

TIME



IMO

SLF 30/18
20 March 1985
Original: ENGLISH

JB-COMMITTEE ON STABILITY AND
LOAD LINES AND ON FISHING
VESSELS SAFETY - 30th session
agenda item 18

REPORT TO THE MARITIME SAFETY COMMITTEE

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1 GENERAL

1.1 The Sub-Committee held its thirtieth session from 25 February to 1 March 1985, under the Chairmanship of Mr. I.A. Manum (Norway).

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

ARGENTINA	LIBERIA
BELGIUM	MEXICO
BRAZIL	NETHERLANDS
CANADA	NIGERIA
CHILE	NORWAY
CHINA	PANAMA
COLOMBIA	PERU
DENMARK	POLAND
ECUADOR	PORTUGAL
FINLAND	REPUBLIC OF KOREA
FRANCE	ROMANIA
GERMAN DEMOCRATIC REPUBLIC	SPAIN
GERMANY, FEDERAL REPUBLIC OF	SWEDEN
GREECE	TUNISIA
INDIA	USSR
ITALY	UNITED KINGDOM
JAPAN	UNITED STATES

a representative from the following specialized agency:

FOOD AND AGRICULTURE ORGANIZATION (FAO)

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)
OIL INDUSTRY INTERNATIONAL EXPLORATION AND PRODUCTION FORUM (E & P FORUM)
ASSOCIATION OF WEST EUROPEAN SHIPBUILDERS (AWES)

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

1.4 During the session, the Federal Republic of Germany presented a film giving a summary of the large series of tank tests performed in that country in order to establish for modern design containerships an adequate level of safety against capsizing. The tests were performed in following and quartering seas with free-running models (4 ships) in very heavy irregular

seaways. By judging the ships' behaviour, which included all kinds of capsizing phenomena, the intact stability values necessary for keeping the ships safe in these seaways were found. The film was an illustration to the proposal for additional stability criteria tailored to safeguard the same level of safety for such ships compared with those of more conventional hull designs when meeting the stability criteria in resolution A.167(ES.IV). The Sub-Committee welcomed the film which was discussed within the working group on intact stability.

1.5 The Sub-Committee re-elected unanimously Mr. I.A. Manum (Norway) and Professor S. Motora (Japan) as Chairman and Vice-Chairman respectively for 1986.

2 DECISIONS BY THE MARITIME SAFETY COMMITTEE

2.1 The decisions taken by the Committee at its forty-ninth and fiftieth sessions pertaining to the work of the Sub-Committee (SLF 30/2) were noted and dealt with as necessary under relevant agenda items.

2.2 In addition the Sub-Committee noted:

- .1 the importance attached to the Revised Guidelines for the Organization and Method of Work of the Maritime Safety Committee and its subsidiary bodies (SLF 30/2, annex 1) which had to be strictly adhered to in conducting future meetings;
- .2 the existence of the extended IMO tanker casualty data bank for possible future use in the activities of the Sub-Committee.

3 SUBDIVISION AND DAMAGE STABILITY OF DRY CARGO SHIPS INCLUDING RO-RO SHIPS

3.1 The Sub-Committee had before it documents relating to:

- .1 information for the master submitted by the USSR (SLF 30/3/1) and the United States (SLF 30/3/5) and annex 2 to SLF 29/15;

- .2 probabilistic concept of subdivision and damage stability submitted by the Netherlands (SLF 30/3/9), Norway (SLF 30/3/3, 30/3/4 and SLF 30/WP.2), Poland (SLF 30/3/2 and SLF 30/3/7), the USSR (SLF 30/3) and the United States (SLF 30/3/6) and background papers submitted by China (SLF/47), France (SLF/44), Japan (SLF/42) and the Netherlands (SLF/39) and annex 3 to SLF 29/15;
- .3 deterministic concept of subdivision and damage stability submitted by the Netherlands (SLF 30/3/8) and the United States (SLF 30/3/6) and background papers submitted by France (SLF/44) and Japan (SLF/41) and a joint paper by France and the United States (SLF 29/WP.2).

3.2 The United Kingdom delegation reserved its position on the need for information on the effect of flooding to be provided to the master. This reservation was supported by Greece and Liberia.

3.3 The Sub-Committee noted a statement by Japan (SLF 30/INF.2) in which Japan judging from calculation results carried out by several countries which indicated that the presently successful design features would undergo drastic changes, stated that further steps towards the development of subdivision and damage stability requirements for dry cargo ships should not be taken before the following assessments are made:

- .1 the need to assess the conclusions of casualty statistics before deciding on the real need for introducing the new principle; and
- .2 careful consideration of the repercussion following a possible change of the traditional concept laid in the present SOLAS Convention.

The Japanese views were supported by a number of delegations.

3.4 The Sub-Committee felt that these views should be submitted to the Committee for guidance on the future work of the Sub-Committee and that the work at this session should proceed as had been previously decided.

3.5 The United States delegation expressed its concern that the development of the probabilistic method already appeared difficult for the short-term since several papers submitted to this session indicated that many questions remain to be studied before the probabilistic method could be completed. Accordingly the United States reiterated its position that the Sub-Committee should attempt to complete a subdivision standard within two sessions.

3.6 The Sub-Committee discussed whether to attempt development of both the deterministic and the probabilistic methods of subdivision and damage stability. It was noted that most of the subdivision and damage stability requirements now in force are deterministic, but that at the last session the Sub-Committee had decided to work primarily on the probabilistic method and that the work programme contained in annex 3 to SLF 30/2 showed only the probabilistic method. While agreeing to support and assist development of any standard, France and the United States reserved their position on the deletion of the deterministic method from the work programme.

3.7 The Sub-Committee established an ad hoc group to consider the above documents in detail and agreed to the following terms of reference to be considered by the group:

- .1 information for the master;
- .2 requirements for the probability of survival of dry cargo ships.

3.8 The Sub-Committee received the report of the group at this session and approved it in general (SLF 30/WP.6). The action taken by the Sub-Committee is given below.

Information for the master

- 3.9 The Sub-Committee agreed to the revised draft guidelines for the preparation of information on the effect of flooding to be provided to masters of new dry cargo ships prepared by the group and set out in annex 2.
- 3.10 The intent of the Sub-Committee is that these guidelines can be used by administrations to the extent that they consider them necessary.
- 3.11 The Committee is invited to approve these guidelines for distribution to Member Governments in an MSC circular.
- 3.12 The Sub-Committee took note of the group's estimation of the cost of preparation of the guidelines to the maritime industry involved, which was estimated to be several thousand US dollars per ship, depending on the type of the ship and the degree of complexity desired.

Requirements for the probability of survival of dry cargo ships

- 3.13 The Sub-Committee agreed on a draft method for further work on the probability of survival of dry cargo ships set out in annex 3 and eventually agreed the requirements should apply to new ships only.
- 3.14 The Sub-Committee agreed with the opinion of the group that:
- .1 no detailed discussion on the magnitude of the required subdivision index R was appropriate until an analysis of the calculations for the attained subdivision index A was completed. However, it was generally agreed that the index R should be based on length (Ls) only. Furthermore the formula for R should be independent of ship type;
 - .2 any meaningful subdivision standard is increasingly difficult to obtain for smaller ships. However, until more relevant information became available, it was considered that at present the draft method outlined in annex 3 should be applied.

3.15 Consideration was given as to whether 'a' and 'p' (uncorrected for 'r'), calculated in accordance with resolution A.265(VIII), should be modified as suggested by Poland (SLF/1, SLF/26 and SLF/37). Although it was considered that the work carried out by Poland was valuable and may eventually lead to a change in the formulae for 'a' and 'p' it was decided that the main work carried out before the next session should be concentrated on the 's' factor.

3.16 With regard to 'r' it was considered that this parameter gave low values especially for minor penetrations, and the modified formulae suggested by Poland (SLF/37) and the Netherlands (SLF 28/10/1) should be applied to any future calculations prepared for the next session.

3.17 In respect of the 's' factor, delegations were invited to apply the formula as stated in the Polish paper (SLF 30/3/7) in any future calculations, together with any formula for 's' they might propose. The USSR was invited to provide details of the 's' factor in accordance with its calculations.

3.18 The Sub-Committee requested Members to carry out sample calculations based on annex 3 for a range of ship types and sizes and to submit the results in time for consideration at the next session.

4 INTACT STABILITY

4.1 The Sub-Committee briefly discussed documents submitted by the Federal Republic of Germany (SLF 30/4, SLF/34 and SLF/35), Japan (SLF 30/4/6 and SLF/43), Norway (SLF 30/4/2). Poland (SLF 30/4/4 and SLF/38), the United Kingdom (SLF 30/4/3 and SLF 30/4/5) and the Secretariat (SLF 30/4/1 and SLF/33).

4.2 The Sub-Committee received a paper by the Secretariat listing the documents previously submitted on external forces caused by fishing gear (SLF/36). Due to the shortage of time this matter could not be discussed at this session. The Sub-Committee again invited Members to submit information on external forces caused by fishing gear, taking into account the information previously submitted.

4.3 The Sub-Committee then requested the ad hoc group on intact stability to consider the above papers, giving priority to the development of the weather criterion, stability of ships in following waves and the problems raised by the Federal Republic of Germany concerning stability criteria (SLF/35).

4.4 The Sub-Committee agreed to consider at its next session development of a single criterion for intact stability of pontoons to substitute for those recommended in MSC/Circ.348. Members were invited to submit comments in good time before the next session in order to enable such a single criterion to be developed for the approval of the Committee.

4.5 Having received the report of the group (SLF 30/WP.7 and SLF 30/WP.7/Add.1) the Sub-Committee approved it in general and in particular concluded as reported in the following paragraphs.

Weather criterion

4.6 The Sub-Committee noted that in revising the recommendation on weather criterion (MSC/Circ.346), the group took into account the following:

- .1 calculation of coefficient "C" for radius of gyration;
- .2 limiting practice of steady state wind angle of heel;
- .3 ship's operation;
- .4 free surface effects.

4.7 The Sub-Committee agreed to the revised text of a recommendation on a severe wind and rolling criterion (weather criterion) for the intact stability of passenger and cargo ships of 24 metres in length and over to supersede MSC/Circ.346 and Corr.1) together with a covering draft Assembly resolution, as set out in annex 4. The Committee is invited to approve the draft resolution and revised recommendation for submission to the Assembly at its fourteenth session for adoption.

4.8 The Sub-Committee discussed further the applicability of the recommendation to fishing vessels and the weather criterion recommended by the 1977 Torremolinos Conference on Safety of Fishing Vessels was noted. In particular it was noted that no numerical values were provided.

4.9 The Sub-Committee agreed that the application of the revised weather criterion set out in annex 4 to fishing vessels of 45 m in length and over in unrestricted service does not involve any difficulties.

4.10 It was realized, however, that for fishing vessels below 45 m in length the effect of wind and waves could be taken into account differently, bearing in mind wind profile over the sea level and the variety of local meteorological conditions.

4.11 In order to give more information regarding the effect of variations of wind pressure on the applicability of the weather criterion, the Sub-Committee invited Members to submit calculations of this effect for small sea-going fishing vessels below 45 m in length to the next session.

4.12 The Sub-Committee intends to review also other weather criteria given in IMO documents such as the MODU Code and the Code of Safety for Dynamically Supported Craft, with a view to making them compatible with the requirements set out in annex 4.

Analysis of intact stability casualty records

4.13 The Sub-Committee considered a paper by Poland which presented analyses of 166 stability casualties reported up to now to the Sub-Committee.

4.14 The Sub-Committee noted that the analyses were carried out using methods identical with those employed in 1966 by the Federal Republic of Germany and Poland (IS VI/3 and PFV IV/2) which had been used to support the stability criteria given in resolutions A.167(ES.IV) and A.168(ES.IV).

4.15 The Sub-Committee noted that the results of the new analyses were very close to those derived from the 1966 papers and no new conclusions are warranted.

4.16 The Sub-Committee expressed appreciation to the Polish delegation for these updated analyses and agreed that analyses should be carried out using different methods. The Polish delegation agreed to undertake this task.

4.17 The Sub-Committee also felt that, at some future date, analyses may be repeated with an enlarged data bank.

Stability of ships in following waves

4.18 The Sub-Committee noted that the group, having considered both the Federal Republic of Germany and the Norwegian papers, as well as the USSR paper to a previous session (SLF 29/4/1) recommended that the still water righting arm curve was most suitable for a comparison for dealing with all types of dynamic phenomena.

4.19 The question of the limits to be observed when applying the criterion proposed by the Federal Republic of Germany was discussed to some extent. The delegation of the Federal Republic of Germany informed the Sub-Committee that their approach was applicable to all dry cargo ships as long as they had their superstructure or deckhouse aft or almost aft, had a forecastle, and hatches as normally found on container ships.

4.20 The Sub-Committee invited Members to submit comments on the principles outlined in the papers submitted by the Federal Republic of Germany and on the criterion proposed. Calculations of the criterion should be carried out in accordance with the annex to SLF 30/4 for as many ships as possible.

4.21 The Sub-Committee also invited Members to comment on the more general questions raised at the end of paper SLF/35.

4.22 The Norwegian delegation presented a paper (SLF 30/4/2) commenting on a static method of judging the stability of a ship positioned on a wave crest (STAB XXVI/4/7).

4.23 The Sub-Committee noted the conclusions by Norway that the static method was difficult to apply due to:

- .1 various computer programmes yielding different results for GZ. The difference was up to 0.20 m at $\phi = 30^\circ$.
- .2 model tests with the same model for which the theoretical calculations were performed showed that when running with the speed of the wave, the wave profile was severely disturbed due to dynamic effects.
- .3 measurements of the same model (captive) showed higher righting moments than calculated.

4.24 The Norwegian delegation agreed to submit information on the dynamic effects mentioned above, and broaching, for consideration at the next session of the Sub-Committee.

Future research

4.25 The Sub-Committee noted the progress made possible by the research by the Federal Republic of Germany and the results of their model tests and that this represented an important step forward.

4.26 Nevertheless, it was noted that stability research projects were presently under way in various other countries.

4.27 The Sub-Committee realized that some of this research will take a long time to complete but benefits would also result in the short term.

4.28 Those Administrations engaged in such research are, therefore, encouraged to continue to submit results thereof which will permit further improvements to be made to stability criteria in the future.

COLLECTION AND ANALYSIS OF DAMAGE CARDS

6.1 The Sub-Committee noted that no papers have been submitted for a number of sessions and agreed not to include this item on its agenda for the time being, but to keep the matter in the work programme of the Sub-Committee and resume its consideration under the separate agenda items if the need arises. Members were invited to continue to submit completed damage cards using the form set out in annex 4 of SLF 29/15 and any other information on the subject.

6 STANDARDS AND PRACTICES ON ICING

6.1 The Sub-Committee had before it the documents submitted by Norway (SLF 30/6/1) and the USSR (SLF 30/6 and SLF/40) on the subject.

6.2 The Sub-Committee noted a brief description of the Norwegian research project on offshore icing to be used for the development of standards on ice accretion. The objective of the project was to provide information on the phenomena of icing needed for safe and efficient design and operation of marine units in cold climates.

6.3 The Sub-Committee also noted the paper by the USSR (SLF 30/6) containing information on national standards on icing of mobile offshore drilling units and ships other than fishing vessels and reports on icing of fishing vessels (SLF/40).

6.4 The Sub-Committee recognized the need for further information on ice accretion on offshore units and ships other than fishing vessels and again invited Members to submit such information using the format previously agreed and comments on a possible future recommendation on ice accretion on offshore units and ships.

MINIMUM ACCEPTABLE STANDARDS OF RESIDUAL STABILITY AFTER DAMAGE FOR
PASSENGER SHIPS

- 7.1 The Sub-Committee had for its consideration documents submitted by the German Democratic Republic (SLF 30/7), the Federal Republic of Germany (SLF 30/7/1), Norway (SLF 30/7/5), Poland (SLF 30/7/4), the USSR (SLF 30/7/2), the United Kingdom (SLF 30/7/6) and the United States (SLF 30/7/3) and annex 5 to SLF 29/15.
- 7.2 The Sub-Committee considered these papers and also the general philosophy relating to regulation II-1/8 of the 1974 SOLAS Convention as amended. The discussion of the papers demonstrated that there was a wide range of opinion on the factors to be taken into account in determining an appropriate residual stability standard. It was noted that the joint proposal by the Netherlands and the United Kingdom was not intended to cover such effects as wind, cargo shift, movement of passengers to life-saving stations and actual embarkation of lifeboats. These must be evaluated separately. Having regard to the importance of any stability standard which may be adopted in relation to the economic and commercial design of passenger ships, Members were invited to study the effect of the various criteria proposed on typical ships of their flag.
- 7.3 In carrying out these studies it was considered that attention should be paid to the following:
- .1 the effect on critical ship designs of the application of each of the alternative criteria in 2.1.1 and 2.1.2 of annex 5 of SLF 29/15.
 - .2 the application of passenger distribution moment and/or one-sided lifeboat deployment, together with an appropriate reserve of stability, as additional residual stability requirements to the criteria of paragraphs 2.1.1 and 2.1.2 of annex 5 of SLF 29/15.

- .3 the residual stability criteria which may be adopted will determine the worst damage cases in any ship but the number of such damage cases may be few in relation to the total cases examined and therefore contribute only to a small extent to the overall safety of the ship.
 - .4 the need to relate the basic philosophy of passenger ship survival with the differing philosophies for other types of ship including the survival time after damage.
 - .5 the fact that the interpretation adopted may differ from the criteria included in the Code of Safety for Special Purpose Ships;
 - .6 whether it is appropriate to introduce selective aspects of the probabilistic approach of resolution A.265(VIII) to the deterministic method e.g. heel after damage and damage stability parameter.
 - .7 whether criteria based on the deployment of lifeboats will introduce anomalies in the standards of safety after damage between ships types and ships of similar type and may affect the type of the life-saving appliances provided.
- 7.4 The Netherlands and the United Kingdom intend to carry out further studies and to submit a further paper on this subject to the next session.
- 7.5 The Greek delegation expressed the view that consideration of this matter should not attempt to produce an amendment to regulation II-1/8 of the 1974 SOLAS Convention as amended but should aim at providing guidance to Contracting Governments on how to apply that provision.
- 7.6 Members were invited to submit the results of their investigations and comments on the subject to the next session.

8 CONSIDERATION OF INTERPRETATIONS OF THE 1966 LOAD LINE CONVENTION
PROPOSED BY IACS

8.1 The Sub-Committee considered a submission by IACS (SLF 30/8) in connection with its previous paper SLF 29/8/1 concerning the interpretation of regulation 38(5), (7) and (12) - Sheer credit for superimposed superstructures. The main conclusion from the paper was that no changes were justified and that the draft interpretation should remain as proposed in SLF 29/8/1.

8.2 However during the discussion, Canada stated it had experienced difficulties in the application of this interpretation, which resulted in a considerable reduction of freeboard, and said that they intend to submit a document for consideration at the next session.

8.3 The Sub-Committee recalled that at its last session a draft interpretation of regulations 25(4), 26(2) and 27(7) - Protection of crew - submitted by IACS in SLF 28/7 was discussed and some modifications were agreed. In this respect, the Sub-Committee noted information by IACS (SLF 30/WP.1) that it revised their interpretation taking into account comments made by the Sub-Committee, but an updated document will be made available to the Sub-Committee at its next session. It was noted that IACS interpretation LL.28 - Deduction for superstructures and trunks - had not received IMO acceptance but is applied by IACS. It was agreed that this interpretation should be reviewed at the next session.

8.4 The Sub-Committee further noted from the information by IACS (SLF 30/WP.1) that its interpretation LL.45 on stability information to be submitted to the master had been revised and will be circulated to the Sub-Committee for consideration at the next session under agenda item dealing with information for the master on intact stability (see also paragraphs 14.2 and 14.3).

8.5 The Sub-Committee also noted from the IACS paper (SLF 30/WP.1) that the interpretation of regulations 19, 20 and 22 concerning minimum wall thickness of pipes (LL.36/Rev.1) had been accepted at the twenty-third session, however it was recalled that unanimous agreement had not been reached. Therefore that interpretation should also be reviewed at the next session.

8.6 The Sub-Committee having recalled that at its twenty-eighth session it agreed on interpretations of article 2(8) - Definition of length for a segmented ship - and regulation 3(9) - Structure of lower freeboard deck - noted that these have still to be forwarded to the Committee for adoption. The Sub-Committee decided to put forward these two outstanding interpretations together with others to be agreed at its forthcoming session.

9 CONSIDERATION OF BASIC PRINCIPLES FOR A FUTURE REVISION OF THE 1966 LOAD LINE CONVENTION

9.1 The Sub-Committee considered documents submitted by Norway (SLF 30/9/2), the USSR (SLF 30/9) and the United States (SLF 30/9/1), which respectively discussed a possible alternative for freeboard calculations, the general work programme and the need for upgrading stability information.

9.2 In relation to SLF 29/15, paragraph 9.4, the United States delegation informed the Sub-Committee that the seaway/ship motion research project had been completed and was being studied with a view to presentation of the major findings at the next session.

9.3 Discussion of the submitted papers by the Sub-Committee resulted in a decision that the proposal in SLF 30/9/2 to carry out further studies whether freeboard may be determined in relation to compliance with stability criteria was not favoured. The Sub-Committee considered that stability was only one of several items to be taken into account in the assessment of freeboard.

9.4 The Sub-Committee discussed ship motions in seaway studies using recent oceanographic wave studies as the most desirable and most promising method of evaluating freeboard and sheer. Some delegations felt that such studies will cover several sessions before sufficient comparative studies have been accomplished to make recommendations for changing the freeboard tables and/or sheer curve formula. In conducting such studies, mono-hull ship forms are the first concern for review but it will also be necessary to review newer ship forms (e.g. double hulls, MODUs, barge carriers, dynamically supported crafts).

9.5 The Sub-Committee had previously noted that some novel ship types have caused difficulties in application of the Convention requirements. Additionally, the exchanges of information in section 16 on Exemption Certificates and on submersible heavy-load ships may indicate the need for consideration of basic principles of the convention for these ships. The Convention should be updated in order to provide a logical basis for freeboard evaluation of such ships.

9.6 As a first step, the studies of ship/seaway motions would be carried out and evaluated. The Sub-Committee also intends to study the relevance of the Convention to new types of vessels which have been developed after the 1966 Load Line Conference.

9.7 Members were invited to submit comments to the next session regarding the work programme and priorities thereof, aiming at establishing the basic principles for a future revision of the Convention.

10 CLARIFICATION OF SPECIFIC REGULATIONS OF THE 1969 TONNAGE CONVENTION

10.1 The Sub-Committee considered in detail a joint paper by the Federal Republic of Germany and the Netherlands (SLF 30/10) and comments thereon submitted by Norway (SLF 30/10/1) and the United Kingdom (SLF 30/10/2).

10.2 The Sub-Committee instructed the ad hoc working group on tonnage measurement to consider only necessary clarification to the regulations of the 1969 Tonnage Convention.

10.3 Having received the report of the ad hoc group (SLF 30/WP.4) the Sub-Committee agreed that:

- .1 the meaning of appendages should be taken to refer to items forming an extension of the hull below the level of the upper deck as defined in regulation 2 of the Convention;
- .2 spaces open to the sea should be taken to refer to spaces below the level of the upper deck.

reference to TM.5/Circ.1, annex, Calculation of volumes (regulation 6), paragraph 3 which lists items not to be measured but which are presently regarded as appendages by the reference to regulation 6(2), the Committee considered that this reference is misleading as the items to be added in the tonnage measurement were to be strictly determined from the definition definitions of regulation 2(4) - Enclosed spaces - and regulation 2(5) - Excluded spaces.

5 The Sub-Committee agreed that paragraph 3 of the interpretation of regulation 6 - Calculation of volumes - should be replaced by the following:

"3 With reference to regulation 6(2) enclosed spaces having a cross section area not exceeding 1 m^2 or a volume not exceeding 1 m^3 should not be included."

6 The Sub-Committee discussed the exact meaning of "weathertight" and "watertight" as quoted in the definition of "upper deck" and agreed that no additional interpretation of "weathertight" was necessary, bearing also in mind that the interpretation of "watertight" is already covered in TM.5/Circ.1.

10.7 In respect of the above several delegations were of the opinion that ships with high side erections may become a new type of "open" shelterdecker. They were of the opinion that this was not in the spirit and intent of the 1969 Tonnage Conference. Such ships in their view may not be desirable from a safety point of view.

10.8 The Committee is invited to approve the above modification to TM.5/Circ.1 and, if so, request the Secretariat to circulate to Contracting Governments a revised version.

10.9 In accordance with the instructions by the Committee, the Sub-Committee agreed that this item has been completed and consequently deleted it from the work programme.

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

11.1 The Sub-Committee had before it documents submitted by Norway (SLF 30/11/1), Poland (SLF 30/11/2, SLF 30/11/3 and SLF/37), Romania (SLF 30/11) and the USSR (SLF/46).

11.2 The Sub-Committee requested the ad hoc group on subdivision and damage stability of dry cargo ships to consider proposals for amendments to subdivision and damage stability regulations of resolution A.265(VIII), referred to in the above documents, derived from the experience gained by countries in application of the resolution.

11.3 The Sub-Committee considered the proposals by the group which were summarized as follows:

- .1 no substantial revision of resolution is recommended until more information and experience are gained;
- .2 formulae for reduction factor 'r', proposed by Poland (SLF/37) and the Netherlands (SLF 28/10/1), should be studied further with a view to future adoption;
- .3 the level of safety required by the existing regulation 5 is to be compared with the SOLAS damage stability criteria and its consequent effect on the subdivision index A calculated according to regulations 6 and 7 should be considered.

11.4 Members were invited to submit additional calculations on the index A applying damage stability criteria as well as those in regulation 5 of resolution A.265(VIII) for consideration at the next session.

12 PERIODIC REVIEW OF THE STABILITY AND SUBDIVISION REGULATIONS OF THE MODU CODE

12.1 The Sub-Committee had for its consideration documents submitted to this session by Norway (SLF 30/12 and SLF 30/12/1) and the Secretariat (SLF 30/12/2) and papers on the subject submitted by countries to the twenty-eighth and twenty-ninth sessions of this Sub-Committee and to the twenty-fifth to twenty-eighth sessions of the Sub-Committee on Ship Design and Equipment (DE 28/WP.2).

12.2 The Sub-Committee considered the paper by the Secretariat (SLF 30/12/2) outlining the outcome of the discussion within the Sub-Committee on Ship Design and Equipment at its twenty-eighth session with regard to the periodic review of the MODU Code and proposals for the procedure for review of stability and subdivision requirements of the MODU Code.

12.3 Having discussed these proposals the Sub-Committee by majority agreed to undertake consideration of the papers submitted to this session by Norway and amendments to the Preamble of the MODU Code proposed by the Sub-Committee on Ship Design and Equipment (SLF 30/12/2, annex).

12.4 Norway expressed the view that all documents submitted for this agenda item, including those to previous sessions, should be considered in order to determine which paragraphs of the Code need to be reviewed. The delegations of Finland, the Netherlands and Sweden supported this view.

12.5 The Sub-Committee noted the information by Norway (SLF 30/12) on a research project on safety of mobile offshore structures consisting of six sub-projects with the objectives to:

- .1 describe icing mechanism of an offshore structure;
- .2 develop time simulation for calculation of motion responses of semi-submersibles with large angle of heel;

- .3 investigate the dynamic response due to environmental loads with special emphasis on the capsizing of semi-submersible platforms;
- .4 define damage conditions with influence on the stability of mobile platforms that might be expected to occur in reality;
- .5 assess the influence of various environmental and physical conditions on the intact stability characteristic of mobile platforms and compare the results with traditional stability calculation;
- .6 draw the final conclusions from the technical work carried out in the various sub-projects in relation to the stability rules for mobile offshore platforms and suggest future research and development projects which can improve the safety level of these units.

12.6 The Sub-Committee also noted a document by Norway (SLF 30/12/1) in which the subject of acceptable risk level and estimation for risk level of shipping activity and offshore units was investigated. The main conclusion from these investigations was that, in order to establish an acceptable safety level in comparison to ships, probability of the loss of MODU due to collision should not exceed a certain value. The risk analysis may be used to establish acceptable safety level and such techniques should be used to define realistic conditions for the design of MODUs in future.

12.7 As requested, the Sub-Committee considered proposals by the Sub-Committee on Ship Design and Equipment for draft amendments to the Preamble and to the definitions in chapter 1 of the MODU Code (SLF 30/12/2, annex). The Sub-Committee agreed as follows:

- .1 paragraph 1 of the Preamble. The Sub-Committee agreed that there was no need to amend the Preamble;

- .2 paragraphs 1.3.13.1 and .2 of chapter 1. The Sub-Committee agreed to the proposed definitions;
- .3 paragraph 1.3.28 and new paragraph 1.6.6 bis of chapter 1. The Sub-Committee agreed that these definitions are beyond the purview of this Sub-Committee;
- .4 paragraph 1.3.13 bis of chapter 1. The Sub-Committee having noted that the term "progressive down flooding" was used without being defined in a number of IMO conventions, codes and other instruments (SLF 30/WP.5) agreed that there was no need for such a definition.

12.8 The Sub-Committee agreed that until results of current research on the subject are provided, the papers submitted to the Organization on this agenda item up to this session would not be further discussed by this Sub-Committee.

12.9 Having noted that the Sub-Committee on Ship Design and Equipment requested the Committee to schedule its twenty-ninth session in 1986 after the thirty-first session of this Sub-Committee, the Sub-Committee was of the opinion that such sequence of meetings would not have the desired effect. A more effective way would be if the Sub-Committee on Ship Design and Equipment would meet first and advise this Sub-Committee on any work on chapter 3 of the MODU Code. The Committee is requested to concur with this Sub-Committee's view in scheduling the sub-committee sessions for the next year.

- 13 REVIEW OF "GUIDANCE ON A METHOD OF CALCULATION OF THE MINIMUM DISTANCE FROM THE DEEPEST OPERATING WATERLINE TO THE LOWEST POINT OF THE TOP OF THE BULWARK OR TO THE EDGE OF THE WORKING DECK" (RECOMMENDATION 9 OF THE 1977 TORREMOLINOS CONFERENCE)

13.1 The Sub-Committee considered a document by Poland (SLF 30/13) relating to their previous document on the subject (SLF 29/11), in which a draft text of a new paragraph (2) of the Guidance was proposed introducing new values of significant wave heights in formulae for the calculation of the minimum height of the protecting freeboard and ensuing editorial amendments.

13.2 The attention of the Sub-Committee was drawn to one of the principles adopted as a basis for determining the freeboard of fishing vessels in accordance with which the main idea of estimation of the protecting freeboard was based on the limitation of the deck wetness probability during fishing operations in moderate beam seas. It was assumed that a small probability of deck wetness in these conditions was adequate to assure the safety of the crew on the working platform.

13.3 In their paper, the Polish delegation demonstrated that Recommendation 9 of the 1977 Torremolinos Conference was based on incorrect assumption with regard to the interrelation between the 5 per cent probability of shipping water on deck and the values of significant wave heights.

13.4 Having considered the draft text of a new paragraph (2) of the Guidance proposed by Poland, the Sub-Committee agreed to a revised text of Recommendation 9 of the 1977 Torremolinos Conference as set out in annex 5. The Committee is invited to adopt the revised text in lieu of Recommendation 9 of the 1977 Torremolinos Conference, for dissemination to Member Governments in an MSC circular. Having completed the work on this item the Sub-Committee deleted it from its work programme.

14 INFORMATION FOR THE MASTER ON INTACT STABILITY

14.1 The Sub-Committee noted a paper by the United States (SLF 30/14) outlining four examples of simplified stability information for the master.

14.2 With regard to annex 5 of this paper, IACS informed the Sub-Committee that it had developed the interpretation of the 1966 Load Line Convention on presentation of information on intact stability (LL.45/Rev.1) which was partly reflected in annex 5, but could not be circulated in time for this session. IACS was invited to submit the interpretation LL.45/Rev.1 well in advance of the next session of the Sub-Committee (see also paragraph 8.4) to allow Members to comment thereon before that session.

.3 The Sub-Committee agreed to consider the matter at the next session with view to its finalization. Members were invited to submit relevant comments, in particular on:

- .1 the table of contents of information desired for intact stability (after review of the IACS paper on interpretation LL.45/Rev.1);
- .2 methods for special quick appraisal on the intact stability of a ship suitable for inclusion in the stability information to be approved; and
- .3 the use of onboard computers for quick stability appraisal by the master.

15 CALCULATION OF STABILITY CURVES FOR SHIPS CARRYING TIMBER DECK CARGOES

15.1 The Sub-Committee received documents submitted by the German Democratic Republic (SLF 30/15/3), the Federal Republic of Germany (SLF 30/15/1), the USSR (SLF 30/15) and the United Kingdom (SLF 30/15/4) containing information on their national practice in respect of the method of calculation of stability curves for ships carrying timber deck cargoes.

15.2 The Sub-Committee also received a document by Poland (SLF 30/15/2) on test calculations of the righting arms for the various concepts of the permeability distribution in the deck cargo volume carried out for a ship in service.

15.3 The Sub-Committee considered the information on national practice on method of calculation of stability curves for ships carrying timber deck cargo and agreed that section 4 of appendix 1 of resolution A.167(ES.IV) as amended by resolution A.206(VII) should not be interpreted in such a way as to permit introduction of a reduced effective height of deck cargo as an equivalent to applying a permeability of 0.25. Such an interpretation would result in an overestimation of the buoyancy effect. The Sub-Committee agreed that no further action is required on the issue and deleted the item from the work programme.

16 ANY OTHER MATTERS

Double bottoms in cargo ships other than tankers

16.1 The Sub-Committee recalled that at its previous sessions it tentatively agreed to draft regulation II-1/12-1 "Double bottoms in cargo ships other than tankers" of the 1974 SOLAS Convention as amended (SLF 28/13, annex 8) and requested IACS to prepare a more definitive text of the draft regulation having regard to the existing practices of classification societies.

16.2 In accordance with the instruction of the Committee, the Sub-Committee considered the statement by IACS referred to it by the Committee (SLF 30/2, annex 2 and MSC 50/9). The Sub-Committee noted the IACS view that due to differences in detail between the rules of classification societies relating to double bottoms, the existing practices of classification societies cannot be offered in a definitive text and that the draft regulation contains sufficient flexibility to be compatible with those rules and need not be changed.

16.3 The Sub-Committee agreed to the draft regulation II-1/12-1 "Double bottoms in cargo ships other than tankers" as set out in annex 6. The Committee is invited to approve the draft regulation for inclusion in future amendments to the 1974 SOLAS Convention and take action as appropriate. The Sub-Committee deleted this item from its work programme.

Damage requirements of the IGC Code and interpretations of the IBC and IGC Codes

16.4 The Sub-Committee noted the request by the Sub-Committee on Bulk Chemicals at its thirteenth session for the consideration of a proposal by Japan concerning paragraph 2.5.2.2 of the IGC Code (SLF 30/17). In the light of discussion on the subject within the Sub-Committee, the delegation of Japan withdrew their proposal.

16.5 As requested by the Sub-Committee on Bulk Chemicals at its fourteenth session the Sub-Committee considered the interpretations of the IBC and IGC Codes concerning longitudinal extent of damage to superstructure and the range of positive stability where the residual stability should be evaluated (SLF 30/17/7) and agreed to the following:

- .1 paragraphs 2.7.8 and 2.8.1 of the IBC and IGC Codes. The Sub-Committee agreed to the interpretation;
- .2 paragraphs 2.9.3.1 of the IBC Code and 2.9.2.1 of the IGC Code. The Sub-Committee agreed that the figures should be deleted and the interpretation should be amended to read:

"The 20° range may be measured from any angle commencing between the position of equilibrium and the angle of 25° (or 30° if no deck immersion occurs)."

16.6 The Committee is invited to concur with the above comments and, if so, to instruct the Secretariat to make the necessary correction to the interpretations of the IBC and IGC Codes, as proposed by the Sub-Committee on Bulk Chemicals.

Exchange of information on standard of equivalency for the intact stability of submersible heavy-load ships

16.7 The Sub-Committee received documents submitted by the Netherlands (SLF 30/17/6), Norway (SLF 30/17/4), the USSR (SLF 30/17/1) and the United States (SLF 30/17/2) on exchange of information regarding the national practices on the intact stability of submersible heavy-load ships which submerge their load line marks during loading or unloading operations.

16.8 Having exchanged information on the subject, the Sub-Committee noted the experience in countries with application stability requirements for submersible heavy-load ships and agreed that there was no need to develop guidelines on this subject.

Voluntary load line certificates for ships less than 24 metres in length

16.9 The Sub-Committee noted a paper submitted by the United States (SLF 30/17/3) on the practice in that country with regard to the issue of voluntary load line certificates for ships less than 24 metres in length. It was noted that the United States has refused permission for voluntary International Load Line Certificates to small ships, bearing in mind that there is no agreed stability standard for smaller ships, resolution A.167(ES.IV) is not adequate for ships less than 24 metres in length and because very small ships must be viewed as at greater risk of being overwhelmed by seaway action in a full ocean environment.

16.10 The exchange of information showed that an International Load Line Certificate was not required for such ships but that some Administrations have some form of a national load line certificate. The Sub-Committee saw no need to continue consideration of this item.

Exchange of information on International Load Line Exemption Certificates

16.11 The Sub-Committee considered a document submitted by the United States (SLF 30/17/8) containing a proposal on guidelines for use by Administrations in issuing Exemption Certificates.

16.12 The Sub-Committee noted some variations in national practice and exchanged views on the need to develop such guidelines.

16.13 The Sub-Committee concluded that no formal guidelines were necessary at this time because the practice of submitted information to the Organization as requested in article 6(3) of the 1966 Load Line Convention would, in time, automatically develop sufficient informal guidelines.

Exchange of information on freeboard, calculation of block coefficient and moonpools for MODUs

16.14 The Sub-Committee had before it a document submitted by the United States (SLF 30/17/5) concerning the treatment of wells for the purpose of calculation of the freeboard of MODUs referred to in paragraphs 3.7.2.3 and 3.7.3.4 of the MODU Code and a background paper submitted by the United Kingdom (SLF/45) with the results of a study conducted with a view to justifying the need for revision of the current wording of the above paragraphs.

16.15 The Sub-Committee agreed that the matter should be considered further in the context of the review of the MODU Code. The Committee is invited to concur with this proposal and to broaden the item on periodic review of the MODU Code in the work programme accordingly. If the Committee agrees, the Sub-Committee intends to take the subject up at the next session. In order to facilitate consideration at that session, Members were invited to submit comments on the above papers.

Status of conventions, codes and other instruments

16.16 The Sub-Committee, having noted statistical data on the number of fishing vessels of 24 metres in length and over (MSC 50/17/3), urged Members to submit and periodically update their information on the number of fishing vessels flying the flag of their countries including those registered in dependent territories.

16.17 In accordance with the decision of the Committee (SLF 30/2, paragraph 2.16) to allow sub-committees to review the status of implementation of codes within their purview, the Sub-Committee discussed its course of action for reviewing the status of the recommendations developed by the Sub-Committee.

16.18 In this respect it was agreed that information on implementation by Members of:

- .1 stability criteria for passenger and cargo ships - resolution A.167(ES.IV)
- .2 stability criteria for fishing vessels - regulation 28 of the 1977 Torremolinos Convention
- .3 equivalent subdivision regulations for passenger ships - resolution A.265(VIII)
- .4 equivalent regulation 27 of the 1966 LL Convention - resolution A.320(XI)
- .5 form of record of conditions of assignment of load lines - LL.3/Circ.19

should be collated in tabular form by the Secretariat for consideration by the Sub-Committee at future sessions.

Third International Conference on Stability of Ships and Ocean Vehicles (STAB '86)

16.19 The Sub-Committee was informed by the Polish delegation that the above conference will be held in Gdansk from 22 to 26 September 1986 organized by the Ship Research Institute, Technical University of Gdansk.*

16.20 The Sub-Committee welcomed the forthcoming event. It was expected that the outcome of that conference would contribute to the work of the Sub-Committee.

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Programme

16.21 The Sub-Committee noted its work programme as revised by the Committee (SLF 30/2, annex 3). The Sub-Committee deleted items which had been finalized at this session and adjusted target dates in accordance with progress made at this session. The adjusted work programme is set out in annex 7. The Committee is invited to approve this work programme.

Arrangements for the next session

16.22 The Sub-Committee noted that the Committee had not yet allocated meeting weeks to the Sub-Committee for 1986 and 1987. It was proposed that in 1986 at least one session should be allocated. This meeting should be scheduled in early 1986 but after the thirtieth session of the Sub-Committee on Ship Design and Equipment, as proposed in paragraph 12.9. The Committee is invited to concur with this proposal.

16.23 The Sub-Committee agreed on items to be included in the agenda for the thirty-first session, as set out in annex 8. It was agreed to establish ad hoc working groups at the next session on the following items:

- .1 requirements for the probability of survival of dry cargo ships;
- .2 intact stability;
- .3 standards for residual damage stability of passenger ships.

16.24 Members of the Sub-Committee were reminded of the decision by the Committee on the submission of documents which is that 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. Other non-bulky documents should be received by the Secretariat not later than two months before the session. Non-bulky documents containing comments to basic documents, and documents of a purely informative nature may be accepted provided that they are received by the Secretariat not later than one month before the opening of the session.

17 ACTION REQUESTED OF THE COMMITTEE

The Committee is invited to approve the report of the Sub-Committee at its thirtieth session in general and in particular to:

- .1 note the views with regard to work on the subject of subdivision and damage stability of dry cargo ships including ro-ro ships as referred to in paragraphs 3.3 and 3.4;
- .2 approve the draft guidelines for the preparation of information on the effect of flooding to be provided to masters of new dry cargo ships for distribution in an MSC circular as referred to in paragraphs 3.9 and 3.11 and set out in annex 2;
- .3 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 of 24 metres in length and over for submission to the Assembly at its fourteenth session for adoption as referred to in paragraph 4.7 and set out in annex 4;
- .4 approve the modification to TM.5/Circ.1 and request the Secretariat to circulate a revision of TM.5/Circ.1 to Contracting Governments as referred to in paragraph 10.5 and 10.8;
- .5 concur with the Sub-Committee's view that in respect of the periodic review of the stability and subdivision regulations of the MODU Code this Sub-Committee would like to meet after the Sub-Committee on Ship Design and Equipment next year as referred to in paragraphs 12.9 and 16.22;

- .6 approve the guidance on a method of calculating the minimum distance from the deepest operating waterline to the lowest point of the top of the bulwark or to the edge of the working deck of fishing vessels for distribution in an MSC circular to Member Governments as referred to in paragraph 13.4 and set out in annex 5;
- .7 approve the draft regulation II-1/12-1 "Double bottoms in cargo ships other than tankers" for inclusion in future amendments to the 1974 SOLAS Convention and to take action as appropriate as referred to in paragraph 16.3 and set out in annex 6;
- .8 concur with the comments on interpretations of the IBC and IGC Codes and instruct the Secretariat to make necessary correction to the interpretations proposed by the Sub-Committee on Bulk Chemicals as referred to in paragraphs 16.5 and 16.6;
- .9 concur with the Sub-Committee's proposal to broaden the work programme item on the MODU Code review to include load line matters as referred to in paragraph 16.15;
- .10 approve the modified work programme of the Sub-Committee as referred to in paragraph 16.21 and set out in annex 7.

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AGENDA FOR THE THIRTIETH SESSION, INCLUDING LIST
OF DOCUMENTS CONSIDERED

1 Adoption of the agenda

SLF 30/1 Provisional agenda

2 Decisions by the Maritime Safety Committee

SLF 30/2 Secretariat

3 Subdivision and damage stability of dry cargo ships including ro-ro ships

SLF 30/WP.6 Ad Hoc Group
SLF 30/INF.2 Japan

.1 information for the master

SLF 30/3/1	USSR	SLF 29/15,	
SLF 30/3/5	United States	Annex 2	Sub-Committee

.2 subdivision and damage stability of dry cargo ships including ro-ro ships (draft probabilistic method)

SLF 30/3	USSR	SLF/39	Netherlands
SLF 30/3/2	Poland	SLF/42	Japan
SLF 30/3/3	Norway	SLF/44	France
SLF 30/3/4	Norway	SLF/47	China
SLF 30/3/6	United States	SLF 29/15,	
SLF 30/3/7	Poland	Annex 3	Sub-Committee
SLF 30/3/9	Netherlands		
SLF 30/WP.2	Norway		

.3 subdivision and damage stability of dry cargo ships including ro-ro ships (draft deterministic method)

SLF 30/3/6	United States	SLF/41	Japan
SLF 30/3/8	Netherlands	SLF/44	France
		SLF 29/WP.2	France & United States

4 Intact stability

SLF 30/WP.7 Ad Hoc Group
SLF 30/WP.7/Add.1
Ad Hoc Group

.1 weather criterion

SLF 30/4/1	Secretariat	MSC/Circ.346 & Corr.1
SLF 30/4/3	United Kingdom	SLF/43 Japan
SLF 30/4/6	Japan	SLF 29/4/3 Poland

.2 stability of ships in following waves

SLF 30/4	Federal Republic of Germany	SLF/34	Federal Republic of Germany
SLF 30/4/2	Norway	STAB XXVI/4/7	German Democra- tic Republic & Poland
SLF 30/4/5	United Kingdom	SLF/17	German Democra- tic Republic

.3 analysis of intact stability casualty records

SLF 30/4/4	Poland	SLF/33	Secretariat
		SLF/38	Poland

.4 external forces caused by fishing gear

SLF/36	Secretariat
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.5 problems concerning stability criteria

SLF/35	Federal Republic of Germany
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5 Collection and analysis of damage cards

6 Standards and practices on icing

SLF 30/6	USSR	SLF/40	USSR
SLF 30/6/1	Norway		

- 7 Minimum acceptable standards of residual stability after damage for passenger ships
- | | | | |
|------------|-----------------------------|--------------------|---------------|
| SLF 30/7 | German Democratic Republic | SLF 29/15, Annex 5 | Sub-Committee |
| SLF 30/7/1 | Federal Republic of Germany | | |
| SLF 30/7/2 | USSR | | |
| SLF 30/7/3 | United States | | |
| SLF 30/7/4 | Poland | | |
| SLF 30/7/5 | Norway | | |
| SLF 30/7/6 | United Kingdom | | |
- 8 Consideration of interpretations of the 1966 Load Line Convention proposed by IACS
- | | | | |
|-------------|------|------------|------|
| SLF 30/8 | IACS | SLF 29/8/1 | IACS |
| SLF 30/WP.1 | IACS | | |
- 9 Consideration of basic principles for a future revision of the 1966 Load Line Convention
- | | | | |
|------------|---------------|--|--|
| SLF 30/9 | USSR | | |
| SLF 30/9/1 | United States | | |
| SLF 30/9/2 | Norway | | |
- 10 Clarification of specific regulations of the 1969 Tonnage Convention
- | | | | |
|-------------|---|-------------|--|
| SLF 30/10 | Federal Republic of Germany & Netherlands | TM.5/Circ.1 | |
| SLF 30/10/1 | Norway | | |
| SLF 30/10/2 | United Kingdom | | |
| SLF 30/WP.4 | Ad Hoc Group | | |
- 11 Review of experience of applying the subdivision and damage stability regulations for passenger ships (resolution A.265(VIII))
- | | | | |
|-------------|--------------|-------------|-------------|
| SLF 30/11 | Romania | SLF/37 | Poland |
| SLF 30/11/1 | Norway | SLF/46 | USSR |
| SLF 30/11/2 | Poland | SLF 28/10/1 | Netherlands |
| SLF 30/11/3 | Poland | SLF/1 | Poland |
| SLF 30/WP.6 | Ad Hoc Group | SLF/26 | Poland |

2 Periodic review of the stability and subdivision regulations of the MODU Code

SLF 30/12	Norway	SLF 29/14	USSR
SLF 30/12/1	Norway	SLF 29/14/3	Norway
SLF 30/12/2	Secretariat	SLF 28/12/2	Norway
SLF 30/WP.5	Secretariat	DE 28/WP.2	Secretariat
		DE 28/5/1	IADC
		DE 28/5/4	United States
		DE 28/5/5	United States
		DE 28/5/8	Japan
		DE 28/5/9	United Kingdom

13 Review of "Guidance on a method of calculation of the minimum distance from the deepest operating waterline to the lowest point of the top of the bulwark or to the edge of the working deck" (Recommendation 9 of the 1977 Torremolinos Conference)

SLF 30/13 Poland

14 Information for the master on intact stability

SLF 30/14	United States	SLF 29/14/1	USSR
		SLF 29/14/2	Norway
		SLF 29/14/6	United Kingdom
		SLF 28/12/3	United States
		Resolution A.167(ES.IV)	
		Resolution A.168(ES.IV)	
		Recommendation 4,	
		1977 Torremolinos Conference	

15 Calculation of stability curves for ships carrying timber deck cargoes

SLF 30/15	USSR	SLF 29/14/5	Poland
SLF 30/15/1	Federal Republic of Germany	Resolution A.206(VII)	
SLF 30/15/2	Poland		
SLF 30/15/3	German Democratic Republic		
SLF 30/15/4	United Kingdom		

16 Election of Chairman and Vice-Chairman for 1986

17 Any other matters

.1 double bottoms in cargo ships other than tankers

SLF 30/2,
Annex 2 Secretariat

.2 damage requirements of the IGC Code and interpretations of the IBC and IGC Codes

SLF 30/17 Secretariat
SLF 30/17/7 Secretariat

.3 exchange of information on standard of equivalency for the intact stability of submersible heavy-load ships

SLF 30/17/1 USSR
SLF 30/17/2 United States
SLF 30/17/4 Norway
SLF 30/17/6 Netherlands

.4 load line certificates

.4.1 voluntary load line certificates for ships less than 24 metres in length

SLF 30/17/3 United States

.4.2 exchange of information on International Load Line Exemption Certificates

SLF 30/17/8 United States

.5 exchange of information on freeboard, calculation of block coefficient and moonpools for MODUs

SLF 30/17/5 United States SLF/45 United Kingdom

.6 status of conventions and codes

SLF 30/2 Secretariat MSC 50/17/3 Secretariat

SLF 30/18
ANNEX 1
Page 6

- .7 adjustment of the work programme and items to be included in the agenda for the thirty-first session

SLF 30/2,
Annex 3 Secretariat
SLF 30/WP.3 Secretariat

18 Report to the Maritime Safety Committee

SLF 30/WP.8	Secretariat
SLF 30/WP.8/Add.1	Secretariat
SLF 30/WP.8/Add.2	Secretariat
SLF 30/WP.8/Add.3	Secretariat
SLF 30/WP.8/Add.4	Secretariat
SLF 30/18	Sub-Committee

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ANNEX 2DRAFT GUIDELINES FOR THE PREPARATION OF INFORMATION ON THE EFFECT
OF FLOODING TO BE PROVIDED TO MASTERS OF DRY CARGO SHIPS

- 1 The information provided on the effect of flooding, together with the damage control plan (resolution A.515(13), regulation II-1/23-1 of the 1974 SOLAS Convention as amended) and any associated booklet, intends to assist the master in exercising his judgement in cases of serious flooding of the ship. It is not meant to replace his judgement but to make him aware of the capabilities of the ship.
- 2 Cases to be investigated and provided in this information should at least include the flooding of the machinery space and each cargo compartment individually. The cases to be investigated for cargo ships with unusual compartmentation may require special consideration.
- 3 For these investigations the ship should be considered, before flooding, as floating on even keel at least for two separate draughts, one of which is to include the summer load line draught. The centre of gravity of the ship (KG) should be taken either from intact stability information or should correspond to the assumed load condition.
- 4 When considering flooding of the machinery space, a permeability of 0.85 should be used. For flooding of cargo compartments a range of anticipated permeabilities should be applied. These permeabilities need not be lower than 0.60 nor be greater than 0.95.
- 5 The results of these flooding investigations should be presented in a concise, easily assimilated form for each condition. Critical factors could be presented in tabular format. A description of the assumptions made in compiling the information should also be given.

ANNEX 3

DRAFT PROBABILISTIC METHOD TO BE TESTED ON DRY CARGO SHIPS

1 Ocean-going dry cargo ships are to have watertight subdivision such that the attained subdivision index A is not less than some required subdivision index R. The value of R will be determined based on an evaluation of various ships and shall reflect a level of safety already obtained by existing ships. It is expected that the value of R will be a function of subdivision length, L_s , as defined in resolution A.265(VIII).

2 The attained subdivision index A is to be calculated according to the following:

$$A = \sum a.p.s$$

Calculations are to be carried out for all compartments and groups of compartments which contribute to the index A.

- .1 The values of 'a' and 'p' (uncorrected for 'r') are to have the same meaning and are to be calculated in accordance with resolution A.265(VIII). Realizing that the difference will be small, it would be of interest to calculate 'a.p' according to the Polish method outlined in SLF 30/3/7 and SLF/1.
- .2 The value of the reduction factor 'r' for longitudinal subdivision may be calculated by the method outlined in the Polish paper (SLF/37). The contribution of longitudinal subdivision shall not be limited by the height of the double bottom in the ship.
- .3 The value of 's' shall be of the form $s = 4.9 \sqrt{x}$ and shall be calculated according to the Polish method (SLF 30/3/7), noting the limitation on heel angle of [15] degrees.
- .4 The value of GM_R in the formulation of 's' shall be the minimum value allowed due to intact stability considerations or as required by Administrations.

ANNEX 4

DRAFT ASSEMBLY RESOLUTION A....(14)

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

ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO resolution A.167(ES.IV) as amended by resolution A.206(VII) the recommendation on intact stability for passenger and cargo ships under 24 m in length,

NOTING 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 of 24 m in length and over,

HAVING CONSIDERED the recommendations made by the Maritime Safety Committee at its fifty-first session,

A

1 ADOPTS the Recommendation on a Severe Wind and Rolling Criterion (Weather Criterion) for Passenger and Cargo Ships of 24 m in length and over, the text of which is set out in the Annex to this resolution, which is also recommended for fishing vessels of 45 m in length and over in unrestricted service,

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 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 to develop improved and additional stability criteria and to review the weather criteria for particular types of craft referred to in paragraph 1, in particular for fishing vessels below 45 m in length, with a view to any possible harmonization which may be achieved between them and to report to the Assembly in due course.

ANNEX

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

(recommended also for fishing vessels of 45 m
in length and over in unrestricted service)

1 Scope

- 1.1 The criterion given hereunder is recommended for new decked seagoing passenger and cargo ships of 24 m in length and over 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 m 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 m in length.
- 1.3 The minimum stability of passenger and cargo ships of 100 m 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.

3 The calculations are to be carried out for operating draughts (on even keel) using the draught distribution of resolution A.265(VIII).

4 Permeabilities for cargo compartments are to reflect anticipated values in the vessel's service. Where the draught variations are due to cargo loadings which affect the flooding permeabilities, the value of μ may be determined as in regulation 4 of resolution A.265(VIII).

5 For this investigation, damage which causes flooding may be limited vertically to the following:

- .1 from the baseline up to, but not including, the first watertight deck above the summer load waterline;
- .2 from the baseline up to and including the first watertight deck above the summer load waterline.

6 Results of this investigation, when submitted, should include the following information:

- .1 profile and arrangements of the vessel with watertight boundaries clearly marked;
- .2 initial draught, KG, GM (required or actual) and permeability assumptions;
- .3 description of damaged compartments;
- .4 final damage conditions, including F_e , GM_e , heel angle and preferably range of stability and GZ_{max} ;
- .5 all a, p, s and r values;
- .6 attained subdivision index A.

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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 standard condition of loading, with reference to the figure 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 (ℓw_1).
- .2 From the resultant angle of equilibrium (θ_0), the ship is assumed to roll due to wave action to an angle of roll (θ_1) to windward. Attention should be paid to the effect of steady wind so that excessive resultant angles of heel are avoided.*
- .3 The ship is then subjected to a gust wind pressure which results in a gust wind heeling lever (ℓw_2).
- .4 Under these circumstances, area "b" should be equal to or greater than area "a".
- .5 Free surface effects should be accounted for in the standard conditions of loading, e.g. according to appendix 1 to resolution A.167(ES.IV).

* The angle of heel under action of steady wind (θ_0) should be limited to a certain angle to the satisfaction of the Administration. As a guide, 16° or 80% of the angle of deck edge immersion, whichever is less, are suggested.

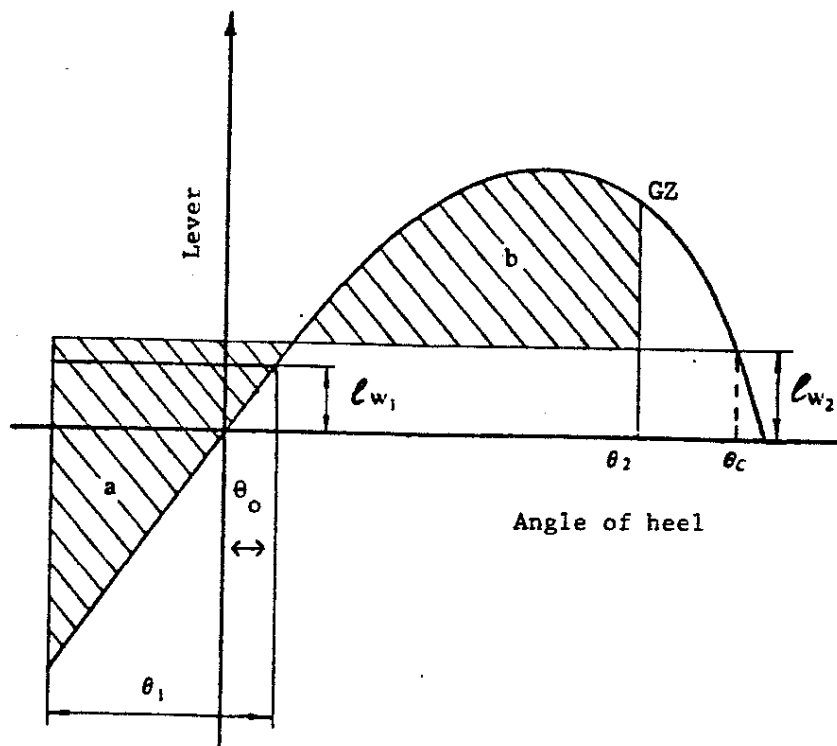


Figure - Severe wind and rolling

The angles in the above figure are defined as follows:

θ_0 = angle of heel under action of steady wind (refer to 2.1.2 and footnote)

θ_1 = angle of roll to windward due to wave action

θ_2 = angle of downflooding (θ_f) or 50° or θ_c whichever is less,

where:

θ_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.

θ_c = angle of second intercept between wind heeling lever lw_1 and GZ curves.

2.2 The wind heeling levers lw_1 and lw_2 referred to in 2.1.1 and 2.1.3 are constant values at all angles of inclination and should be calculated as follows:

$$lw_1 = \frac{P \cdot A \cdot Z}{\Delta} \text{ (m)} \text{ and } lw_2 = 1.5 lw_1 \text{ (m)}$$

where: $P = 0.0514 (t/m^2)^*$

A = projected lateral area of the portion of the ship and deck cargo above the waterline (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)

Δ = displacement (t)

2.3 The angle of roll (θ_1)** referred to in 2.1.2 should be calculated as follows:

$$\theta_1 = 109k \cdot X_1 \cdot X_2 \sqrt{r \cdot s} \text{ (degrees)}$$

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 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

$$r = 0.73 \pm 0.6 \text{ OG/d}$$

with: OG = distance between the centre of gravity and waterline (m) (+ above, - below)

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

s = factor as shown in table 4

* The value of P used for ships in restricted service may be reduced subject to the approval of the Administration.

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

Table 1

Values of factor X_1

B/d	X_1
≤ 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
≥ 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

$\frac{A_K \cdot 100}{L \cdot B}$	k
0	1.0
1.0	.98
1.5	.95
2.0	.88
2.5	.79
3.0	.74
3.5	.72
≥ 4.0	.70

Table 4

Values of factor s

T	s
≤ 6	0.100
7	0.098
8	0.093
12	0.065
14	0.053
16	0.044
18	0.038
≥ 20	0.035

(intermediate values in tables 1 - 4 should be obtained by linear interpolation).

$$\text{Rolling period } T = \frac{2 C \cdot B}{\sqrt{GM}} \quad (\text{second})$$

$$\text{where: } C = 0.373 + 0.023 (B/d) - 0.043 (L/100)$$

The symbols in the above tables and formula for the rolling period are defined as follows:

- L = waterline length of the ship (m)
- B = moulded breadth of the ship (m)
- 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)
- GM = metacentric height corrected for free surface effect (m).

ANNEX 5PROTECTION OF THE CREW OF FISHING VESSELS FROM WATER
SHIPPED ON DECK

Guidance on a method of calculating the minimum
distance from the deepest operating waterline
to the lowest point of the top of the bulwark
or to the edge of the working deck

The minimum vertical distance from the deepest operating waterline to the lowest point of the bulwark or to the edge of the working deck if guard rails are fitted, referred to in regulation 108(2)* of the Torremolinos International Convention for the Safety of Fishing Vessels, 1977 should be determined for each vessel, taking into account the probability of shipping water on the deck when the vessel is in moderate beam seas when fishing. This probability should not be greater than 5%. The calculations should take account of the damping coefficient associated with the presence of bilge keels or any other roll damping arrangements.

2 Where no national practice exists, this distance may be determined by means of the following formulae, based upon the regression analysis of results of the calculations of the probability of shipping water on deck which is assumed to be 5% when the vessel is fishing in beam seas with the significant wave heights of about 2.9 m and about 1.4 m respectively:

$$H = 0.53 + 0.11B + 0.32(2.60 - \frac{B}{d}) + 0.85(C_B - 0.60) + 0.61(GM - 0.70) \text{ (m)}$$

for vessels which are intended to stop their fishing operations at the significant wave heights of more than 2.9 m, and

* Regulation 108(2):

"The minimum vertical distance from the deepest operating waterline to the lowest point of the top of the bulwark, or to the edge of the working deck if guard rails are fitted shall ensure adequate protection of the crew from water shipped on deck, taking into account the sea states and the weather conditions in which the vessel may operate, the areas of operation, type of vessel and its method of fishing and shall be to the satisfaction of the Administration."

$$H = 0.80 + 0.23(2.60 - \frac{B}{d}), + 0.52(C_B - 0.60) + 0.62(GM - 0.70) \text{ (m)}$$

for vessels which are intended to stop their fishing operations at the significant wave height of 1.4 m; if the significant wave heights are between 2.9 m and 1.4 m the values of H should be determined by linear interpolations. In the above formulae:

B = maximum breadth of the vessel, measured amidships to the moulded line of the frame in a vessel with a metal shell and to the outer surface of the hull in a vessel with a shell of any other material. (m)

d = maximum permissible moulded draught (m)

C_B = block coefficient

GM = initial metacentric height (m)

All dimensions correspond to the deepest operating waterline.

ANNEX 6

PROPOSED AMENDMENTS TO CHAPTER II-1 OF THE
1974 SOLAS CONVENTION AS AMENDED

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."

ANNEX 7

WORK PROGRAMME OF THE SUB-COMMITTEE

		<u>Target completion date</u>
1	Subdivision and damage stability of dry cargo ships including ro-ro ships:	
	.1 probabilistic concept of survival	1988
2	Intact stability:	
	.1 review of IMO criteria (resolutions A.167(ES.IV) and A.168(ES.IV)) including harmonization of agreed weather criterion with those for different types of ships	1988
	.2 improved criteria taking into account the effect of following, quartering and breaking seas, external forces and other factors affecting stability as well as systematic model tests	continuous
	.3 stability of pontoons - evaluation of experience to set a single standard	1988
	.4 collection and analysis of intact stability casualty records	continuous
	.5 information for the master on intact stability	1987
3	Collection and analysis of damage cards	continuous
4	Standards and practices on icing	1987
5	Standards of residual damage stability for passenger ships	1986
6	Interpretations of the 1966 Load Line Convention proposed by IACS	1986
7	Basic principles for a future revision of the 1966 Load Line Convention	continuous

	<u>Target completion date</u>
8 Review of experience of applying the subdivision and damage stability regulations for passenger ships (resolution A.265(VIII))	1987
9 Periodic review of the stability and subdivision [and load line]* requirements of the MODU Code	1987/88

* Pending the decision of the MSC (see paragraph 16.15 of the report).

ANNEX 8ITEMS TO BE INCLUDED IN THE AGENDA FOR THE
THIRTY-FIRST SESSION

- 1 Subdivision and damage stability of dry cargo ships including ro-ro ships (ad hoc group 1)
- 2 Intact stability (ad hoc group 2)
 - .1 review of IMO criteria (resolutions A.167(ES.IV) and A.168(ES.IV)) including harmonization of agreed weather criterion with those for different types of ships
 - .2 improved criteria taking into account the effect of following, quartering and breaking seas, external forces and other factors affecting stability as well as systematic model tests
 - .3 stability of pontoons - evaluation of experience to set a single standard
 - .4 collection and analysis of intact stability casualty records
- 3 External forces caused by fishing gear
- 4 Standards and practices on icing
- 5 Standards of residual damage stability for passenger ships (ad hoc group 3)
- 6 Interpretations of the 1966 Load Line Convention proposed by IACS
- 7 Basic principles for a future revision of the 1966 Load Line Convention
- 8 Review of experience of applying the subdivision and damage stability regulations for passenger ships (resolution A.265(VIII)) (ad hoc group 1)
- 9 Periodic review of the stability and subdivision [and load line]* requirements of the MODU Code
- 10 Information for the master on intact stability
- 11 Status of instruments related to the work of the Sub-Committee

* Pending the decision of the MSC (see paragraph 16.15 of the report).