INTERNATIONAL MARITIME ORGANIZATION

IMO

E

MARINE ENVIRONMENT PROTECTION COMMITTEE
58th session
Agenda item 4

MEPC 58/4/34
15 August 2008
Original: ENGLISH

PREVENTION OF AIR POLLUTION FROM SHIPS

Comments on the proposed baseline formula

Submitted by China

SUMMARY

Executive summary:	This document comments on the proposed baseline formulation and contains a proposal for the verification and setting of the formulation on the basis of the results of the analysis on tankers, bulk carriers and container ships using the same calculation methodology for ship design CO_2 index contained in document GHG-WG 1/2/1
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 10
Related documents:	MEPC 58/4, GHG-WG 1/2/1, GHG-WG 1/2/2 and GHG-WG 1/WP.1

Background

1 This document is submitted in accordance with the provisions of paragraph 4.10.5 of the Guidelines on the organization and method of work of the MSC and MEPC and their subsidiary bodies (MSC-MEPC.1/Circ.2).

Introduction

2 GHG-WG1 developed Draft Guidelines on the Method of calculation of the new ship design CO_2 index as contained in annex 5 to document MEPC 58/4. This new ship design CO_2 index formula was produced on the basis of the proposals submitted by Denmark and Japan (documents GHG-WG 1/2/1 and GHG-WG 1/2/2), which provides a good basis for evaluation of CO_2 emissions and energy efficiency. The equation "baseline value = $a \times b^{-c}$" was determined based on regression analysis of ships delivered in the period from 1995 to 2004 using the Fairplay database, utilizing a simplified calculation formula of new ship design CO_2 index.

3 The determination of values "a" and "c" would directly affect the baseline value and would have impacts on future ship design standards. At the GHG-WG 1 meeting, some delegations, including China, expressed the view that the formula for a mandatory new ship design CO_2 index and the CO_2 baseline should be further verified and analysed using a sufficient number of new ship samples, taking into account, in particular, the impacts on CO_2 index of the latest measures adopted by IMO to improve ship safety.

4 With an aim to verify the proposed baseline value, China selected a number of oil tankers, bulk carriers and container ships built between 2004 and 2007 for ship CO_2 design index calculation and analysis using the calculation formula and the regression method specified in paragraphs 24 and 25 of GHG-WG1/2/1 respectively. Values of "a" and "c" obtained from these calculations deviated considerably from those contained in paragraph 25 of GHG-WG 1/2/1. Further calculations and analysis were also made to the selected oil tankers in two separate groups: tankers below 60,000 DWT (30 tankers) and tankers of 60,000 DWT and above (30 tankers), the results of which were still different from those of GHG-WG 1/2/1. As for container ships, no matter which unit was used (TEU or DWT) in the calculations, the discrepancies were too significant to form regression curves. This indicates that the proposed baseline formula can not be verified for container ships. The results of the evaluation are shown in Figures 1 to 6.

Figure 1 (60 tankers from 20,000 DWT to 300,000 DWT)

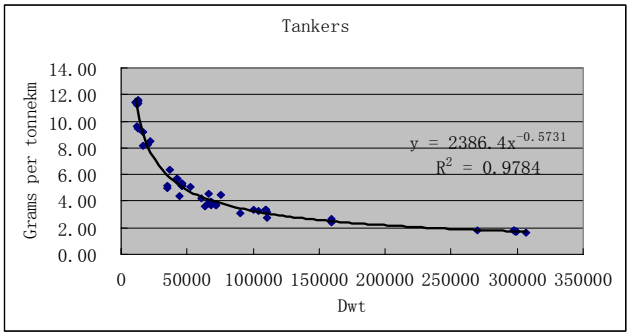


Figure 2 (69 bulk carriers from 30,000 DWT to 180,000 DWT)

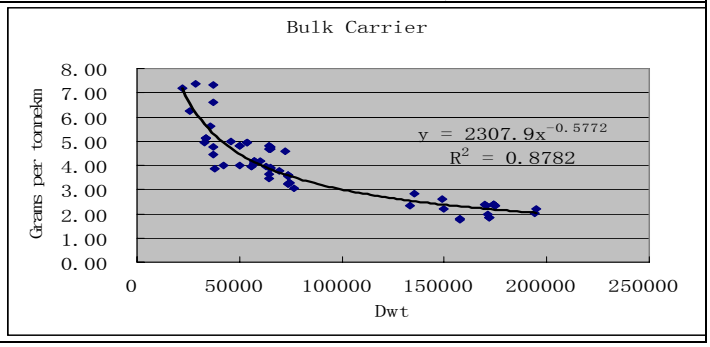


Figure 3 (30 tankers <60,000 DWT)

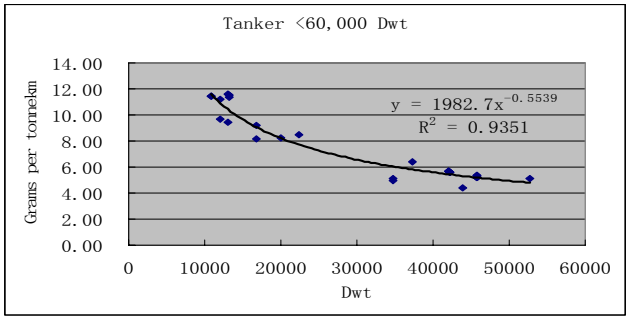


Figure 4 (30 tankers ≥60,000 DWT)

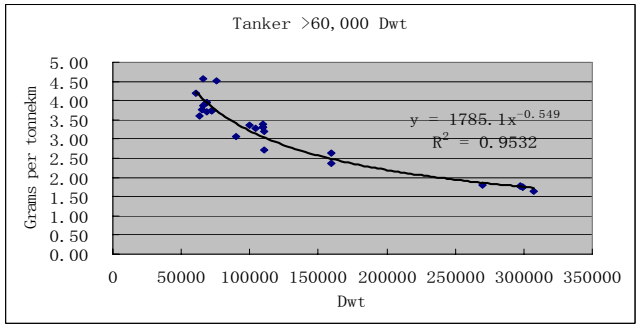


Figure 5 (50 container ships from 30,000 DWT to 100,000 DWT)

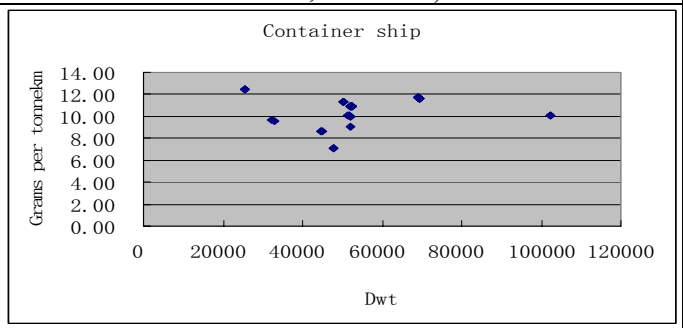
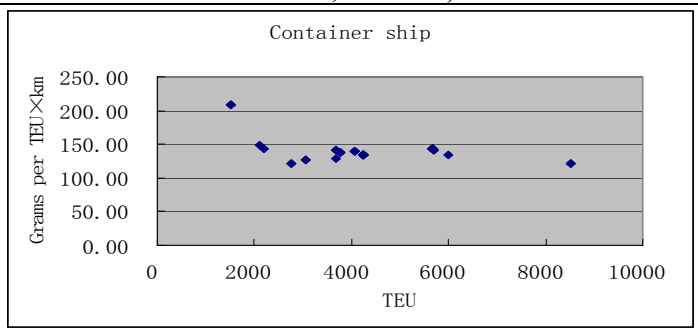


Figure 6 (the same 50 ships in Figure 5, from 2,000 TEU to 8,000 TEU)



5 In order to evaluate the impacts of CSR ship (Common Structural Rules) on CO_2 index, the CO_2 indexes of four different DWT groups of CSR and non-CSR bulk carriers (in similar DWT) were also calculated and compared. The results show that, in Group 1, the CO_2 index is less for the CSR ship of greater DWT, while in Groups 2 and 3, the CO_2 index is greater for the CSR ship of less DWT.

Table 1

No.	DWT(Ton)		design CO_2 index (g/tkm)		
	CSR	**Non-CSR**	**CSR**	**Non-CSR**	**Difference**
1	23,000	22,019	6.29	7.19	**14.31%**
2	38,000	38,033	5.03	3.86	**23.26%**
3	57,500	57,596	4.54	4.16	**8.37%**
4	180,000	174,766	2.58	2.36	**8.52%**

6 For double-side skin bulk carriers and single-side skin bulk carriers of the same main scantlings and DWT, the CO_2 index of the former is, on average, approximately 2% greater than the latter. This indicates that further improvement and verification should be made to the proposed baseline formula with regard to ship categorization. For example, consideration should be given to the impact by the increase of the weight of hull steel for the CSR ships.

Comments

7 Most of the sample ships selected for the analysis were built between 2004 and 2007, and some of the bulk carriers were even at the design stage. The selected oil tankers were at the range of 20,000 DWT to 300,000 DWT， bulk carriers of 30,000 DWT to 180,000 DWT, and container ships of 2,000 TEU to 8,000 TEU or 30,000 DWT to 100,000 DWT. For ships of the same type but of different sizes, “a” and “c” values varied considerably. As new ship types, built to comply with the new IMO safety measures, e.g., CSR ships, double-side skin bulk carriers, may likely cause an increase in design CO_2 index, it should be further considered whether CO_2 index should be developed separately for those ship types.

8 Ship design CO_2 index is a requirement for new ships, so the baseline value should be determined on the basis of data for new ships. Full consideration should be given to new types of ships and ships designed to meet the new requirements, such as CSR ships, double/single-side skin bulk carriers as well as GBS ships (Goal-based Standards), ships with protected fuel tanks and ships with PMA (Permanent Means of Access), etc. The entry-into-force and implementation of Ballast Water Management Convention, and the implementation of the revised MARPOL Annex VI on NO_x and SO_x regulations, will all cause an increase in energy consumption, and thus lead to increased CO_2 emissions.

Proposal

9 In light of paragraphs 7 and 8 above, China would like to propose the following:

.1 the CO_2 index formula should be verified and the baseline formula should be developed on the basis of analysing different ship types and sizes, using a sufficient number of new ship samples;

.2 a group of experts with the representation of various fields should be established by IMO, for example, a joint IMO/Government/Industries (shipbuilding and shipping) group of experts to conduct analysis using a consistent methodology (mathematical model) and database comprising data of new ships from 2005 to 2007. Samples selected from the database should be representative of ships engaged in international voyages worldwide. The current methodology (mathematical model) should be further improved based on the results of the analysis;

.3 the methodology used by this group of experts should be provided to Member States for analysis and verification of their own fleets and ships, the results of which could be submitted to IMO for consideration;

.4 it is premature to establish the baseline formula at present, because the current number of new ships cannot meet the basic requirements for regressions and many elements still need further verification. Therefore, no mandatory measures should be adopted at this stage, but interim guidelines could be adopted to encourage individual Members to apply the CO_2 design index on a voluntary basis; and

.5 the "x" in the baseline formula should be deleted.

Action requested of the Committee

10 The Committee is invited to consider the above comments and proposal, and take action as appropriate.