INTERNATIONAL MARITIME ORGANIZATION

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PREVENTION OF AIR POLLUTION FROM SHIPS

Comments related to trial calculations of the EEDI for subgroups of ro-ro cargo ships

Submitted by INTERFERRY and CESA

SUMMARY

Executive summary:	This document comments on the outcome of performed tests and trials in accordance with the grouping of ro-ro ships in vehicle carriers, volume carriers and weight carriers. The performed grouping reveals that only vehicle carriers represent a consistent group of comparable ships as standard ship types (e.g., bulk carriers and tankers). It is therefore concluded that further refinement and improvement for a reasonable design assessment of ro-ro cargo ships should be required.
Strategic direction:	7.3
High-level action:	7.3.1
Planned output:	7.3.1.3
Action to be taken:	Paragraph 23
Related documents:	MEPC 60/4/6, MEPC 60/4/15; MEPC.1/Circ.681; GHG-WG 2/2/13, GHG-WG 2/2/22 and MEPC 59/4/38

Background

1 This document is submitted in accordance with paragraph 4.10.5 of the Guidelines on 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.2) and provides comments on the documents MEPC 60/4/6 (Denmark) and MEPC 60/4/15 (Greece).

2 For a fair comparison among ro-ro cargo ships the Committee decided, during its fifty-ninth session, to split the ro-ro cargo ships in three categories: vehicle carriers, volume carriers and weight carriers. While the first category is easy to identify, the latter two have been defined, as a first attempt, by deadweight per lane metre above or below four tonnes (4 t/m).

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3 For a wide investigation, an informal expert group led by Denmark was formed with the participation of industry partners and academia to carry out trial applications of the EEDI formulation as set out in the interim guidelines (MEPC.1/Circ.681).

4 Due to time constraint, a concerted interpretation of results and conclusions have not been achieved. Hence, not all the proposed action items expressed by Denmark in document MEPC 60/4/6 (Denmark) are fully shared by industry partners.

Vehicle carriers

5 Vehicle carriers represent ships that are mainly operating on international transoceanic routes with rather uniform design criteria and speed. Therefore their efficiency is easily comparable and the presented baseline of this group has a reasonable correlation. Ro-ro vehicle carriers could be therefore considered as standard ship types like tankers, bulker, and container vessels.

Defining volume carriers and weight carriers

6 Ro-ro volume carriers were distinguished from weight carriers by deadweight per lane meter less than four tonnes (4 t/m). This definition was a first assumption. The division of the two groups appears to be very difficult and the baselines presented in document MEPC 60/4/6 are quite inconsistent.

7 The diversity within the volume and weight carriers is still high because individual ships vary considerably in their design-speed, individual adaption to berth-size and individual cargo/passenger capacities. Furthermore these groups will not cover all ships. Outliers have been removed without clarification on how similar ships will be treated in the future.

8 The proposed definition of volume carriers by deadweight per lane metre of two t/m or above but below four t/m, and weight carriers by four t/m or above but below eight t/m is not suitable. The proposal does not reflect any reasonable design criterions. Ships with c. four t/m could be easily designed for both groups, although the baselines for volume and weight carriers differ tremendously.

9 A ship with four t/m for which the EEDI would be above the baseline of weight carriers might only meet the attained index if the machinery power is reduced by several megawatts. With a slightly different ratio of t/m the same ship would easily plot below the baseline of volume carriers and could even install more power for a higher design-speed.

Further analysis of the proposed sub-division into volume and weight carriers

10 The Institute of Ship Design and Ships Safety of Hamburg Technical University analysed the impact of subdividing ro-ro ships into different types on the EEDI using the baseline definitions as proposed in document MEPC 60/4/6.

11 A known fuel efficient short sea ro-ro vessel designed to carry road trailers on four cargo decks has been selected for the investigation. The ship has 2,166 lane metres and 5,300 dwt at a full scantling draft of 5.70 m. As the dw/lm-ratio is 2.45, the ship is a volume carrier. The computed EEDI amounts to 56, which is below the volume carrier requirement of 60 according to the baseline. Therefore, the power demand of the ship could be even increased for c. 1,000 kW before its EEDI will meet the baseline definition for volume carriers. The weight carrier baseline would require an EEDI-value of 32.5, which means the ship has c. 6,100 kW in excess power, if it should be classified as a weight carrier.

12 If the same basic ship design would have to transport heavy cargo, it would be the most reasonable design option to reduce the ships-weight by removing the weather deck and increase the deadweight. Now, the lane metres are reduced to 1,600. Based on four t/m, the corresponding deadweight would be c. 6,400 dwt, which results in a draft of 6.00 m. By proposed definition the ship is now a weight carrier. The computed EEDI for the 6.00 m draft is now 51.5. Compared to the weight carrier baseline which has now to be applied, the EEDI requirement is 32. Based on the larger deadweight, the excess in power has now boosted from 6,100 kw to 7,050 kW, simply because the EEDI-difference is now multiplied with a larger deadweight-value.

13 Although the computed EEDI-value has suggested that the ship has become more efficient after the conversion, the excess power demand as weight carrier shows exactly the opposite behaviour. If the deadweight is slightly reduced, the ship becomes a volume carrier again with an EEDI well below the relevant volume carrier baseline so that it could again use more power (and emit more CO_2).

14 The main problem of the EEDI and its baseline, namely the inconsistency, as shown in document GHG-WG 2/2/22, has thus not been solved by the proposed segmentation, in contrary, the level of inconsistency has increased.

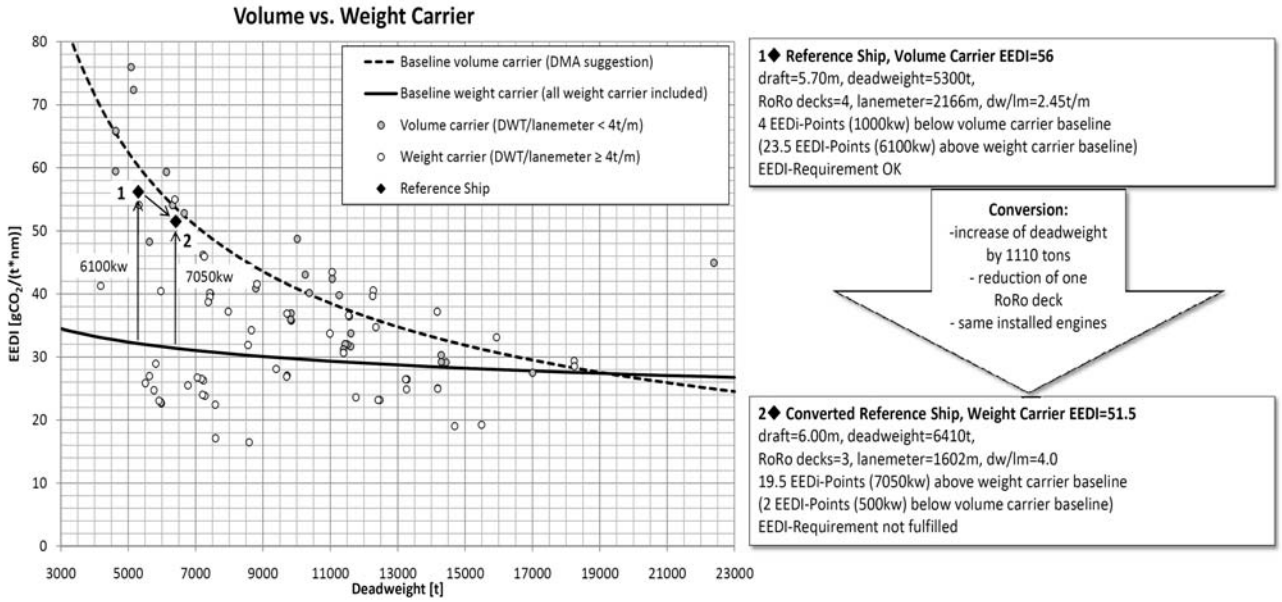

Figure 1: EEDI values and proposed baseline definitions for weight carriers and volume carriers showing the main results of the reference ship described in paragraph 11. The generally large scatter for the weight carriers should also be noted.

15 Therefore, the proposal in document MEPC 60/4/6 is not deemed appropriate with respect to the proposed separation between volume and weight carriers.

Schedule defined transport systems

16 CESA would like to refer to the well argued study EEDI TESTS AND TRIALS FOR EMSA by DELTAMARIN (http://www.emsa.europa.eu/end185d012d003.html) in which it is concluded that the EEDI concept is not applicable for schedule defined transport systems and could lead to sub optimization.

17 It is important to acknowledge that cargo transportation in the short sea shipping sector is in direct competition with other transport modes. Moreover, it should be reflected that the reduction of a certain service speed is not possible if the transport has to serve a strict schedule. If the required index would not be attained in these circumstances, the cargo would have to be transported by another transport mode or the owner would have to provide a larger ship. Both cases might lead to an increase of emissions.

18 In previous submissions, INTERFERRY and CESA have already suggested that it is mainly the speed that determines the attained index. The EEDI should provide incentives for design improvements for all ships to sustainably reduce the emissions of CO_2, regardless of their design-speed. By using the current formula the EEDI would be misused as a speed limit as described by Greece in document MEPC 60/4/15, which will penalize the schedule defined transport system.

Conclusions

19 The trial application of the EEDI for ro-ro cargo ships reveals that only the group of vehicle carriers are similar ships with a comparable operation profile. For volume and weight carriers the individual EEDI of each ship is not comparable within the group and does not reflect its efficiency.

20 A fragmentation in groups containing too few ships should be avoided.

21 A clear definition of design-categories is important to avoid any hybrid ships which could be adapted for more than one group with varying baselines.

22 The EEDI application as it was proposed for ro-ro volume and weight carriers was not successful. Further developments of a more suitable index are required. CESA strongly proposes the implementation of market-based instruments for ships operating in the short sea shipping sector. This will offer further incentives to the industry and owners to enhance the efficiency of ships and therefore will reduce CO_2 emissions considerably.

Action requested of the Committee

23 The Committee is invited to consider the views presented and take action as appropriate.