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CONSTRUCTION
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Agenda item 8

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**REVISION OF SOLAS CHAPTERS II-1 (PART C) AND V, AND RELATED INSTRUMENTS
REGARDING STEERING AND PROPULSION REQUIREMENTS, TO ADDRESS BOTH
TRADITIONAL AND NON-TRADITIONAL PROPULSION AND STEERING SYSTEMS**

Comments on document SDC 11/8/1

Submitted by Japan, the Republic of Korea, ICS and ASEF

SUMMARY

<i>Executive summary:</i>	This document comments on document SDC 11/8/1, i.e. part 2 of the report of the Correspondence Group on the Revision of SOLAS Chapters II-1 (part C) and V, and related instruments, with regard to the mandatory application of the manoeuvrability standards in SOLAS regulations.			
<i>Strategic direction, if applicable:</i>	2			
<i>Output:</i>	2.9			
<i>Action to be taken:</i>	Paragraph 20			
<i>Related documents:</i>	MSC 105/18/1; SDC 11/INF.2; MSC.64(67) and MSC.137(76)	SDC 10/WP.4; MSC.1/Circ.1053;	SDC 11/8/1, resolutions	SDC 11/8/2, A.601(15);

Introduction

1 This document is submitted in accordance with the provisions of paragraph 6.12.5 of the *Organization and method of work of the Maritime Safety Committee and Marine Environment Protection Committee and their subsidiary bodies* (MSC-MEPC.1/Circ.5/Rev.5), and includes comments on document SDC 11/8/1 (Japan).

2 SDC 10 established the Correspondence Group on Revision of SOLAS chapters II-1 (part C) and V (the Group), and related instruments, regarding steering and propulsion requirements, to address both traditional and non-traditional systems. The Group, having considered draft amendments to SOLAS regulations based on annex 2 of document SDC 10/WP.4, taking into account document MSC 105/18/1 (Austria et al.), prepared the draft new SOLAS regulations II-1/28-1 and II-1/29-1 set out in annexes 1 and 2 of document SDC 11/8/1, for further consideration by the Sub-Committee.

Discussion

3 The draft SOLAS regulations II-1/28-1 and 29-1 prepared by the Group include optional texts to make specific requirements in resolutions A.601(15) and MSC.137(76) and MSC.1/Circ.1053 mandatory. These resolutions and circular are currently treated as recommendatory under the existing SOLAS regulations. The co-sponsors consider it premature to make these instruments mandatory in view of practical difficulties in implementation and unclear effects on the improvement of safety.

4 During the discussion in the Group, several members raised issues that could arise from making the relevant resolutions/circular mandatory. These issues were included in paragraphs 9 and 17 of document SDC 11/8/1. Japan had also raised these issues at SDC 10, as specified in paragraph 8.16 of document SDC 10/17.

5 Additionally, during the Group's deliberations, Japan provided data obtained from actual sea trials. Japan has submitted document SDC 11/INF.2, which provides information on full astern tests for the Sub-Committee's consideration.

6 As grounds for considering the mandatory application of the relevant resolutions/circular through the draft SOLAS regulations as premature, the co-sponsors provide the following issues to show areas requiring further consideration. Additionally, detailed information and comments on specific issues are provided in documents SDC 11/INF.2 and SDC 11/8/2.

Stopping ability

7 The existing SOLAS regulation II-1/28 only requires measuring and recording the ship's ability to stop within a reasonable distance. On the other hand, the proposed new SOLAS regulation II-1/28-1 requires compliance with the stopping ability requirements in resolution MSC.137(76). There are the following practical issues in the implementation as explained in document SDC 11/INF.2:

- .1 significant variability in the full astern stopping test results was observed, even among sister ships. Furthermore, the primary cause of variations in the measured overall track reach was identified as external factors, such as wind, waves and tidal currents. Therefore, the full astern stopping test procedure in resolution MSC.137(76) was not appropriate to verify stopping ability accurately; and
- .2 a number of ships would exceed the current threshold of 15 ship lengths specified in resolution MSC.137(76), indicating that the current criterion is not suitable as a performance baseline for the present state of the fleet.

8 Thus, making stopping ability requirements in resolution MSC.137(76) mandatory means introducing rigid requirements based on unreliable test procedures and inappropriate criteria that are not well-suited to the actual conditions of current sea trials.

Ship steering performance

9 The draft SOLAS regulation II-1/29-1 prepared by the Group proposes a new test procedure "heading-keeping test" as an alternative to the Zig-Zag test for evaluating ships' manoeuvrability. However, the heading-keeping test cannot evaluate ships' own manoeuvrability as the Zig-Zag test, since the heading-keeping test only checks whether ships are capable of sailing in a straight line or not with well-tuned autopilot or a well-trained helmsman; and this is explained in document SDC 11/8/2.

10 Proper evaluation of manoeuvrability requires assessing both course-keeping ability and turning ability as inherent characteristics. In resolution MSC.137(76), course-keeping ability or, in other words, ship directional stability, is evaluated by the zig-zag test. In addition, the *Explanatory notes to the standards for ship manoeuvrability* (MSC.1/Circ.1053), which facilitate the implementation of resolution MSC.137(76), specify other tests as "additional manoeuvres" to assess course-keeping ability.

11 As a matter of greater importance, no accidents have been reported due to insufficient manoeuvrability under the current regime. This is reported in chapter 8.2 of the final report of "EMSA - Steering and Manoeuvrability Study (STEERSAFE)":

"The incident databases investigated in connection with this project do not indicate insufficient performance of a fully functional steering system to be a common cause for incidents. More common causes are malfunction and external impacts. Hence, improved manoeuvring performance is not found to be necessary to ensure safe operation."

12 Therefore, if necessary, new regulations should be established based on due consideration of both the identified deficiencies in resolution MSC.137(76) and the intended purposes of any additional requirements.

Conversion of draught from light load to full load

13 As stated in paragraph 17.11 of the Group's report (SDC 11/8/1), the manoeuvring standards in resolution MSC.137(76) are specified for fully loaded conditions. However, sea trials are conducted under lightly loaded conditions for all ship types, with exception for some types of tankers. Therefore, the results of all manoeuvrability tests, including the stopping performance tests under lightly loaded conditions, need to be converted to those under fully loaded conditions.

14 For facilitating such correction for manoeuvring ability, the International Towing Tank Conference (ITTC) published the recommended procedure 7.5-04-02-01 "Full scale Manoeuvring Trials". Section 4.1 of the recommended procedure notes as follows:

"If the full-scale trials are to be compared to numerical simulation in model scale or free running model tests, the scale effects must be taken into account. The ITTC Procedure 7.5-02-06-01 includes important comments about the scale effects in the free running model tests and how to compensate them."

15 In the recommended procedure 7.5-02-06-01 "Free Running Model Tests" referred above, section 2.1.3 notes as follows:

"(...)

The two scale effect phenomena occur: the larger model wake fraction and the larger model resistance. If the propeller is operated at the model self-propulsion point, the propeller loading condition may be excessive, hence the rudder effectiveness of a model may generally be larger compared with that of a real ship. Accordingly, free running models tend to be more stable (or less unstable) with respect to course keeping ability. (...) This will be dependent on ship type and can be evaluated based on ship model correlation data. Sometimes, it might be necessary to compensate for the larger frictional resistance of the model with an additional propulsion device, e.g. a wind fan or air jet device. Guidelines for this still need to be established and there is no worldwide consensus.

(...)

Besides the above-mentioned scale effects, there are unknown scale effects. These affect the side force and turning moment that a hull develops while drifting and turning. There is no worldwide consensus on the magnitude or influence of these scale effects yet."

16 Judging from the above, there is no internationally accepted detailed methodology for the conversion from the results of manoeuvrability tests under lightly loaded conditions to those under fully loaded conditions. Thus, at this moment, the establishment of reliable conversion procedures is eagerly awaited through further efforts by relevant organizations, such as ITTC, in the future with further accumulation of relevant data from the manoeuvring tests under fully loaded conditions.

Manoeuvring information on board ships

17 The draft SOLAS amendments prepared by the Group also propose to make resolution A.601(15) on the provision of manoeuvring information onboard ships mandatory. However, as this resolution contains unclear provisions without detailed instructions, e.g. "other relevant data" in paragraph 3.3 of the annex, it is difficult to make the resolution mandatory.

Conclusion

18 Based on the above, the co-sponsors consider that making these standards mandatory through SOLAS amendments would not only lack a clear demonstration of necessity but also cause practical difficulties by mandating unreliable evaluation methods. It is naturally prudent to develop the accuracy and practicability of all manoeuvrability tests including stopping performance tests, recording the results, and providing manoeuvring information on board for ensuring proper understanding of the ship's manoeuvring characteristics by the ship's operators rather than hastily mandating premature instruments. Furthermore, as the purpose of this output is to develop SOLAS regulations that address both traditional and non-traditional propulsion and steering systems, consideration of improving manoeuvring performance should be dealt with as a separate matter along with justification for such improvement.

Proposal

19 Based on the above discussions, the co-sponsors propose to further consider the draft new SOLAS regulations II-1/28-1 and 29-1 set out in annexes 1 and 2 of document SDC 11/8/1, based on the optional texts therein which do not incorporate the mandatory application of the requirements in the relevant IMO instruments, i.e. MSC.1/Circ.1053 and resolutions MSC.137(76) and A.601(15).

Action requested of the Sub-Committee

20 The Sub-Committee is invited to consider the proposal in paragraph 19 and to take action, as appropriate.
