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PREVENTION OF AIR POLLUTION FROM SHIPS

Elements to be considered for verification of the calculation of the design CO_2 index

Submitted by Denmark

SUMMARY

Executive summary:	This document provides elements to be considered in order to establish a verification procedure of the calculation of a particular ship design CO_2 index cf. paragraphs 2.18 and 2.19 of the report from the first intersessional Meeting of the Working Group on Greenhouse Gas Emissions from Ships
Strategic direction:	7.3
High-level action:	7.3.1
Planned output:	7.3.1.1 and 7.3.1.3
Action to be taken:	Paragraph 18
Related documents:	MEPC 58/4; GHG-WG 1/2/1; GHG-WG 1/2/2; MEPC 57/4/3, MEPC 57/4/11, MEPC 57/4/12, MEPC 57/INF.12, MEPC 57/WP.8 and MEPC 58/4/8

Introduction

1 MEPC 57 tasked the first intersessional Meeting of the Working Group on Greenhouse Gas Emissions from Ships (GHG-WG1) to develop a mandatory design CO_2 index for new ships and, if deemed appropriate, for approval at MEPC 58. Based on the two submissions from Denmark and Japan, the GHG-WG1 developed a concept for a mandatory design CO_2 index for new ships.

2 This document is submitted in accordance with MSC-MEPC.1/Circ.2 on Guidelines on the organization and method of work.

Objective

3 The objective of this document is to provide elements of thoughts regarding a possible way forward for the verification, prior to approval of the calculation of the design CO_2 index for new ship.

4 When a ship is ordered, a plan approval process is carried out before and during the construction. At this stage several features are approved, including the ship stability book and the structural strength. The performance data of the engines are also available from the engine designer.

5 The regulations and requirements to be fulfilled are defined in the building contract, and the plan approval is carried out according to the regulations of the flag State and of the classification society. The plan approval is conducted either by the Administration itself and/or the classification society acting on behalf of the Administration. In this attempt to clarify the possible verification process to be applied, it has been decided to seek out types of existing elements; tests already taking place (on a mandatory or a contractual basis), which could be of merit to the verification.

6 If a ship is built with the purpose of sale during the building process or when finished, the flag State and the classification society may not be known, but the ship must fulfil the international conventions and the regulations of a recognized classification society. According to an industry source the procedure is that the ship is built to "Mainly Standard Regulations". This is done by choosing a flag State with a regulation based on the international conventions only. In such cases plan approval is normally carried out by the classification society on behalf of both the flag State and the society.

To measure and verify the rated installed power of each engine

7 To measure the Maximum Continuous Rated power (MCR) of engines installed on board without risk of evasion, it is proposed to take into consideration the results from the factory acceptance tests, and the tests carried out according to the NO_x Technical Code. These tests are performed and conducted on each of the internal combustion engines installed on board the ship. This is the method by means of which the shipowner, the shipyard, the Administration and the classification society ensure that the engines match the specification and the requirements in the NO_x Technical Code.

8 As these test results are being applied there is no need to develop new types of technical tests. It is therefore recommended to ensure that the Administration (or RO acting on their behalf) have access to the data in order to verify the value indicated in the annex. This legal requirement could be part of MARPOL Annex VI, part B.

To measure and verify the speed

9 The speed is one of the key factors considered, when signing a new building contract, as it constitutes an essential element for the commercial benefit of the ship. The shipyard will ensure that the speed estimate in the project phase is as solid and sound as possible. During the design of the vessel, a candidate model of the hull is usually tested in a towing tank or simulated in a computer. Several tests are performed including propulsion tests, so as to verify that the speed will be achieved. These test results could be used in the planning phase, as it would be a requirement to perform the test at a loading condition similar to the anticipated sea trial condition as well as a summer load line condition. At a later stage a correction could be applied based on

the sea trial results once the ship is built. The difference between the towing tank test and the sea trials is rarely substantial, and therefore a check in the design phase is appropriate.

10 It should be considered which rules to apply to ships, where towing tank tests are not performed, and also to set a limit to the amount of constructional changes between sister ships that will demand separate towing tank tests for each ship.

To measure and verify the ship capacity

11 Some of the key data in the design phase are cargo and tank capacities and stability data. Data must be submitted to the class society concerned and to the Administration. Should there be any change in the cargo tank capacity, this will not necessarily be communicated to the Administration. The Administration may request only the final drawing and, in case of any alterations, the plans are only requested for submission if they impact a parameter deemed safety critical by the Administration (e.g., bunker tank localization).

12 In order to verify the necessary data of the design CO_2 index, information from the stability book and the tonnage measurements are needed.

Possible Design approval phases

13 A two-step approach should be required. To ensure a correct implementation the index calculation should be submitted at the early design stage, in order to eliminate ships that do not fulfil the requirements. It will equally be necessary to ensure – as far as possible by sea trials – that the ship is in fact performing as designed. It has to be agreed how failure to meet index requirements during sea trials shall be dealt with.

14 The design CO_2 index for new buildings shall be documented by calculations and required tests results as mentioned above. The calculation shall indicate the expected required and attained design CO_2 index for the ship and the documentation shall be submitted to the Administration.

15 Based on the documentation received, and by means of using approved standards for calculation and assessment of the expected required and attained design CO_2, the index calculation will be verified.

16 Depending on the outcome of this exercise, the plan approval will be granted in order to proceed with the planning and construction of the ship according to the building contract.

Sea trials

17 Sea trials should be carried out to document that a ship is delivered with a design CO_2 index close to the calculated index. The correction from values measured on sea trials to index calculation values shall be carried out in a uniform way based on the guidelines to be developed by the Organization.

Action requested of the Committee

18 The Committee is invited to consider the proposed elements when establishing a verifcation procedure for a design CO_2 index for new ships.