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CONSIDERATION AND ADOPTION OF AMENDMENTS TO MANDATORY INSTRUMENTS

Editorial clarifications needed in order to ensure homogeneous application of risk assessment in conjunction with part A-1 of the draft IGF Code

Submitted by China, Germany, Japan, Republic of Korea, Spain and the Community of European Shipyards' Associations (CESA)

SUMMARY

Executive summary:	This document provides comments on the structure of the draft IGF Code with regard to the different levels of regulations and compliance mechanisms. It proposes specific editorial clarifications in order to better define the scope of risk assessment/analysis as required by part A, section 4.2 of the Code, as invited by the IGF Code Working Group at MSC 94
Strategic direction:	5.2
High-level action:	5.2.1
Planned output:	5.2.1.2
Action to be taken:	Paragraph 14
Related documents:	MSC 95/3/4; MSC 94/11/6 and resolution MSC.285(86)

Assessment of the draft IGF Code structure

1 The draft IGF Code (MSC 95/3/4, annex), submitted to MSC 95 for adoption, is a document with a complex structure of safety provisions. In particular, the draft Code contains the following levels of regulations and compliance mechanisms:

.1 Part A-1 contains **prescriptive requirements**, which according to the Preamble are intended "to meet the functional requirements for natural gas fuel";

.2 **Goals and functional requirements** are provided in part A, section. 3, which according to the Preamble were specified in order to form "the basis for the design, construction and operation";

.3 **Alternative Design** provisions are provided in part A, section 2.3, which according to paragraph 2.3.2 serve a two-fold purpose. Firstly, to provide the opportunity to deviate from requirements of the Code with regard to appliances and arrangements (e.g. the prescriptive natural gas part A-1). Secondly, to provide the opportunity to use low-flashpoint fuels other than natural gas. In both cases the goals and functional requirements should be utilized in order to set internationally agreed criteria to be used with the demonstration of equivalence according to SOLAS regulation II-1/55, which will be approved by Administrations and not by the IMO; and

.4 General Requirements are provided in part A, section 4, which mandate a **risk assessment** and provide a minimal list of specific risks that should be considered.

2 The above assessment reveals that, although the individual levels contain acceptable regulatory methods and compliance instruments, the scope and interrelation of the four tiers remain unclear from an editorial point of view.

3 Part A-1 has been designed in a manner that compliance with the prescriptive requirements would ensure that design, construction and operation of a part A-1 ship implicitly fulfils the referenced functional requirements of part A, section 3 as well as the additional functional requirements of the relevant sections of part A-1. This means that complying with all regulations of part A-1 would yield a new ship that e.g. would be equipped with a system of equivalent safety, reliability and dependability in comparison to what can be achieved with new and comparable conventional oil-fuelled main and auxiliary machinery (see the functional requirement in paragraph 3.2.1 of the draft IGF Code).

4 The functional requirement itself will only be used and assessed in conjunction with ship designs and machinery systems, which are deviating from the part A-1 standard. Alternative design and risk assessment are the instruments and tools that are used in order to demonstrate compliance with these goals and objectives that are not implicitly implemented through part A-1 regulations in technical detail.

5 In this context, it should be noted that the use of risk analysis/assessment in the *Interim guidelines on safety for natural gas-fuelled engine installations in ships* (resolution MSC.285(86)) is limited to "new or altered concepts or configurations" addressed by section 2 (Ship Arrangements and System Design) and to deviations from the prescriptive regulations for gas piping. Since the draft IGF Code and in particular part A-1 has been developed to a significantly higher level of technical detail it seems to be redundant to now require risk assessment for all aspects of new ships, even if most of them will be designed according to regulations, which provide a safety standard equivalent to conventionally fuelled ships.

6 If this interpretation is in line with the intentions of the IGF Code authors, it can be concluded that the draft is lacking clarity regarding the scope of application of the mandatory risk assessment and should be editorially improved in the process of adoption at MSC 95. In order to clarify, it might be helpful to amend section 4.2 such that the scope of risk assessment is clearly defined.

Interpretation of the intentions connected to the IGF Code structure

7 In order to seek clarification CESA submitted document MSC 94/11/6, which received sufficient support in Plenary at MSC 94. When considering the requirements for risk assessment in the working group, the co-sponsors of this document expressed the view that a risk assessment is not required for ships designed and constructed according to prescriptive provisions of part A-1 of the draft Code, unless a risk assessment is specifically stipulated in a prescriptive provision. Other participants, however, expressed the view that a risk assessment should be carried out for all new vessels, which should be more limited in scope for ships complying with part A-1.

8 Due to time constraints and since for both positions no specific proposals were available at MSC 94, the group did not amend section 4.2 of the draft Code. However, the group recognized that interested Member States and international organizations could submit specific proposals to the Committee for clarification of the intended scope and methodology of risk assessments under the IGF Code.

9 In order to develop a specific proposal to better define the field of application of risk assessment/analysis for part A-1 ships the co-sponsors have analyzed in detail the draft IGF Code and identified the following paragraphs indicating in bold the issues for which risk assessment/analysis is specifically required :

- 5.10.5 **Drip trays** – Each tray shall have a sufficient capacity to ensure that the **maximum amount of spill** according to the risk assessment can be handled.

- 5.12.3 – The **air lock** shall be designed in a way that no gas can be released to safe spaces in case of the most critical event in the gas dangerous space separated by the air lock. The events shall be evaluated in the risk analysis according to 4.2.

- 6.4.1.1 – The risk assessment required in 4.2 shall include evaluation of the vessel's liquefied **gas fuel containment system**, and may lead to additional safety measures for integration into the overall vessel design.

- 6.4.15.4.7 **Accidental design condition**

  6.4.15.4.7.1 The containment system and the supporting hull structure shall be designed for the accidental loads specified in 6.4.9.5 (forward acceleration due to collision and buoyancy due to flooding). These loads need not be combined with each other or with environmental loads.

  6.4.15.4.7.2 Additional relevant accidental scenarios shall be determined based on a risk analysis. Particular attention shall be paid to securing devices inside of tanks.

- 8.3.1.1 – The **bunkering station** shall be located on open deck so that sufficient natural ventilation is provided. Closed or semi-enclosed bunkering stations shall be subject to special consideration within the risk assessment.

- 13.4.1 – The **tank connection space** shall be provided with an effective mechanical forced ventilation system of extraction type. A ventilation capacity of at least 30 air changes per hour shall be provided. The rate of air changes may be reduced if other adequate means of explosion protection are installed. The equivalence of alternative installations shall be demonstrated by a risk assessment.

- 13.7 Regulations for bunkering station – the risk assessment required by 8.3.1.1 if **semi-enclosed bunkering stations** are to be mechanically ventilated.

- 15.8.1.10 – Permanently installed **gas detectors** shall be fitted [in]: … .10 **at ventilation inlets to accommodation and machinery spaces** if required based on the risk assessment required in 4.2.

- Annex, 4.4 – The **class factor γ = 1.2** may be reduced if it is justified through risk analysis and subject to the approval by the Administration.

- Annex, 6.8 **Accident limit state** – Additional relevant accident scenarios shall be determined based on a risk analysis.

10 Some of the paragraphs above, namely paragraphs 8.3.1.1, 13.4.1, 13.7 of, and 4.4 of the annex, to the draft IGF Code, mandate a risk assessment in case that deviation from the prescriptive requirements is foreseen. In these cases it is of course necessary to conduct a risk assessment.

11 In other cases, such as paragraphs 5.10.5, 5.12.3, 6.4.15.4.7 of, and 6.8 of the annex to, the draft IGF Code, a risk assessment is used in order to determine the most critical condition, additional scenarios or amounts that should be used for the design. In these cases risk assessment can be a helpful tool, but it should be noted, that the prescriptive requirements above or scenarios already defined might be sufficient.

12 Finally, in one case, namely paragraph 15.8.1.10, the risk assessment can be used in order to limit equipment requirements to those cases, where the necessity is proven by risk assessment.

Concrete Proposal

13 The co-sponsors welcome the use of risk assessment/analysis in the specific cases analyzed above and proposes clarifying the scope accordingly. The annex to this document provides specific proposals for modification of the draft IGF Code in track change mode.

Action requested of the Committee

14 The Committee is requested to consider the views presented and take action as deemed appropriate.

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ANNEX

PROPOSED MODIFICATIONS TO THE DRAFT IGF CODE RELATED TO THE SCOPE OF RISK ASSESSMENT

1 Preamble

This Code addresses all areas that need special consideration for the usage of the low-flashpoint fuel. The basic philosophy of the IGF Code considers the goal-based approach (MSC.1/Circ.1394). Therefore, goals and functional requirements were specified for each section forming the basis for the design, construction and operation.

The current version of this Code includes regulations to meet the functional requirements for natural gas fuel. If all prescriptive requirements for natural gas fuel stipulated in part A-1 are met, additional risk assessments/analyses are only required if expressly stated under the relevant paragraphs of part A-1.~~Regulations for other low-flashpoint fuels will be added to this Code as, and when, they are developed by the Organization.~~

Regulations for other low-flashpoint fuels will be added to this Code as, and when, they are developed by the Organization. In the meantime, for other low-flashpoint fuels, compliance with the functional requirements of this Code must be demonstrated through alternative design.

4 GENERAL REQUIREMENTS

4.1 Goal

The goal of this chapter is to ensure that the necessary assessments of the risks involved are carried out in order to eliminate or mitigate any adverse effect to the persons on board, the environment or the ship.

4.2 Risk assessment

4.2.1 A risk assessment shall be conducted where explicitly required to ensure that risks arising from the use of low-flashpoint fuels affecting persons on board, the environment, the structural strength or the integrity of the ship are addressed. Consideration shall be given to the hazards associated with physical layout, operation and maintenance, following any reasonably foreseeable failure. Risk assessment/analysis is explicitly required by paragraphs 5.10.5, 5.12.3, 6.4.1.1, 6.4.15.4.7.2, 8.3.1.1, 13.4.1, 13.7 and 15.8.1.10 as well as by paragraphs 4.4 and 6.8 of the annex.

4.2.2 The risks shall be analysed using acceptable and recognized risk analysis techniques, and loss of function, component damage, fire, explosion and electric shock shall as a minimum be considered. The analysis shall ensure that risks are eliminated wherever possible. Risks which cannot be eliminated shall be mitigated as necessary. Details of risks, and the means by which they are mitigated, shall be documented to the satisfaction of the Administration.