INTERNATIONAL MARITIME ORGANIZATION

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SUB-COMMITTEE ON STABILITY AND LOAD LINES AND ON FISHING VESSELS SAFETY
51st session
Agenda item 4

SLF 51/4
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REVISION OF THE INTACT STABILITY CODE

Report of the working group (part 2)

Submitted by the chairman of the working group

SUMMARY

Executive summary:	This document provides part 2 of the report of the Working Group on Intact Stability established at SLF 50
Action to be taken:	Paragraph 12
Related documents:	SLF 50/WP.2; SLF 50/4; SLF 50/4/4; SLF 50/4/9; SLF 50/4/11; SLF 50/4/12; SLF 50/INF.2 and SLF 47/6

General

1 The Working Group on Intact Stability (IS) met from 30 April to 4 May 2007 under the chairmanship of Mr. A. Francescutto (Italy). Following the presentation of part 1 of the group's report to the Sub-Committee (SLF 50/WP.2), the group continued to discuss the revision of the IS Code. This document presents part 2 of the group's report.

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

BRAZIL
CHINA
FINLAND
FRANCE
GERMANY
GREECE
ITALY
JAPAN
NETHERLANDS
NORWAY
POLAND
PORTUGAL
REPUBLIC OF KOREA
SPAIN
SWEDEN
SYRIAN ARAB REPUBLIC
TURKEY
UNITED KINGDOM
UNITED STATES

the following Associate Member of IMO:

HONG KONG, CHINA

and an observer from the following non-governmental organization:

ROYAL INSTITUTION OF NAVAL ARCHITECTS (RINA)

Terms of reference

3 Taking into account the comments made and decisions taken in plenary, the working group is instructed to:

.1 finalize the draft revised IS Code on the basis of document SLF 50/4/1, including matters related to the inclusion of an equivalency section in part A of the draft revised IS Code, the problem of some ships with wide beam and small depth and regulations for certain types of ships, taking into account documents SLF 50/4/5, SLF 50/4/6, SLF 50/4/7, SLF 50/4/8, SLF 50/4/10 and SLF 50/4/11;

.2 finalize the draft amendments to the 1974 SOLAS Convention and the 1988 LL Protocol based on paragraphs 4 and 5 of document SLF 50/4/10;

.3 finalize the draft Explanatory Notes to the revised Intact Stability Code on the basis of document SLF 50/4/2, taking into account document SLF 50/4/3;

.4 further consider the dynamic stability and performance-based criteria, taking into account documents SLF 50/4, SLF 50/4/4, SLF 50/4/9, SLF 50/4/11, SLF 50/4/12 and SLF 50/INF.2;

.5 consider IACS unified interpretation SC 178 on Emergency fire pumps in cargo ships (FP 51/9/9) and advise the Sub-Committee as appropriate;

.6 review the plan of action contained in annex 8 of document SLF 49/17, taking into account the progress made during the session;

.7 consider whether it is necessary to establish a correspondence group and, if so, prepare terms of reference for consideration by the Sub-Committee; and

.8 submit a written report (part 1) by Thursday, 3 May 2007, except on item .4 above; and continue working through the week on item .4 and submit part 2 of the report to SLF 51, as soon as possible after this session so that it can be taken into account by the correspondence group, if established.

4 The group had for its consideration documents SLF 50/4 (Chairman), SLF 50/4/1, SLF 50/4/2, SLF 50/4/9, SLF 50/4/10 and SLF 50/INF.2 (Germany), SLF 50/4/3 (Turkey), SLF 50/4/4 (Japan, the Netherlands and the United States), SLF 50/4/5 and SLF 50/4/12 (Italy), SLF 50/4/6 (Japan), SLF 50/4/8 (China), SLF 50/4/11 (Poland), SLF 50/4/13 (Secretariat), SLF 50/INF.3 (Republic of Korea) and FP 51/9/9 (IACS).

Extent of Application of New Generation Criteria

5 The group considered the matter of the application of the new generation criteria in reference to the existing criteria contained in the IS Code and noted its discussions during SLF 46 (document SLF 47/6, paragraphs 4 to 7), which for convenience are re-stated below:

"Weather Criterion

4 The group considered in detail the documents SLF 46/6/7, SLF 46/6/8, SLF 46/6/10, SLF 46/6/12, SLF 46/6/14, SLF 46/6/15, SLF 46/6/16, SLF 46/6/17 and SLF 46/6/18. After extensive discussion, the group agreed on the following:

.1 the intact stability of the dead ship condition under the effect of wind and waves needs to be assessed; and

.2 due to the interrelation of coefficients in the current weather criteria, any change of coefficients requires thorough investigation and validation which made it difficult to accomplish the revision process for all involved coefficients for any type of ship in the short term.

5 In view of the above, the group suggested:

.1 for the short term, to concentrate efforts regarding the revision of the weather criterion on the establishment of interim provisions, such as guidelines for model experiments and full scale trials, to the satisfaction of the Administration. The current criteria should be kept as standard until new criteria are agreed upon;

.2 to address the intact stability of the dead ship condition in the long-term approach; and

.3 that documents SLF 46/6/7, SLF 46/6/8, SLF 46/6/10, SLF 46/6/12, SLF 46/6/14, SLF 46/6/15, SLF 46/6/16, SLF 46/6/17 and SLF 46/6/18 would be further considered during the work of the intersessional correspondence group and in the development of the long-term approach.

Long-term approach

6 During discussion on documents SLF 46/6/4, SLF 46/6/6 and SLF 46/6/9 about the work that should be carried during the long-term approach, it turned up that the meaning of 'physics-based performance criteria' needed to be defined more clearly. In this respect, some kinds of criteria were explicitly named, such as scenario-based, probabilistic, deterministic, prescriptive, etc. It was agreed that a definition should be formulated with high priority in the short term.

7 Taking up the discussion about phenomena for which criteria should be developed, it was considered helpful by the group to structure the work under the following headlines:

.1 phenomena in beam waves;

.2 phenomena linked to stability alterations and stability loss in waves;

.3 phenomena linked to manoeuvrability (e.g. large heeling angles in full speed turning, broaching, etc.); and

.4 phenomena related to wind action."

6 In considering the types of new generation criteria, the group returned to the discussion summarized in paragraph 6 of document SLF 47/6 and noted that such criteria could have a probabilistic or deterministic form combined with a performance-based or parametric treatment of the stability.

7 The group agreed that the updated plan of action for the intact stability work (SLF 50/WP.2, annex 6) covered the elements discussed in paragraph 7 of document SLF 47/6.

8 The group conducted an extensive discussion of how the new generation criteria, described in the update plan of action (SLF 50/WP.2, annex 6) would be implemented, and had the view that new generation criteria (described under paragraphs 2.4 and 2.5 of annex 6 to SLF 50/WP.2), once developed, could be applied to certain ships that possibly could be more susceptible to hazards not or insufficiently covered by the existing criteria, as assessed by way of "vulnerability criteria" (referred to in paragraph 2.3 of annex 6 to SLF 50/WP.2). In so doing, the new generation criteria would be considered, for the time being, as a supplement or as part of an alternative to the existing criteria. Further, the group agreed that new generation criteria should be implemented into part A of the IS Code as mandatory criteria, when appropriate verification and validation is done and sufficient experience is gained through application of the Interim Guideline.

Framework: problems to be considered and methods available

9 Three phenomena to be included in the performance-based intact stability criteria were agreed by the Sub-Committee during SLF 49, as follows:

.1 restoring arm variation problems such as parametric excitation and pure loss of stability;

.2 stability under dead ship condition defined by SOLAS regulation II-1/3-8; and

.3 manoeuvring-related problems in waves such as broaching-to.

10 In considering the problems connected with the implementation of new criteria (SLF 50/WP.2, annex 6) and after thorough discussion, the group prepared the list of problems and available methods, as set out in the annex, to be referred to the correspondence group for further consideration.

11 With the aim of providing thorough comparisons and validation of the developed methodologies, the need of exchanging ship plans whether possible and of considering common/public hull forms and other data was identified by the group.

Action requested of the Sub-Committee

12 The Sub-Committee is invited to consider the above information and take action as appropriate.

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ANNEX

PROBLEMS TO BE CONSIDERED – METHODS AVAILABLE

1 General problems

.1 advantage / disadvantage of probabilistic criteria;
.2 time dependence;
.3 an assumed situation; and
.4 hypothesis of capsizing.

2 Other problems

.1 the problem of rarity; and
.2 benchmarking.

3 Methods for regular waves

.1 nonlinear dynamics – bifurcation analysis; and
.2 numerical codes.

4 Methods for irregular waves

.1 numerical codes;
.2 time scale split method;
.3 statistical extrapolation; and
.4 long-term route scenario simulation.

5 Scenarios suggested for preliminary studies and comparisons

.1 beam seas – no wind – regular waves;
.2 beam seas – wind and drift- regular waves;
.3 beam seas – no wind – irregular waves;
.4 beam seas – gusty wind - irregular waves;
.5 beam seas – wind and drift- irregular waves;
.6 following seas – pure loss of stability / surf-riding / broaching;
.7 longitudinal regular wave – parametric resonance;
.8 longitudinal irregular wave – parametric resonance;
.9 quartering/oblique regular seas – parametric resonance; and
.10 quartering/oblique irregular seas – parametric resonance.

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