



SUB-COMMITTEE ON STABILITY AND  
LOAD LINES AND ON FISHING  
VESSELS SAFETY - 28th session  
Agenda item 13

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REPORT TO THE MARITIME SAFETY COMMITTEE

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1 GENERAL

1.1 The Sub-Committee held its twenty-eighth session from 7 to 11 February 1983 under the Chairmanship of Mr. E.H. Middleton (United States).

1.2 The session was attended by representatives from the following countries:

ARGENTINA	LIBERIA
BELGIUM	MOROCCO
BRAZIL	NETHERLANDS
CANADA	NIGERIA
CHILE	NORWAY
CHINA	PERU
DENMARK	POLAND
FINLAND	PORTUGAL
FRANCE	REPUBLIC OF KOREA
GABON	ROMANIA
GERMAN DEMOCRATIC REPUBLIC	SPAIN
GERMANY, FEDERAL REPUBLIC OF	SWEEDEN
GREECE	USSR
ICELAND	UNITED KINGDOM
INDIA	UNITED STATES
ITALY	YUGOSLAVIA
JAPAN	

and observers from the following non-governmental organizations:

INTERNATIONAL CHAMBER OF SHIPPING (ICS)  
INTERNATIONAL ASSOCIATION OF CLASSIFICATION SOCIETIES (IACS)  
INTERNATIONAL ASSOCIATION OF DRILLING CONTRACTORS (IADC)  
INTERNATIONAL CONFEDERATION OF FREE TRADE UNIONS (ICFTU)  
OIL COMPANIES INTERNATIONAL MARINE FORUM (OCIMF)  
OIL INDUSTRY INTERNATIONAL EXPLORATION AND PRODUCTION FORUM (E AND P FORUM)

1.3 The agenda adopted by the Sub-Committee, together with a list of documents for this session, is given at Annex 1.

1.4 Mr. Middleton informed the Sub-Committee that his term as Chairman would expire at the end of this year and that he would not be available to serve in that capacity in the future. However, he expected that he would continue to participate as a delegate and make contributions to the work of the Sub-Committee and other bodies of the Organization.

1.5 The Sub-Committee expressed its sincere gratitude to Mr. Middleton for his outstanding contribution as Chairman of this Sub-Committee and as Chairman and Vice Chairman of the former Sub-Committee on Subdivision, Stability and Load Lines as well as being one of the longest serving delegates (17 years) to that Sub-Committee. His many valuable contributions in other bodies of the Organization as well as in international conferences over the years were also recalled with appreciation. The Sub-Committee thanked Mr. Middleton for his excellent leadership during his term of office.

1.6 The Sub-Committee noted that its present Vice Chairman, Mr. B. Sjöholm (Sweden) would probably not be participating in future sessions of the Sub-Committee due to his approaching retirement. The Sub-Committee recalled that Mr. Sjöholm, who participated in all the meetings of the former Sub-Committees on Subdivision, Stability and Load Lines and on Safety of Fishing Vessels from their inception had made numerous important contributions to the work of these sub-committees as well as to the 1977 Torremolinos Conference on Safety of Fishing Vessels. The Sub-Committee wished him a long and happy retirement.

1.7 Mr. I. Manum (Norway) and Professor S. Motora (Japan) were elected unanimously, as Chairman and Vice Chairman respectively.

## 2 DECISIONS BY THE MARITIME SAFETY COMMITTEE

2.1 The Sub-Committee noted the decisions taken by the Committee at its forty-sixth and forty-seventh sessions (SLF 28/2) and in particular noted that sub-committees should not review, alter, amend or up-date any instruments without permission from the Committee and that before granting permission the Committee should be satisfied that there was a compelling need for the work to be carried out on the basis of background information submitted by the proponent.

2.2 The Sub-Committee also noted the revised instructions by the Committee for the submission of documents prior to sessions which are:

- .1 bulky documents and documents which require action or decision should be received by the Secretariat not later than three months before the opening of the session. Exception to this rule can only be accepted with prior authorization by the Committee;
- .2 other non-bulky documents should be received by the Secretariat not later than two months before the opening day of the session; and
- .3 non-bulky documents containing comments to basic documents and purely informative documents may be accepted, provided that they are received by the Secretariat not later than one month before the opening of the session.

2.3 The Sub-Committee also noted that any further improvements to SOLAS should be presented as recommendations, in convention language, for adoption by the Assembly, and that future amendments to the Convention would be introduced at not less than four to five year intervals.

3 SUBDIVISION AND DAMAGE STABILITY OF DRY CARGO SHIPS INCLUDING RO/RO SHIPS AND STATISTICAL ANALYSIS OF DAMAGE STABILITY CASUALTIES

3.1 The Sub-Committee considered briefly the following documents:

- .1 relating to information to the master and to the damage control plan submitted by China (SLF 28/3/3), Greece (SLF 28/3/8), Norway (SLF 28/3/9), Sweden (SLF 28/3/4) and the USSR (SLF 28/3/5);
- .2 relating to possible subdivision and damage stability requirements of dry cargo ships including ro/ro ships submitted by the Federal Republic of Germany (SLF 28/3/10), France (SLF 28/3/2), the Netherlands (SLF 28/3/1), Norway (SLF 28/3/9), Poland (SLF 28/3), the USSR (SLF 28/3/7) and the United States (SLF 28/3/6).

3.2 The Sub-Committee established an ad hoc group to consider the above papers in detail and to give priority to the necessary information to the master and items to be included in the damage control plan.

3.3 The Sub-Committee agreed to the following terms of reference to be considered by an ad hoc group:

- .1 information to the master;
- .2 subdivision and damage stability requirements for dry cargo ships including ro/ro ships.

3.4 The Sub-Committee received the report of the group to this session and approved it in general (SLF 28/WP.6 and SLF 28/WP.6/Add.1). The action taken by the Sub-Committee is reflected hereunder.

Information to the master

3.5 The Sub-Committee decided that every new dry cargo ship should be provided with a damage control plan including information on measures to be taken in the event of damage to ship and agreed to a new Regulation II-1/23-1 of the 1981 SOLAS Amendments "Damage Control in Dry Cargo Ships" as set out at Annex 2.

3.6 The Committee is invited to approve Regulation II-1/23-1 to be submitted to the Assembly for adoption as an interim recommendation until it could be included in a future amendment to the 1974 SOLAS Convention. For this purpose a covering draft Assembly resolution is also included in Annex 2.

3.7 A majority of the Sub-Committee was of the opinion that in addition to a damage control plan, damage stability information could be useful. The purpose of such information would be to enable the master to investigate the survival capability of his ship in the actual loading condition. Such data could be of

assistance to the master in the event of damage. In order to avoid misleading the master, the information should not, however, contain any specific instructions or recommendations.

3.8 The Sub-Committee, realising that relevant survival criteria still have to be established, agreed that it was premature to develop such additional information in detail at this time. As a first step, however, a format for an information booklet could be developed.

3.9 The Sub-Committee agreed that revised guidelines for the preparation of damage stability information to be provided to masters of dry cargo ships, as set out at Annex 3, should be considered between sessions, and Members were invited to submit comments for discussion in time before the next session.\*

Subdivision and damage stability requirements for dry cargo ships,  
including ro/ro ships

3.10 The Sub-Committee expressed the opinion that any such future requirements should preferably be based on the probabilistic concept and that the development of this concept should be initiated. However, it was recognized that the development of the probabilistic concept into an applicable method will require considerable time.

3.11 The Sub-Committee noted that a proposal for deterministic subdivision and damage stability requirements submitted by France (SLF 28/3/2) as an interim measure for ro/ro ships had been closely examined by the group, which felt that it needed to continue at the next session. Members were invited to submit comments on the draft requirements by France in time before the next session.\*

#### 4 INTACT STABILITY

4.1 The Sub-Committee considered briefly submissions on:

- .1 the weather criterion by the USSR (SLF 28/4/2), the United States (SLF 28/4/1), and on the result of calculations for sample ships by China (SLF/6), Japan (SLF/2 and SLF/7, Poland (SLF/12), Spain (SLF/8 and SLF/8/Add.1) and the USSR (SLF/15).
- .2 the stability of pontoons by the United States (SLF 28/4) and Spain (SLF/4 and SLF/4/Add.1).
- .3 the stability of fishing vessels affected by fishing gear by the Netherlands (SLF/3) and the USSR (SLF/11) and on stability of ships in following waves by the German Democratic Republic (SLF/5).

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\* See paragraph 2.2 of the report.

4.2 The ad hoc group on intact stability was requested to continue the development of weather criterion to supplement the intact stability recommendations for passenger and cargo ships contained in resolution A.167(ES.IV) and fishing vessels in resolution A.168(ES.IV) and to finalize the guidelines on intact stability of pontoons.

4.3 The group was also requested to consider what further action should be undertaken for up-dating analysis of intact stability casualty records. If time permits, the group should also consider the effect of fishing gear on stability of fishing vessels and the question of stability problems in breaking and following waves.

#### Stability of pontoons

4.4 The Sub-Committee was not able to agree on a single criterion to be used for the assessment of intact stability of pontoons, as proposed by Spain (SLF/4 and SLF/4/Add.1). Agreement was, however, reached on the interim guidelines set out at Annex 4, including a compilation of the national practices of several countries.

4.5 The Committee is invited to approve these interim guidelines for distribution in an MSC circular, requesting governments to submit comments on experience gained with their application. The Sub-Committee agreed to review the guidelines at an appropriate time, with a view to recommending a set of criteria.

#### Weather criterion

4.6 The Sub-Committee agreed on a recommendation on a severe wind and rolling criterion (weather criterion) for the intact stability of passenger and cargo ships over 24 metres in length taking into account amendments proposed during discussion, and a draft Assembly resolution, which are set out at Annex 5.

4.7 The Committee is invited to approve this draft Assembly resolution and the recommendation for submission to the Assembly at its thirteenth session with a view to their adoption.

4.8 The stability standard of the weather criterion, based on a limiting angle of  $50^{\circ}$ , is in general slightly lower than that required by resolution A.167(ES.IV). However, the delegation of China was of the opinion that it would be reasonable to reduce the limiting angle to  $40^{\circ}$  or alternatively reduce the coefficient C from 0.76 to 0.64 in the formula for rolling angle calculation as in SLF/6.

4.9 The Sub-Committee noted that further calculations were needed for fishing vessels, taking into account the weather criterion and Members are invited to submit relevant data in accordance with the guidelines given in the report of the ad hoc group (SLF 28/WP.4/Add.1) in time for the next session.\*

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\* See paragraph 2.2 of the report.

IMO criteria

4.10 The Sub-Committee took no action at this session in respect of review of IMO criteria. Having noted that no information on the need to review stability criteria covered by resolution A.167(ES.IV) and Regulation 28 of the 1977 Torremolinos Convention had been submitted to this session nor to the previous sessions of the two former Sub-Committees, the Sub-Committee, however, concurred that this subject should be retained in its work programme as a sub-item of lower priority.

Ships not fully loaded

4.11 The Sub-Committee agreed that application of developed weather criterion in conjunction with resolution A.167(ES.IV) will cover the problem of intact stability of ships not fully loaded as related to severe wind and rolling and agreed to delete this sub-item from the work programme until further evidence of need is forthcoming.

External forces caused by fishing gear and other adverse effects specific to fishing vessels

4.12 The Sub-Committee noted papers submitted by the Netherlands (SLF/3) and the USSR (SLF/11) on this subject which suggest two methods for verification of stability of fishing vessels during fishing operations. Members were invited to study and comment on whether the development of a criterion on the two different bases should be pursued, bearing in mind that the operations with fishing gear have an adverse effect on stability. The Netherlands was invited to submit their improved standards for perusal at the next session.

Stability of ships in following waves

4.13 The Sub-Committee agreed that the problem of stability in following waves was a very complicated one and that the quasi-static consideration covered only a part of the problem. It was pointed out that the dynamic effects should be taken into account, including the possibility of parametric resonance, broaching and other phenomena. As a first step to a practical solution of the problem it was agreed that it would be useful to develop further the quasi-static method as proposed in STAB XXVI/4/7 by the German Democratic Republic and Poland.

4.14 The Sub-Committee recalled papers on the subject of stability in following waves submitted to IMO previously which are listed at Annex 6.

4.15 Members were invited to comment on these papers and also to submit summaries of any recent investigations to the next session.\*

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\* See paragraph 2.2 of the report.



4.16 The Sub-Committee agreed that further development of the method proposed in STAB XXVI/4/7 required the following steps:

- .1 preparation of step by step calculations for a sample ship;
- .2 performing calculations for a number of ships, including the ship given in STAB XIX/4;
- .3 analysing results of calculations received.

The German Democratic Republic agreed to submit a sample calculation for a ship, by 1 April 1983, for circulation to Members of the Sub-Committee. Other Members were also invited to perform calculations and submit results to the next session.\*

#### Stability in breaking waves

4.17 The importance of this effect on the safety of small vessels, particularly fishing vessels (less than 45 m in length), was discussed at some length. The Sub-Committee was informed by the Norwegian delegation that it has invoked new regulations to attempt to counter accidents caused primarily by breaking waves, directed essentially to a requirement to extend the range of stability to 60° in most existing vessels and to 80° in new vessels of less than 45 metres in length. It was agreed that this subject has important implications towards the improvement of the design of many types of small vessels, the security of cargo at large heel angles, and therefore, merits further study. The Sub-Committee would welcome any submissions on this item.

#### Collection of intact stability casualty records

4.18 The Sub-Committee recognized the importance of the need to obtain further data on intact stability casualties and invited Members to submit any information to future sessions.

#### Work programme on intact stability

4.19 The Sub-Committee agreed that the group should consider the following items:

- .1 severe wind and rolling criterion (weather criterion) for fishing vessels;
- .2 forces caused by fishing gear;
- .3 following waves;

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\* See paragraph 2.2 of the report.

- .4 breaking waves;
- .5 shipping of water on deck;
- .6 intact stability casualty records.

4.20 Members were invited to submit comments and papers relating to this work programme in good time before the next session.\*

## 5 STANDARDS AND PRACTICES ON ICING

5.1 The Sub-Committee recalled that the Sub-Committee on Safety of Fishing Vessels at its twenty-fourth session agreed that this Sub-Committee should consider the matter in detail at this session and invited Members to submit:

- .1 relevant information on better delineation on icing;
- .2 further icing reports;
- .3 comments on PFV/273 with regard to the method of calculation of ice accretion.

5.2 During the discussion the Sub-Committee agreed that this item should be retained in the agenda and Members were again invited to submit relevant information as referred to in 5.1, using the icing reporting format formally agreed by the Sub-Committee on Safety of Fishing Vessels (PFV XXI/11, Annex V) which is reproduced at Annex 7.

5.3 Views were also expressed that this matter should be considered in a broader sense, i.e. to expand this item to include ship types other than fishing vessels. It was pointed out that in arctic areas atmospheric icing needs consideration for oil rigs. Special purpose ships in offshore industry, especially stand-by ships, should receive close attention as regards icing.

5.4 In order to facilitate future consideration of this item the Secretariat was requested to prepare a comprehensive list of documents on the subject for the next session.

5.5 The delegations of Canada and Japan offered to submit information on studies carried out in their countries on the subject.

## 6 IMPLEMENTATION AND INTERPRETATION OF PART B OF CHAPTER II-1 OF THE 1974 SOLAS CONVENTION (DOUBLE BOTTOMS IN CARGO SHIPS AND DEFINITION OF THE LONGFORWARD SUPERSTRUCTURE)

6.1 The Sub-Committee recalled that at its last session agreement was reached to continue consideration of a definition for the term "longforward superstructure"

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\* See paragraph 2.2 of the report.

As no written comments were submitted to the session the Sub-Committee felt that there was no compelling need for such a definition.

6.2 The Sub-Committee recognized that a new paragraph regarding peak and machinery space bulkheads in cargo ships, as proposed by the Sub-Committee at the last session (STAB 27/13, paragraph 8.3) for future inclusion in Regulation II-1/11 of the 1981 SOLAS Amendments needed further amendment to take account of proposals submitted by the USSR (SLF 28/6/1) and IACS (SLF 28/6/2). The revised text of the paragraphs is given in Annex 8.

6.3 As a consequence a new heading for this regulation to also cover bulkheads separating the machinery space and stern tube arrangement is also proposed in Annex 8. The Committee is invited to approve the amendments to this Regulation for inclusion in a future amendment to the Convention.

6.4 The Sub-Committee tentatively agreed on a draft Regulation II-1/12-1 "Double Bottoms in Cargo Ships other than Tankers" as set out at Annex 8, based on the proposal by India (MSC XLII/3/5) and comments thereon by Sweden (SLF 28/6/3) and the USSR (SLF 28/6).

6.5 Members were invited to consider this draft regulation and to submit comments in good time before the next session\* when the Sub-Committee intends to finalize it.

## 7 IMPLEMENTATION AND INTERPRETATION OF THE 1966 LOAD LINE CONVENTION

### Implementation of the Convention

7.1 The Sub-Committee noted that in response to LL.3/Circ.30 requesting information on the action taken by Governments to implement the Regulation equivalent to Regulation 27 (resolution A.320(IX)), the Unified Interpretations (LL.3/Circ.20 and LL.3/Circ.22) and the Form of Record of Conditions of Assignment of Load Lines (LL.3/Circ.19) only eight submissions have so far been received. Members who had not done so were again invited to provide information on these matters as requested in LL.3/Circ.30.

7.2 The delegation of Spain informed the Sub-Committee that it had implemented the Regulation equivalent to Regulation 27 (resolution A.320(IX)) and the Unified Interpretations, and will confirm this in writing.

### Interpretation of the Convention

7.3 The Sub-Committee recalled its decision to consider at this session interpretations of Article 2(8) - definition of length for a segmented ship, Regulation 3(9) - structure of lower freeboard deck and Regulation 24(1) - freeing port areas.

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\* See paragraph 2.2 of the report.

7.4 The Sub-Committee had before it documents submitted by the USSR (SLF 28/7/1) and IACS (SLF 28/7).

7.5 Having considered these proposals, the Sub-Committee agreed to the interpretations of Article 2(8) and Regulation 3(9) as set out at Annex 9.

7.6 The Sub-Committee noted the submission by the USSR (SLF 28/7/1) that it could not support a reduction in freeing port areas for small ships having high bulwarks, as proposed in STAB XXII/13/2. The USSR delegation offered to submit a draft interpretation of Regulation 24(1) of the 1966 Load Line Convention dealing with this subject, which will be considered at the next session.

7.7 With regard to the interpretation of Regulations 25(4), 26(2) and 27(7) - protection of crew - submitted by IACS (SLF 28/7), the Sub-Committee noted that the subject needed further study and agreed to take up the matter at the next session. Members were invited to submit comments in time before the next session.\*

#### Amendments to the Convention

7.8 In order to avoid an incorrect application of amended Regulation 3(1) - definition of length for ships having a bulbous bow - as agreed at the last session (STAB 27/13, Annex 2) the Sub-Committee, having taken into account the submission by IACS (SLF/14), agreed to revise that proposed amendment, as set out at Annex 10.

7.9 The Committee is invited to approve this future amendment instead of the text referred to in paragraph 5.2 and set out at Annex 2 of STAB 27/13.

#### Preparations for a systematic review of the Convention

7.10 The Sub-Committee noted the background papers submitted by the USSR (SLF/9) and the United States (SLF/10) concerning a systematic review of the 1966 Load Line Convention and considered briefly a possible approach for such work.

7.11 The Sub-Committee tentatively agreed on the review of the following items:

- .1 correction for block coefficient (Regulation 30);
- .2 deduction for superstructures (Regulation 37);
- .3 freeboard tables (Regulation 28);
- .4 standard sheer for large ships having extra freeboard (Regulation 38).

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\* See paragraph 2.2 of the report.

7.12 The Sub-Committee further agreed, in principle, that the basis for the first step in reviewing the Convention might be:

- .1 changing of conditions of freeboard assignment for ships with greater than minimum freeboard and development of such conditions for certain ships specified in paragraph 3.2.2 (STAB 27/6);
- .2 improvement of the safety of smaller ships (less than 100 m in length);
- .3 correction for bending or sagging of a tanker's hull;
- .4 equivalents and combination of various corrections to the tabular freeboard, etc.

7.13 Members were invited to submit proposals and comments on the matter in time before the next session,\* provided the Committee approves this item in the work programme at its forty-eighth session.

#### 8 IMPLEMENTATION AND INTERPRETATION OF THE 1969 TONNAGE CONVENTION

8.1 The Sub-Committee had before it documents submitted by Sweden (SLF 28/8) and ICS (SLF 28/8/1) and requested a group of experts on tonnage measurement to consider them initially.

8.2 Having received the report of the group, the Sub-Committee agreed to finalize interpretations of the provisions of the Convention prepared by the group, which are set out at Annex 11.

8.3 The Sub-Committee, in considering the proposal by ICS (SLF 28/8/1) in which the exclusion from Vc of the volumes of dedicated clean ballast tanks was proposed, agreed that dual purpose COW/CBT tanks should be included in the calculations of Vc. The Sub-Committee, however, agreed that dedicated clean ballast tanks should be treated the same as segregated ballast tanks. Revised text for the interpretation of Regulation 7 is included in Annex 11.

8.4 The MEPC is invited to note at its next session the action taken in respect of paragraph 8.3 above.

8.5 The Committee is invited to approve the interpretations set out at Annex 11 and to agree to their circulation to Contracting Governments of the 1969 Tonnage Convention for their information, in addition to TM/Circ.28, taking into account any comments by the MEPC concerning the problem of clean ballast tanks.

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\* See paragraph 2.2 of the report.

8.6 The Sub-Committee also considered the question of Tonnage Convention application in those countries which accede to or accept the Convention after its entry into force on 18 July 1982.

8.7 The Sub-Committee expressed the opinion that Article 2(6) which defines a "new" ship as one the keel of which is laid or which is at a similar stage of construction on or after the date of coming into force of the present Convention, and Article 3(2)(a) which provides for Convention application to such "new" ships, are indications of the retroactivity of application to 18 July 1982. The Committee is invited to consider the above statement and to take any action which is deemed necessary.

8.8 The Sub-Committee, in responding to item 5 of SLF 28/8, considered whether net tonnage as calculated under the 1969 Tonnage Convention would always be an accurate reflection of a ship's earning capacity. While it agreed that a study of the international use of net tonnage may be useful in the long term, such a study is not of immediate concern until the users of net tonnage clearly indicate its diminished value or irrelevancy.

8.9 The Sub-Committee agreed that the ad hoc group on tonnage measurement might meet at the next session pending submissions of a substantive nature which would warrant such a meeting of the group. The Secretariat was requested to contact the Chairman of the Sub-Committee three months before the Sub-Committee's next session and to inform the heads of delegations concerning his decision as to whether the group on tonnage measurement will be established or whether the matter will be taken in plenary.

## 9 IMPLEMENTATION AND INTERPRETATION OF THE 1977 TORREMOLINOS CONVENTION

9.1 The Sub-Committee was informed that two more ratifications of the Convention have been received since the last session of the Sub-Committee on Safety of Fishing Vessels; the total number of ratifications is now eight.

9.2 The Sub-Committee was also informed by the Secretariat of the status of statistics on the number of fishing vessels in the world above 24 metres in length. It was noted that full co-operation of all fishing States would be required in supplying the number of fishing vessels of 24 m and above under their flag preferably twice a year, but at least once a year. The Sub-Committee urged its Members to take active steps to provide such data.

9.3 The Sub-Committee noted that the Food and Agriculture Organization of the United Nations (FAO) had approved amendments to Part B of the Code of Safety for Fishermen and Fishing Vessels (PFV 24/13, Annex 2) and that relevant information was still outstanding from the International Labour Organisation (ILO).

9.4 The Sub-Committee briefly considered the future work to be done under this agenda item, and agreed that when the Convention enters into force it will be necessary to harmonize the provisions with those of the 1981 and 1983 SOLAS Amendments.

9.5 Members were invited to submit comments on such amendments for consideration at the next session provided the Committee approves this item in the work programme at its forty-eighth session.

10 REVIEW OF EXPERIENCE OF APPLYING THE SUBDIVISION AND DAMAGE STABILITY REGULATIONS FOR PASSENGER SHIPS (RESOLUTION A.265(VIII))

10.1 The Sub-Committee considered submissions by Poland (SLF 28/10 and SLF/1), the Netherlands (SLF 28/10/1) and the United States (SLF 28/10/2).

10.2 The Sub-Committee noted the views expressed in the documents submitted by Poland and the Netherlands and recognized that the theoretical basis of "p" and "r" adopted in resolution A.265(VIII) may need to be reviewed. However, in view of the limited experience gained in applying resolution A.265(VIII) to actual ships there appears to be no justification as yet to modify the formulae.

10.3 In particular, it was recognized that any revision of resolution A.265(VIII) would necessitate the analysis of damage statistics updated to include modern ship designs.

10.4 It was noted that no information has been submitted as to what extent resolution A.265(VIII) was used in lieu of Part B of Chapter II-1 of the 1974 SOLAS Convention. The usefulness of such information was recognized.

10.5 After review, the Sub-Committee noted that only a few Administrations have actually received requests for approval based on resolution A.265(VIII).

11 ANY OTHER MATTERS

Subdivision and stability requirements of MARPOL 73/78

11.1 The Sub-Committee had before it a document by the United Kingdom (SLF 28/12) which refers to MEPC 17/5/2 in which it sought to reach a common approach on the interpretation of Regulation 25(1) of Annex I of the MARPOL Convention with regard to the submissions of subdivision and damage stability information bearing in mind the coming into force of the MARPOL Convention on 2 October 1983.

11.2 The Sub-Committee agreed that this matter should be considered by an ad hoc group and the results of their discussions are summarized below.

11.3 The Sub-Committee was informed that Regulation 25(1) was interpreted by some Administrations to mean only specific conditions and by others to mean a full range of conditions with KG limit curves as required by the Gas Carrier and Bulk Chemical Codes. Additionally, the Sub-Committee learned that some classification societies performing calculations on behalf of Administrations had experienced problems in that sometimes owners are not explicit as to operational requirements and it should be recommended that owners should completely specify their operational requirements to the builder/designer.

11.4 The Sub-Committee was further informed that while some Administrations/owners are well in hand with the work necessary to comply with Regulation 25(1) of MARPOL, others are not. The Sub-Committee was unable to determine the extent of the work still outstanding but agreed that, since the calculations were time consuming, some Administrations/owners could be in great difficulty in meeting the Convention requirements by 2 October 1983.

11.5 The Sub-Committee noted that three general methods of review have been utilized by those Administrations which have been applying the MARPOL requirements:

- .1 specific loading conditions;
- .2 conservative maximum KG assumptions, resulting in conservative minimum tank loading requirements;
- .3 precise maximum KG assumptions resulting from a large number of actual loading conditions in association with limiting KG curves or tables.

The method chosen is primarily determined by the operating requirements of the owner. The first method has been used for tankers employed in a limited trading pattern while the third method is adopted by owners wishing to have complete flexibility in the types and disposition of cargoes carried.

11.6 The Liberian delegation stated that its experience in the application of Regulation 25(1) of Annex I of the MARPOL Convention was that while only a few owners have utilized the small specific trading method (11.5.1 above) and a few have used the extensive limiting KG curve approach (11.5.2 above), most owners have chosen to provide a sufficiently large number of specific loading conditions to permit reasonably flexible operating conditions. Furthermore the great majority of new Liberian tankers, as defined in Regulation 1(6) of Annex I of the MARPOL Convention had been assessed in accordance with the requirements of Regulation 25(1).



11.7 The Sub-Committee was unable to agree on a common interpretation of Regulation 25(1) or whether a type of simplified information might exist which would enable Administrations to meet the 2 October 1983 deadline. The Sub-Committee proposed the following courses of action by the MEPC in the event that this date could not be met:

- .1 to provide limited approval and a short-term certificate.  
The limited approval would be based on the vessel's intended trading pattern for a period of 3 - 6 months while the full calculations were completed;
- .2 to arrange for a period of grace for the completion of the necessary calculations.

11.8 Members of the Sub-Committee were invited to suggest to their delegates to MEPC to provide information and statistics on the number of approvals issued and whether a problem exists in complying with Regulation 25(1) for all vessels prior to the date of coming into force.

11.9 Because of the urgency in concluding the matter in time before the entry into force of Annex I of MARPOL 73/78 (2 October 1983) the Secretariat was requested to bring this section to the attention of the MEPC at its next session. The Committee is invited to take note of the action by the Sub-Committee.

#### Review of the MODU Code

11.10 The Sub-Committee noted that the Sub-Committee on Ship Design and Equipment would welcome any suggestion from this Sub-Committee on the need for amending the MODU Code in respect of matters falling in the scope of its responsibility (SLF 28/12/1).

11.11 The Norwegian delegation in SLF 28/12/2 stressed the importance of amending some of the stability requirements of the MODU Code. In the paper, the unsatisfactory state of requirements for inclining experiments and GM is pointed out with regard to intact stability. For damage stability, a case-study based on more stringent requirements for reserve buoyancy was presented. The study shows the beneficial effect of more specific requirements on reserve buoyancy in the deck structure than the present lenient requirements of the Code. It is therefore recommended to initiate a study on a more extensive damage concept than presently contained in the MODU Code.

11.12 Several Members supported the Norwegian delegation's proposal that there appeared a need for reviewing stability and subdivision requirements of the MODU Code. Other delegations were of the opinion that it was premature to

revise the Code, which had been adopted two years before, until more experience had been gained in its application. It was also pointed out that before the results of investigations into the loss of the rig OCEAN RANGER were available, no work should be initiated.

11.13 The Secretariat was requested to inform the Sub-Committee on Ship Design and Equipment that the MODU Code, like other IMO recommendations, should therefore only be under continuous review, and that no specific work should be initiated at the present.

Information on ship's stability to the master

11.14 The Sub-Committee had before it a document submitted by the United States (SLF 28/12/3) on the format for information on ship's stability to the master.

11.15 The Sub-Committee noted the United States' proposal and agreed to consider the document at the next session, taking into account Section 7 of resolution A.167(ES.IV) and Recommendation 4 of Attachment 3 to the Final Act of the International Conference on Safety of Fishing Vessels, 1977. Members were invited to submit comments on this issue in time before the next session.\*

Guidelines for uniform application of the survival requirements of the Bulk Chemical and Gas Carrier Codes

11.16 The Sub-Committee took note of information by the Netherlands (SLF/13) on the implication of the "Guidelines for uniform application of the survival requirements of the Bulk Chemical Code and Gas Carrier Code" as distributed with document MSC/Circ.286.

Second International Conference on Stability of Ships and Ocean Vehicles

11.17 The Sub-Committee noted the oral information by Professor Matora (Japan) on the Second International Conference on Stability of Ships and Ocean Vehicles held in Tokyo in the week 24 to 29 October 1982, which he organized.

Work Programme

11.18 The Sub-Committee agreed on a revised work programme as set out at Annex 12. The Committee is invited to approve the revised work programme, in particular inclusion of the item on harmonization of the 1977 Torremolinos Convention with the 1981 and 1983 SOLAS Amendments, and concur with the Sub-Committee's proposal to start systematic review of the 1966 Load Line Convention.

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\* See paragraph 2.2 of the report.

Arrangements for the next session

11.19 The Sub-Committee noted that the Committee has not yet decided on the number of sessions for the next budgetary period 1984/85, but that one session is envisaged for this Sub-Committee in 1984. If this session is agreed, the Sub-Committee agreed that it should be held in March 1984.

11.20 The Sub-Committee agreed on items to be included in the agenda for the next session as set out at Annex 13. It was agreed to establish ad hoc working groups at the next session on the following:

- .1 subdivision and damage stability of dry cargo ships; and
- .2 intact stability.

There may also be an ad hoc working group on tonnage measurement if the Chairman of the Sub-Committee so decides (see paragraph 8.9).

12 ACTION TO BE TAKEN BY THE COMMITTEE

The Committee is invited to consider and approve the report in general and in particular:

- .1 to approve the interim recommendation and the covering draft Assembly resolution on damage control in dry cargo ships for submission to the Assembly at its thirteenth session for adoption as referred to in 3.6 and set out at Annex 2;
- .2 to approve the draft interim guidelines on intact stability requirements for pontoons for distribution in an MSC circular as referred to in 4.5 and set out at Annex 4;
- .3 to approve the recommendation and the covering draft Assembly resolution on a severe wind and rolling criterion (weather criterion) for the intact stability of passenger and cargo ships over 24 metres in length for submission to the Assembly at its thirteenth session for adoption as referred to in 4.7 and set out at Annex 5;
- .4 to approve the amendments to Regulation II-1/11 of the 1981 SOLAS Amendments for inclusion in a future amendment to the SOLAS Convention as referred to in 6.2 and 6.3 and set out at Annex 8;
- .5 to approve the amendment to Regulation 3(1) of the 1966 Load Line Convention as referred to in 7.9 and set out at Annex 10, to supersede the text set out at Annex 2 of STAB 27/13;

- .6 to note that the Sub-Committee in paragraphs 7.11 and 7.12 tentatively agreed on the items and basis for the first step in reviewing the 1966 Load Line Convention and to agree to such a review;
- .7 to approve the interpretations of the 1969 Tonnage Convention and agree to their circulation to Contracting Governments as a TM circular as referred to in 8.5 and set out at Annex 11, having regard to any comments by the MEPC in respect of volume of clean ballast tanks;
- .8 to consider the Sub-Committee's opinion on the definition of a "new ship" under the 1969 Tonnage Convention as referred to in 8.6 and 8.7 and to take action as appropriate;
- .9 to note the Sub-Committee's view on the necessity of work on harmonization of the provisions of the 1977 Torremolinos Convention with those of the 1981 and 1983 SOLAS Amendments as referred to in 9.4 and 9.5 and agree that such work be undertaken;
- .10 to note the action by the Sub-Committee in respect of interpretation of Regulation 25(1) of Annex I of the MARPOL Convention as referred to in 11.7;
- .11 to approve the revised work programme of the Sub-Committee referred to in 11.18 and set out at Annex 12, and in particular to agree to the inclusion of items on harmonization of the 1977 Torremolinos Convention with the 1981 and 1983 SOLAS Amendments and on a systematic review of the 1966 Load Line Convention.

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ANNEX 2

DRAFT ASSEMBLY RESOLUTION A....(13)

INTERIM RECOMMENDATION ON DAMAGE CONTROL  
IN DRY CARGO SHIPS

THE ASSEMBLY,

RECALLING Article 16(i) of the Convention on the International Maritime Organization concerning functions of the Assembly,

NOTING the decision by the Maritime Safety Committee at its forty-seventh session that any further improvements to the SOLAS Convention should be presented as recommendations for adoption by the Assembly,

RECOGNIZING the need to provide the masters of dry cargo ships with practical information on measures to be taken to maintain the survival capability of ships in the event of damage,

A

HAVING CONSIDERED the recommendations of the Maritime Safety Committee at its [forty-eighth] session:

- .1 ADOPTS the Interim Recommendation on Damage Control in Dry Cargo Ships, the text of which is set out in the Annex to this resolution
- .2 INVITES all governments concerned to apply this recommendation for new dry cargo ships.

B

REQUESTS the Maritime Safety Committee to include the regulation set out at Annex, in amendments to the 1974 SOLAS Convention at an appropriate time.

ANNEX

DAMAGE CONTROL IN DRY CARGO SHIPS

(Regulation II-1/23-1 of the 1981 SOLAS Amendments)

1 There shall be permanently exhibited, for the guidance of the officer in charge of the ship a plan showing clearly for each deck and hold the boundaries of the watertight compartments, the openings therein with the means of closure and position of any controls thereof, and the arrangements for the correction of any list due to flooding. In addition, booklets containing the aforementioned information shall be made available to the officers of the ship.

2 Indicators shall be provided for all sliding doors and for hinged doors in watertight bulkheads. Indication showing whether the doors are open or closed shall be given in the vicinity of the aforementioned plan. In addition shell doors and other openings which, in the opinion of the Administration could lead to major flooding if left open or not properly secured, shall be provided with such indicators.

3.1 General precautions shall be a listing of equipment, conditions and operational procedures considered by the Administration to be necessary to maintain watertight integrity under normal ship operations.

3.2 Specific precautions shall be a listing of elements (i.e. closures, security of cargo, sounding of alarms, etc.) considered by the Administration to be vital to the survival of the ship and its crew.

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ANNEX 3GUIDELINES FOR THE PREPARATION OF DAMAGE STABILITY INFORMATION  
TO BE PROVIDED TO MASTERS OF DRY CARGO SHIPS

1 The purpose of the damage stability information provided is to be an aid to the Master in exercising his judgement in cases of serious flooding. It is not meant to replace his judgement and should be as clear and concise as possible.

2 As a minimum, damage cases to be investigated and included in the booklet should be flooding of the machinery space and individual cargo spaces. The damage cases to be investigated for cargo ships with unusual compartmentation will require special consideration.

3 Flooding of these compartments is to be considered singly and should assume complete flooding of the cargo space, ignoring decks within the space.

4 For these investigations the ship should be considered as floating on a level keel at two separate draughts, i.e. the summer load line draught and a mid-draught which equates approximately to the mean of the summer load line and light ship draughts. In these investigations the centre of gravity of the ship should be taken as follows:

- .1 when sailing at the summer load line draught the KG equating to the homogeneously loaded condition, and
- .2 when sailing at the mid-draught the KG should be at a realistic figure for that corresponding displacement.

Any other loading condition which could result in a more severe consequence should be investigated.

5 When considering flooding of the machinery space, a permeability of 0.85 should be used and for flooding of cargo spaces three different permeabilities, such as 0.60, 0.80 and 0.95 should be examined.

6 The results of these flooding investigations should be presented as flooding data sheets for each flooding condition included in the damage stability booklet. Critical factors could be presented in tabular format.

7 The contents of the damage stability booklet should encompass a full description of safety measures and operational conditions, and assumptions made during compilation of the above mentioned booklet. Piping plans and tank capacity plans for evaluation of counter flooding possibilities could be included.





ANNEX 4DRAFT INTERIM GUIDELINES ON INTACT  
STABILITY REQUIREMENTS FOR PONTOONS

## 1 PREAMBLE

These Guidelines are provided for the information of Administrations concerned with the intact stability of pontoons. Instead of a single criterion, a compilation of the national practices of several Administrations is presented. Similarities in national practice are easily identified. Differences may be necessary to take account of the severity of service. The parameters in the various criteria are applicable to pontoons in unrestricted service. Administrations concerned are invited to examine and evaluate the various national practices and to choose the one that best suits the designs and modes of operation of the pontoons under consideration.

## 2 SCOPE

2.1 It should be recognized that these Guidelines provide only general guidance and do not include all of the specific requirements of those Administrations whose criteria have been identified. Less stringent requirements may be considered for pontoons in protected waters.

2.2 In general, a pontoon is considered to be:

- .1 non self-propelled;
- .2 normally unmanned;
- .3 carrying only deck cargo;
- .4 normally having a block coefficient of 0.9 or greater;
- .5 normally having ratios of breadth/draught greater than 6.0 and breadth/depth of greater than 3.0; and
- .6 having no hatchways in the deck except small manholes closed with gasketed covers.

## 3 STABILITY TEST

An inclining experiment is not normally required for a pontoon provided a conservative value of the lightship vertical centre of gravity (KG) is assumed for the stability calculations. Several Administrations suggest KG be assumed at the level of the main deck although it is recognized that a lesser value could be acceptable if fully documented. The lightship displacement and longitudinal centre of gravity should be determined by calculation based on draught and density readings.

#### 4 STABILITY DRAWINGS AND CALCULATIONS

4.1 The following information is typical of that required to be submitted to the Administration for approval:

- .1 Lines drawing.
- .2 Hydrostatic curves.
- .3 Cross curves.
- .4 Report of draught and density readings and calculation of lightship displacement and longitudinal centre of gravity.
- .5 Statement and justification of assumed vertical centre of gravity.
- .6 Calculations demonstrating compliance with the applicable intact stability criterion.
- .7 Simplified stability guidance such as a loading diagram, so that the pontoon may be loaded in compliance with the applicable stability criterion.

4.2 Concerning the performance of calculations, the following is suggested by various Administrations:

- .1 No account should be taken of the buoyancy of deck cargo.  
(Some Administrations permit buoyancy credit for adequately secured timber).
- .2 Consideration should be given to such factors as water absorption (e.g. timber), trapped water in cargo (e.g. pipes), and ice accretion.
- .3 In performing wind heel calculations
  - .3.1 the wind pressure should be constant and considered to act on a solid mass extending over the length of the cargo deck and to an assumed height above the deck;
  - .3.2 the centre of gravity of the cargo should be assumed at a point mid-height of the cargo; and
  - .3.3 the wind lever arm should be taken from the centre of the deck cargo to a point at one half the draught.
- .4 Calculations should be performed covering the full range of operating draughts.
- .5 As pontoons are normally unmanned, the downflooding angle should be taken as the angle at which an opening through which progressive flooding may take place is immersed which would not be an opening closed by a watertight manhole cover or a vent fitted with an automatic closure.

## 5 INTACT STABILITY CRITERIA

The following is a summary of intact stability criteria for pontoons of several Administrations (given in alphabetical order of the States concerned).

### 5.1 Federal Republic of Germany

- .1 The area under the righting lever curve up to the angle of maximum righting lever should be at least 0.07 metre-radians.
- .2 The range of positive stability should be at least 30°.

### 5.2 Netherlands

- .1 The initial metacentric height (GM) should be as follows:

$$GM \geq (B/10F)^2 (m)$$

- .2 The range of positive stability should be at least 35°.
- .3 When subjected to a beam wind load of 100 kg/m<sup>2</sup>, the pontoon should not heel to an angle greater than that expressed by its tangent as follows:

$$\tan \theta \leq F/B$$

Where in .1 and .2:

$\theta$  = maximum angle of heel

B = breadth of the pontoon (m)

F = freeboard of the pontoon (m)

### 5.3 Norway

- .1 The area under the righting lever curve up to the angle of maximum righting lever or the angle of downflooding, whichever is the lesser, should be at least 0.08 metre-radians.

### 5.4 Sweden

- .1 The area under the righting lever curve up to the angle of maximum righting lever should be at least 0.07 metre-radians.
- .2 The range of positive stability should be at least 30°.

### 5.5 United Kingdom

- .1 The area under the righting lever curve up to the angle of maximum righting lever should be at least 0.08 metre-radians.

- .2 The area under the righting lever curve between the angles of  $30^{\circ}$  and  $40^{\circ}$  should be at least 0.03 metre-radians.
- .3 When subjected to a beam wind load of  $75 \text{ kg/m}^2$  the pontoon should not heel beyond an angle corresponding to half the freeboard.

#### 5.6 United States

- .1 The area under the righting lever curve up to the angle of maximum righting lever, the angle of downflooding, or  $40^{\circ}$ , whichever is less, should be at least 0.08 metre-radians.
- .2 The initial metacentric height (GM) should be as follows:

$$GM \geq \frac{PAH}{W \tan \theta} \quad (\text{m})$$

Where

P =  $.055 + (L/1309)^2$  tonnes/ $\text{m}^2$  (L = length of the pontoon between perpendiculars (m))

A = projected lateral area of the portion of the pontoon and deck cargo above the waterline ( $\text{m}^2$ )

H = the vertical distance from the centre of A to the centre of the underwater lateral area or approximately to the one-half draught point (m)

W = displacement (tonnes)

$\theta = 14^{\circ}$  or the angle of heel at which one-half the freeboard to the deck edge is immersed, whichever is the lesser.

#### 6 STABILITY INFORMATION

Simplified stability information should normally be provided in the form of a loading diagram or table. Listed below are several ways this information could be presented:

- .1 Maximum height of deck cargo versus displacement or draught.
- .2 Maximum vertical centre of gravity of deck cargo versus displacement or draught.
- .3 Maximum deadweight moment of deck cargo versus displacement or draught.
- .4 Maximum vertical centre of gravity of the pontoon versus displacement or draught.
- .5 Minimum metacentric height of the pontoon versus displacement or draught.

ANNEX 5

DRAFT ASSEMBLY RESOLUTION A....(13)

RECOMMENDATION ON A SEVERE WIND AND ROLLING CRITERION  
(WEATHER CRITERION) FOR THE INTACT STABILITY OF  
PASSENGER AND CARGO SHIPS OVER  
24 METRES IN LENGTH

THE ASSEMBLY,

NOTING Article 16(i) of the Convention on the International Maritime Organization concerning the functions of the Assembly,

RECALLING resolution A.167(ES.IV) as amended by resolution A.206(VII) on the recommendation on intact stability for passenger and cargo ships under 100 metres in length,

ALSO RECALLING that the Maritime Safety Committee in resolution A.167(ES.IV) had been requested to continue studies on improved stability criteria,

RECOGNIZING the need for the establishment of international standards for a weather criterion for passenger and cargo ships above 24 metres in length,

HAVING CONSIDERED the recommendations made by the Maritime Safety Committee at its [forty-eighth] session,

A

- 1 ADOPTS the Recommendation on a Severe Wind and Rolling Criterion (Weather Criterion) for Passenger and Cargo Ships above 24 metres in length, the text of which is set out in the Annex to this resolution,
- 2 INVITES all governments concerned to take steps to give effect to the recommendation as soon as possible, unless they are fully satisfied that their national stability requirements supported by long operating experience ensure adequate stability for particular types and sizes of ships,

B

1 NOTING that weather criteria were previously adopted by the Assembly for dynamically supported craft in resolution A.373(X) as well as for mobile offshore drilling units in resolution A.414(XI) and that a weather criterion for fishing vessels is also given in Recommendation 1 of Attachment 3 to the Final Act of the International Conference on Safety of Fishing Vessels, 1977,

2 REQUESTS the Maritime Safety Committee to continue the study of stability and to develop improved and additional criteria and to review the weather criteria referred to above with a view to any possible harmonization which may be able to be achieved between them.

ANNEX

RECOMMENDATION ON A SEVERE WIND AND ROLLING CRITERION  
(WEATHER CRITERION) FOR THE INTACT STABILITY OF  
PASSENGER AND CARGO SHIPS OVER  
24 METRES IN LENGTH

1 Scope

1.1 The criterion given hereunder is recommended for new decked sea-going passenger and cargo ships over 24 metres in length and applies to all loading conditions.

1.2 This criterion supplements the stability criteria of the recommendation on intact stability for passenger and cargo ships under 100 metres in length in resolution A.167(ES.IV) as amended by resolution A.206(VII). The more stringent criteria of resolution A.167(ES.IV) and the weather criterion of this recommendation should govern the minimum requirements for passenger or cargo ships below 100 metres in length.

1.3 The minimum stability of passenger and cargo ships of 100 metres in length and above should comply with the weather criterion of this recommendation in addition to other appropriate stability criteria to the satisfaction of the Administration.

1.4 Administrations are invited to adopt, in conjunction with other appropriate criteria, the weather criterion of this recommendation unless satisfied that experience justifies departures therefrom.

2 Recommended criterion

2.1 The ability of a ship to withstand the combined effects of beam wind and rolling should be demonstrated for each normal condition of loading, with reference to Figure 1, as follows:

- .1 The ship is subjected to a steady wind pressure acting perpendicular to the ship's centreline which results in a steady wind heeling lever ( $\ell_{w1}$ ).
- .2 From the resultant angle of equilibrium ( $\theta_0$ ), the ship is assumed to roll due to wave action to an angle of roll ( $\theta_1$ ) to windward.
- .3 The ship is then subjected to a gust wind pressure which results in a gust wind heeling lever ( $\ell_{w2}$ ).
- .4 Under these circumstances, area b should be equal to or greater than area a.

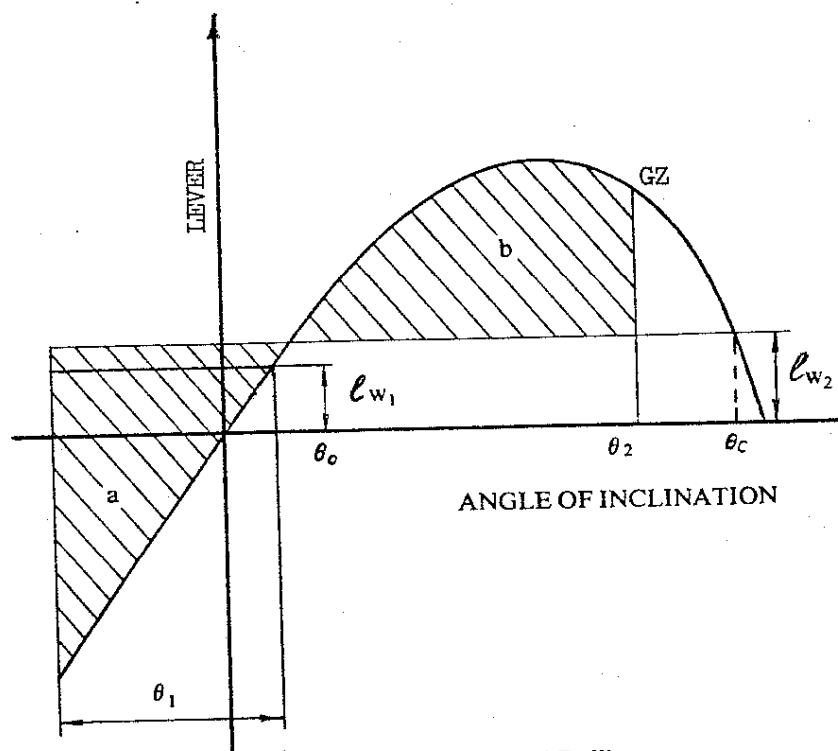


Figure 1 — Severe Wind and Rolling

The angles in the above figure are defined as follows:

$\theta_0$  = angle of heel under action of steady wind

$\theta_1$  = angle of roll to windward due to wave action

$\theta_2$  = angle of downflooding ( $\theta_f$ ) or  $50^\circ$  or  $\theta_c$  whichever is less,

where:

$\theta_f$  = angle of heel at which openings in the hull, superstructures or deckhouses which cannot be closed weathertight immerse. In applying this criterion, small openings through which progressive flooding cannot take place need not be considered as open

$\theta_c$  = angle of second intercept.

2.2 The wind heeling levers  $\ell_{w1}$  and  $\ell_{w2}$  referred to in 2.1.1 and 2.1.3 are constant values at all angles of inclination and should be calculated as follows:

$$\ell_{w1} = \frac{P A Z}{\Delta} \text{ (m)} \text{ and } \ell_{w2} = 1.5 \ell_{w1} \text{ (m)}$$

where:  $P = 0.0514 \text{ t/m}^2$  ( $t = 1000 \text{ kg}$ )

$A$  = projected lateral area of the portion of the ship and deck cargo above the waterline ( $\text{m}^2$ )

$Z$  = vertical distance from the centre of  $A$  to the centre of the underwater lateral area or approximately to a point at one half the draught (m)

$\Delta$  = displacement (t)



2.3 The angle of roll ( $\theta_1$ )\* referred to in 2.1.2 should be calculated as follows:

$$\theta_1 = 109.3k X_1 X_2 \sqrt{r s}$$

where:  $X_1$  = factor as shown in table 1

$X_2$  = factor as shown in table 2

$k$  = factor as follows:

$k = 1.0$  for a round-bilged ship having no bilge or bar keels;

$k = 0.7$  for a ship having sharp bilges;

$k$  = as shown in table 3 for a ship having bilge keels, a bar keel or both

$$r = 0.73 + 0.6 OG/d$$

with:  $OG$  = height of the centre of gravity above waterline (m)

$d$  = mean moulded draught of the ship (m).

$s$  = factor as shown in table 4.

Table 1

Values of factor  $X_1$ 

B/d	$X_1$
$\leq 2.4$	1.0
2.5	.98
2.6	.96
2.7	.95
2.8	.93
2.9	.91
3.0	.90
3.1	.88
3.2	.86
3.3	.84
3.4	.82
$\geq 3.5$	.80

Table 2

Values of factor  $X_2$ 

$C_B$	$X_2$
$\leq .45$	.75
.50	.82
.55	.89
.60	.95
.65	.97
$\geq .70$	1.0

Table 3

Values of factor  $k$ 

$\frac{A_k \cdot 100}{LB}$	$k$
0	1.0
1.0	.98
1.5	.95
2.0	.88
2.5	.79
3.0	.74
3.5	.72
$\geq 4.0$	.70

Table 4

Values of factor  $s$ 

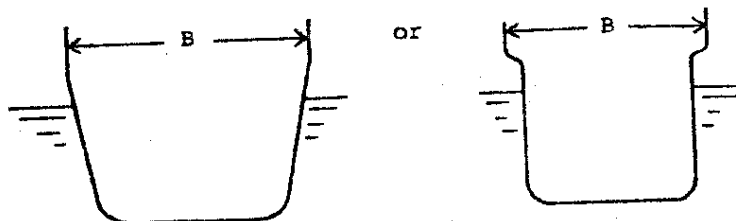
T	$s$
$\leq 6$	0.100
7	0.098
8	0.0934
12	0.0646
14	0.053
16	0.044
18	0.038
$\geq 20$	0.035

\* The angle of roll for ships provided with antirolling devices should be determined without taking into account the operation of these devices.

The symbols in the above tables are defined as follows:

$L$  = length of the ship (m)

$B$  = breadth of the ship (m) as follows:



$d$  = mean moulded draught of the ship (m)

$C_b$  = block coefficient

$A_k$  = total overall area of bilge keels, or area of the lateral projection of the bar keel, or sum of these areas ( $m^2$ )

$$T = \frac{2.01 C B}{\sqrt{GM}}$$

where:  $GM$  = metacentric height (m)

$B$  = breadth of the ship (m) as above

$G$  =  $0.3725 + 0.0227 (B/d) - 0.0043 (L/10)$ ; or  
if the side shell of the midship part of the ship  
is inclined or flared as illustrated above:

$C$  =  $0.3085 + 0.0027 (B/d) - 0.0043 (L/10)$   
with  $L$ ,  $B$  and  $d$  as defined above.

Intermediate values in tables 1 - 4 should be obtained by linear interpolation.

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ANNEX 6LIST OF DOCUMENTS CONCERNING STABILITY  
LOSS IN FOLLOWING WAVES

<u>Symbol</u>	<u>Issued by</u>	<u>Summary</u>
PFV I/7	France	Behaviour of fishing vessels at sea
PFV I/13	USSR	Stability and behaviour of ships in following seas
PFV III/5	France	Decrease of righting arms of stability on the crest of a wave
PFV III/12	Federal Republic of Germany	Decrease of righting arms of stability on the crest of a wave
PFV V/6	USSR	Results of model tests of two fishing vessels on the crest of a wave
PFV VI/2	France	Comments on stability of a vessel on the crest of a wave
PFV VI/25	Denmark	Reduction of stability in following seas
PFV VI/25/Corr.1	Denmark	Reduction of stability in following seas
PFV VII/15	Federal Republic of Germany	Results of a model test at constant moment of heeling on regular and irregular waves
PFV VIII/5	France	Study of behaviour of a tuna boat in a swell
PFV VIII/16	Federal Republic of Germany	Stability in following seas of a deep sea cutter
PFV IX/7	Federal Republic of Germany	Further particulars on vessels in a seaway (PFV VIII/16)
PFV IX/7/2	Federal Republic of Germany	Cutter model in irregular seas and minimum stability required
PFV IX/7/3	USSR	Comparative stability test of a trawler model in following seas
PFV X/8/1	USSR	Analysis of ship motions and heeling in following seas
PFV X/8/2	Denmark	Comparison with the results of tests carried out by the USSR

<u>Symbol</u>	<u>Issued by</u>	<u>Summary</u>
PFV/9	Poland	Theoretical and experimental investigations regarding stability of fishing vessels
PFV/11	USSR	Stability of a vessel on the crest of a wave
PFV/46	USSR	Stability of a vessel on the crest of a wave
PFV/55	Denmark	Comparison of methods of calculating the decrease of righting arms of stability on the crest of a wave
PFV/173/Rev.1	USSR	Brief explanation to films of a trawler trapped by following seas
STAB III/8	Federal Republic of Germany	Intact stability model test
STAB XIX/4	Netherlands	Intact Stability - A case of a capsized in following waves due to pure stability loss on the crest of a wave
STAB XXII/6/3	United Kingdom	Intact Stability - General philosophy for ships of all types - Comments on STAB/41
STAB XXII/6/5	Netherlands	Intact Stability - Stability in following waves
STAB XXIV/4/2	Federal Republic of Germany	Righting lever curves of ships on the crest of a wave
STAB XXV/4/10	Japan	Comments concerning intact stability of ships on the crest of a wave
STAB XXVI/4/7	German Democratic Republic and Poland	Guidance on method of calculation of the intact stability of ships in following waves
STAB 27/5/1	Netherlands	Results obtained in applying procedure outlined in STAB/41
STAB 27/5/2	USSR	Comments on Guidance set out in STAB XXVI/4/7
STAB/INF.28	Denmark	The transverse stability of a tanker model in waves, A. Zborowski and V. Chomchuenchit

<u>Symbol</u>	<u>Issued by</u>	<u>Summary</u>
STAB/7	United States	Experimental studies of capsizing of intact ships in heavy seas
STAB/41	Netherlands	Some aspects of ship motions in irregular beam and following waves
STAB/44	Netherlands	Shipping of water in following waves - Calculations for a supply vessel
STAB/45	United States	Ship motions and capsizing in astern seas
STAB/71	USSR	Capsizing in heavy weather conditions
STAB/91	Netherlands	Stability of beam trawlers in following seas
SLF/5	German Democratic Republic	Stability of ships in following waves

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ANNEX 7GUIDANCE FOR OBTAINING REPORTS OF ICING OCCURRENCE  
AND MAKING ANNUAL COLLECTIVE ANALYSES OF THESE  
REPORTS BY ADMINISTRATIONS PARTICIPATING

The minimum information to be contained in reports by skippers of fishing vessels or masters of other vessels of similar dimensions should be as contained under the headings (1) to (3) below. Particulars under headings (4) and (5) should be obtained as far as practicable.

(1) Ice thicknesses

These should be given at a sufficient number of positions on the vessel to allow the examining authority to make a reasonable assessment of the overall amount of icing and its longitudinal and vertical distribution. The thicknesses should be the maximum which occur during the period reported.

(2) Time and place of occurrence

The dates, times and approximate geographical positions of the vessel during each occasion of icing experience should be stated as nearly as practicable. It should be clear from reports whether the build-up of ice took place over short or long periods throughout the voyage.

(3) Hydrometeorological conditions

Information should be provided in respect of air and sea temperatures, wind velocity and sea condition also degree of spray encountered particularly at period of most rapid ice formation.

(4) Navigation during occurrence

This should be reported in a manner which will indicate the extent to which avoiding procedure was adopted. Under moderate icing the vessel's normal fishing operation may have been continued in the normal way, in which case a general comment with regard to the vessel's speed, direction relative to wind and sea should be stated. In more extreme cases the vessel's normal operation may have been terminated and avoiding tactics adopted. In these cases the course of action should be stated as fully as possible.

(5) De-icing action

Such action generally can only be effectively undertaken during an abatement in the severity of the conditions. Information as to the man-hours devoted to de-icing, the methods used and the extent of successful de-icing action should be stated.

Members of the Sub-Committee are invited to present collective analyses of reports for each winter season involved. These analyses may be developed as considered appropriate by each delegation but as a minimum the analyses should be based on an assessment of each reported case of icing in relation to the nominal value represented by the recommended IMO allowance (resolution A.168(ES.IV), Appendix III) and geographical position of the vessel reporting. As a supplement to this analysis delegations are invited to extend the study, for example, to separate rapid as distinct from slow rates of icing reported or to distinguish between reports from large and small vessels or indicate the extent to which avoiding action has been taken. Reports of no icing occurrence are of statistical value but of secondary importance in comparison with the quantity of icing.

The form for obtaining reports on icing as used by Canada is set out at Appendix to this Annex.



## APPENDIX



Transport Canada

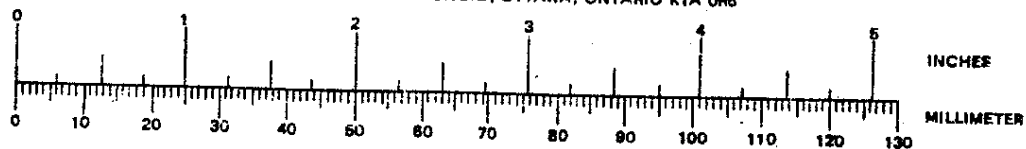
## SHIP ICING REPORT

PLEASE REPORT ON THIS FORM ANY INSTANCE OF ICE FORMATION ON VESSEL DURING VOYAGE. IF MORE THAN ONE OCCURRENCE OF ICING ON VOYAGE, USE SEPARATE FORM FOR EACH ENCOUNTER. IT IS IMPORTANT TO COMPLETE A FORM FOR EACH VOYAGE EVEN IF NO ICING OCCURS.

Name of ship:		Type of vessel:	
Owner:		Home port:	
DATE OF VOYAGE			
Start:		Finish:	
1. ROUTE OR AREA OPERATIONS —			
State route or area —		Was icing encountered?— Yes <input type="checkbox"/> No <input type="checkbox"/>	
State where icing was encountered, give lat. & long., Decca or Loran fixes or distance and bearing from known point of land.			
Give date and time (local) when icing commenced —			
Date		Stopped	
2. WEATHER CONDITIONS DURING ICING:			
Weather (rain, snow, etc.) —		Wind (speed & direction) —	
Sea state and wave height	Air temp.	Sea temp.	
3.			
While ice was forming, was vessel steaming? <input type="checkbox"/>		Speed	Heading
fishing? <input type="checkbox"/>			
dodging? <input type="checkbox"/>			
other? <input type="checkbox"/> Comment:			
4. Severity of icing estimated as: <input type="checkbox"/> Trace <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy			
5. INDICATE AVERAGE ICE THICKNESS AT VARIOUS LOCATIONS WHEN BUILD-UP IS GREATEST:			
	0-1 in. 0-25 mm	1-2 in. 25-50 mm	2-3 in. 50-75 mm
(a) Diameter of ice on forward rails			
(b) Diameter of ice on other rails			
(c) Diameter of ice on forward stay			
(d) Thickness on main deck			
(e) Thickness on boat neck			
(f) Thickness on wheel house front			
(g) Thickness on bulwarks			
(h) Other specify			
6. What height did ice extend on forward mast?		7. Total weight of ice on vessel estimated as	
Feet Metres above main deck		Tons	
8. Was handling affected by icing? Yes <input type="checkbox"/> No <input type="checkbox"/>		9. Additional comments:	
Comments such as rolling time and amount of heel would be helpful.			

COMPLETED FORMS SHOULD BE MAILED TO: LOW TEMPERATURE LABORATORY, DIVISION OF MECHANICAL ENGINEERING, NATIONAL RESEARCH COUNCIL, OTTAWA, ONTARIO K1A 0R6

15-0273  
(11-77)



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ANNEX 8

DRAFT AMENDMENTS TO PART B OF CHAPTER II-1  
OF THE 1981 SOLAS AMENDMENTS

Amend the heading of Regulation II-1/11 to read:

"Peak and Machinery Space Bulkheads and Stern Tubes in Cargo Ships"

Add the following paragraphs to Regulation II-1/11 to read:

"8 Bulkheads shall be fitted separating the machinery space from cargo and passenger spaces forward and aft and made watertight up to the freeboard deck.

9 Stern tubes shall be enclosed in a watertight space (or spaces) of moderate volume. Other measures to minimize the danger of water penetrating into the ship in case of damage to stern tube arrangements may be taken at the discretion of the Administration."

Add a new draft Regulation II-1/12-1 to read:

"Double Bottoms in Cargo Ships other than Tankers

1 A double bottom shall be fitted extending from the collision bulkhead to the afterpeak bulkhead as far as this is practicable and compatible with the design and proper working of the ship.

2 Where a double bottom is required to be fitted its depth shall be to the satisfaction of the Administration and the inner bottom shall be continued out to the ship's side in such a manner as to protect the bottom to the turn of the bilge.

3 Small wells constructed in the double bottom in connexion with the drainage arrangements of holds shall not extend in depth more than necessary. A well extending to the outer bottom, may, however, be permitted at the after end of the shaft tunnel of the ship. Other wells may be permitted by the Administration if it is satisfied that the arrangements give protection equivalent to that afforded by a double bottom complying with this Regulation.

4 A double bottom need not be fitted in way of watertight compartments used exclusively for the carriage of liquids provided the safety of the ship in the event of bottom damage, is not, in the opinion of the Administration thereby impaired."

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SUB-COMMITTEE ON STABILITY AND LOAD  
LINES AND ON FISHING VESSELS SAFETY

28th session

7-11 February 1983

List of Documents

- 1 Adoption of the agenda
  - SLF 28/1 Provisional agenda
  - No symbol List of documents
  - No symbol Proposed timetable
- 2 Decisions by the Maritime Safety Committee
  - SLF 28/2 Secretariat
- 3 Subdivision and damage stability of dry cargo ships including ro/ro ships and statistical analysis of damage stability casualties
  - .1 Information to the Master
    - SLF 28/3/3 China STAB 27/7 United Kingdom
    - SLF 28/3/4 Sweden STAB XXVI/14, Annex 5
    - SLF 28/3/5 USSR
    - SLF 28/3/8 Greece
    - SLF 28/3/9 Norway
  - .2 Subdivision and damage stability requirements for dry cargo ships, including ro/ro ships
    - SLF 28/3 Poland
    - SLF 28/3/1 Netherlands
    - SLF 28/3/2 France
    - SLF 28/3/6 United States
    - SLF 28/3/7 USSR
    - SLF 28/3/9 Norway
    - SLF 28/3/10 Federal Republic of Germany
- 4 Intact stability
  - .1 review of IMO criteria
    - No documents
  - .2 improved criteria taking into account external forces and other factors affecting stability as well as systematic model tests

- |            |               |             |        |
|------------|---------------|-------------|--------|
| SLF 28/4/1 | United States | SLF/2       | Japan  |
| SLF 28/4/2 | USSR          | SLF/6       | China  |
|            |               | SLF/7       | Japan  |
|            |               | SLF/8       | Spain  |
|            |               | SLF/8/Add.1 | Spain  |
|            |               | SLF/12      | Poland |
- .3 stability of ships not fully loaded, including ballast condition  
No document
- .4 stability of pontoons
- |          |               |             |       |
|----------|---------------|-------------|-------|
| SLF 28/4 | United States | SLF/4       | Spain |
|          |               | SLF/4/Add.1 | Spain |
- .5 collection and analysis of damage stability cards and intact stability casualty records, especially for decked fishing vessels of less than 24 metres in length  
No documents
- .6 other matters
- |  |  |        |                            |
|--|--|--------|----------------------------|
|  |  | SLF/3  | Netherlands                |
|  |  | SLF/5  | German Democratic Republic |
|  |  | SLF/11 | USSR                       |
- 5 Standards and practices on icing  
No documents
- 6 Implementation and interpretation of Part B of Chapter II-1 of the 1974 SOLAS Convention (double bottoms in cargo ships and definition of the longforward superstructure)
- |            |        |               |       |
|------------|--------|---------------|-------|
| SLF 28/6   | USSR   | MSC XLIII/3/5 | India |
| SLF 28/6/1 | USSR   |               |       |
| SLF 28/6/2 | IACS   |               |       |
| SLF 28/6/3 | Sweden |               |       |
- 7 Implementation and interpretation of the 1966 Load Line Convention
- |            |      |        |               |
|------------|------|--------|---------------|
| SLF 28/7   | IACS | SLF/9  | USSR          |
| SLF 28/7/1 | USSR | SLF/10 | United States |
- 8 Implementation and interpretation of the 1969 Tonnage Convention
- |            |        |            |
|------------|--------|------------|
| SLF 28/8   | Sweden | TM/Circ.27 |
| SLF 28/8/1 | ICS    | TM/Circ.28 |
|            |        | TM/Circ.29 |
|            |        | TM/Circ.30 |
|            |        | TM/Circ.31 |

- 9 Implementation and interpretation of the 1977 Torremolinos Convention and related Codes  
No documents *ratified*
- 10 Review of experience of applying the subdivision and damage stability regulations for passenger ships (resolution A.265(VIII))  
SLF 28/10 Poland STAB/89 Poland  
SLF 28/10/1 Netherlands SLF/1 Poland  
SLF 28/10/2 United States
- 11 Election of Chairman and Vice-Chairman for 1984 *Manu*  
*Motor*
- 12 Any other matters
- .1 application of the subdivision and stability requirements of MARPOL 73/78  
SLF 28/12 United Kingdom MEPC 17/5/2 United Kingdom
- .2 review of the MODU Code  
SLF 28/12/1 Secretariat DE 25/9 Norway  
SLF 28/12/2 Norway DE 26/8 IADC  
DE 26/8/1 IADC  
DE 26/8/2 United Kingdom  
DE 26/8/3 E and P Forum  
DE 26/8/4 France  
DE 26/8/5 United States
- .3 information to the Master on intact stability  
SLF 28/12/3 United States
- .4 guidelines for uniform application of the survival requirements of the Bulk Chemical Code and Gas Carrier Code  
SLF/13 Netherlands
- 13 Report to the Maritime Safety Committee
-



ANNEX 9

## DRAFT INTERPRETATIONS OF THE 1966 LOAD LINE CONVENTION

Article 2(8) - Definition of Length for a Segmented Ship

A ship which is composed of a series of permanently attached sections should have a freeboard determined by the overall length of the series. A rigidly attached, but detachable, propulsion section should be included in the total length (L). A non-rigidly attached, detachable propulsion section should be treated as a separate ship.

Regulation 3(9) - Structure of Lower Freeboard Deck

When a lower deck is designated as the freeboard deck, it should be continuous in fore and aft direction as well as athwartship. Such freeboard deck as a minimum should consist of suitably framed stringers at the ship sides and transversely at each watertight bulkhead which extends to the upperdeck, within cargo spaces. The width of these stringers should not be less than can be conveniently fitted having regard to the structure and the operation of the ship. Any arrangement of stringers should be such that structural requirement can also be met.

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ANNEX 10

DRAFT AMENDMENT TO THE 1966 LOAD LINE CONVENTION

The following replaces the amendment to Regulation 3(1) of the 1966 Load Line Convention as proposed in STAB 27/13, Annex 2:

Regulation 3(1) - Definition of length for ships having a bulbous bow

Add the following after the first sentence:

"Where the stem contour is concave above the waterline at 85 per cent of the least moulded depth, both the forward terminal of the total length and the foreside of the stem respectively shall be taken at the vertical projection to that waterline of the aftermost point of the stem contour (above that waterline)."

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ANNEX 11INTERPRETATIONS OF THE INTERNATIONAL CONVENTION ON  
TONNAGE MEASUREMENT OF SHIPS, 19691 Definitions (Article 2(8))

1.1 When establishing the length of a rudder-less flat top barge, the length should be calculated at 96% of the total length of a waterline at 85% of the least moulded depth measured from the top of the keel.

1.2 Column-stabilized units such as semi-submersible drilling units should be considered novel types of craft. Because the length under (Article 2(8)) or the moulded breadth under (Regulation 2(3)) for such ships is misleading, it would be appropriate for such ships to use the overall length and breadth to the outside plating between fixed structures. The citation of the length (Article 2(8)) and breadth (Regulation 2(3)) in the respective boxes of the International Tonnage Certificate (1969) should be deleted and a notation in "Remarks" should be made to identify the ship as, inter alia, a "semi-submersible drilling unit", etc.

2 Form of Certificate (Article 9(2))

2.1 The "Date" shown on the front of the International Tonnage Certificate, (1969) refers to the year when the keel was laid (Article 2(6)) or undergoes modification as defined in Article 3(2)(b) but when the year of construction or modification is 1982, the month and day should also be described.

2.2 Information inserted in the "location" columns on the reverse of the International Tonnage Certificate (1969) should not be too detailed.

2.3 The phrase "Date and place of original measurement" should refer to the issue of the original International Tonnage Certificate (1969) and should have no reference to measurement under pre-existing national systems.

2.4 The phrase "Date and place of last previous remeasurement" should refer to the date and place of issue of the last International Tonnage Certificate.

3 Enclosed Spaces (Regulation 2(4))

Space located within the boundaries of "permanent or movable awnings" (Regulation 2(4)) should be subject to treatment under Regulation 2(5).

4 Spaces Open to the Sea (Regulation 6(3))

Volumes within the hulls of ships, such as split-hull barges and dredgers, should be retained in  $V$  and  $V_c$  notwithstanding that the space within the hull is temporarily opened to the sea when discharging cargo (see illustration).

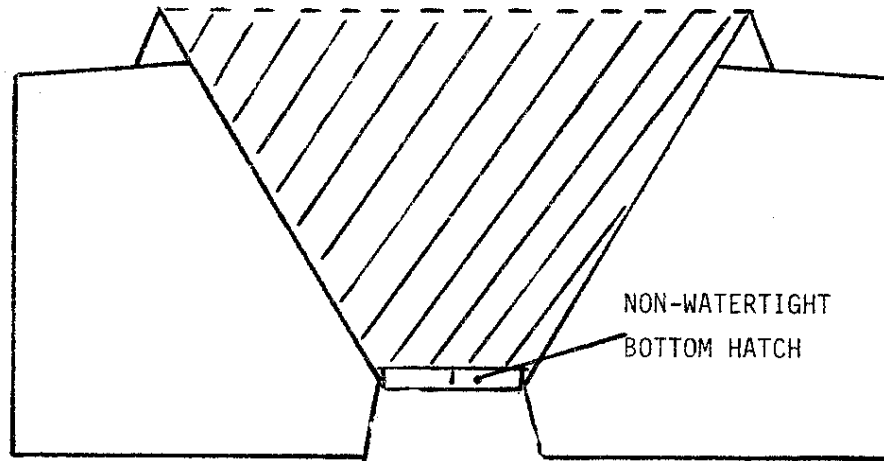
5 Cargo Spaces (Regulation 2(7))

5.1 The volumes of clean ballast tanks in oil tankers should be included in  $V_c$  when the ship is fitted with a crude oil washing system which would permit dual purpose cargo/clean ballast tank use of these tanks.

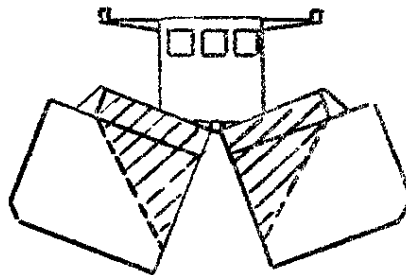
5.2 The volumes of dedicated clean ballast tanks should be excluded from  $V_c$  provided that the:

- .1 tanks are not used for cargo;
- .2 ship carries a single IOPP Certificate which indicates it is operating with dedicated clean ballast tanks in accordance with Regulation 13A, Annex I, MARPOL 1973/78;
- .3 following notation is inserted in the "Remarks" column on the International Tonnage Certificate, (1969):

"This ship carries an IOPP Certificate in conformity with Regulation 13A, Annex I, MARPOL 1973/78. The following tanks are dedicated solely to the carriage of clean ballast water: \_\_\_\_\_."



Shaded volumes included in  $V$  and  $V_c$



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## WORK PROGRAMME OF THE SUB-COMMITTEE

- \*1 Subdivision and damage stability of dry cargo ships including ro/ro ships
- 2 Intact stability:
  - \*\*\*.1 review of IMO criteria
  - \*\*\*.2 improved criteria taking into account external forces and other factors affecting stability as well as systematic model tests
  - \*\*3 stability of pontoons
  - \*\*\*.4 collection and analysis of intact stability casualty records, especially for decked fishing vessels of less than 24 metres in length
- \*\*\*3 Collection and analysis of damage stability cards
- \*4 Standards and practices on icing
- \*\*\*5 Implementation and interpretation of Part B of Chapter II-1 of the 1974 SOLAS Convention
- \*\*\*6 Implementation and interpretation of the 1966 Load Line Convention
- \*\*\*7 Implementation and interpretation of the 1969 Tonnage Convention
- \*\*\*8 Implementation and interpretation of the 1977 Torremolinos Convention including harmonization with the 1981 and 1983 SOLAS Amendments
- \*\*\*9 Implementation and interpretation of the FAO/ILO/IMO Code of Safety for Fishermen and Fishing Vessels
- \*\*\*10 Implementation and interpretation of the FAO/ILO/IMO Voluntary Guidelines for the Design, Construction and Equipment of Small Fishing Vessels
- \*\*\*11 Review of experience of applying the subdivision and damage stability regulations for passenger ships (resolution A.265(VIII))
- \*\*\*12 Systematic review of the 1966 Load Line Convention

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\* Items of higher priority

\*\* Items of lower priority

\*\*\* Items under continuous review

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ANNEX 13ITEMS TO BE INCLUDED IN THE AGENDAS FOR THE  
TWENTY-NINTH AND THIRTIETH SESSIONSTwenty-ninth session

- 1 Subdivision and damage stability of dry cargo ships including ro/ro ships (ad hoc group)
- 2 Intact stability (ad hoc group)
  - .1 review of IMO criteria
  - .2 improved criteria taking into account external forces and other factors affecting stability as well as systematic model test
  - .3 stability of pontoons
  - .4 collection and analysis of intact stability casualty records especially for decked fishing vessels of less than 24 metres in length
  - .5 other matters
- 3 Collection and analysis of damage stability cards
- 4 Standards and practices on icing
- 5 Implementation and interpretation of Part B of Chapter II-1 of the 1974 SOLAS Convention
- 6 Implementation and interpretation of the 1966 Load Line Convention
- 7 Implementation and interpretation of the 1969 Tonnage Convention
- 8 Implementation and interpretation of the 1977 Torremolinos Convention and related Codes including harmonization with the 1981 and 1983 SOLAS Amendments
- 9 Review of experience of applying the subdivision and damage stability regulations for passenger ships (resolution A.265(VIII))
- 10 Systematic review of the 1966 Load Line Convention

Thirtieth session

- 1 Subdivision and damage stability of dry cargo ships including ro/ro ships
- 2 Intact stability
- 3 Collection and analysis of damage stability cards
- 4 Standards and practices on icing
- 5 Implementation and interpretation of Part B of Chapter II-1 of the 1974 SOLAS Convention

- 6 Implementation and interpretation of the 1966 Load Line Convention
  - 7 Implementation and interpretation of the 1969 Tonnage Convention
  - 8 Implementation and interpretation of the 1977 Torremolinos Convention  
and related Codes including harmonization with the 1981 and 1983 SOLAS  
Amendments
  - 9 Systematic review of the 1966 Load Line Convention
-