cargo spaces intended for the carriage of dangerous goods in freight containers and portable tanks. In this regard a purpose-built container space is a cargo space fitted with cell guides for stowage and securing containers;”

121 In paragraph 7.17.2.3, the words “, including special category spaces as defined in the IMDG Code,” are inserted after the words “ro-ro spaces”.

122 The following text is added at the end of paragraph 7.17.3:

“For the purpose of this section, “on deck” shall be taken to mean spaces on the weather deck.”

123 In paragraph 7.17.3.1.2, the word “supplying” is replaced with the words “simultaneously supplying the arrangements required by 7.17.3.1.3 for the largest designated cargo space and the” and the following sentence is inserted after the first sentence:

“This requirement shall be met by the total capacity of the main fire pump(s) not including the capacity of the emergency fire pump, if fitted.”

124 In paragraph 7.17.3.1.3, the following amendments are made:

- .1 the words “shall be provided” are deleted from the end of the first sentence and are re-inserted after the first word “Means”;
- .2 the words “copious quantities of water” are replaced with the words “with water at not less than 5 l/min/m² of the horizontal area of cargo spaces”; and
- .3 the words “meet the requirements of 7.8.6 and” are inserted after the words “drainage and pumping arrangements shall”.

125 The following sentence is added at the end of paragraph 7.17.3.1.4:

“Substitution by a high expansion foam system complying with regulation II-2/10.4.1.1.2 of the Convention is also acceptable.”

126 The following new paragraphs 7.17.3.1.5 and 7.17.3.1.6 are added after existing paragraph 7.17.3.1.4:

“7.17.3.1.5 The requirements of 7.17.3.1.1 to 7.17.3.1.4 may be fulfilled by a water spray system complying with the standards developed by the Organization, provided that the amount of water required for fire-fighting purposes in the largest cargo space allows simultaneous use of the water spray system plus four jets of water from hose nozzles in accordance with 7.17.3.1.2.

7.17.3.1.6 Craft carrying dangerous goods shall be provided with three fire hoses and nozzles complying with 7.7.5.6 in addition to those required by 7.7.5.5.”

127 In the first sentence of paragraph 7.17.3.2, the words “or vehicle decks” are added after the words “enclosed cargo spaces”.

128 In paragraph 7.17.3.4.2, the sentence “Exhaust fans shall be of non-sparking type.” is inserted after the first sentence and the text of the last sentence is replaced with the following:

“Suitable wire mesh guards having a mesh size not exceeding 13 mm x 13 mm shall be fitted over inlet and outlet ventilation openings to prevent foreign objects from entering into the casing.”

129 Existing paragraph 7.17.3.4.3 is renumbered as 7.17.3.4.4; the relevant reference in table 7.17-2 is amended; and the following new paragraph 7.17.3.4.3 is inserted:

“7.17.3.4.3 If adjacent spaces are not separated from cargo spaces by gastight bulkheads or decks, ventilation requirements apply to the adjacent spaces as for the cargo space itself as required by regulation II-2/19.3.4.2 of the Convention and the guidance developed by the Organization.”

130 The following new paragraph 7.17.3.4.5 is added after existing paragraph 7.17.3.4.4:

“7.17.3.4.5 For open-top container craft, power ventilation is required only for the lower part of the cargo hold for which purpose-built ducting is required. The ventilation rate shall be at least two air changes per hour based on the empty hold volume below the weather deck.”

131 In table 7.17-1, the words “(includes cargoes of group B of the Bulk Cargo Code except for cargoes denoted Materials Hazardous in Bulk)” are added to the words “Solid dangerous goods in bulk” at the head of the right-hand column.

132 In table 7.17-1, the words “per hour” are added at the end of the second sentence of note 1.

133 In table 7.17-2, note 4, the words “residues of” are added after the word “containing”.

134 In table 7.17-2, the following note 7 is inserted with references from row 7.17.3.4.2, columns 4.2 and 4.3, and existing notes 7 to 11 to Table 7.17-3 together with their references in that table are renumbered as 8 to 12:

“7 For seedcake containing residues of solvent extraction and cargoes of IMDG Code Class 4.3, two separate fans shall be permanently fitted unless portable type fans have been adapted for being securely fitted (e.g. fixed) prior to loading and during the voyage. The ventilation system shall comply with the provisions of 7.17.3.4.1 and 7.17.3.4.2. Ventilation shall be such that any escaping gases cannot reach public spaces or crew accommodation on or under deck.”

135 In tables 7.17-2 and 7.17-3, the word “Hazard” is inserted before “class” and “classes” wherever occurring.

136 In table 7.17-3, in column 7 and 8, the terms “3.1 3.2” and “3.3” are replaced with “3” and the following new note 13 is added to “x” in column “5.2”, last and penultimate lines:

“Under the provisions of the IMDG Code, as amended, stowage of class 5.2 dangerous goods under deck or in enclosed ro-ro spaces is prohibited.”

137 The following subparagraphs are added to paragraph 7.17.3.5:

“.1 if the bilge drainage system for cargo spaces is additional to the system served by pumps in the machinery space, the capacity of the system shall be not less than 10 m³/h per cargo space served. If the additional system is a common system, the capacity need not exceed 25 m³/h. The additional bilge system need not be arranged with redundancy. Whenever flammable or toxic liquids are carried, the bilge line into the machinery space shall be isolated either by fitting a blank flange or by a closed lockable valve;

.2 if bilge drainage of cargo spaces is arranged by gravity drainage, the drainage shall be either lead directly overboard or to a closed drain tank located outside the machinery spaces. The tank shall be provided with vent pipe to a safe location on the open deck;

- .3 enclosed spaces outside machinery spaces containing bilge pumps serving cargo spaces intended for carriage of flammable or toxic liquids shall be fitted with separate mechanical ventilation giving at least six air changes per hour. Electrical equipment in the space shall be of certified safe type. If the space has access from another enclosed space, the door shall be self-closing; and
- .4 drainage from a cargo space into bilge wells in a lower space is only permitted if that space satisfies the same requirements as the cargo space above.”

138 The following text is added at the end of the first sentence of paragraph 7.17.3.6.1:

“shall be selected taking into account the hazards associated with the chemicals being transported and the standards developed by the Organization according to the class and physical state.”

139 The following new sentence is added at the end of paragraph 7.17.3.6.2:

“In addition to the requirements of 7.10.3.2.2, two spare charges suitable for use with the breathing apparatus shall be provided for each required apparatus.”

140 In paragraph 7.17.3.8.2, the words “meet the requirements of 7.8.6, have its valves operable from outside the space at a position in the vicinity of the extinguishing system controls and” are inserted after the words “drainage and pumping arrangements shall”.

Chapter 8 – Life-saving appliances and arrangements

141 Existing paragraphs 8.7.6 to 8.7.10 are renumbered as 8.7.7 to 8.7.11 and a new paragraph 8.7.6 inserted as follows:

“8.7.6 Where an MES is provided for embarkation of survival craft on a Category B craft, an alternative means of evacuating passengers and crew into survival craft on the same side of the craft in conditions up to and including the worst intended conditions is to be provided for use if the MES is lost or rendered unserviceable in the event of damage of longitudinal extent specified in 2.6.7.1.”

Chapter 10 – Auxiliary systems

142 In paragraph 10.2.4.8, the words “the filling pipes” at the end of the first sentence are deleted and in its place inserted the words “bunkering pipes and any filling pipes served by on-board pumps”. In addition, the words “and, for fuel of flashpoint less than 43°C,” are replaced by the words “where there is no risk of fire or explosion from the emergence of oils and vapour and shall not lead into crew spaces, passenger spaces, special category spaces, ro-ro spaces (other than open ro-ro spaces), machinery spaces or similar spaces. For fuel of flashpoint less than 43°C such valves and pipes”.

Chapter 11 – Remote control, alarm and safety systems

143 In paragraph 11.3.3, the end of the first sentence is amended to read “shall be provided at one or more stations outside the operating compartment.”

144 In paragraph 11.4.1.2, subparagraphs .4 to .11 are renumbered as .5 to .12 and a new subparagraph “.4” is inserted after the existing subparagraph “.3” as follows:

“.4 detection of bilge water in each watertight compartment below the design waterline”.

Chapter 13 – Shipborne navigational systems and equipment and voyage data recorders

145 Existing paragraph 13.8.2 is renumbered as 13.8.3 and a new paragraph 13.8.2 inserted as follows:

“13.8.2 High-speed craft shall be fitted with an ECDIS as follows:

- .1 craft constructed on or after [1 July 2008];
- .2 craft constructed before [1 July 2008], not later than [1 July 2010].”

Chapter 14 – Radiocommunications

146 The existing text of paragraph 14.15.10 is replaced by the following:

“14.15.10 Satellite EPIRBs on all craft shall be:

- .1 annually tested for all aspects of operational efficiency, with special emphasis on checking the emission on operational frequencies, coding and registration, at intervals as specified below:
 - .1 on passenger craft, within 3 months before the expiry date of the High-Speed Craft Safety Certificate; and
 - .2 on cargo craft, within 3 months before the expiry date, or 3 months before or after the anniversary date, of the High-Speed Craft Safety Certificate;

The test may be conducted on board the craft or at an approved testing station; and

- .2 subject to maintenance at intervals not exceeding five years, to be performed at an approved shore-based maintenance facility.”

Chapter 18 – Operational requirements

147 The existing text of paragraph 18.1.3.4 is replaced as follows:

“.4 provision in the area of operation of a base port having functions and facilities in accordance with the requirements of this Code.”

Annex 1 – Form of High-Speed Craft Safety Certificate and Record of Equipment

148 In Annex 1, Record of Equipment, Part 4, the words “Two-way on-scene radiocommunications 121.5 MHz & 123.1 MHz” are inserted as item 7.

149 A new form “Standard Format for Document of Compliance – Special requirements for craft carrying dangerous goods” is inserted at the end of annex 1, in accordance with annex to document DE 48/11/3 (France) subject to the amendment detailed in paragraph 11.5.2 of document DE 48/25.

Annex 6 – Stability of hydrofoil craft

150 In the preamble, add new paragraphs (after the existing introductory paragraph and prior to paragraph 1) as follows:

“As required by 2.3.1, the stability of hydrofoil craft shall be assessed under all permitted conditions of loading.

The term “hull-borne mode” has the same meaning as “displacement mode” defined in 1.4.22 of the Code.

The term “foil-borne mode” has the same meaning as “non-displacement mode” defined in 1.4.38 of the Code.”

Annex 7 – Stability of multihull craft

151 In paragraph 1.4.2, add to the first paragraph the following sentence:

“Alternatively another method of assessment may be employed, as provided for in 2.1.4 of this Code.”

152 At the end of paragraph 1.5, the following sentence is added:

“The determination of θ_r using model test or other data should be made using the method for determining θ_z in 1.1.5.3 of annex 6.”

153 At the end of the paragraph 2.3, the words “, as determined in 1.5 of this annex.” are added.

Annex 8 – Stability of monohull craft

154 The existing text of paragraph 1.1 is replaced by the following:

“1.1 The weather criterion contained in paragraph 3.2 of the Intact Stability Code* shall apply. In applying the weather criterion, the value of wind pressure P (N/m²) shall be taken as:

$$500\{V_w/26\}^2$$

where V_w = wind speed (m/s) corresponding to the worst intended conditions.

The angle of heel due to wind, in applying paragraph 3.2.2.1.2 of the Intact Stability Code, should not exceed 16° or 80% of the angle of deck-edge immersion (whichever is lesser). Where the angle of heel due to wind exceeds 10° efficient non-slip deck surfaces and suitable holding points should be provided, in accordance with paragraph 2.13.1.1 of this Code. In applying the weather criterion, account shall also be taken of the roll damping characteristics of individual craft in assessing the assumed roll angle θ_1 , which

may alternatively be derived from model or full scale tests using the method for determining θ_z in 1.1.5.3 of annex 6. Hulls with features which greatly increase damping, such as immersed sidehulls, substantial arrays of foils, or flexible skirts or seals, are likely to experience significantly smaller magnitudes of roll angle. For such craft, therefore, the roll angle shall be derived from model or full scale tests or in the absence of such data shall be taken as 15°.”

155 The following new sentence is added at the end of paragraph 2.1.1:

“The range shall be taken as the difference between the equilibrium heel angle and the heel angle at which the residual righting lever subsequently becomes negative or the angle at which progressive flooding occurs, whichever is less.”

Annex 9 – Definitions, requirements and compliance criteria related to operational and safety performance

156 In second sentence of first paragraph the word “prototype” is replaced by the word “first”.

157 In paragraphs 2.1.1, 2.1.2, 2.1.3 and 3.3.1, the words “maximum operational speed” are amended to read “90% of maximum speed”.

158 In paragraph 3.2, the sentence “The worst intended conditions should not exceed 150% of the more severe of the two measured sea conditions.” is inserted as the penultimate sentence.

Annex 10 – Criteria for testing and evaluation of revenue and crew seats

159 In paragraph 3.4, the words “same strength and stiffness” are amended to read “equivalent strength and stiffness”.

160 In the first sentence of paragraph 3.5, the words “suitable for the test being conducted” are replaced by the words “corresponding to the Hybrid III human surrogate (unless a more advanced test dummy is available).”

161 In paragraph 3.6, after the words “and measurement,” the words “if possible” are deleted.

162 The following paragraphs 3.9.3.3 to 3.9.3.5 are inserted after paragraph 3.9.3.2 and the existing paragraph 3.9.3.3 is renumbered as 3.9.3.6:

“.3.3 neck flexion does not exceed 88 Nm;

.3.4 neck extension does not exceed 48 Nm;

.3.5 in lieu of the requirements of subparagraphs .3.3 and .3.4 above, a seatback or headrest of at least 850 mm above the seat cushion is acceptable; and”.

163 A new annex 12 is added, as follows:

“Annex 12

FACTORS TO BE CONSIDERED IN DETERMINING CRAFT OPERATING LIMITATIONS*

1 Purpose and scope

The purpose of this annex is to identify all the parameters to which consideration should be given when determining the Worst Intended Conditions (defined in 1.4.61) and other Operational Limitations (defined in 1.4.41) for insertion into the Permit to Operate, in order to facilitate consistent application of the Code.

2 Factors to be considered

As a minimum, the following factors shall be considered:

- .1 The maximum distance from refuge implied by 1.3.4.
- .2 The availability of rescue resources to comply with 1.4.12.1 (Category A craft only).
- .3 Minimum air temperature (susceptibility to icing), visibility and depth of water for safe operation as addressed by 1.4.61.
- .4 The significant wave height and maximum mean wind speed used when applying the requirements for stability and buoyancy in chapter 2 and associated annexes.
- .5 The safe seakeeping limitations (especially significant wave height) considering the known stability hazards listed in 2.1.5, the operating conditions on the intended route, see 18.1.3.2, and the motions experienced during operation defined in 3.3 of annex 9.
- .6 The structural safety of the craft in Critical Design Conditions according to chapter 3.
- .7 The safe deployment and operation of evacuation systems and survival craft as required by 8.6.5.
- .8 The safe handling limitations determined in accordance with the sea trials required by chapter 17 and annexes 3 and 9, identifying any limitations on weight and centre-of-gravity position according to 17.3, and the effects of failures and malfunctions according to 17.4.”

* Refer to the guidelines to be developed by the Organization.

FOOTNOTES TO BE ADDED OR AMENDED IN THE 2000 HSC CODE

164 A footnote is inserted after “emergency source of power” in paragraph 1.4.16 with associated footnote reading:

“Spaces containing, for instance, the following battery sources should be regarded as control stations regardless of battery capacity:

- .1 emergency batteries in separate battery room for power supply from black-out until start of emergency generator;
- .2 emergency batteries in separate battery room as reserve source of energy to radiocommunications installations;
- .3 batteries for start of emergency generator; and
- .4 in general, all emergency batteries required by 12.3.”

165 In paragraph 1.4.16, a footnote reference is inserted after the word “centralized” with associated footnote to read:

“Where in the sections of this Code relevant to fixed fire-extinguishing systems there are no specific requirements for the centralization within a control station of major components of a system, such major components may be placed in spaces which are not considered to be control stations.”

166 The following footnote to the heading of paragraph 2.2.1 is inserted:

“These requirements encompass the need for all hull openings and their closures to be provided with satisfactory integrity.”

167 In paragraph 2.2.3.2.2, a footnote to the words “model tests” is inserted as follows:

“Reference should be made to MSC/Circ.[...] which provides guidelines for the conduct of high-speed craft model testing.”

168 In paragraph 2.2.7.3, a footnote to the word “elsewhere” is inserted as follows:

“Refer to paragraph 2.1.3.2.”

169 In paragraph 2.2.8, the following footnote is inserted in relation to the word “elsewhere” in paragraphs 2.2.8.1.1, 2.2.8.2.2, 2.2.8.3.4, and 2.2.8.4.1:

“Refer to paragraph 2.1.3.2.”

170 At the end of paragraph 2.2.8.2.1, the following footnote is inserted:

“Conformity with the requirements of organizations recognized by the Administration in accordance with regulation XI-1/1 of the Convention may be considered to possess adequate strength.”

- 171 In paragraph 2.3.4, a footnote to the heading of Table 2.3.4 is inserted as follows:
- “Table 2.3.4 is advisory, and accommodates cases where a monohull has stability characteristics like a multihull, and those of a multihull that are like a monohull.”
- 172 At the end of paragraph 2.6.4.1, a footnote is inserted as follows:
- “Reference may be made to Cellular plastics, rigid — Determination of water absorption for assessing water absorption properties (ISO 2896:1987).
- The water absorption of low density material should not exceed 8 % by volume after being fully submerged for 8 days according to ISO 2896 should be considered to be “impervious to water absorption”. Material complying with IMO resolution MSC.81(70) should also be deemed to satisfy this standard. Refer to: Small craft – Stability and buoyancy (ISO 12217).”
- 173 In paragraph 2.11, a footnote to the words “cases of loading” is inserted as follows:
- “Attention is drawn to the longitudinal centre-of-gravity limitations established in compliance with 17.3.”
- 174 In paragraph 2.13.1.1, the following footnote is added after the words “within 15 min”:
- “Refer to the Recommendations on a standard method for establishing compliance with the requirements for cross-flooding arrangements in passenger ships adopted by the Organization by resolution A.266(VIII) as amended.”
- 175 In paragraph 2.15, the following footnote is added after the words “within 15 min”:
- “Refer to the Recommendations on a standard method for establishing compliance with the requirements for cross-flooding arrangements in passenger ships, adopted by the Organization by resolution A.266(VIII) as amended.”
- 176 The footnote in paragraph 4.8.2 is replaced with the following:
- “Refer to the Guidelines for a simplified evacuation analysis of high-speed passenger craft (MSC/Circ.1166).”
- 177 The following footnote to paragraph 4.8.10.2.1 is inserted:
- “Refer to the Guidelines for a simplified evacuation analysis of high-speed passenger craft, paragraph 3.5.1 (MSC/Circ.1166).”
- 178 The following footnote is added to the chapeau of paragraph 7.4.3.3:
- “Fire test procedures referenced in the FTP Code (resolution MSC.61(67), as amended by resolutions MSC.101(73) and MSC.173(79)) and MSC/Circ.916, 964, 1004, 1008, 1036 and 1120 should be applied to items and materials covered by this paragraph as follows:
- .1 case furniture (FTP Code, annex 1, parts 1 and 10);

- .2 frames of all other furniture (FTP Code, annex 1, parts 1 and 10);
- .3 draperies, textiles and other suspended textile materials (FTP Code, annex 1, part 7);
- .4 upholstered furniture, e.g. passenger seating (FTP Code, annex 1, part 8);
- .5 bedding components (FTP Code, annex 1, part 9); and
- .6 deck finish materials (FTP Code, annex 1, parts 2 and 6).”

179 The following footnote is added to paragraph 7.4.3.5:

“Refer to paragraph 7.9.3.4 and the FTP Code, annex 2, paragraphs 1 and 5.1.”

180 The footnote to paragraph 7.7.3.3.1 is replaced with the following:

“Refer to the Guidelines for the approval of fixed water-based local application fire-fighting systems for use in category A machinery spaces (MSC/Circ.913), and the associated interpretations of MSC/Circ.1082.”

181 The following footnote is added to paragraph 7.7.3.3.7:

“Refer to the Code on Alarms and Indicators, 1995 (resolution A.830(19)).”

182 The following footnote is added to paragraph 7.7.4:

“Refer to the Improved guidelines for marine portable fire extinguishers (resolution A.951(23)), and Fire protection equipment – Portable fire extinguishers – Performance and construction (ISO 7165:1999).”

183 In paragraph 7.8.2, the following footnote is inserted after the words “approved fixed pressure water-spraying system”:

“Refer to Recommendation on fixed fire-extinguishing systems for special category spaces (resolution A.123(V)).”

184 The following footnote is inserted after the words “effective power ventilation system” in paragraph 7.8.5.1:

“Refer to on the Design guidelines and operational recommendations for ventilation systems in ro-ro cargo spaces (MSC/Circ.729).”

185 In paragraph 7.9.3.4, a footnote reference is inserted after the words “open spaces” to read “Refer to the definition in 7.3.1.6.”

186 In paragraph 7.10.3.1.1, the following footnote reference is inserted after the words “protective clothing”:

“Refer to Protective clothing – Protection against heat and fire – Evaluation of materials and material assemblies when exposed to source of radiant heat (ISO 6942:2002).”

187 In paragraph 7.10.3.1.4, the following footnote is inserted after the words “temperature class T 3”:

“Refer to Electrical apparatus for explosive gas atmospheres (IEC Publication 60079).”

188 The words “and the associated interpretations of MSC/Circ.912.” are added at the end of the footnote to paragraph 7.13.1.

189 The words “and the associated interpretations of MSC/Circ.912.” are added at the end of the footnote to paragraph 7.16.1.

190 The footnote to the title of Part D of chapter 7 is deleted.

191 The following footnote is added to paragraph 7.17.3.1.3:

“Refer to Recommendation on fixed fire-extinguishing systems for special category spaces (resolution A.123(V)).”

192 In paragraph 7.17.3.1.5, the following footnote is inserted after the word “Organization”:

“Refer to paragraphs 9.2, 9.3 and 9.4 of the Interim guidelines for open-top containerships (MSC/Circ.608/Rev.1).”

193 The footnote to paragraph 7.17.3.2 is amended to read:

“Refer to Electrical installations in ships – Part 506: Special features – Ships carrying specific dangerous goods and materials hazardous only in bulk (IEC Publication 60092-506) and Electrical apparatus for explosive gas atmospheres (IEC Publication 79).”

194 In paragraph 7.17.3.4.2, a footnote is inserted after the words “non-sparking type.” as follows:

“Refer to IACS Unified Requirement F 29, as revised.”

195 The following footnote is added to paragraph 7.17.3.5.3 after the words “certified safe type”:

“Refer to Special features – Ships carrying dangerous goods and materials hazardous only in bulk (IEC 60092-506).”

196 The following footnote is added to the first sentence of paragraph 7.17.3.6.1:

“For solid bulk cargoes, the protective clothing should satisfy the equipment provisions specified in the respective schedules of the BC Code for the individual substances. For packaged goods, the protective clothing should satisfy the equipment provisions specified in emergency procedures (EmS) of the Supplement to the IMDG Code for the individual substances.”

197 The footnote to paragraph 7.17.3.8.1 is amended to refer to MSC/Circ.1146 instead of MSC/Circ.671.

198 In paragraph 7.17.3.8.2, the following footnotes are added after the words “water-spraying system” and at the end of the penultimate sentence, respectively:

“Refer to Recommendation on fixed fire-extinguishing systems for special category spaces (resolution A.123(V)).”

“Refer to relevant provisions of regulation II-2/20.6.1.4 of the Convention.”

199 In paragraph 7.17.4, the following footnote is added:

“Refer to “Standard Format for Document of Compliance – Special requirements for craft carrying dangerous goods” in Annex 1, and MSC/Circ.1148 – Issuing and renewal of document of compliance with the special requirements applicable to ships carrying dangerous goods.”

200 In paragraph 8.1.10.10, a footnote is added at the end as follows:

“This definition does not include an appliance or device fitted to the craft (e.g. mini-slide fitted as an alternative to survival craft embarkation arrangements accepted under 8.7.5) the deployment of which is not taken into account in determining the evacuation time in accordance with 4.8.”

201 In paragraph 8.4.2, a footnote having the same wording as for 8.4.1 is inserted at the end.

202 In paragraph 9.1.5, a footnote to the words “dead craft condition” is inserted stating “Refer to the Unified interpretation to the 2000 HSC Code (MSC/Circ.1177).”

203 After the words “approved material” in paragraph 10.2.4.9, a footnote is inserted as follows:

“For valves fitted to oil fuel tanks and which are under static pressure-head, steel or nodular cast iron may be accepted. However, ordinary cast iron valves may be used in piping systems where the design pressure is lower than 0.7 N/mm² and the design temperature is below 60°C.”

204 In paragraph 15.1.1, a footnote is inserted after the words “Operating area” as follows:

“Refer to Ship’s Bridge Layout and Associated Equipment – Requirements and Guidelines (ISO 8468:1990); and the Guidelines on ergonomic criteria for bridge equipment and layout (MSC/Circ.982).”

205 In annex 3, table 1, footnote 1 is amended to read:

“The accelerometers used shall have an accuracy of at least 5% full scale and shall have a frequency response bandwidth of at least 0.2 Hz to 20 Hz. Sampling frequency shall not be lower than 40 Hz. Filtering is recommended to eliminate any influence from machinery vibrations.”

206 In annex 3, table 1, the reference to footnote 2 is moved up to relate to the heading “Value”.

ANNEX 11

JUSTIFICATION FOR A PROPOSED NEW WORK PROGRAMME ITEM (in accordance with MSC/Circ.1099 – MEPC/Circ.366)

GUIDELINES FOR UNIFORM OPERATING LIMITATIONS FOR HIGH-SPEED CRAFT

1 Scope of the proposal

1.1 Development of guidelines to ensure the uniform and comprehensive derivation of operating limitations in the Permit to Operate for High-Speed Craft, taking into consideration the new annex proposed in paragraph 1.9.7 of the 2000 HSC Code, as amended.

1.2 Where the Annex 9 of the Code of Safety for High-Speed Craft 2000, as amended, is insufficiently precise, to develop interpretations of the existing requirements to facilitate the uniform application of this Code.

2 Compelling need

2.1 The text of the Code of Safety for High-Speed Craft incorporates various measures that determine the limits within which a high-speed craft is considered to be safe to operate. At present there is substantial evidence that such limits are currently not being determined in a consistent or comprehensive manner, such that different limitations are being placed on the same design of craft by different Administrations due to differing interpretations of the Code, and that some of the provisions of the Code are not always being taken into consideration in any way.

2.2 It is clear that the safety level intended by the HSC Code will not be attained unless a consistent approach to the determination of operating limitations is developed. Thus it is clear that there is a compelling need to develop guidelines to address these issues as soon as practicable.

3 Analysis of the issues involved, having regard to the costs to the maritime industry and global legislative and administrative burdens

3.1 The purpose of this effort would be primarily to ensure consistent and comprehensive application of the existing requirements of the HSC Code regarding the derivation of operating limitations so that they are uniformly applied by Administrations, and not to impose new ones, so the costs to the maritime industry are anticipated to be minimal. Indeed it is probable that such consistency will reduce the legal and contractual difficulties currently being experienced by some builders and operators of HSC.

3.2 The administrative burdens to the Organization and to Member States are also anticipated to be minimal.

4 Benefits

This new work programme item will provide Administrations and recognized organizations acting on their behalf with a tool to enable the requirements of the HSC Code to be applied in a uniform manner, and owners and builders of high-speed craft will benefit by being provided with consistent and comprehensive operating limitations. It will also assist port State control officers by providing clear guidance on how the operating limitations were derived.

5 Priority and target completion date

This matter should have a high priority since the issues relate to the safe operation of craft. It is expected that two sessions plus an intersessional correspondence group will be necessary to properly deal with this matter.

6 Specific indication of the action required

The Committee is invited to approve a new work programme item entitled “Guidelines for uniform operating limitations for high-speed craft” allocated to the DE (co-ordinator), COMSAR, NAV and SLF Sub-Committees with an expected duration of two sessions for all sub-committees plus an additional session for the co-ordinator.

7 Remarks on the criteria for general acceptance

- .1 Is the subject of the proposal within the scope of IMO’s objectives? Yes.
- .2 Do adequate industry standards exist? No, this is a matter of clarification of an existing IMO instrument to facilitate its uniform implementation.
- .3 Do the benefits justify the proposed action? Yes.

8 Identification of which subsidiary bodies are essential to complete the work

The work should be able to be accomplished in two sessions by the DE Sub-Committee (general design and construction issues, structure, life-saving appliances and co-ordination) with the assistance of the COMSAR Sub-Committee in respect of search and rescue issues, the NAV Sub-Committee regarding navigational conditions and safe handling and the SLF Sub-Committee in relation to dynamic stability, buoyancy and associated seakeeping matters.

ANNEX 12**DRAFT AMENDMENTS TO THE 1994 HSC CODE****Chapter 1 – General comments and requirements**

1 The existing paragraph 1.2 is numbered as 1.2.1 and a new paragraph 1.2.2 is added as follows:

“1.2.2 New installation of materials containing asbestos used for the structure, machinery, electrical installations and equipment of a craft to which this Code applies shall be prohibited except for:

- .1 vanes used in rotary vane compressors and rotary vane vacuum pumps;
- .2 watertight joints and linings used for the circulation of fluids when, at high temperature (in excess of 350°C) or pressure (in excess of 7 x 10⁶ Pa), there is a risk of fire, corrosion or toxicity; and
- .3 supple and flexible thermal insulation assemblies used for temperatures above 1,000°C.”

Chapter 8 – Life-saving appliances and arrangements

2 In paragraph 8.9.7.1.2, the footnote is amended by inserting “, as amended by resolution MSC.55(66)” at the end after “resolution A.761(18)”.

3 A new paragraph 8.9.7.2 is inserted after paragraph 8.9.7.1.2 as follows:

“8.9.7.2 In addition to or in conjunction with the servicing intervals of marine evacuation systems (MES) required above, each marine evacuation system should be deployed from the craft on a rotational basis at intervals to be agreed by the Administration provided that each system is to be deployed at least once every six years.”

4 The heading “Operational readiness” at paragraph 8.9.1 is deleted and replaced by the word “General”. The text of paragraph 8.9.1 is renumbered as 8.9.1.1 and new paragraphs 8.9.1.2 and 8.9.1.3 with associated footnote inserted thereafter as follows:

“8.9.1.2 Before giving approval to novel life-saving appliances or arrangements, the Administration should ensure that such appliances or arrangements:

- .1 provide safety standards at least equivalent to the requirements of this chapter and have been evaluated and tested in accordance with the recommendations of the Organization;^{*} or
- .2 have successfully undergone, to the satisfaction of the Administration, evaluation and tests which are substantially equivalent to those recommendations.

8.9.1.3 An Administration which permits extension of liferaft service intervals in accordance with 8.9.1.2 should notify the Organization in accordance with regulation I/5(b) of the Convention.

* Refer to the Code of Practice for the Evaluation, Testing and Acceptance of Prototype Novel Life-Saving Appliances and Arrangements, adopted by the Organization by resolution A.520(13)."

5 A new paragraph 8.9.10 with heading "Periodic servicing of launching appliances" is inserted after paragraph 8.9.9 as follows:

"8.9.10 *Periodic servicing of launching appliances*

Launching appliances:

- .1 should be serviced at recommended intervals in accordance with instructions for on-board maintenance as required by regulation III/36 of the Convention;
- .2 should be subjected to a thorough examination at intervals not exceeding 5 years; and
- .3 should upon completion of the examination in .2 be subjected to a dynamic test of the winch brake in accordance with paragraph 6.1.2.5.2 of the LSA Code (i.e. with a proof load of not less than 1.1 times the maximum working load at maximum lowering speed)."

6 A new paragraph 8.9.11 with heading "Novel life-saving appliances or arrangements" is inserted after paragraph 8.9.10 as follows:

"8.9.11 *Novel life-saving appliances or arrangements*

An Administration which approves new and novel inflatable liferaft arrangements pursuant to 8.9.1.2 may allow for extended servicing intervals under the following conditions:

- .1 the new and novel liferaft arrangement should maintain the same standard, as required by testing procedures, throughout the extended servicing intervals;
- .2 the liferaft system should be checked on board by certified personnel according to 8.7; and
- .3 Service at intervals not exceeding five years should be carried out in accordance with the recommendations of the Organization."

7 A new paragraph 8.9.12 with associated footnote is inserted after paragraph 8.9.11 as follows:

“8.9.12 An Administration which permits extension of liferaft service intervals in accordance with 8.9.11 should notify the Organization in accordance with regulation I/5(b) of the Convention.*

* Refer to the Code of Practice for the Evaluation, Testing and Acceptance of Prototype Novel Life-Saving Appliances and Arrangements, adopted by the Organization by resolution A.520(13).”

Chapter 13 – Navigational equipment

8 Existing paragraph 13.14.2 is renumbered as 13.14.3 and a new paragraph 13.14.2 inserted as follows:

“13.14.2 All craft, including existing craft, shall be fitted with an ECDIS not later than [1 July 2010].”

Chapter 14 – Radiocommunications

9 The existing text after the heading is deleted and replaced by the following paragraph 14.1:

“14.1 Craft should be provided with radiocommunications facilities as specified in chapter 14 of the 2000 HSC Code, as amended (resolution MSC.99(73) as amended up to and including resolution MSC.[...(...)]) that are fitted and operated in accordance with the provisions of that chapter.”

Annex 7 – Stability of multihull craft

10 The references to 2.9 in paragraph 1.4.1 and 2.4 in paragraph 2.5 are amended to 2.10 and 2.6 respectively.

ANNEX 13

DRAFT AMENDMENTS TO THE DSC CODE

Chapter 1 – General

1 A new paragraph 1.1.5 is added after existing paragraph 1.1.4 as follows:

“1.1.5 New installation of materials containing asbestos used for the structure, machinery, electrical installations and equipment of a craft to which this Code applies shall be prohibited except for:

- .1 vanes used in rotary vane compressors and rotary vane vacuum pumps;
- .2 watertight joints and linings used for the circulation of fluids when, at high temperature (in excess of 350°C) or pressure (in excess of 7 x 10⁶ Pa), there is a risk of fire, corrosion or toxicity; and
- .3 supple and flexible thermal insulation assemblies used for temperatures above 1,000°C.”

Chapter 8 – Life-saving appliances

2 The following new paragraph 8.2.9 is inserted after paragraph 8.2.8:

“8.2.9 Periodic servicing of launching appliances

Launching appliances:

- .1 should be serviced at recommended intervals in accordance with instructions for on-board maintenance as required by regulation III/36 of the Convention;
- .2 should be subjected to a thorough examination at intervals not exceeding 5 years; and
- .3 should upon completion of the examination in .2 be subjected to a dynamic test of the winch brake in accordance with paragraph 6.1.2.5.2 of the LSA Code (i.e. with a proof load of not less than 1.1 times the maximum working load at maximum lowering speed).”

3 A new section 8.7 is inserted after section 8.6 as follows:

“8.7 Servicing of inflatable liferafts, inflatable lifejackets, marine evacuation systems and inflatable rescue boats

Every inflatable liferaft, inflatable lifejacket and MES should be serviced:

- .1 At intervals not exceeding 12 months, provided where in any case this is not practicable, the Administration may extend this period by one month;

- .2 At an approved service station which is competent to service them, maintains proper servicing facilities and uses only properly trained personnel.*

* Refer to the Recommendations on conditions for the approval of servicing stations for inflatable liferafts, adopted by the Organization by resolution A.761(18), as amended by resolution MSC.55(66)."

- 4 The following text is inserted after section 8.7 as a new section 8.8:

"8.8 Rotational deployment of marine evacuation systems

In addition to or in conjunction with the servicing intervals of marine evacuation systems required above, each marine evacuation system should be deployed from the craft on a rotational basis at intervals to be agreed by the Administration provided that each system is to be deployed at least once every six years."

- 5 A new section 8.9 with associated footnote is inserted after the existing section 8.8 as follows:

"8.9 Novel life-saving appliances or arrangements

8.9.1 Before giving approval to novel life-saving appliances or arrangements, the Administration should ensure that such appliances or arrangements:

- .1 provide safety standards at least equivalent to the requirements of this chapter and have been evaluated and tested in accordance with the recommendations of the Organization;* or
- .2 have successfully undergone, to the satisfaction of the Administration, evaluation and tests which are substantially equivalent to those recommendations.

8.9.2 An Administration which approves new and novel inflatable liferaft arrangements pursuant to 8.9.1 may allow for extended servicing intervals under the following conditions:

- .1 The new and novel liferaft arrangement should maintain the same standard, as required by testing procedures, throughout the extended servicing intervals.
- .2 The liferaft system should be checked on board by certified personnel according to 8.7.
- .3 Service at intervals not exceeding five years should be carried out in accordance with the recommendations of the Organization.

8.9.3 An Administration which permits extension of liferaft service intervals in accordance with 8.9.2 should notify the Organization in accordance with regulation I/5(b) of the Convention.

* Refer to the Code of Practice for the Evaluation, Testing and Acceptance of Prototype Novel Life-Saving Appliances and Arrangements, adopted by the Organization by resolution A.520(13)."

Chapter 13 – Radiocommunication and navigational equipment

6 In paragraph 13.1, the words “as amended (up to and including resolutions MSC.69(69), MSC.123(75) and MSC.152(78)).” are inserted at the end.

7 The text of existing paragraph 13.2 under the heading “Navigation – General” is renumbered as 13.2.1 and the following new paragraph 13.2.2 is inserted:

“13.2.2 The navigation equipment and its installation should be to the satisfaction of the Administration. The Administration should determine to what extent the navigational equipment provisions of this chapter do not apply to craft below 150 gross tonnage.”

8 The following new section 13.10 is inserted after paragraph 13.9:

“13.10 Automatic identification system

13.10.1 Craft should be provided with an automatic identification system (AIS) as follows:

- .1 in the case of passenger craft, no later than [1 July 2008];
- .2 in the case of cargo craft of 3,000 gross tonnage and upwards, no later than [1 July 2008]; and
- .3 in the case of cargo craft of less than 3,000 gross tonnage, no later than [1 July 2008].

13.10.2 AIS should:

- .1 provide automatically to appropriately equipped shore stations, other vessels and aircraft information, including the craft’s identity, type, position, course, speed, navigational status and other safety-related information;
- .2 receive automatically such information from similarly fitted vessels;
- .3 monitor and track vessels; and
- .4 exchange data with shore based facilities.

13.10.3 The requirements of .2 should not apply where international agreements, rules or standards provide for the protection of navigational information.

13.10.4 AIS should be operated taking into account the guidelines adopted by the Organization.*

* Refer to Guidelines for the Onboard Operational Use of Shipborne Automatic Identification Systems (AIS) adopted by the Organization by resolution A.917(22).”

9 The following new section 13.11 is inserted after paragraph 13.10:

“13.11 Voyage data recorders (VDR)**

13.11.1 To assist in casualty investigations, passenger craft should be fitted with a voyage data recorder (VDR) as follows:

- .1 ro-ro passenger craft, not later than the first survey after 1 January 2003;
and
- .2 passenger craft other than ro-ro passenger craft, not later than 1 January 2004.

13.11.2 The Administration may exempt passenger craft, other than ro-ro passenger craft, from being fitted with a VDR where it can be demonstrated that interfacing a VDR with the existing equipment on the craft is unreasonable and impracticable.

13.11.3 The voyage data recorder system, including all sensors, should be subjected to an annual performance test. The test should be conducted by an approved testing or servicing facility to verify the accuracy, duration and recoverability of the recorded data. In addition, tests and inspections should be conducted to determine the serviceability of all protective enclosures and devices fitted to aid location. A copy of the certificate of compliance issued by the testing facility, stating the date of compliance and the applicable performance standards, should be retained on board the craft.

** Refer to Recommendation and Performance Standards for voyage data recorders (VDR's) adopted by the Organization by resolution A.861(20).”

10 The following new section 13.12 is inserted after paragraph 13.11:

“13.12 Nautical charts and publications

13.12.1 Craft should be provided with nautical charts and nautical publications to plan and display the craft's route for the intended voyage and to plot and monitor positions throughout the voyage. An electronic chart display and information system (ECDIS) may be accepted as meeting the chart carriage requirements of this paragraph.

13.12.2 All craft, including existing craft, should be fitted with an ECDIS not later than [1 July 2010].

13.12.3 Backup arrangements should be provided to meet the functional requirements of 13.12.1, if this function is partly or fully fulfilled by electronic means.***

*** An appropriate folio of paper nautical charts may be used as a backup arrangement for ECDIS. Other backup arrangements for ECDIS are acceptable (see appendix 6 to resolution A.817(19), as amended.”

ANNEX 14**DRAFT AMENDMENTS TO SOLAS REGULATIONS II-1/3-2 AND XII/6****DRAFT RESOLUTION MSC.[...(82)]
[(adopted on ... December 2006)]****ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR
THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING FURTHER article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as “the Convention”), concerning the amendment procedure applicable to the Annex to the Convention, other than to the provisions of chapter I thereof,

HAVING CONSIDERED, at its [eighty-second] session, amendments to the Convention, proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in the annex to the present resolution;
2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on [1 January 2008], unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world’s merchant fleet, have notified their objections to the amendments;
3. INVITES SOLAS Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on [...] upon their acceptance in accordance with paragraph 2 above;
4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Contracting Governments to the Convention;
5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its annex to Members of the Organization, which are not Contracting Governments to the Convention;
- [6. RESOLVES that SOLAS Contracting Governments may apply, in advance, the annexed amendments to SOLAS regulation II-1/3-2 with respect to the corrosion prevention of dedicated seawater ballast tanks of all types of ships and double-side skin spaces in bulk carriers of 150 m in length and upwards adopted by this resolution together with the Performance standards for protective coatings for dedicated seawater ballast tanks on all new ships and double-sided skin spaces of bulk carriers adopted by resolution MSC.[...(82)] to ships flying their flag constructed on or after 1 July 2006.]

ANNEX

**AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR
THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED**

**CHAPTER II-1
CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY,
MACHINERY AND ELECTRICAL INSTALLATIONS**

**PART A-1
STRUCTURE OF SHIPS**

Regulation 3-2 – Corrosion prevention of seawater ballast tanks in oil tankers and bulk carriers

1 The existing title and text of the regulation are replaced by the following:

“Corrosion prevention of seawater ballast tanks of all types of ships and double-side skin spaces of bulk carriers

1 Except as provided for in paragraph 2, all dedicated seawater ballast tanks arranged in ships [of not less than [...] gross tonnage] constructed on or after [date to be determined by the MSC], and [dedicated seawater ballast tanks and] double-side skin spaces arranged in bulk carriers of 150 m in length and upwards constructed on or after [the date to be determined by the MSC] shall [have an efficient corrosion prevention system, such as hard protective coatings or equivalent. The protective coatings shall comply with] [be coated in accordance with] the [Performance standard for protective coatings for dedicated seawater ballast tanks on all new ships and double-side skin spaces of bulk carriers], adopted by the Maritime Safety Committee by resolution [MSC.(...)], as may be amended by the Organization, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of article VIII of the present Convention concerning the amendment procedures applicable to the Annex other than chapter I.

2 All dedicated sea water ballast tanks arranged in oil tankers and bulk carriers constructed on or after 1 July 1998 but before [the dates referred to in paragraph 1] shall comply with the provisions of regulation II-1/3-2 adopted by resolution MSC.47(66).”

**CHAPTER XII
ADDITIONAL SAFETY MEASURES FOR BULK CARRIERS**

Regulation 6 – Structural and other requirements for bulk carriers

2 The existing paragraph 3 is deleted and existing paragraphs 4 and 5 are renumbered as paragraphs 3 and 4.

ANNEX 15

**DRAFT RESOLUTION MSC.[...(82)]
[(adopted on ... December 2006)]****PERFORMANCE STANDARD FOR PROTECTIVE COATINGS FOR DEDICATED
SEAWATER BALLAST TANKS ON ALL NEW SHIPS
AND DOUBLE-SIDE SKIN SPACES OF BULK CARRIERS**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING the amendments to regulations II-1/3-2 and XII/6 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended (hereinafter referred to as “the Convention”) adopted by resolution MSC.[...(82)], concerning corrosion prevention of dedicated seawater ballast tanks and double-side skin spaces,

NOTING ALSO that the aforementioned regulations provide that the corrosion prevention system referred to therein shall comply with the requirements of the Performance standard for protective coatings for dedicated seawater ballast tanks on all new ships and double-side skin spaces of bulk carriers (hereinafter referred to as “the Performance standard for protective coatings”) to be made mandatory under the Convention;

RECOGNIZING that the Performance standard for protective coatings referred to above is not intended to inhibit the development of new or novel technologies which provide for alternative systems,

HAVING CONSIDERED, at its [eighty-second] session, the text of the proposed Performance standard for protective coatings,

1. ADOPTS the Performance standard for protective coatings for dedicated seawater ballast tanks on all new ships and double-side skin spaces of bulk carriers, the text of which is set out in the annex to the present resolution;
2. INVITES Contracting Governments to the Convention to note that the Performance standard for protective coatings will take effect on [...] upon entry into force of the amendments to regulations II-1/3-2 and XII/6 of the Convention;
3. REQUESTS the Secretary-General to transmit certified copies of this resolution and the text of the Performance standard for protective coatings contained in the annex to all Contracting Governments to the Convention;
4. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and the annex to all Members of the Organization, which are not Contracting Governments to the Convention;
5. INVITES Governments to encourage the development of novel technologies aimed at providing for alternative systems and to keep the Organization advised of any positive results.

ANNEX

PERFORMANCE STANDARD FOR PROTECTIVE COATINGS FOR DEDICATED SEAWATER BALLAST TANKS ON ALL NEW SHIPS AND DOUBLE-SIDE SKIN SPACES OF BULK CARRIERS

1 PURPOSE

This Standard provides technical requirements for protective coatings in dedicated seawater ballast tanks constructed of steel of all type of ships and double-side skin spaces arranged in bulk carriers of 150 m in length and upward constructed on or after [...] for the purpose of SOLAS regulation II-1/3-2 as adopted by resolution MSC.[...(82)].

2 DEFINITIONS

For the purpose of this Standard, the following definitions apply:

- 2.1 *Abrasive inclusions* are abrasive particles shot into the surface of the steel or embedded in a layer of coating.
- 2.2 *Ballast tanks* are those as defined in resolutions A.798(19) and A.744(18).
- 2.3 *Dew point* is the temperature at which air is saturated with moisture.
- 2.4 *DFT* is dry film thickness.
- 2.5 *Edge grinding* is the treatment of edge before secondary surface preparation.
- 2.6 “*GOOD*” *condition* is the condition with minor spot rusting as defined in resolution A.744(18).
- 2.7 *Hard coating* is a coating that chemically converts during its curing process or a non-convertible air drying coating which may be used for maintenance purposes. Can be either inorganic or organic.
- 2.8 *Maintenance* is [to include inspection of the coating and repair of mechanically caused damage or that caused by circumstances outside the operating environment for which the coating was designed and specified. This should not include re-coating of non-mechanically induced damage in the intended operating environment] [*alternative*: cleaning and inspection of the coating and repairing if required].
- 2.9 *NDFT* is the nominal dry film thickness. 90/10 practice may be adopted, which means that 90% of all thickness measurements shall be greater than or equal to NDFT and none of the remaining 10% measurements shall be below 0.9 x NDFT.
- 2.10 *Primer coat* is the first coat of the coating system applied in the shipyard after shop primer application.
- 2.11 *Shop-primer* is the prefabrication primer coating applied to steel plates, often in automatic plants (and before the first coat of a coating system).

2.12 *Stripe coating* is painting of edges, welds, hard to reach areas, etc., to ensure good paint adhesion and proper paint thickness in critical areas.

2.13 *Target useful life* is the target value, in years, of the durability for which the coating system is designed.

2.14 *Technical Data Sheet* is paint manufacturer's Product Data Sheet which contains detailed technical instruction and information relevant to the coating and its application.

3 GENERAL PRINCIPLES

3.1 The ability of the coating system to reach its target useful life depends on the type of coating system, steel preparation, application and coating inspection and maintenance. All these aspects contribute to the good performance of the coating system. All are dealt with in this Performance standard with the exception of in-service coating inspection[, which is covered by resolution A.744(18) for tankers and bulk carriers,] and maintenance.

3.2 Inspection of surface preparation and coating processes shall be agreed upon between the shipowner, the shipyard and the coating manufacturer and presented to the Administration or its recognized organization for review. Clear evidence of these inspections shall be reported and be included in the Coating Technical File (CTF) (see paragraph 3.5).

[3.3 This being a design standard aiming to achieve a target life, the assumptions contained with regard to coating service are of key importance. Any reference to maintenance or repair during the operational life of the ship, unless explicitly stated otherwise, should be taken to refer only to that of mechanically introduced damage and not deterioration by gradual processes. Notwithstanding the above design assumption, any coating faults discovered in service should be repaired regardless of their cause.]

3.4 When considering the Standard provided in section 4, the following is to be taken into account:

- .1 it is essential that specifications, procedures and the various different steps in the coating application process (including, but not limited to, surface preparation) are strictly applied by the shipbuilder in order to prevent premature decay and/or deterioration of the coating system;
- .2 proper periodic coating inspection and maintenance and repairs of any damages found during the ship life are necessary and are to be carried out by the operator of the ship on behalf of the owner;
- .3 the coating performance can be improved by adopting measures at the ship design stage such as reducing scallops, using rolled profiles, avoiding complex geometric configurations and ensuring that the structural configuration permits easy access for tools and to facilitate cleaning, drainage and drying of the space to be coated;
- .4 the coating performance standard provided in this document is based on experience from manufacturers, shipyards and ship operators; it is not intended to exclude suitable alternative coating systems, providing a performance at least equivalent to that specified in this Standard is demonstrated. Acceptance criteria for alternative systems are provided in section 8.

3.5 Coating Technical File

3.5.1 Specification of the coating system applied to the water ballast tanks and double-side skin spaces of bulk carriers of 150 m and upwards, record of the shipyard's and shipowner's coating work, detailed criteria for coating selection, job specifications, inspection, maintenance and repair shall be documented in the Coating Technical File, and the Coating Technical File shall be reviewed by the Administration or an organization recognized by the Administration.

3.5.2 New construction stage

The Coating Technical File shall contain at least the following items relating to this Standard and shall be delivered by the shipyard at new ship construction stage:

- .1 copy of Statement of Compliance or Type Approval Certificate;
- .2 copy of Technical Data Sheet, including:
 - product name and identification mark and/or number;
 - materials, components and composition of the coating system, colours;
 - minimum and maximum dry film thickness;
 - application methods, tools and/or machines;
 - condition of surface to be coated (de-rusting grade, cleanness, profile, etc.); and
 - environmental limitations (temperature and humidity);
- .3 shipyard work records of coating application, including:
 - applied actual space and area (in square metres) of each compartment;
 - applied coating system;
 - time of coating, thickness, number of layers, etc.;
 - ambient condition during coating; and
 - method of surface preparation;
- .4 procedures for inspection and repair of coating system during ship construction;
- .5 coating log issued by the coating inspector – stating that the coating was applied in accordance with the specifications to the satisfaction of the coating supplier representative and specifying deviations from the specifications (example of daily log and non-conformity report, see annex 2);
- .6 shipyard's verified inspection report, including:
 - completion date of inspection;
 - result of inspection;
 - remarks (if given); and
 - inspector signature; and
- .7 procedures for in-service maintenance and repair of coating system.

3.5.3 Maintenance, significant repair[, full and partial recoating applies to repairs of tanks in FAIR and POOR or worse condition]

In the Coating Technical File the shipowner shall record at least the following items at maintenance and significant repair, recoating stage:

- .1 copy of Technical Data Sheet, including:
 - product name and identification mark and/or number;
 - materials, components and composition of the coating system, colours;
 - minimum and maximum dry film thickness;
 - application methods, tools and/or machines;
 - condition of surface to be coated (de-rusting grade, cleanness, profile, etc.); and
 - environmental limitations (temperature and humidity);
- .2 work records of coating application, including:
 - applied actual space and area (in square metres) of each compartment;
 - applied coating system;
 - time of coating, thickness, number of layers, etc.;
 - ambient condition during coating; and
 - method of surface preparation;
- .3 procedures for inspection and repair of coating system;
- [.4 coating log issued by the coating inspector stating that the coating was applied in accordance with the specifications to the satisfaction of the coating supplier representative and specifying deviations from the specifications (example of daily log and non-conformity report, see annex 2);] and
- .5 shipyard's verified inspection report, including:
 - completion date of inspection;
 - result of inspection;
 - remarks (if given); and
 - inspector signature.

3.5.4 Re-coating

If full or partial re-coating is carried out, the items specified in paragraph 3.5.2 shall be recorded in the Coating Technical File.

3.5.5 The Coating Technical File shall be kept on board and maintained throughout the life of the ship.

3.6 Health and safety

The shipyard is responsible for implementation of national regulations to ensure the health and safety of individuals and to minimize the risk of fire and explosion.

4 COATING STANDARD

4.1 Performance standard

This Standard is based on specifications and requirements which intend to provide a target useful coating life of 15 years, which is considered to be the time period, from initial application, over which the coating system is intended to remain in “GOOD” condition. However, the actual useful life will vary, depending on numerous variables including actual conditions encountered in service, the frequency and extent of maintenance performed with shipboard means and repairs to any damages to the coating.

4.2 Standard application

Protective coatings for dedicated seawater ballast tanks of all ship types and double-side skin spaces arranged in bulk carriers of 150 m in length and upward shall comply with the requirements in this Standard.

4.3 Basic coating requirements

4.3.1 The requirements for protective coating systems for dedicated seawater ballast tanks of all ship types and double-side skin spaces arranged in bulk carriers of 150 m in length and upward meeting the performance standard specified in paragraph 4.1 are listed in Table 1.

4.3.2 Coating manufacturers shall provide a specification of the protective coating system to satisfy the requirements of Table 1.

4.3.3 The Administration or an organization recognized by the Administration shall verify the Technical Data Sheet and Statement of Compliance or Type Approval Certificate for the protective coating system.

4.3.4 The shipyard shall apply the protective coating in accordance with the verified Technical Data Sheet and its own verified application procedures.

Table 1 – Basic coating system requirements for ballast tanks of all type of ships and double-side skin spaces of bulk carriers of 150 m and upwards

	Characteristic	Requirement	Reference standard
1 Design of coating system			
.a	Selection of the coating system	The selection of the coating system should be considered by the parties involved with respect to the service conditions and planned maintenance. The following aspects, among other things should be considered: .1 location of space relative to heated surfaces; .2 frequency of ballasting and deballasting operations; .3 required surface conditions; .4 required surface cleanliness and dryness;	

	Characteristic	Requirement	Reference standard
		<p>.5 supplementary cathodic protections, if any (where coating is supplemented by cathodic protection, the coating should be compatible with the cathodic protection system).</p> <p>Coating manufacturers shall have products with documented satisfactory performance records and technical data sheets. The manufacturers should also be capable of rendering adequate technical assistance. Performance records, technical data sheet and technical assistance (if given) shall be recorded in the Coating Technical File.</p> <p>Coatings for application underneath sun-heated decks or on bulkheads forming boundaries of heated spaces shall be able to withstand repeated heating and/or cooling without becoming brittle.</p>	–
.b	Coating type	<p>Epoxy based systems.</p> <p>Other coating systems with performance according to the test procedure in Annex 1.</p> <p>A multi-coat system with each coat of contrasting colour is recommended.</p> <p>The top coat shall be of a light colour in order to facilitate in-service inspection.</p>	–
.c	Coating pre-qualification test	<p>Epoxy based systems tested prior to the date of entry into force of this standard, in a laboratory by a method corresponding to the test procedure in Annex 1 or equivalent, which as a minimum meets the requirements for rusting and blistering may be accepted.</p> <p>For all other systems, testing according to the procedure in Annex 1, or equivalent, is required.</p> <p>Field exposure for 5 years with a final coating condition of not less than “GOOD” may also be accepted.</p>	
.d	Job specification	<p>There shall be a minimum of two stripe coats and two spray coats, except that the second stripe coat, by way of welded seams only, may be reduced in scope where it is proven that the NDFT can be met by the coats applied in order to avoid unnecessary over thickness, any reduction in scope of the second stripe coat shall be fully detailed in the CTF.</p> <p>Stripe coats shall be applied by brush or roller. Roller to be used for scallops, ratholes, etc. only.</p> <p>Each main coating layers shall be appropriately cured before application of the next coat, in accordance with coating manufacturer’s recommendations. Surface contaminant such as rust, grease, etc. shall be removed prior to painting with proper method according to the paint manufacturer’s recommendation. Job specifications shall include the dry-to-recoat times and walk-on time given by the manufacturer.</p>	–

	Characteristic	Requirement	Reference standard
.e	NDFT (nominal total dry film thickness)	[NDFT 300 µm with 90/10 rule] [NDFT 335 µm with 90/10 rule] for epoxy based coatings, other systems to coating manufacturer's specifications. Maximum total dry film thickness according to manufacturer's detailed specifications. Care shall be taken to avoid increasing the thickness in an exaggerated way. Wet film thickness shall be regularly checked during application. Thinner shall be limited to those types and quantities recommended by the manufacturer.	– Type of gauge and calibration in accordance with SSPC-PA2
.2 PSP (Primary Surface Preparation)			
.a	Blasting and profile	Sa 2½; with profiles between 30-75 µm. Blasting should not be carried out when: .1 the relative humidity is above 85%; or .2 the surface temperature of steel is less than 3°C above the dew point. Checking of the steel surface cleanliness and roughness profile should be carried out at the end of the surface preparation and before the application of the primer, in accordance with the manufacturer's recommendations.	ISO 8501-1, ISO 8503-1/3
.b	Water soluble salt limit equivalent to NaCl	≤ 50 mg/m ² of sodium chloride	Conductively measured in accordance with ISO 8502-9
.c	Shop primer	Zinc containing inhibitor free zinc silicate based or equivalent. Compatibility with main coating system shall be confirmed by the coating manufacturer.	–
.3 SSP (Secondary surface preparation)			
.a	Steel condition	The steel surface should be prepared so that the coating selected can achieve an even distribution at the required NDFT and have an adequate adhesion by removing sharp edges, grinding weld beads and removing weld spatter and any other surface contaminant in accordance with ISO 8501-3 grade P2. Edges to be treated to a rounded radius of minimum 2 mm, or subjected to three pass grinding, or at least equivalent process before painting.	ISO 8501-3

	Characteristic	Requirement	Reference standard
.b	Surface treatment	Sa 2½ on damaged shop primer and welds; Sa 2 removing at least 70% of intact shop primer, which has not been proven compatible. If the complete coating system comprising epoxy based main coating and compatible shop primer has passed a pre-qualification certified by test procedures in Annex 1, intact shop primer may be retained. The retained shop primer shall be cleaned by sweep blasting, water washing or equivalent method.	ISO 8501-1
.c	Surface treatment after erection	Butts and small damages up to 3% of total area of the tank, St 3 or for butts Sa 2½ where practicable. In case where more than 3% of total area of the tank, then Sa 2½. Coating in overlap to be feathered.	ISO 8501-1
.d	Profile requirements	As recommended by the coating manufacturer 30-75 µm.	ISO 8503-1/3
.e	Dust	Dust quantity rating ["2"]["3"]["4"] for dust size class "0", "1" or "2". Dust quantity rating "1" for dust size class "3", "4" or "5".	ISO 8502-3
.f	Water soluble salts limit equivalent to NaCl after blasting/grinding	≤ 50 mg/m ² of sodium chloride	Conductively measured in accordance with ISO 8502-9
[.g	Abrasive inclusions	None (as viewed without magnification).	–]
.h	Oil contamination	No oil contamination.	
.4 Miscellaneous			
.a	Ventilation	Adequate ventilation is necessary for the proper drying and curing of coating. Ventilation should be maintained throughout the application process and for a period after application is completed, as recommended by the coating manufacturer.	–
.b	Environmental conditions	Coating shall be applied under controlled humidity and surface conditions, in accordance with the manufacturer's specifications. In addition, coating shall not be applied when: .1 the relative humidity is above 85%; or .2 the surface temperature is less than 3°C above the dew point.	–
.c	Testing of coating	Destructive testing should be avoided. Dry film thickness shall be measured after each coat for quality control purpose and the total dry film thickness shall be confirmed after completion of final coat, using appropriate thickness gauges.	BS EN ISO 19840 Annex 3
.d	Repair	Any defective areas, e.g. pin-holes, bubbles, voids, etc. should be marked up and appropriate repairs effected. All such repairs shall be re-checked and documented.	–

5 COATING SYSTEM APPROVAL

Results from prequalification tests (Table 1, 1.c) of the coating system shall be documented, and a Statement of Compliance or Type Approval certificate shall be issued if found satisfactory by a third party, independent of the coating manufacturer.

6 COATING INSPECTION REQUIREMENTS

6.1 General

6.1.1 To ensure compliance with this Standard, the following shall be carried out by the qualified coating inspectors certified to NACE Level II, FROSIO level Red or equivalent as verified by the Administration or the recognized organization.

6.1.2 Coating inspectors shall inspect surface preparation and coating application during the coating process by carrying out, as a minimum, those inspection items identified in section 6.2 to ensure compliance with this Standard. Emphasis shall be placed on initiation of each stage of surface preparation and coatings application as improper work is extremely difficult to correct later in the coating progress. Representative structural members shall be non-destructively examined for coating thickness. The inspector shall verify that appropriate collective measures have been carried out.

6.1.3 Results from the inspection shall be recorded by the inspector and shall be included in the CTF (refer to Annex 2, Example of Daily Log and Non-conformity Report).

6.2 Inspection items

Construction stage	Inspection items
Primary surface preparation	a The surface temperature of steel, the relative humidity and the dew point shall be measured and recorded before the blasting process starts and at times of sudden changes in weather.
	b The surface of steel plates shall be tested for soluble salt checked for oil, grease and other contamination.
	c The cleanliness of the steel surface shall be monitored in the shop primer application process.
	d The shop primer material shall be confirmed to meet the requirements of 2.c of Table 1.
Thickness	If compatibility with the main coating system has been declared, then the thickness and curing of the zinc silicate shop primer to be confirmed to conform to the specified values.
Block assembly	a After completing construction of the block and before secondary surface preparation starts, a visual inspection for steel surface treatment including edge treatment shall be carried out. Any oil, grease or other visible contamination to be removed.

Construction stage	Inspection items
	<p>b After blasting/grinding/cleaning and prior to coating, a visual inspection of the prepared surface shall be carried out. On completion of blasting and cleaning and prior to the application of the first coat of the system, the steel surface shall be tested for levels of remaining soluble salts in at least one location per block.</p> <p>c The surface temperature, the relative humidity and the dew point shall be monitored and recorded during the coating application and curing.</p> <p>d Inspection to be performed of the steps in the coating application process mentioned in Table 1.</p> <p>e DFT measurements shall be taken to prove that the coating has been applied to the thickness as specified and outlined in Annex 3.</p>
Erection	<p>a Visual inspection for steel surface condition, surface preparation and verification of conformance to other requirements in Table 1, and the agreed specification to be performed.</p> <p>b The surface temperature, the relative humidity and the dew point shall be measured and recorded before coating starts and regularly during the coating process.</p> <p>c Inspection to be performed of the steps in the coating application process mentioned in Table 1.</p>

7 VERIFICATION REQUIREMENTS

The following shall be carried out by the Administration or recognized organization prior to reviewing the Coating Technical File for the ship subject to this Performance Standard:

- .1 check that the Technical Data Sheet and Statement of Compliance comply with the Coating Performance Standard;
- .2 check that the coating identification on representative containers is consistent with the coating identified in the Technical Data Sheet and Statement of Compliance;
- .3 check that the inspector is qualified in accordance with the qualification standards in paragraph 6.1.1;
- .4 check that the inspector's reports of surface preparation and the coating's application indicate compliance with the manufacturer's Technical Data Sheet and Statement of Compliance; and
- .5 monitor implementation of the coating inspection requirements.

8 ALTERNATIVE SYSTEMS

8.1 All systems that are not an epoxy based system applied according to Table 1 of this Standard are defined as alternative systems.

8.2 This Performance Standard is based on recognized and commonly used coating systems. It is not meant to exclude other, alternative, systems with proven equivalent performance, for example non epoxy based systems.

8.3 Acceptance of alternative systems will be subject to documented evidence that they ensure a corrosion prevention performance at least equivalent to that indicated in this Standard.

8.4 As a minimum, the documented evidence shall consist of satisfactory performance corresponding to that of a coating system which conforms to the Coating Standard described in section 4, a target useful life of 15 years in either actual field exposure for 5 years with final coating condition not less than "GOOD" or laboratory testing. Laboratory test shall be conducted in accordance with the test procedure given in Annex 1 of this Standard.

ANNEX 1

TEST PROCEDURES FOR COATING QUALIFICATION FOR BALLAST TANK OF ALL TYPES OF SHIPS AND DOUBLE-SIDE SKIN SPACES OF BULK CARRIERS COATING

1 Scope

These Procedures provide details of the test procedure referred to in paragraphs 5 and 8.3 of this Standard.

2 Definitions

Coating specification means the specification of coating systems which includes the type of coating system, steel preparation, surface preparation, surface cleanliness, environmental conditions, application procedure, acceptance criteria and inspection.

3 Testing

Coating specification shall be verified by the following tests. The test procedures shall comply with Appendix 1 (Test on simulated ballast tank conditions) and Appendix 2 (Condensation chamber tests) to this annex as follows:

- .1 For protective coatings for dedicated seawater ballast tanks, Appendix 1 and Appendix 2 shall apply.
- .2 For the protective coatings for double-side spaces of bulk carriers of 150 m in length and upwards other than dedicated seawater ballast tanks, Appendix 2 shall apply.

APPENDIX 1

TEST ON SIMULATED BALLAST TANK CONDITIONS

1 Test condition

Test on simulated ballast tank conditions shall satisfy each of the following conditions:

- .1 The test shall be carried out for 180 days.
- .2 There are to be 5 test panels.
- .3 The size of each test panel is 200 mm x 400 mm x 3 mm. Two of the panels (Panel 3 and 4 below) have a U-bar welded on with one flat side to the back (5 cm by 5 cm, the full length of the test plate) to provide an angular shape. The panels are to be treated according to the Performance Standard, Table 1, 2 and 3, and coating system applied according to Table 1, 1 .d and .e. Shop primer to be weathered for at least 2 months and cleaned. For innovation purpose, alternative preparation, coating systems and dry film thicknesses may be used when clearly defined.
- .4 The reverse side of the test piece shall be painted appropriately, in order not to affect the test results.
- .5 As simulating the condition of actual ballast tank, the test cycle runs for two weeks with natural or artificial seawater and one week empty. The temperature of the seawater is to be kept at about 35°C.
- .6 Test Panel 1: This panel is to be heated for 12 hours at 50°C and cooled for 12 hours at 20°C in order to simulate upper deck condition. The test panel is cyclically splashed with natural or artificial seawater in order to simulate a ship's pitching and rolling motion. The interval of splashing is 3 seconds or faster. The panel has a scribe line down to bare steel across width.
- .7 Test Panel 2 has a fixed sacrificial zinc anode in order to evaluate the effect of cathodic protection. A circular 8 mm artificial holiday down to bare steel is introduced on the test panel 100 mm from the anode in order to evaluate the effect of the cathodic protection. The test panel is cyclically immersed with natural or artificial seawater.
- .8 Test Panel 3: to be cooled on the reverse side, in order to give a temperature gradient in order to simulate a cooled bulkhead in a ballast wing tank, and splashed with natural or artificial seawater in order to simulate a ship's pitching and rolling motion. The gradient of temperature is approximately 20°C, and the interval of splashing is 3 seconds or faster. The panel has a scribe line down to bare steel across width.

- .9 Test Panel 4 is to be cyclically splashed with natural or artificial seawater in order to simulate a ship's pitching and rolling motion. The interval of splashing is 3 seconds or faster. The panel has a scribe line down to bare steel across width.
- .10 Test Panel 5 is to be exposed to dry heat for 180 days at 70°C to simulate boundary plating between heated bunker tank and ballast tank in double bottom.

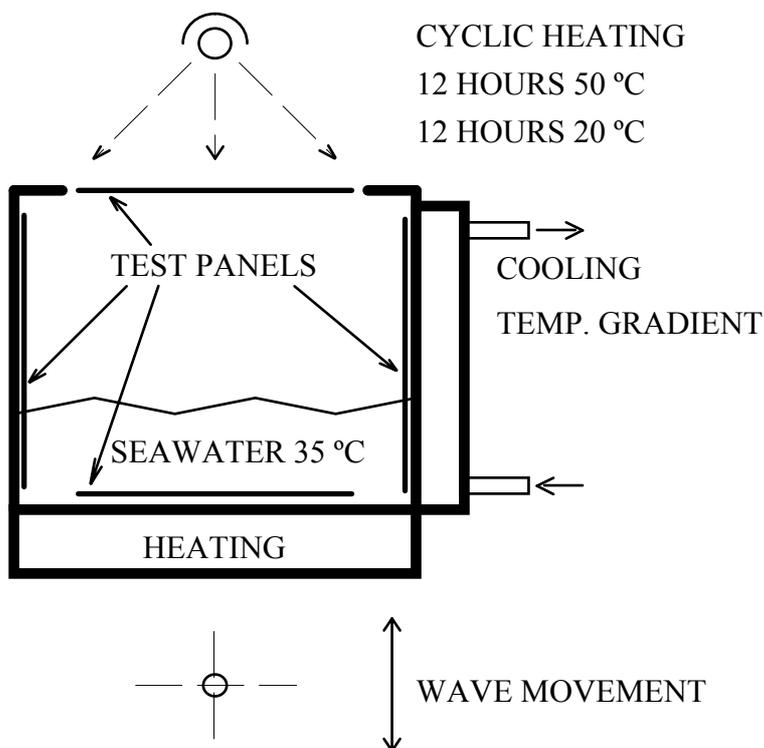


Figure 1
Wave tank for testing of ballast tank coatings

2 Test results

2.1 Prior to the testing, the following measured data of the coating system shall be reported:

- .1 Infrared (IR) identification (main components);
- .2 specific gravity according to ISO 2811-74; and
- .3 number of pinholes, low voltage detector at 90 Volt.

2.2 After the testing, the following measured data shall be reported:

- .1 blisters and rust according to ISO 4628/2 and ISO 4628/3;
- .2 dry film thickness (DFT) (use of a template) (see Annex 3);
- .3 adhesion value according to ISO 4624;

- .4 flexibility according to ASTM D4145, modified according to panel thickness (3 mm steel, 300 µm coating, 150 mm cylindrical mandrel gives 2% elongation) for information only;
- .5 cathodic protection weight loss/current demand/disbondment from artificial holiday;
- .6 undercutting from scribe. The undercutting along both sides of the scribe is measured and the maximum undercutting determined on each panel. The average of the three maximum records is used for the acceptance.

3 Acceptance criteria

3.1 The test results based on section 2 shall satisfy the following criteria:

Item	Acceptance criteria for epoxy based systems applied according to Table 1 of this Standard	Acceptance criteria for alternative systems
Blisters on panel	No blisters	No blisters
Rust on panel	Ri 0 (0%)	Ri 0 (0%)
Number of pinholes	0	0
Adhesive failure	> 3.5 MPa Adhesive failure between substrate and coating or between coats for 60% or more of the areas	> 5.0 MPa Adhesive failure between substrate and coating or between coats for 60% or more of the areas
Cohesive failure	≥3.0 MPa Cohesive failure in coating for 40% or more of the area	>5.0 MPa Cohesive failure in coating for 40% or more of the area
Cathodic protection current demand calculated from weight loss	< 5mA/m ²	< 5mA/m ²
Cathodic protection; disbondment from artificial holiday	< 8mm	< 5mm
Undercutting from scribe	< 8mm	< 5 mm
U-beam	Any defects, cracking or detachment, at the angle or weld will lead to system being failed.	Any defects, cracking or detachment, at the angle or weld will lead to system being failed.

3.2 Epoxy based systems tested prior to the date of entry into force of this Standard shall satisfy only the criteria for blistering and rust in the table above.

3.3 Epoxy based systems tested when applied according to Table 1 of this Standard shall satisfy the criteria for epoxy based systems as indicated in the table above.

3.4 Alternative systems not necessarily epoxy based and/or not necessarily applied according to Table 1 of this Standard shall satisfy the criteria for alternative systems as indicated in the table above.

4 Test report

The test report shall include the following information:

- .1 name of the manufacturer;
- .2 date of tests;
- .3 product name/identification of both paint and primer;
- .4 batch number;
- .5 data of surface preparation on steel panels, including the following:
 - surface treatment;
 - water soluble salts limit;
 - dust; and
 - abrasive inclusions;
- .6 application data of coating system, including the following:
 - shop primed;
 - number of coats;
 - recoat interval^{*};
 - dry film thickness (DFT) prior to testing^{*};
 - thinner^{*};
 - humidity^{*};
 - air temperature^{*}; and
 - steel temperature;

^{*} Both of actual specimen data and manufacturer's requirement/recommendation.
- .7 test results according to section 2; and
- .8 judgment according to section 3.

APPENDIX 2

CONDENSATION CHAMBER TEST

1 Test condition

Condensation chamber test shall be conducted in accordance with ISO 6270.

- .1 The exposure time is 180 days.
- .2 There are to be 2 test panels.
- .3 The size of each test panel is 150 mm x 150 mm x 3 mm. The panels are to be treated according to the Performance Standard Table 1, 2 and 3, and coating system applied according to Table 1, 1 .d and .e. Shop primer to be weathered for at least 2 months and cleaned. For innovation purposes, alternative preparation, coating systems and dry film thicknesses may be used when clearly defined.
- .4 The reverse side of the test piece shall be painted appropriately, in order not to affect the test results.

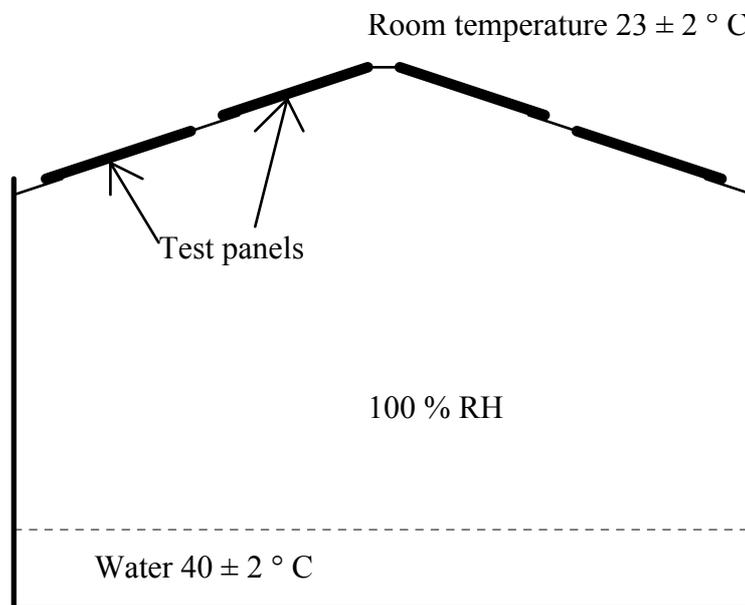


Figure 2
Condensation chamber

2 Test results

According to section 2 (except for paragraphs 2.2.5 and 2.2.6) of Appendix 1.

3 Acceptance criteria

3.1 The test results based on section 2 shall satisfy the following criteria:

Item	Acceptance criteria for epoxy based systems applied according to table 1 of this standard	Acceptance criteria for alternative systems
Blisters on panel	No blisters	No blisters
Rust on panel	Ri 0 (0%)	Ri 0 (0%)
Number of pinholes	0	0
Adhesive failure	> 3.5 MPa Adhesive failure between substrate and coating or between coats for 60% or more of the areas	> 5.0 MPa Adhesive failure between substrate and coating or between coats for 60% or more of the areas
Cohesive failure	>3.0 MPa Cohesive failure in coating for 40% or more of the area	>5.0 MPa Cohesive failure in coating for 40% or more of the area

3.2 Epoxy based systems tested prior to the date of entry into force of this Standard shall satisfy only the criteria for blistering and rust in the table above.

3.3 Epoxy based systems tested when applied according to Table 1 of this Standard shall satisfy the criteria for epoxy based systems as indicated in the table above.

3.4 Alternative systems not necessarily epoxy based and/or not necessarily applied according to Table 1 of this Standard shall satisfy the criteria for alternative systems as indicated in the table above.

4 Test report

According to section 4 of Appendix 1.

ANNEX 2
EXAMPLE OF DAILY LOG AND NON-CONFORMITY REPORT

DAILY LOG

Sheet No:

Vessel:		Tank/Hold No:		Database:					
Part of structure:									
SURFACE PREPARATION									
Method:				Area (m²):					
Abrasive:				Grain size:					
Surface temp:				Air temp.:					
Rel. humidity (max):				Dew point:					
Standard achieved:									
Rounding of edges:									
Comments:									
Job No:			Date:			Signature:			
COATING APPLICATION									
Method:									
Coat No	System	Batch No	Date	Air temp.	Surf. temp.	RH%	Dew Point	DFT* Meas. *	Speci- fied
* Mesured min. and max. DFT. WFT and DFT readings to be attached to daily log.									
Comments:									
Job No:			Date:			Signature:			

Non-conformity report

Sheet No:

Vessel:	Tank/Hold No:	Database:
Part of structure:		
CORRECTIVE DESCRIPTION OF THE INSPECTION FINDINGS		
Description of Findings:		
Reference document (daily log):		
Action taken:		
Job No:	Date:	Signature:

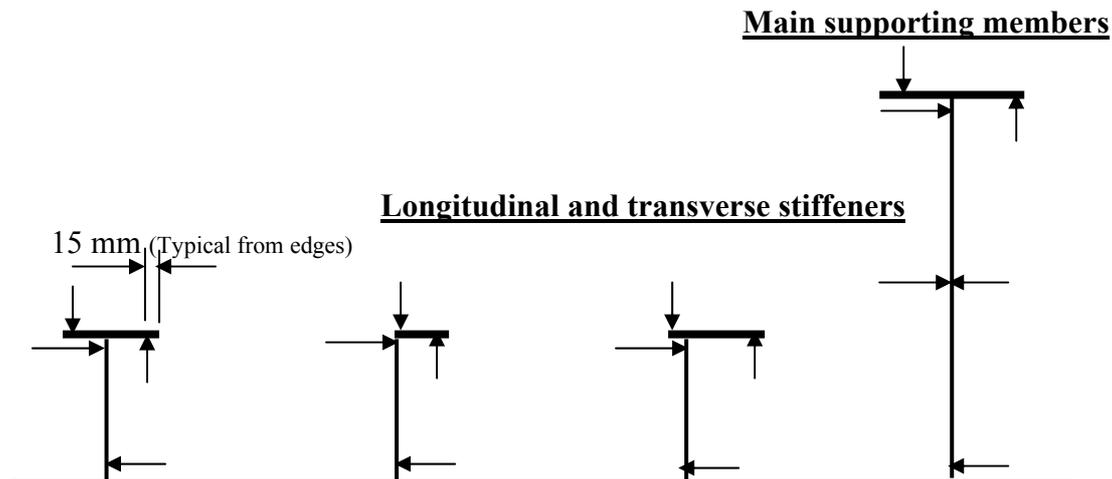
ANNEX 3

DRY FILM THICKNESS MEASUREMENTS

The following verification check points of DFT are to be taken:

- .1 At least one measurement per 5 m² of flat surface areas.
- .2 At least one measurement at 2 to 3 metre intervals and at 15 mm from edges of tank boundaries.
- .3 Longitudinal and transverse stiffener members:

One set of measurements as shown below, taken at 2 to 3 metres run and not less than three sets between main supporting members where one set is at each end and one at about mid-span.



- .4 Main supporting members (girders and transverse) one set of measurements per 2 to 3 metres run as shown above but not less than three sets.
- .5 Around openings one measurement from each side of the opening.
- .6 Five measurements per square metre (m²) but not less than three measurements taken at complex areas (i.e. large brackets of main supporting members).
- .7 Additional spot checks to be taken to verify coating thickness for any area considered suspect by the coating inspector.

ANNEX 16

DRAFT MSC CIRCULAR

APPLICATION OF SOLAS REGULATION XII/6.3 ON CORROSION PREVENTION OF DOUBLE-SIDE SKIN SPACES AND DEDICATED SEAWATER BALLAST TANKS OF BULK CARRIERS AND APPLICATION OF THE PERFORMANCE STANDARD FOR PROTECTIVE COATINGS FOR DEDICATED SEAWATER BALLAST TANKS ON ALL NEW SHIPS AND DOUBLE-SIDE SKIN SPACES OF BULK CARRIERS

1 The Maritime Safety Committee, at its [eighty-first session (10 to 19 May 2006)], acknowledged concerns expressed with regard to problems which might be encountered when implementing the requirements of SOLAS regulation XII/6.3 regarding corrosion prevention of double-side skin spaces and dedicated seawater ballast tanks of bulk carriers, adopted by resolution MSC.170(79), which will enter into force on 1 July 2006, and of the associated Performance standard for protective coatings for dedicated seawater ballast tanks on all new ships and double-side skin spaces of bulk carriers.

2 The Committee, in order to make the aforementioned Performance standard for protective coatings mandatory under the revised SOLAS regulation II-1/3-2, approved the attached draft amendments to SOLAS regulations II-1/3-2 (annex 1) and XII/6 and the Performance standard for protective coatings for dedicated seawater ballast tanks on all new ships and double-side skin spaces of bulk carriers (annex 2), with a view to subsequent adoption at [MSC 82]. These amendments are expected to enter into force on [...].

3 In approving the draft amendments, the Committee recognized that bulk carriers of 150 m in length and upwards constructed on or after 1 July 2006 will still be required to be coated in accordance with the requirements of regulation II-1/3-2, as adopted by resolution MSC.47(66), until the entry into force of the aforementioned amendments.

4 The Committee, therefore, as indicated in operative paragraph 6 of the attached draft MSC resolution, resolved that SOLAS Contracting Governments may apply in advance the annexed draft SOLAS regulation II-1/3-2 together with the Performance standard for protective coatings for dedicated seawater ballast tanks on all new ships and double-side skin spaces of bulk carriers of 150 m in length and upwards to ships flying their flag constructed on or after 1 July 2006 in lieu of SOLAS regulation II-1/3-2 as adopted by resolution MSC.47(66).

5 SOLAS Contracting Governments are invited to take account of this decision when surveying and certifying bulk carriers under SOLAS regulations I/8 and I/12 and when exercising port State control under SOLAS regulation I/19.

ANNEX 1

[Annex 14 of DE 49/20 to be inserted]

ANNEX 2

[Annex 15 of DE 49/20 to be inserted]

ANNEX 17

DRAFT AMENDMENTS TO SOLAS REGULATION II-1/3-4

CHAPTER II-1
CONSTRUCTION – STRUCTURE, SUBDIVISIONS AND STABILITY, MACHINERY
AND ELECTRICAL INSTALLATIONS

Regulation 3-4 – Emergency towing arrangements on tankers

1 The existing title of the regulation is replaced with the following:

“Emergency towing arrangements and procedures”

2 The existing paragraphs 1 to 3 are replaced with the following:

“1 Emergency towing arrangements on tankers

1.1 Emergency towing arrangements shall be fitted at both ends on board every tanker of not less than 20,000 tonnes deadweight.

1.2 For tankers constructed on or after 1 July 2002:

.1 the arrangements shall, at all times, be capable of rapid deployment in the absence of main power on the ship to be towed and easy connection to the towing ship. At least one of the emergency towing arrangements shall be pre-rigged ready for rapid deployment; and

.2 emergency towing arrangements at both ends shall be of adequate strength taking into account the size and deadweight of the ship, and the expected forces during bad weather conditions. The design and construction and prototype testing of emergency towing arrangements shall be approved by the Administration, based on the Guidelines developed by the Organization.

1.3 For tankers constructed before 1 July 2002, the design and construction of emergency towing arrangements shall be approved by the Administration, based on the Guidelines developed by the Organization.*

2 Emergency towing procedures on ships

2.1 Ships shall be provided with an emergency towing procedure. Such a procedure shall be carried aboard the ship for use in emergency situations and shall be based on existing arrangements and equipment available on board the ship.

* Refer to the Guidelines on emergency towing arrangements for tankers adopted by the Maritime Safety Committee by resolution MSC.35(63), as may be amended.

- 2.2 The procedure** shall include:
- .1 drawings of fore and aft deck showing possible emergency towing arrangements;
 - .2 inventory of equipment on board that can be used for emergency towing;
 - .3 means and methods of communication; and
 - .4 sample procedures to facilitate the preparation for and conducting of emergency towing operations.
- 2.3 Paragraph 2 applies to:
- .1 all new ships constructed on or after [1 July 2008];
 - .2 cargo ships constructed before [1 July 2008] of not less than 20,000 dwt and all passenger ships not later than [1 July 2008]; and
 - .3 cargo ships constructed before [1 July 2008] of less than 20,000 dwt not later than [1 July 2010].”

** Refer to the guidelines for owners/operators on the development of emergency towing procedures (to be developed by the Organization).

ANNEX 18**DRAFT MSC CIRCULAR****MEANS OF EMBARKATION ON AND DISEMBARKATION FROM SHIPS**

1 The Maritime Safety Committee, at its seventy-seventh session (28 May to 6 June 2003), in view of a number of accidents involving accommodation ladders resulting in loss of life and injury, instructed the Sub-Committee on Ship Design and Equipment to develop amendments to SOLAS regulations I/7 and I/8 to require inspections of the means of crew access to and from ships, such as gangways and accommodation ladders as part of the survey of the ship's equipment.

2 The Sub-Committee, at its forty-eighth session (21 to 25 February 2005), discussed the development of the above-mentioned SOLAS amendments and agreed that this was not mainly a design and specification issue, but very much related to maintenance and that a number of national and international standards, including an ISO standard, addressing the matter, already existed. The Sub-Committee also agreed that pilot ladders¹ should also be considered and invited the submission of concrete proposals on inspection and survey requirements for accommodation and pilot ladders.

3 The Sub-Committee, at its forty-ninth session (20 to 24 February 2006), following discussion of the matter on the basis of proposals for a draft new SOLAS regulation II-1/3-9 and related guidelines for inspection and survey for accommodation and pilot ladders, decided that further consideration should be given to the issue at DE 50. However, it was agreed that, in the meantime, Member Governments should be made aware of the existing problems regarding inspection and maintenance of accommodation and pilot ladders.

4 The Committee, at its [eighty-first session (10 to 19 May 2006),] recognized that, in the light of this development, some time may lapse before the eventual regulatory framework could be adopted and enter in force. As a result, in an effort to reduce the number of accidents involving means of embarkation on and disembarkation from ships, and the resulting loss of life and injury, it recommended that Administrations should review and update, as necessary, any existing national requirements relating to the matter, as well as the associated survey and inspection provisions. If such national requirements do not already exist, Administrations should consider establishing, in the interim and as appropriate, national requirements, taking into account other national practices and related standards.²

5 Member Governments are invited to bring this circular to the attention of ship owners, ship builders, designers, port State control authorities and seafarers with a view to ensuring an improvement of the current situation, particularly in relation to inspection and maintenance procedures to secure the operational safety of this equipment.

¹ See also SOLAS regulation V/23 on Pilot transfer arrangements.

² See ISO 799:2004 Ships and marine technology – Pilot ladders; [ISO 5488:1979] [ISO 5488-1988] Shipbuilding, accommodation ladders; and ISO 7061:1993 Shipbuilding – Aluminum shore gangways for seagoing vessels.

ANNEX 19**DRAFT MEPC CIRCULAR****REVISED GUIDELINES FOR SYSTEMS FOR HANDLING OILY WASTES
IN MACHINERY SPACES OF SHIPS
INCORPORATING GUIDANCE NOTES FOR AN
INTEGRATED BILGE WATER TREATMENT SYSTEM (IBTS)**

1 Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78), contains certain regulations and unified interpretations related to equipment for the storage, handling and disposal of oily residues and engine-room oily bilge water.

2 In order to facilitate the work of Administrations on systems for handling oily wastes in machinery spaces of ships, the Marine Environment Protection Committee (MEPC) has continuously reviewed an appropriate technology for fulfilment of the Convention requirements.

3 The “Guidelines for systems for handling oily wastes in machinery spaces of ships” appended to MEPC/Circ.235 were developed as guidance for Administrations, shipowners and shipbuilders for consideration in achieving an efficient and effective system for the handling of oily bilge water and oily residues for ships the keels of which are laid on or after 1 January 1992 and, where practicable, ships already in service.

4 The aforementioned Guidelines have been reviewed in accordance with the current provisions of the Convention and revised as set out at annex to this circular.

5 For further prevention of oil pollution from machinery spaces of ships, MEPC considered that the reduction of the generation of oily bilge water generated in machinery spaces is effective and approved the concept of Integrated Bilge Water Treatment System (IBTS) which incorporates the means to reduce the amount of oily bilge water and process the oily bilge water and oil residue (sludge) in a holistic manner.

6 MEPC 54 recognized the need to disseminate the concept of IBTS and developed the Guidance notes for IBTS as set out in the appendix to the Guidelines.

ANNEX

REVISED GUIDELINES FOR SYSTEMS FOR HANDLING OILY WASTES IN MACHINERY SPACES OF SHIPS

1 Annex I of the MARPOL 73/78 contains certain regulations and unified interpretations related to equipment for the storage, handling and disposal of oily residues and engine-room oily bilge water.

2 In the continuous review by the MEPC of appropriate technology for fulfilment of the Convention requirements, substantial information has been collected which is valuable in the design, approval and surveying of installations in engine-rooms for systems handling oily bilge water, and oily residues, but does not form part of the Convention regulations or the related interpretations.

3 The MEPC had decided that this information is, nevertheless, of substantial value to Administrations, shipowners and shipbuilders and, accordingly, decided that the dissemination of the information should be in the format of an MEPC circular.

4 The information contained in these Guidelines should be regarded as guidance in achieving an efficient and effective system for the handling of oily bilge water and oily residues for new buildings and, where applicable and reasonable, for ships which are in service. The information should be considered in conjunction with specific conditions and circumstances, shipowners' and shipbuilders' practices, classification society rules, Administration requirements, etc., applicable to specific ship.

5 Definitions for the purpose of the Guidelines

5.1 Oily waste means oil residues (sludge) and oily bilge water.

5.2 Oil residue (sludge) means:

- .1 separated sludge, which means sludge resulting from purification of fuel and lubricating oil;
- .2 drain and leakage oil, which means oil resulting from drainages and leakages in machinery spaces; and
- .3 exhausted oils, which means exhausted lubricating oil, hydraulic oil or other hydrocarbon-based liquid which are not suitable for use in machinery due to deterioration and contamination.

5.3 Sludge tanks mean:

- .1 tanks for separated sludge;
- .2 drain and leakage oil tanks; and
- .3 exhausted oil tanks.

5.4 Bilge water holding tanks mean tanks for oily bilge water.

5.5 Regulations referred to in these Guidelines are those contained in Annex I of MARPOL 73/78.

5.6 Oil sludge incinerators are systems serving for incineration of oil sludge generated on board seagoing ships.

Sludge incinerators could be:

- main and auxiliary steam boilers with appropriate oil sludge processing systems;
- heaters of thermal fluid systems with appropriate oil sludge processing systems;
- incinerators with appropriate oil sludge processing systems designed for sludge incineration; or
- inert gas systems with appropriate oil sludge processing systems.

6 Collection and storage of oily wastes

6.1 A sludge tank or tanks are mandatory under regulation 17.

6.2 A bilge water holding tank is arranged to receive the daily generation of bilge water before this water is discharged ashore or discharged through the 15 ppm equipment overboard. A bilge water holding tank is not mandatory, but will enable ships to operate safely during port visits, during operation in special areas and coastal waters and during periods of maintenance of the 15 ppm equipment.

6.3 A bilge water holding tank will also provide additional safeguards in the purification of oily bilge water should quick-separating detergents be used for cleaning purposes.

7 Arrangements of oily waste tanks

7.1 Tanks for the purposes mentioned above should be arranged to satisfy the intended service of the ship.

7.2 Sludge tanks may be separate and independent but may also be combined, as suitable, depending on the size and the service of the ship.

7.3 The merits of arranging an independent tank for the collection of separated sludge should be considered, having regard to the smaller tank volume that needs to have cleaning and heating arrangements and the reduced space requirement for tank capacity that should preferably be arranged above the tank top.

7.4 If a bilge water holding tank is arranged, it should be separate and independent from other tanks for the collection of sludge.

7.5 Ships operating with residual fuel oil of a relative density greater than 0.94 at 15°C should be provided with a bilge water holding tank of adequate capacity and fitted with heating facilities to preheat the oily mixture prior to the discharge of the tank's contents to the sea through or 15 ppm equipment.

8 Size of oily waste tanks

8.1 Tanks for collection of oily waste from various functions in the engine-room should have adequate capacity, having regard to the intended type of service of the ship. The information given below will provide guidance in this respect, but all other aspects applicable to the specific vessel trading pattern and time in port should additionally be taken into account.

8.2 The recommended capacity for oil residue (sludge) tanks is specified in the interpretations to regulation 17.

8.3 If an exhausted oil tank is installed, in addition to the requirement under regulation 17, it should be of sufficient capacity to receive lubricating oil or other oils and hydrocarbon-based liquids from engine-room systems being exhausted due to deterioration, contamination or due to maintenance activities. The oil being discharged from the 15 ppm equipment may also be discharged to this tank. For main and auxiliary engines, which require a complete change of the lubricating oil at sea, the capacity of the tank should be determined as 1.5 m³ for each 1,000 kW engine rating.

8.4 If a drain and leakage oil tank is installed, in addition to the requirement under regulation 17 it may be arranged at several locations in the engine-room. The oil being discharged from the 15 ppm equipment may also be discharged to this tank. The recommended capacity should be as follows:

Main engine rating (kW)	Capacity (m ³)
up to 10,000	$20 \times D \times p/10^6$
above 10,000	$D \times (0.2 + 7 \times (P-10,000)/10^6)$

where, D = days; the same length of the voyage as used in the interpretation to regulation 17.

P = main engine rating in kW.

8.5 Bilge water holding tanks, if fitted, should have a capacity that provides to the ship the flexibility of operation in ports, coastal waters and special areas, without the need to discharge deoiled water overboard. The operational merit of not having to operate the 15 ppm equipment frequently should also be considered. The capacity of bilge water holding tanks should be as follows:

Main engine rating (kW)	capacity (m ³)
up to 1,000	1.5
Above 1,000 up to 20,000	$1.5 + (P-1,000)/1,500$
Above 20,000	$14.2 + 0.2 (P-20,000)/1,500$

where, P = main engine rating in kW

9 Pumping, piping and discharge systems in machinery spaces

9.1 On board ships, the propulsion systems of which are operated by heavy fuel oil, the following guidelines are provided for the piping system comprising the plant components for the treatment and storage of oily bilge water, separated sludge, drain and leakage oil and exhausted oil.

9.2 The effluent from the 15 ppm equipment should be capable of being recycled to the bilge or bilge water holding tank.

9.3 If an integral pump is fitted, the discharge should not bypass the 15 ppm equipment.

9.4 The discharge piping system of the 15 ppm equipment should be completely separate from the bilge pumping and ballast water system except the recycling line referred to in paragraph 9.2.

9.5 The ship's discharge pipeline for oily wastes to the standard discharge connection should be separated from the bunker fuel oil.

9.6 The separated dirty water and exhausted control water of fuel oil purifiers should be discharged into a particular tank for this purpose in order to minimize the influx to the tank for separated sludge. This particular tank should be located above the double bottom for the purpose of facilitating its drain without the need of a drain pump. If dirty water and exhausted control water from purifiers is not discharged to a particular tank, and in lieu of this to a tank for separated sludge, the tank should be located above the double bottom for the purpose of the aforementioned draining facilities.

9.7 Piping to and from sludge tanks shall have no direct connection overboard, other than the standard discharge connection required by regulation 19.

10 Systems for separated sludge

10.1 Tanks for separated sludge and their pipework

Tanks for separated sludge, their pipework and pumps should be designed as follows:

10.1.1 Size of tanks

See paragraph 8.

10.1.2 Design of tanks and tank heating systems

The tanks and tank heating systems should be designed to the satisfaction of the Administration.

10.1.3 Tank heating system

Tanks for separated sludge should be equipped with tank heating systems. The heating pipes should be arranged such that, seen from the heating inlet, to start with they are arranged in a way of the boundaries and then across the whole bottom area sufficiently high, in order to avoid being covered totally by sediments in the tank:

The tank heating system should be designed such as to enable heating of the oil sludge up to 60°C.

The suction line from the sludge tank to the pump should be provided with heat tracing.

10.1.4 Pipelines from the heavy fuel oil purifier to the tank

Whenever possible, the sludge tank should be located below the heavy fuel oil purifier. If this is not possible, the sludge tank should be situated close to the heavy fuel oil purifier in such a way that the discharge line to the tank can be installed at the maximum gradient. The pipelines should, wherever possible, be straight or fitted with large radius elbows.

10.1.5 The submersible pump or opening of the suction line should be arranged so that the oil sludge's path to the suction opening is as short as possible, or the sludge tank should be mounted or designed, so that the oil sludge moves down a slope towards the suction opening. The openings should be placed as wide as possible in the frames above the tank bottom in such a way that the oil sludge has free access to the suction line.

10.1.6 Pump and pressure lines

The pump should be suitable for use with high viscosity oil sludge, e.g. "self-priming displacement pump", with suitable means for protection against dry running. It should have a total head of at least 4 bar, and the delivery rate should be determined by applying the formula:

$$Q = V/t \text{ (m}^3\text{/h)}$$

where V is the volume of the sludge tank as calculated by the interpretation to regulation 17. Four hours should be substituted for the time t. However, the pumping capacity should be not less than 2.0 m³/h.

The geodetic suction head of the pump should not exceed 3.0 m for ships with main engine rating up to 15,000 kW and 3.5 m for ships greater than 15,000 kW.

The pressure side of the pump should only be connected to the transfer line on deck, to sludge tanks and to the incineration equipment, if provided.

10.1.7 Sludge tank design to facilitate cleaning

Access holes should be arranged so that all areas of the tank can be cleaned. An access hole should be sited on top of the tank to facilitate the use of a portable pump.

10.1.8 Steaming-out lines

The top of sludge tanks should be fitted with steaming-out lines for cleaning.

11 Example of an on-board system for oil sludge incineration

11.1 General

In addition to the provision of sludge tanks, another means for the disposal of oil residue (sludge) are oil sludge incinerators.

11.2 Oil sludge incinerators

An oil sludge incinerator system is composed of:

- steam boiler or heater of thermal fluid systems or an incinerator;
- oil burner;
- oil sludge processing system; and
- tanks for separated sludge.

11.3 Oil sludge processing systems

The oil sludge processing system consists of:

- tank for mixing oil residues with fuel oil (mixing tank);
- oil sludge preheating system;
- filter; and
- homogenization system.

11.4 Mixing tank

The mixing tank should be provided in addition to the tank for separated sludge. It should be equipped with suitable drainage facilities. With a view to improving combustibility and calorific value, a fuel oil supply connection should be provided.

11.5 Homogenization system

The homogenization system should assure that the entire contents of the mixing tank should be processed into a homogenous and combustible mixture. This system should be put into operation, following adequate draining of the tank. A device for continuous indication and monitoring of the water content of the oil sludge should be provided.

APPENDIX

Guidance notes for the Integrated Bilge Water Treatment System (IBTS)

1 Introduction

1.1 Bilge is generated by the leakage of water and oil from the equipment and piping or maintenance works resulting from the routine operation in machinery space of ships. Such leaked oil and water are usually mixed and collected on the tank top or bilge wells as oily bilge water.

1.2 Oily bilge water shall be treated in accordance with the requirements of Convention. The operation of such treatment, including the operation and maintenance of bilge filtering equipment, is a heavy load of engineers onboard.

1.3 With the revision of the Guidelines and Specifications for Pollution Prevention Equipment for Machinery Space Bilge of Ships adopted by resolution MEPC.107(49), the capability of bilge filtering equipment has been improved. However, the treatment process of oily bilge water with the improved equipment and the engineers' load will be basically unchanged and the amount of oily bilge water generated in ships has not been reduced.

1.4 To promote the prevention of oil pollution from machinery spaces of ships and reduce the load of the engineers onboard, it is effective to minimize the amount of the oily bilge water generated in machinery spaces.

1.5 MEPC 54 noted the design with the concept of Integrated Bilge Water Treatment System (IBTS) which incorporates the means to minimize the amount of oily bilge water and proceed the oily bilge water and oil residue (sludge) as a drastic solution to prevent oil pollution from machinery spaces of ships.

1.6 MEPC 54, in recognizing the need to disseminate the concept of IBTS, agreed to append the Guidance notes on IBTS to the revised Guidelines for systems for handling oily wastes in machinery spaces of ships.

1.7 The purpose of these Guidance notes is to provide shipowners and shipbuilders with information to help the design of the ship incorporating the concept of IBTS.

2 Concept of Integrated Bilge Water Treatment System (IBTS)

Integrated Bilge Water Treatment System (IBTS) is a system to minimize the amount of the oily bilge water generated in machinery spaces by means to treat the leaked water and oil separately and also provides integrated means to process the oily bilge water and oil residue (sludge).

3 Definitions for the purposes of the Guidance notes

3.1 Clean drains mean drains resulting from the leakage of equipment used for sea water, fresh water, steam etc. which are not contaminated by oil.

3.2 Oily drains mean drains resulting from the leakage of equipment used for oil.

3.3 Oily bilge water means water collected in the bilge wells or the tank top resulting from the unexpected leakage from piping or the maintenance work in machinery spaces, which may be contaminated by oil.

3.4 Oil residue (sludge): refer to 5.2 of appendix 1. It includes oily drains.

3.5 Bilge primary tank means a pre-treatment unit for separation of oily bilge water.

4 Outline of IBTS

4.1 Collection of drains

4.1.1 Oily drains are collected through the fixed drainage arrangements to sludge tanks.

4.1.2 Clean drains are collected through the fixed drainage arrangements to clean drain tanks.

4.1.3 Oily drain and clean drain shall be collected separately so as not to contaminate clean drains with oil.

4.2 Pre-treatment of oily bilge water

To avoid feeding excessive oil to oil filtering equipment, oily bilge water in the bilge wells is transferred to the bilge primary tank for pre-separation of oil. The high oil contained water is transferred to sludge tanks and the low oil contained water is transferred to the bilge water holding tank.

4.3 Discharge of oily bilge water

Oily bilge water in the bilge water holding tank is discharged overboard through the oil filtering equipment in accordance with Regulation 16 of the Convention.

4.4 Discharge of clean drains

Clean drains may be discharged overboard directly through the discharge arrangement independent from the system for oily bilge water or oil.

4.5 Treatment of oil residue (sludge)

4.5.1 Oil residue (sludge) in sludge tanks is transferred to the waste oil tanks.

4.5.2 Water in oil residue (sludge) is vaporized by heating in the waste oil tanks.

4.5.3 Oil residue (sludge) is incinerated by the sludge incinerator or discharged to the reception facilities through the standard shore connection.

4.5.4 Oily drains from fuel oil systems may be burnt by the boiler as re-generative fuel.

5 Additional installations of IBTS

In addition to the installations required by the Conventions, the following installations are required to compose IBTS:

5.1 Drainage system

5.1.1 Drip trays or coamings with sufficient depth provided under the equipment used for oil such as diesel engines, burners, pumps, heaters, coolers, filters and tanks to keep spillage of oil.

5.1.2 Drip trays or coamings with sufficient depth provided under the equipment used for water such as pumps, heaters, coolers, filters, tanks, condensers and boilers to keep spillage of water.

5.1.3 Independent drainage arrangements for oil and water to sludge tanks and the clean drain tank.

5.2 Pre-treatment unit for oil separation

Bilge primary tank with construction of cascade, which is able to separate oil from oily bilge water by gravity with drainage facilities of the oil on the top as primary separation of oily bilge water. Refer to the example of bilge primary tank shown in Figure 1.

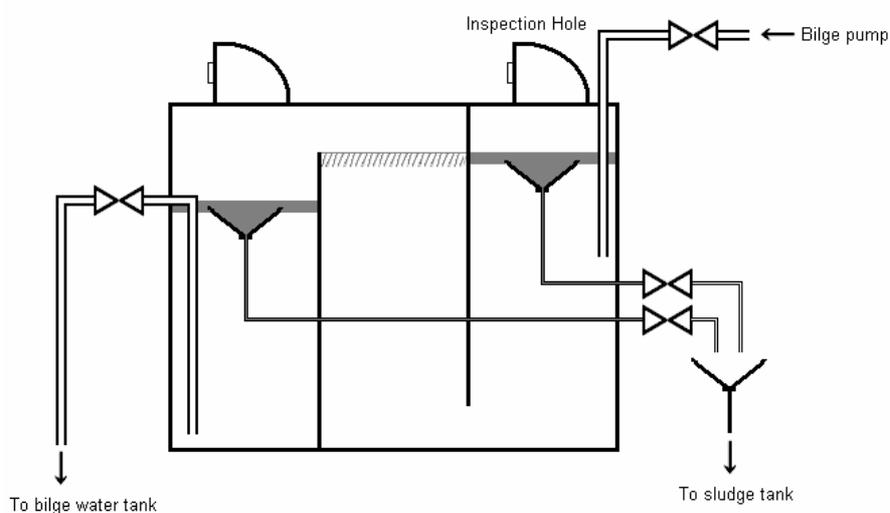


Figure 1 – Example of bilge primary tank

5.3 Storage tanks

5.3.1 Clean drain tank: Tank for the retention of clean drains.

5.3.2 Bilge water holding tank: Tank for the retention of oily bilge water.

5.3.3 Waste oil tank: Tank for preparation of oil residue (sludge) for incineration.

5.4 Discharge arrangement of clean drains

The discharge arrangement of clean drains to overboard should be independent from the system for oily bilge water.

5.5 Exclusive pump for the oil filtering equipment

It is preferable to be provided with an exclusive pump to transfer the pre-treated bilge water from bilge water holding tank to the oil filtering equipment so as not to mix the pre-treated bilge water and untreated oily bilge water.

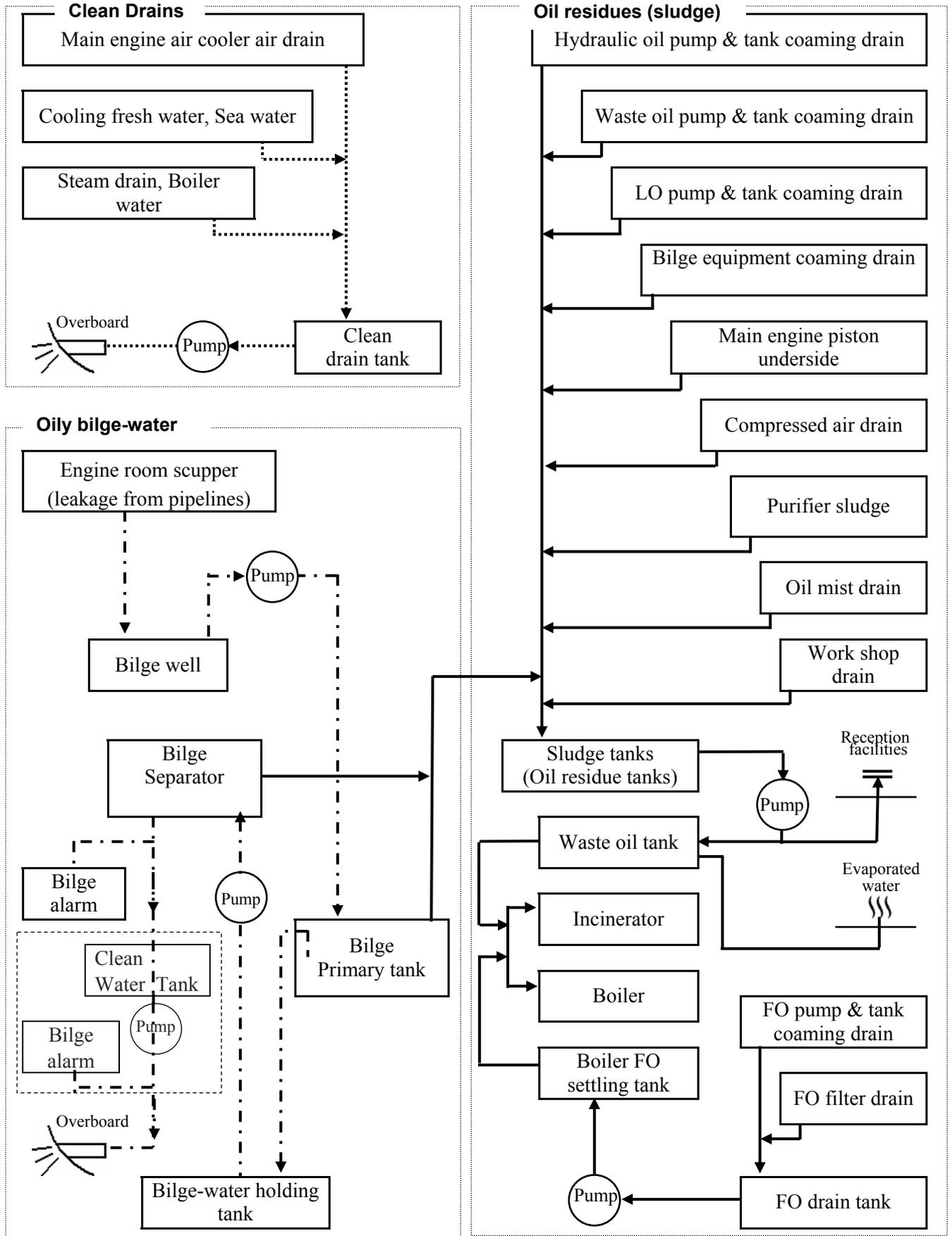
5.6 Heating arrangement

5.6.1 Heating arrangement of the bilge primary tank to facilitate separation of oil.

5.6.2 Heating arrangement of the waste oil tank to vaporize water and facilitate incineration.

6 Example of IBTS

A typical flow diagram of IBTS is shown in Figure 2.



Optional arrangements (not including the IBTS concept)

Figure 2 – Flow Diagram of Integrated Bilge Water Treatment System (IBTS)

ANNEX 20**DRAFT MSC CIRCULAR****AMENDMENTS TO THE UNIFIED INTERPRETATIONS TO SOLAS CHAPTERS II-1
AND XII APPROVED BY MSC/CIRC.1176**

1 The Maritime Safety Committee, at its eightieth session (11 to 20 May 2005), approved unified interpretations of the provisions of SOLAS chapters II-1 and XII and the Technical provisions for means of access for inspections, following the recommendations made by the Sub-Committee on Ship Design and Equipment at its forty-eighth session, with a view to ensuring a uniform approach towards the application of the provisions of SOLAS chapters II-1 and XII.

2 The Committee, at its [eighty-first session (10 to 19 May 2006),] following the recommendations made by the Sub-Committee on Ship Design and Equipment at its forty-ninth session, approved amendments to the above mentioned unified interpretations, set out in the annex.

3 Member Governments are invited to use the annexed amendments to the interpretations when applying relevant provisions of SOLAS chapters II-1 and XII, and to bring them to the attention of all parties concerned.

ANNEX

AMENDMENTS TO THE UNIFIED INTERPRETATIONS TO SOLAS CHAPTERS II-1 AND XII APPROVED BY MSC/CIRC.1176

1.1 SOLAS REGULATION II-1/3-6, SECTION 1

Technical background

- 1 The last sentence of the technical background is replaced by the following:

“Regulation II-1/3-6 is applicable to new, purpose-built FPSO or FSU if they are subject to the scope of the ESP Guidelines (resolution A.744(18), as amended). Considering that the principles of the Technical provisions for means of access for inspections (resolution MSC.158(78)) recognize that permanent means of access should be considered and provided for at the design stage so that, to the maximum extent possible, they can be made an integral part of the designed structural arrangement, regulation II-1/3-6 is not considered applicable to an FPSO/FSU that is converted from an existing tanker.”

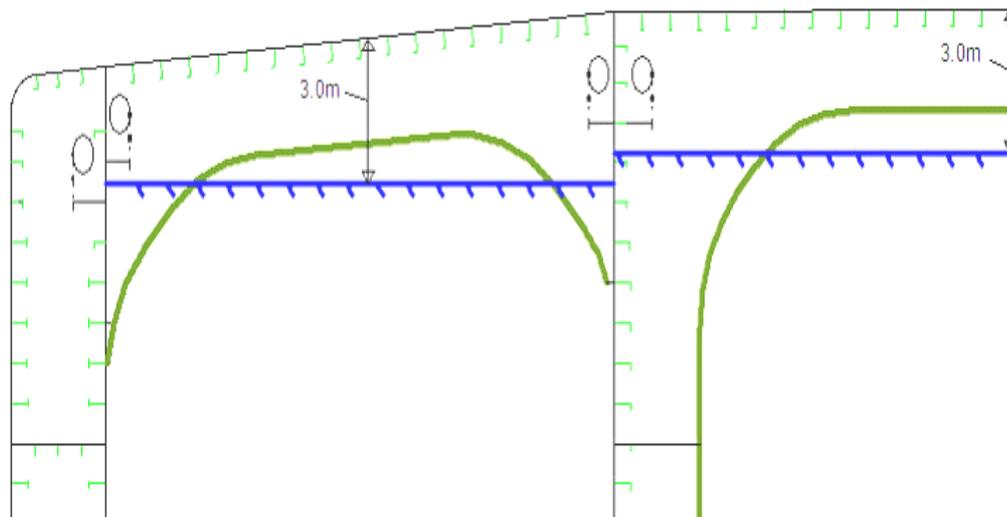
1.5 SOLAS REGULATION II-1/3-6, PARAGRAPH 3.2

Interpretation

- 2 The following text is added at the end of the existing text of the interpretation:

“Where rafting is indicated in the ship structures access manual as the means to gain ready access to the under deck structure, the term “*similar obstructions*” referred to in the regulation includes internal structures (e.g., webs >1.5 m deep) which restrict the ability to raft (at the maximum water level needed for rafting of under deck structure) directly to the nearest access ladder and hatchway to deck. When rafts or boats alone, as an alternative means of access, are allowed under the conditions specified in resolution A.744(18), permanent means of access are to be provided to allow safe entry and exit. This means:

- .1 access direct from the deck via a vertical ladder and small platform fitted approximately 2 m below the deck in each bay; or
- .2 access to deck from a longitudinal permanent platform having ladders to deck in each end of the tank. The platform should, for the full length of the tank, be arranged in level with, or above, the maximum water level needed for rafting of under deck structure. For this purpose, the ullage corresponding to the maximum water level is to be assumed not more than 3 m from the deck plate measured at the midspan of deck transverses and in the middle length of the tank (see figure below). A permanent means of access from the longitudinal permanent platform to the water level indicated above should be fitted in each bay (e.g., permanent rungs on one of the deck webs inboard of the longitudinal permanent platform).”



3.2 SOLAS REGULATION II-1/26.11, MACHINERY INSTALLATIONS – SERVICE TANK ARRANGEMENTS

Examples of application for the most common systems

3 The existing headings 1 and 1.1 are replaced by the following:

“1 Example 1

1.1 Requirement according to SOLAS – Main and auxiliary engines and boiler(s) operating with heavy fuel oil (HFO) (one fuel ship)”

4 The following new section 2 is added at the end of the existing interpretation:

“2 Example 2

2.1. Requirement according to SOLAS - Main engine(s) and auxiliary boiler(s) operating with HFO and auxiliary engine operating with marine diesel oil (MDO)

HFO Serv. TK Capacity for at least 8 h Main Eng. + Aux. Boiler	HFO Serv. TK Capacity for at least 8 h Main Eng. + Aux. Boiler	MDO Serv. TK Capacity for at least 8 h Aux. Eng.	MDO Serv. TK Capacity for at least 8 h Aux. Eng.
--	--	--	--

2.2. *Equivalent arrangement*

HFO Serv. TK Capacity for at least 8 h Main Eng. + Aux. Boiler	MDO Serv. TK Capacity for at least the highest of: • 4 h Main Eng. + Aux. Eng + Aux. Boiler or • 8 h Aux. Eng. + Aux Boiler	MDO Serv. TK Capacity for at least the highest of: • 4 h Main Eng. + Aux. Eng + Aux. Boiler or • 8 h Aux. Eng. + Aux Boiler
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The arrangements in 1.2 and 2.2 apply, provided the propulsion and vital systems which use two types of fuel support rapid fuel change over and are capable of operating in all normal operating conditions at sea with both types of fuel (MDO and HFO).”

5.3 SOLAS REGULATION II-1/41.4, CONNECTING MEANS BY WHICH THE MAIN BUSBARS OF THE MAIN SOURCE OF ELECTRICAL POWER ARE NORMALLY CONNECTED

5 In the title of the section, the term “II-1/41.4” is replaced by the term “II-1/41.5.1.3”.

Interpretation

6 In subparagraph .1 of the existing interpretation the word “and” is replaced by the word “or”.

10.4 PERFORMANCE STANDARDS FOR WATER LEVEL DETECTORS ON BULK CARRIERS, PARAGRAPH 3.3.7

Interpretation

7 The existing text of the interpretation is replaced by the following:

“Fault monitoring should address faults associated with the system that include open circuit, short circuit, as well as arrangement details that would include loss of power supplies and CPU failure for computer based alarm/monitoring system, etc.”

ANNEX 21**TERMS OF REFERENCE OF THE SUB-COMMITTEE**

1 Under the direct instructions of the Maritime Safety Committee and as may be requested by the Marine Environment Protection Committee, the Sub-Committee on Ship Design and Equipment (DE) will consider matters related to the following subjects, including the development of any necessary amendments to relevant conventions and other mandatory and non-mandatory instruments, as well as the preparation of new mandatory and non-mandatory instruments, guidelines and recommendations, for consideration by the Committees, as appropriate, including the role of such measures for the protection of the marine environment:

- .1 design, construction, structure, equipment, machinery installations and electrical installations of all types of ships, vessels and craft covered by IMO instruments;
- .2 life-saving equipment, appliances and arrangements; and
- .3 survey and certification.

2 The conventions and other mandatory instruments referred to above include, as a minimum:

- .1 1974 SOLAS Convention (chapters I, II-1, III, X, XI-1 and XII and other relevant chapters, as appropriate) and the 1988 Protocol relating thereto;
- .2 MARPOL 73/78 (Annexes I and IV and other relevant annexes, as appropriate);
- .3 International Life-Saving Appliance (LSA) Code;
- .4 International Code of Safety for High-Speed Craft (HSC Code), 1994 and 2000;
- .5 Guidelines on the enhanced programme of inspections during surveys of bulk carriers and oil tankers (resolution A.744(18)); and
- .6 Condition Assessment Scheme (CAS).

3 The non-mandatory instruments, which the Sub-Committee may be called upon to review, include, as a minimum:

- .1 Code of Safety for Dynamically Supported Craft (DSC Code);
- .2 Code for the Construction and Equipment of Mobile Offshore Drilling Units (MODU Code);
- .3 Code of Safe Practice for the Carriage of Cargoes and Persons by Offshore Supply Vessels (OSV Code);
- .4 Code of Safety for Diving Systems;
- .5 Code of Safety for Special Purpose Ships (SPS Code);

- .6 Code on Alarms and Indicators;
- .7 Code on Noise Level on Board Ships;
- .8 Interim Guidelines for Wing-In-Ground (WIG) Craft;
- .9 Standards for Ship Manoeuvrability;
- .10 Guidelines for the Design, Construction and Operation of Passenger Submersible Craft; and
- .11 Guidelines for Ships Operating in Arctic Ice-Covered Waters.

ANNEX 22

**DRAFT REVISED WORK PROGRAMME OF THE SUB-COMMITTEE
AND PROVISIONAL AGENDA FOR DE 50**

DRAFT REVISED WORK PROGRAMME OF THE SUB-COMMITTEE

		Target completion date/number of sessions needed for completion	Reference
1	Casualty analysis (co-ordinated by FSI)	Continuous	MSC 70/23, paragraphs 9.17 and 20.4
2	Consideration of IACS unified interpretations	Continuous	MSC 78/26, paragraph 22.12
H.1	Amendments to resolution A.744(18)	2006 2007	DE 45/27, paragraphs 7.18 and 7.19; DE 48/25, section 3
[H.2	Safety aspects of ballast water management*	2006	MSC 71/23, paragraph 9.11; DE 48/25, section 17]
H.3	Passenger ship safety	2006	MSC 74/24, paragraph 21.4; MSC 79/23, paragraph 4.12; DE 48/25, section 4
H.4 H.3	Measures to prevent accidents with lifeboats** (in co-operation with FSI, NAV and STW)	2006 2008	MSC 74/24, paragraph 21.34; DE 48/25, section 5 FP 50/21, section 13
H.5	Review of the 2000 HSC Code and amendments to the DSC Code and the 1994 HSC Code (in co-operation with FP, COMSAR, NAV and SLF)	2006	MSC 75/24, paragraph 12.22; MSC 76/23, paragraphs 8.19 and 20.4; DE 48/25, section 11

- Notes:**
- 1 “H” means a high priority item and “L” means a low priority item. However, within the high and low priority groups, items have not been listed in any order of priority.
 - 2 Struck-out text indicates proposed deletion and shaded text shows proposed additions or changes.
 - 3 Items printed in bold letters have been selected for the provisional agenda for DE 50.

* Depending on the outcome of BLG 10, following the decision of MSC 80 and MEPC 53 to include the item in the provisional agenda for BLG 10 on an *ad hoc* basis for 2006 only.

** FP 50 requested the MSC to extend the target completion date to 2008.

H.6 H.4	Performance standards for protective coatings	2006 2007	MSC 76/23, paragraphs 20.41.2 and 20.48; DE 48/25, section 12
H.7 H.5	Inspection and survey requirements for accommodation ladders	2006 2007	MSC 77/26, paragraph 23.32; DE 48/25, section 16
H.8 H.6	Mandatory emergency towing systems in ships other than tankers of not less than 20,000 dwt	2006 2007	MSC 77/26, paragraph 23.33; DE 48/25, section 14
H.9 H.7	Compatibility of life-saving appliances*	2006 2008	DE 47/15, paragraph 5.3; MSC 78/26, paragraph 24.37.1; DE 48/25, section 8 FP 50/21, section 14
H.10	Inconsistencies in IMO instruments regarding requirements for life-saving appliances**	2006	DE 42/15, paragraph 9.7; MSC 78/26, paragraph 24.37.2; DE 48/25, section 10 FP 50/21, section 15
H.11 H.8	Guidelines under MARPOL Annex VI on prevention of air pollution from ships		MEPC 41/20, paragraph 8.22.1; DE 42/15, paragraphs 10.2 to 10.4
	.1 Guidelines on equivalent methods to reduce on-board NO_x emission***	2007	DE 48/25, paragraphs 13.5, 22.1.4.1 and 22.3
	.2 Guidelines on other technological methods verifiable or enforceable to limit SO _x emission***	2 sessions	
H.12	Revision of the Guidelines for systems for handling oily wastes in machinery spaces of ships (MEPC/Circ.235)	2006	MEPC 51/22, paragraph 20.5 DE 48/25, section 18
H.13 H.9	Review of the SPS Code (in co-operation with DSC, FP, NAV, COMSAR and SLF)	2007	MSC 78/26, paragraph 24.9; DE 48/25, paragraph 22.1.4.2
H.14	Amendments to resolution A.761(18)	2007	MSC 78/26, paragraph 24.38; DE 48/25, paragraph 22.1.4.3 FP 50/21, section 17
H.15 H.10	Development of provisions for gas-fuelled ships (in co-operation with BLG and FP)	2007	MSC 78/26, paragraph 24.39; DE 48/25, section 19

* FP 50 requested the MSC to extend the target completion date to 2008.

** FP 50 concluded work on this item.

*** Depending on the outcome of BLG 10, following the decision of MSC 80 and MEPC 53 to include the item in the provisional agenda for BLG 10 on an *ad hoc* basis for 2006 only.

H.16 H.11	Test standards for extended service intervals of inflatable liferafts	2007	MSC 78/26, paragraph 24.41; DE 48/25, section 20, FP 50/20, section 16
H.17 H.12	Amendments to the Guidelines for ships operating in Arctic ice-covered waters (in co-operation with SLF, as necessary)	2-sessions 2008	MSC 79/23, paragraph 8.25
H.18 H.13	Revision of the Code on Alarms and Indicators (in co-operation with appropriate sub-committees, as necessary)	2007	MSC 79/23, paragraph 20.28; DE 48/25, paragraph 22.1.4.4
H.19 H.14	Amendments to the MODU Code	2007	MSC 79/23, paragraph 22.51; DE 48/25, paragraph 22.1.4.5
H.20	Review of requirements on relevant equipment for the revision of the Intact Stability Code	2006	MSC 80/24, paragraphs 9.2.1 and 21.27
[H.15]	Guidelines for uniform operating limitations of high-speed craft	2009	DE 49/20, section 5]
L.1	Revision of resolution A.760(18)	2-sessions 2008	DE 46/32, paragraph 31.23; DE 47/25, paragraph 22.6
L.2	Free-fall lifeboats with float-free capabilities	1 session	MSC 76/23, paragraphs 20.41.3 and 20.48; DE 47/25, paragraph 22.6

DRAFT PROVISIONAL AGENDA FOR DE 50*

- Opening of the session
- 1 Adoption of the agenda
 - 2 Decisions of other IMO bodies
 - 3 Amendments to resolution A.744(18)
 - 4 Performance standards for protective coatings
 - 5 Inspection and survey requirements for accommodation ladders
 - 6 Mandatory emergency towing systems in ships other than tankers greater than 20,000 dwt
 - 7 Development of provisions for gas-fuelled ships
 - 8 Consideration of IACS Unified Interpretations
 - 9 Review of the SPS Code
 - 10 Revision of the Code on Alarms and Indicators
 - 11 Amendments to the MODU Code
 - 12 Measures to prevent accidents with lifeboats
 - 13 Compatibility of life-saving appliances
 - 14 Test standards for extended service intervals of inflatable liferafts
 - 15 Guidelines on equivalent methods to reduce on-board NO_x emission **
 - 16 Guidelines on other technological methods verifiable or enforceable to limit SO_x emission **
 - 17 Amendments to the Guidelines for ships operating in Arctic ice-covered waters
 - 18 Revision of resolution A.760(18)
 - 19 Casualty analysis
 - [20 Guidelines for uniform operating limitations of high-speed craft]
 - 21 Work programme and agenda for DE 51
 - 22 Election of Chairman and Vice-Chairman for 2008
 - 23 Any other business
 - 24 Report to the Maritime Safety Committee

* Agenda item numbers do not necessarily indicate priority.
** Depending on decisions by MEPC 54.

ANNEX 23

DRAFT CIRCULAR SLS.14/CIRC.115/ADD.3

INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974

Issue of Exemption Certificates under the 1974 SOLAS Convention
and amendments thereto

1 The Maritime Safety Committee, at its [eighty-first session (10 to 19 May 2006)], considered the issue of Exemption Certificates to individual ships with respect to the requirements for fire protection, detection and extinction and for life-saving equipment and arrangements of the 1974 SOLAS Convention, as amended, and agreed that the circular needed to be updated to reflect amendments to SOLAS chapters II-2 and III adopted in recent years.

2 The Committee agreed that the established practice relating to the issue of Exemption Certificates when an Administration makes use of the provisions of chapter III referring to “warm climates” should continue to be followed.

3 The Committee further decided to amend SLS.14/Circ.115 as follows:

- .1 in the annex, under the heading “Chapter II-2 (1974 SOLAS Convention/Amendments)”:
 - .1.1 add the reference “/1.4.1 (00 Nov)” after the reference “1(e)/1.4.1(81)”;
 - .1.2 add the reference “/10.2.1.2.2.2 (00 Nov)” after the reference “-/4.3.4.3(81)”;
 - .1.3 add the reference “/13.3.2.1.1 (00 Nov)” after the reference “48(a)(i)/28.1.1(81)”;
 - .1.4 add the reference “/7.6 (00 Nov)” after the reference “32(a)(iii)/40.2(81)/40.2(89)”;
 - .1.5 add the reference “/13.3.3.6 (00 Nov)” after the reference “-/45.1.3(81)”;
 - .1.6 add the reference “/10.7.1.4 (00 Nov)” after the reference “-/53.1.3(96)”;
and
 - .1.7 add the reference “/-” after the reference “-/60.4.2(81)”;
- .2 in the annex, under the heading “Chapter III (1974 SOLAS Convention/Amendments)”:
 - .2.1 add the reference “/2.1 (96 May)” after the reference “3(a)/2.1(83)”;
 - .2.2 add the reference “/LSA Code, paragraph 4.4.8.32” after the reference “11(b)/41.8.32(83)”;

ANNEX 24

**DRAFT AMENDMENTS TO SOLAS REGULATIONS XII/12.1.2 AND XII/13.1 AND
THE FORM OF SAFETY CERTIFICATE FOR NUCLEAR PASSENGER SHIPS**

CHAPTER XII

ADDITIONAL SAFETY MEASURES FOR BULK CARRIERS

Regulation 12 – Hold, ballast and dry space water ingress alarms

1 In paragraph 1.2, the words “regulation II-1/11” are replaced with the words “regulation II-1/12”.

Regulation 13 – Availability of pumping systems

2 In paragraph 1, the words “regulation II-1/11.4” are replaced with the words “regulation II-1/12”.

APPENDIX

CERTIFICATES

Form of Safety Certificate for Nuclear Passenger Ships

3 In the table of subparagraph 2.1.3, in the section commencing with the words “THIS IS TO CERTIFY:”, the words “regulation II-1/13” are replaced with the words “regulation II-1/18”.
