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DEVELOPMENT OF FURTHER MEASURES TO ENHANCE THE SAFETY OF SHIPS RELATING TO THE USE OF FUEL OIL

Further comments on the revised version of IACS UI SC123 as provided in the annex to document SDC 6/9/4

Submitted by IACS

SUMMARY

Executive summary:	This document provides further comments on IACS UI SC123, which SDC 6 agreed to forward to MSC 101 with a request that it be considered under the Committee's new agenda item on "Development of measures to enhance the safety of ships relating to the use of fuel oil"
Strategic direction, if applicable:	1
Output:	1.29
Action to be taken:	Paragraph 16
Related documents:	SDC 6/9/4, SDC 6/13, paragraphs 9.22 to 9.24 and MSC 101/12/Rev.1, paragraph 2.16

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 the Marine Environment Protection Committee and their subsidiary bodies* (MSC-MEPC.1/Circ.5/Rev.1) and provides comments on the report of SDC 6 in relation to the Sub-Committee's consideration of document SDC 6/9/4 (IACS) (MSC 101/12/Rev.1, paragraph 2.16).

Background

2 In the annex to document SDC 6/9/4, IACS submitted the latest version of IACS Unified Interpretation (UI) SC123, which has been developed in light of typical fuel oil service tank arrangements for vessels trading in Emission Control Areas (ECAs) that use both low sulphur distillate and residual grade fuel oils, with a view to facilitating the consistent and global implementation of SOLAS regulation II-1/26.11.

3 At SDC 6, while some delegations supported the draft unified interpretation, in principle, others expressed concerns in regard to the provision requiring an emergency fuel changeover at a maximum of one hour, which was neither recommended by manufacturers nor considered to be safe when carried out on board (SDC 6/13, paragraph 9.23). Following discussion, the Sub-Committee agreed that this matter required further consideration and forwarded document SDC 6/9/4 to MSC 101 with a request that it be considered under the Committee's new agenda item on "Development of measures to enhance the safety of ships relating to the use of fuel oil" (SDC 6/13, paragraph 9.24).

Discussion

4 SOLAS regulation II-1/26.11 requires two fuel oil service tanks for each type of fuel used on board necessary for propulsion and vital systems or equivalent arrangements, with a capacity of at least eight hours at maximum continuous rating of the propulsion plant and normal operating load at sea of the generator plant.

5 This SOLAS regulation was introduced as a result of the investigation into the accident on **MV Braer** in January 1993, which was caused by contamination of the fuel oil service tank with rain or sea water via a broken air pipe.

6 Consequently, IACS understands that the issue addressed by SOLAS regulation II-1/26.11 is catastrophic contamination of the fuel, which may cause the main engine and auxiliaries to stop. In such a condition, before restarting the propulsion, flushing the fuel supply and injection system from the contaminated fuel oil will require a significant amount of time. Only after this operation has been completed can the engine be supplied with fresh fuel oil, from an alternative service tank, and then re-started. Consequently, in this context, the time for changing over from one fuel to another is not a critical parameter. The previous revision (Rev.3) of IACS UI SC123 was based on the above rationale, and this was endorsed by the Committee in MSC/Circ.1176 (and subsequently MSC.1/Circ.1464).

7 However, IACS considers it should be recalled that when IACS UI SC123 was first developed, each onboard machinery component (main engine, auxiliary engines, boiler etc.) normally operated on one fuel type, e.g. a residual fuel for the main engine and either a residual fuel or a distillate fuel for the auxiliary engines.

8 Following entry into force of MARPOL Annex VI and the introduction of Emission Control Areas (ECAs), ships operating both inside and outside of ECAs may comply with regulation 14 of MARPOL Annex VI by using different fuels inside and outside of the ECA. The difference in the fuel used may just be the different sulphur content of the fuels or may be different fuel grades, i.e. residual fuel or distillate fuel. Such scenarios were the catalyst for IACS to develop a new revision of UI SC123.

9 When considering ships operating with different fuels, the intention of the latest version of IACS UI SC123, as provided in the annex to document SDC 6/9/4, is first to clarify that fuel oils that only differ by sulphur content are not to be considered as different "types" of fuel in the context of the SOLAS regulation II-1/26.11, as they may be used interchangeably in an emergency according to regulation 3 of MARPOL Annex VI. IACS UI SC123 clarifies this issue by not distinguishing between service tanks containing Residual Marine Fuel (RMF) or Low Sulphur Residual Marine Fuel (LSRMF); and not distinguishing between service tanks containing Distillate Marine Fuel (DMF) or Low Sulphur Distillate Marine Fuel (LSDMF).

10 The other way around, and as indicated in Rev.3 of UI SC123, the premise for applicability of the UI is that rapid fuel changeover can be performed on ships that are using different grades of fuels. However, the entry into force of MARPOL Annex VI and the consequential introduction to the marine market of low viscosity DMF (min. 2 cSt @ 40°C) has introduced more challenges than was the case for the DMF used as bases for the previous UI SC123 (typical MDO viscosities ranged from 6-11 cSt).

11 It is to be noted that normally a changeover from RMF to LSDMF, and vice-versa, does not allow for simply opening one valve and then changing over. In order to prevent thermal shock, the fuel temperature gradient needs to be controlled. In this regard, engine manufacturers' guidelines advise not to exceed 2°C per minute. This implies that going from DMF at an ambient temperature of 20°C to RMF having an injection temperature of 150°C, requires approximately one hour. The other way around (RMF to DMF) is similar, but DMF coolers may also need to be activated. In some cases, separate fuel supply pumps need to be used. IACS UI SC123 is not intended to cover the changeover procedure already addressed in MARPOL Annex VI, but to cover the case of the loss of one of the ship's fuel service tanks, as addressed in SOLAS regulation II-1/26.11.

12 Therefore, taking into account the foregoing, IACS considers that the conditions for accepting an arrangement with less than two service tanks for each type of fuel as an equivalent arrangement are the possibility to carry out an emergency changeover; and the capacity to operate on either fuel in all normal operating conditions. Additionally, IACS considers that the emergency fuel changeover should be carried out as quickly as is safe and practicable to do so, taking into consideration the machinery manufacturer's recommendations for safe changeover (e.g. allowable rate of fuel temperature change to prevent thermal shocks); and preferably within one hour.

13 Regarding the capacity of the tanks, IACS understands that the intent of SOLAS regulation II-1/26.11 means each ship is to have an arrangement that allows operation of all the essential machinery for at least eight hours with either tank out of service. The tank arrangement is therefore to take into account that tanks used may contain RMF or DMF. The capacities indicated in paragraphs 1.2 and 2.2 take into account the above understanding. The capacities indicated in paragraph 2.2, however, may require a clarification that is provided in paragraph 15 below.

14 Paragraph 2.2 addresses the case that the main engine may use either RMF or DMF, whereas the auxiliary engines can only use DMF. When the ship is outside an ECA or otherwise runs the main engine and boiler on RMF, in case of contamination of the RMF tank, the arrangement in paragraph 2.2 ensures availability of two DMF tanks, each allowing four hours of operation of the main engine and boiler, and eight hours of operation of the auxiliary engines. As a result, the eight hours criteria is satisfied after changeover from one grade of fuel to the other one by sequentially using both the DMF tanks. The case of contamination of one DMF tank is easily addressed by changing to the other DMF tank. When the ship is inside an ECA or otherwise runs the main engine on DMF, in case of contamination of one DMF tank, the arrangement in paragraph 2.2 ensures availability of the RMF tank, and the other DMF tank; the first allowing eight hours of operation of the main engine and boiler, and the latter allowing eight hours of operation of the auxiliary engines. As a result, the eight hours criteria is satisfied after changeover of the main engine from one grade of fuel to the other one. The case of contamination of the RMF tank has no impact because it is not in use.

15 Since SDC 6, IACS has realized that there is an opportunity to improve the clarity of its UI SC123, and it is proposed that the UI is now considered together with the following corrections (shown as additions/~~deletions~~):

"1.2 Potential equivalent arrangement*

RMF/LSRMF Serv. TK Capacity for at least 8 h Main Eng.+ Aux Boiler + Aux Eng	DMF/LSDMF Serv. TK Capacity for at least 8 h Main Eng.+ Aux Boiler + Aux Eng ~~or ECA operation~~

2. Example 2

2.1 Requirement according to SOLAS – Main Engine(s) and Auxiliary Boiler(s) can operate on both fuels, but actually use Residual Marine Fuels (RMF ~~and LSRMF~~) outside ECAs and Distillate Marine fuels (~~DMF and~~ LSDMF) within ECAs. Auxiliary Engines can only operate on Distillate Marine fuels (DMF and LSDMF) (multiple fuel ship)

RMF~~/LSRMF~~ Serv. TK 1 Capacity for at least 8 h Main Eng.+ Aux Boiler	RMF~~/LSRMF~~ Serv. TK 2 Capacity for at least 8 h Main Eng.+ Aux Boiler	DMF/LSDMF Serv. TK 1 Capacity for at least 8 h Main Eng.+ Aux Boiler + Aux Eng	DMF/LSDMF Serv. TK 2 Capacity for at least 8 h Main Eng.+ Aux Boiler + Aux Eng

2.2 Potential equivalent arrangement*

RMF~~/LSRMF~~ Serv. TK Capacity for at least 8 h Main Eng.+ Aux Boiler	DMF/LSDMF Serv. TK 1 Capacity for at Least : 4 h Main Eng. +Aux Boiler + Aux. Eng or ~~and~~ 8 h Aux Eng whichever is greater	DMF/LSDMF Serv. TK 2 Capacity for at Least: 4 h Main Eng. + Aux Boiler + Aux Eng or ~~and~~ 8h Aux. Eng whichever is greater

*Conditions apply – see paragraph 3 below.

3. The potential equivalent arrangements in 1.2 and 2.2 are acceptable, provided the propulsion and vital systems which use the two ~~types~~ grades of fuel support an emergency fuel changeover and are capable of operating in all normal operating conditions at sea with both ~~types~~ grades of fuel. The emergency fuel changeover, including the following, should be ~~able to be~~ carried out as quickly as is safe and practicable taking into consideration the machinery manufacturer's recommendations for change over (e.g. allowable rate of fuel temperature change to prevent thermal shocks) and preferably within ~~the time not exceeding~~ one hour:

- ~~Taking into consideration the machinery manufacturers recommendations for safe change over (e.g. prevention of temperature shock)~~"

Action requested of the Committee

16 The Committee is invited to consider the foregoing comments and proposals, in relation to IACS UI SC123 and take action, as appropriate.