



INTERSESSIONAL MEETING OF THE
GREENHOUSE GAS WORKING GROUP
2nd session
Agenda item 2

GHG-WG 2/2/11
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CONSIDERATION OF THE ENERGY EFFICIENCY DESIGN INDEX FOR NEW SHIPS

Comments on the coefficient “fw” in the EEDI formula

Submitted by China

SUMMARY

<i>Executive summary:</i>	This document provides comments on the acquisition of coefficient “fw” in the Energy Efficiency Design Index formula contained in document MEPC 58/23, annex 11
<i>Strategic direction:</i>	7.3
<i>High-level action:</i>	7.3.1
<i>Planned output:</i>	7.3.1.1 and 7.3.1.3
<i>Action to be taken:</i>	Paragraph 9
<i>Related documents:</i>	MEPC 58/4, annex 5; MEPC 58/4/27, MEPC 58/4/28, MEPC 58/4/29 and MEPC 58/23

Introduction

1 MEPC 58 approved the draft Interim Guidelines on the Method of Calculation of the Energy Efficiency Design Index for New Ships (refers to MEPC 58/23, annex 11), and agreed to use the draft interim guidelines for further EEDI calculation and verification.

2 The sea condition factor f_w is included in the formula for calculating EEDI, and according to paragraph 9 of annex 11 to document MEPC 58/23, the f_w value can be determined either by conducting a performance simulation test under the representative sea condition, or being obtained from a standardized applicable curve/table. However, before the above two methods would become available, f_w value should be taken as 1.0.

3 Japan proposed detailed methods to determine f_w value in documents MEPC 58/4/27 and MEPC 58/4/28 supplemented by procedures and methods to obtain baselines for different types of ships set out in document MEPC 58/4/29.

4 Following a thorough study on the methods provided in documents MEPC 58/4/27, MEPC 58/4/28 and MEPC 58/4/29 and taking into account the actual practice in ship design and simulation test, China agrees that it is meaningful to consider the impact of actual sea conditions on energy efficiency, however such consideration should be built on a universal and reasonable basis. China thinks that the following aspects should be considered when formulating the relevant guidelines on f_w .

Discussion

5 In the interim guidelines, it is suggested to select Beaufort scale 6 as the representative sea condition parameter. In fact, ships may encounter different sea conditions under the offshore and deepwater voyage, therefore Beaufort scale 6 cannot be universally representative for all conditions, at least, it cannot cover conditions under the different seaworthiness of different vessels. As the velocity for some ships are limited under the scale 6, therefore an additional weighting factor corresponding to different sea conditions should be considered regarding the different types of ships.

6 On the determination of “standard f_w curve”, document MEPC 58/4/29 takes Beaufort scale 6 as a voyage data influencing the service speed, and takes the data under Beaufort scale 2, scale 3, and scale 4 as calm sea conditions with no waves and no wind. This method will result in a greater value of f_w , which is not reasonable and practicable.

7 Regarding the theoretical calculation of f_w , the suggested method on determination of ship wave increased or decreased on the basis of the linear frequency domain potential theory and spectrum analysis with irregular waves contained in documents MEPC 58/4/27 and MEPC 58/4/28 will result in a significant difference of the accuracy of calculation to different types of ships. Moreover, this calculation method cannot reflect the impact of the wave added or deducted to the energy-saving ships due to the modification of hull form above the waterline.

Comments

8 In light of paragraphs 5 to 7 above, China suggests that the following elements should be considered when determining the f_w value in the EEDI formula as a sea factor.

- .1 the determination of f_w should be based on the average sea condition. A weighting factor corresponding to different sea conditions should be considered to cover the actual sea voyage of the individual vessel. The standard curve/table statistic calculation and simulation calculation of f_w should be further verified;
- .2 a set of available average voyage data should be selected for statistic calculation, and a reasonable weighting coefficient factor should be added into the standard curve/table for each type of ship; and
- .3 the numerical simulation methods should be established applicable to different types of ships, especially the robust time domain nonlinear hydrodynamic simulation technology accounting for the large amplitude ship-wave motions for evaluating the energy-saving ships and the evaluation method for active speed loss in rough sea.

Action requested of the Intersessional Meeting

9 The Intersessional Meeting is invited to consider the above and take action as appropriate.