**SDC 4**

The 4th session of the IMO Sub-Committee on Ship Design and Construction (SDC) was held from 13 to 17 February 2017.

***Amendments to SOLAS regulations II-1/6 and II-1/8-1***

SDC 4 has established the Working Group on Subdivision and Damage Stability (SDS WG) and instructed it, taking into account the comments made and decisions taken in plenary and recalling the relevant decision at SDC 3, to consider the outstanding issues related to items 3, 4 and 7 of the agenda.

***The SDS WG agreed on the following changes to the:***

* Reg. II-1/5.2 and 5.4 (Intact stability) regarding lightweight limits for sister ships and alterations;
* Reg.II-1/7-2.2 (Calculation of the factor si) regarding calculation of a flooding stage immediately after a damage;
* Reg.II-1/12.2 (Peak and machinery space bulkheads, shaft tunnels, etc.) EN was deleted as it was considered to contradict the application requirement in the draft regulation II-1/4.2.2;
* Reg.II-1/13.2.3 (Openings in watertight bulkheads below the bulkhead deck in passenger ships) regarding use of heat sensitive materials in penetration of watertight bulkheads, including a test procedure for penetration means;
* Reg.II-1/17.1 (Internal watertight integrity of passenger ships only above the bulkhead deck) regarding watertight doors located above bulkhead deck, including doors intermittently submerged in the residual stability range;
* Reg.II-1/17-1 regarding access from ro-ro decks to spaces below.

SDC 4 agreed to the draft Explanatory Notes as a MSC resolution with the same applicability as the new SOLAS chapter II-1 subdivision and damage stability amendments (i.e. applicable to ships contracted on or after 1 January 2020), for submission to MSC 98 (June 2017) with a view to their approval.

***Availability of a passenger ship's electrical power supply in cases of flooding from side raking damage***

SDC 4 agreed to refer further consideration of draft amendments to SOLAS regulation II-1/8-1.2 to improve the availability of a passenger ship's electrical power supply in cases of flooding from side raking damage.

Due to time constraint, this item has not been completed and will be continued in the re-established SDS Correspondence Group (CG), under the co-ordination of the US. This SDS CG will be instructed to work on developing functional requirements, performance requirements and, as appropriate, amendments to SOLAS regulations.

***Computerized stability support for the master in case of flooding for existing passenger ships***

A proposal was made to require all passenger ships, regardless of date of build, to be provided with a computer which is capable of assessing the stability after damage.

IACS, having reviewed the Guidelines on operational information for masters of passenger ships for safe return to port by own power or under tow (MSC.1/Circ.1400), the Revised guidelines on operational information for masters of passenger ships for safe return to port (MSC.1/Circ.1532), and the Guidelines for the approval of stability instruments (MSC.1/Circ.1229), was of the opinion that it might be difficult to apply all the items in these circulars to some existing passenger ships, as for older ones there may be problems in obtaining all the information specified in the circulars.

The SDS WG agreed that the most appropriate approach would be to develop a new set of guidelines on stability computers and shore-based support for existing passenger ships constructed before 1 January 2014. The base document used to develop the new draft guidelines should be the *Revised guidelines on operational information for masters of passenger ships for safe return to port*(MSC.1/Circ.1532). Ships constructed before 1 January 2014 that voluntarily carry on-board stability computers may not fully comply with the new draft guidelines and should be subject to the "Equivalence" provision in paragraph 31 of MSC.1/Circ.1532.

The drafting of these new Guidelines will be continued in SDS Correspondence Group.

***Finalization of second generation intact stability criteria***

Development of the second generation intact stability criteria has led to draft regulations for vulnerability criteria. The criteria address the following issues: parametric roll/surf riding broaching/pure loss of stability on a wave crest/dead ship condition/excessive accelerations. Three levels of criteria are used to demonstrate compliance. Explanatory notes are under development since SLF 55. Concerns are raised by many delegations when the criteria are tested on an existing ship failing to meet level 2 criteria and that consequently needs to be viewed according to direct stability assessment.

Solving inconsistency problems with the proposed criteria is a hard work. Many delegations regretted that this sensitive issue is addressed in a too academic way.

The Chair recalling that target completion date is 2019, the delay this will cause to the finalization of the second generation intact stability is to be regretted, however it is essential that any new requirements are robust and have been thoroughly verified.

***Draft Guidelines of the direct stability assessment procedures.***

The Working Group established by SDC 4 prepared the draft Guidelines of direct stability assessment procedures and considered the possibility of developing an Explanatory Note at a future stage. It noted that there was a lack of data in several areas of the draft Guidelines of direct stability assessment, and agreed that, at this session, priority should be given to the identification and the scope of the remaining tasks, with a view to finalizing the draft Guidelines at the next session.

***Draft amendments to part B of the 2008 IS Code regarding the draft vulnerability criteria (levels 1 and 2) for the pure loss of stability failure mode and the dead ship condition failure mode.***

When applying the five vulnerability criteria, about 70% of ships do not meet the level 1 or 2 requirements and, hence, need to apply either operational restrictions or undertake the expensive and time consuming process of level 3 – direct stability assessment. These results are not backed by experience on operating existing ships, nor by any accident statistics. Therefore, the proposed amendments to the 2008 IS Code need to be carefully evaluated.

SDC 4 re-established the Correspondence Group on Intact Stability, under the coordination of Japan, for matters related to second generation intact stability criteria, and more precisely to:

* further develop the draft Guidelines for the specification of direct stability assessment;
* further develop the draft amendments to the 2008 IS Code regarding the draft vulnerability criteria (levels 1 and 2) for each of the five stability failure modes, with a view to resolving the inconsistencies between level 1 and 2, in particular, with regard to the dead ship condition stability failure mode, and consider in detail consistency and integrity issues deriving from the use of different mathematical models in vulnerability levels 1 and 2 and direct assessment criteria;
* further develop the draft explanatory notes for all five stability failure modes;
* further develop the draft Guidelines for the preparation and approval of operational limitations and operational guidance.

It has invited Member States and international organizations to submit proposals regarding the application of operational limitations and/or operational guidance within the framework for the second generation intact stability criteria to SDC 5.

***Amendments to SOLAS and FSS Code to make evacuation analysis mandatory for new passenger ships and review of the Recommendation on evacuation analysis for new and existing passenger ships***

SDC 3 had completed the Revised guidelines on evacuation analysis for new and existing passenger ships and submitted them to MSC. As a consequence of these amendments it was recognized that amendments to SOLAS regulation II-2/13 and chapter 13 of the FSS Code with regard to open decks may be needed.

Having noted that no documents related to this output had been submitted for consideration at this session, SDC 4 agreed that no further action needed to be taken on this matter. MSC 98 will be invited to note that the work on this output has been completed.

**Revision of section 3 of the Guidelines for damage control plans and information to the master (MSC.1/Circ.1245) for passenger ships**

Following the review of Passenger Ship Safety undertaken by MSC, it was agreed that there should be a review of the Guidelines for damage control plans and information to the master (MSC.1/Circ.1245) to include some enhancements.

IMO adopted the Graphical symbols for shipboard fire control plans (resolution A.952(23)), which enhanced the implementation of the fire control plans.

It has been proposed to use the graphical symbols for shipboard fire control plans, which were adopted in resolution A.952(23), for the same fittings and/or equipment in damage control plans, for ease of identification and consistent operation on board passenger ships, and consequently to amend section 3 of the Guidelines for damage control plans and information to the master (MSC.1/Circ.1245).

The SDS WG was of the view that the approval of a complete revision of the existing Guidelines may have a number of implications, taking into account that they are applicable both to cargo and passenger ships.

Amendments to the *Guidelines for damage control plans and information to the master*(MSC.1/Circ.1245) have been prepared accordingly.

***Mandatory instrument and/or provisions addressing safety standards for the carriage of more than 12 industrial personnel on board vessels engaged on international voyages***

MSC 97 had issued an interim measure in the form of a non-mandatory resolution (MSC.418(97)). There will be a new chapter in SOLAS (chapter [XV]) and a supporting mandatory Code. MSC 97 endorsed the view that the proposed definitions of industrial personnel and offshore industrial activities should be a basis for the development of this mandatory instrument.

An outline format for the Code has been submitted to SDC 4.

In order to progress the work on this output intersessionally, SDC 4 has established the Correspondence Group on this issue, and has tasked it to :

* develop the draft new SOLAS chapter [XV];
* develop the draft Code;
* develop a matrix that identifies the relevant aspects of the existing IMO regulatory framework, with regard to definitions and application, in order to ensure that the new SOLAS chapter [XV] and the new Code are consistent with, and avoid unnecessary duplication of, the existing IMO instruments.

**Amendments to the 2011 ESP Code**

Even if the Enhanced Survey Programme (ESP) Code has been regularly updated to maintain compatibility with the IACS requirements (UR Z10), there are still some inconsistencies between the Code and the UR.

SDC 4 has authorized IACS and the Secretariat to analyse the 2011 ESP Code and provide the report on the progress made for consideration at the next session.

The consolidated ESP Code, if agreed by the SDC, should be submitted to the MSC for approval and subsequent adoption, taking into account that the four-year-cycle for entry into force should not be adhered to the entry-into-force date of the consolidated ESP Code.

Until the consolidated ESP Code enters into force, SDC 4 agreed that Member States and international organizations should note the relevance of IACS UR Z10, when carrying out hull surveys of bulk carriers and oil tankers.

**Amendments to MSC/Circ.686**

SDC 3 had noted that there are aspects of the *Guidelines on the means of access to structures for inspection and maintenance of oil tankers and bulk carriers*(MSC/Circ.686) that have not been incorporated into the 2011 ESP Code.

It has agreed to the draft Revised guidelines and the associated draft MSC circular provided by IACS, for submission to MSC 98 with a view to approval.

Member Governments will be invited to apply these Guidelines to new ships constructed on or after 1 October 1994. In the case of existing ships constructed before 1 October 1994, the Guidelines should be applied if so far as the Administration deems reasonable and practicable.

***Unified interpretations regarding drainage of enclosed spaces situated on the bulkhead deck (IACS UI SC81) and special requirements for vehicle ferries, ro-ro ships and other ships of similar type (IACS UI SC220)***

IACS UIs SC81 and SC220 of SOLAS regulations II-1/17-1, II-1/20-2 and II-1/35-1 have been endorsed by SDC 4 which agreed on the associated draft MSC for submission to the MSC 98 with a view to approval, in conjunction with the approval of the draft revised Explanatory Notes to SOLAS chapter II-1 subdivision and damage stability regulations.

***Draft consolidated MSC circular on UIs of Solas chapters II-1 and XII, of the technical provisions for means of access inspections (resolution MSC 148(78)) and of the performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers (resolution MSC.188(79))***

SDC 4 endorsed the consolidated draft MSC circular containing provisions of MSC.1/Circ.1464/Rev.1 and its Corr.1, as amended by MSC.1/Circ.1507 and MSC.1/Circ.1545 for submission to MSC 98 with a view to approval.

This new consolidated circular should apply to ships constructed on or after the date of its approval, which is anticipated will be at MSC 98.

Meanwhile, IACS members will uniformly implement the amended version of IACS UI SC191 (Rev.7, Corr.1), including the clarification to the interpretations relating to section 3.5 of the annex to resolution MSC.158(78)), on ships contracted for construction on or after 1 July 2016.

***Determination of the deadweight to be stated on certificates***

SDC 4 endorsed the draft UIs of SOLAS regulations II-1/2.20 and II-2/3.21, and regulation 1.23 of MARPOL Annex I, regarding the use of even-keel hydrostatics for determination of the regulatory deadweight to be entered on relevant statutory certificates, and agreed to the corresponding draft MSC circular for submission to MSC 98 and MEPC 71, respectively, with a view to approval.

Concerning the acceptance to include a loading condition at a trimmed waterline with a corresponding deadweight that exceeds the even-keel deadweight in a loading manual and stability information, SDC 4 considered that this proposal went beyond an UI and, therefore, invited interested Member States to bring this issue to the attention of the MSC.

***Revised SOLAS regulation II-1/3-8 and associated guidelines (MSC.1/Circ.1175) and new guidelines for safe mooring operations for all ships***

MSC.1/Circ.1175 was based on two IACS documents, UR A2 and Rec.10. MSC 97 had instructed SDC 4 to consider the recent updates to IACS UR A2 and the non-fishing vessel mooring-related elements of IACS Recommendation 10, when reviewing MSC/Circ.1175, as necessary.

Correspondence Group has been working on developing amendments to SOLAS (II-1/3-8) and the new guidelines. The main elements are as follows:

* As the draft revised regulation SOLAS regulation II-1/3-8 includes requirements for existing ships and new ships, the definition of new ships has been included;
* The whole regulation has been restructured in order to ensure clarity and coherence.

But the group could not finalize the draft Guidelines on the design of safe mooring arrangements within the available time slot:

* several members questioned the feasibility of using a ship specific risk assessment in the design phase, including a definition of the ALARP (As Low As Reasonably Practicable) area, as an appropriate tool to ensure safe mooring operations;
* recommending risk assessments for all new ships of 3.000 GT and above could be demanding and impractical;
* recommending an approval process by an "independent competent person" could be inappropriate.

SDC 4 approved the report, in general, and took the following actions:

* considered that further discussion is necessary in order to finalize the draft Guidelines on the design of safe mooring arrangements;
* agreed that the draft Guidelines as prepared by the Correspondence Group should only give guidance on how to design the mooring arrangement;
* agreed that relevant descriptions, such as selection, identification and use of mooring lines, should be included in dedicated Guidelines on the selection, identification and use of mooring lines ;
* agreed that the need of generic guidelines on the inspection and/or maintenance of mooring lines should also be considered.

Consequently, SDC 4 decided to re-establish the Correspondence Group on Safe Mooring Operations, with a view to :

* finalizing the draft revised SOLAS regulation II-1/3-8 and the draft Guidelines on the design of safe mooring arrangements, taking into account the updates to IACS UR A2 and the non-fishing vessel mooring-related elements of IACS Recommendation 10;
* developing separate Guidelines on safe mooring operations;
* considering the need for any additional Guidelines on the selection, identification, inspection, maintenance and use of mooring lines.

The target completion year for this output has been extended to 2019.

**Guidelines for use of Fibre Reinforced Plastic (FRP) within ship structures**

Draft guidelines have been developed to address the fire aspects of using FRP, in particular how to comply with SOLAS II-2/17. These guidelines should be used as a supplement to the Guidelines for the approval of alternatives and equivalents as provided for in various IMO instruments (MSC.1/Circ.1455) and the Guidelines on alternative design and arrangements for fire safety (MSC.1/Circ.1002, as amended by MSC.1/Circ.1552) when approving FRP elements within ship structures.

SDC 4 had for its consideration the report of the Correspondence group on Development of Interim guidelines for use of FRP elements within ship structures, including the updated draft Interim guidelines and the associated draft MSC circular.

Noting the content of this report, SDC 4 agreed that:

* non-combustible FRP composite structures and other elements that can comply with the prescriptive requirements are outside the scope of the Interim guidelines;
* FRP elements are parts of the ship structure that have to prove their equivalence with traditional building materials by means of alternative design, making use of the draft Interim guidelines, therefore a method of compliance with the functional requirements should be explained in the Guidelines, but this goal should not be introduced into the definition;
* specific procedures and detailed examples in regard to evaluation of fire safety risks for FRP elements should be developed.

The Plenary tasked the Working Group on fire protection to finalize the draft Interim guidelines for use of FRP elements within ship structures and the associated draft MSC circular.

The WG made minor modifications and editorial corrections, and prepared a final clean version of the Interim guidelines and the associated draft MSC circular for submission to MSC 98 for approval.

**Biennial status report and provisional agenda for SDC 5**

The safety aspects of the Polar Code became mandatory for SOLAS ships on 1 January 2017 and will be applicable to existing ships from 1 January 2018.

As part of the development of a mandatory Polar Code for ships operating in polar waters, a two-step approach to the work was proposed by the Polar Code Working Group at DE 54, and was subsequently approved by DE 54 and MSC 89:

* Step 1: Passenger and cargo ships covered by SOLAS;
* Step 2: Non-SOLAS ships, including fishing vessels and pleasure craft.

Taking into account that a relevant output is already included in the 2018-2019 biennial agenda of the Committee, MSC 97 Chair's view was that the work related to the second phase for non-SOLAS ships should not begin until experience in the application of the Polar Code to SOLAS ships was gained.

Considering that no further action could be taken on this matter, without receiving clear policy instructions from MSC, SDC 4 invited MSC 98 to provide clear instructions on the following points:

* when the development of the second phase of the Polar Code should begin;
* the scope of application of the second phase of the Polar Code;
* the recommendatory or mandatory status of the second phase of the Polar Code.

**Wing in ground craft**

SDC 4 noted the progress of the work carried out intersessionally by interested parties regarding the revision of the *Interim guidelines for wing-in-ground craft*(MSC.1/Circ.1054 and Corr.1).

New issues which are not established in the Interim guidelines had been identified, in particular, the need for amendments to the requirements for training and certification of officers on WIG for avoiding collision with other ships.

SDC 4 invited all interested Member States and interested parties to proceed with further development of the draft Guidelines, with a view to submitting the consolidated text for consideration at SDC 5, and to consider whether the new issues identified above remain within the scope of this output.