BAHRIA CLASSIFICATION SOCIETY

BCS-G 005

Guidelines on Operational Carbon Intensity Indicators and the Calculation Methods

October 2022

These guidelines list requirements and procedures and are intended to be used as supporting material to BCS Rules.

Unless otherwise specified, these Rules apply according to the implementation dates as defined in each interpretation. See Rule Change Summary on BCS website for revision details

"General Terms and Conditions" of the respective latest edition will be applicable (see Rules for Classification and Survey).

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1. General

These guidelines are prepared in accordance with Resolution MEPC.352(78) and enter into force on November 1, 2022.

In the Initial IMO Strategy on Reduction of GHG Emissions from Ships, the level of ambition on carbon intensity of international shipping is quantified by the CO2 emissions per transport work, as an average across international shipping.

These Guidelines address the calculation methods and the applicability of the operational carbon intensity indicator (CII) for individual ships to which chapter 4 of MARPOL Annex VI, as amended, applies.

2. Definitions

2.1 MARPOL means the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocols of 1978 and 1997 relating thereto, as amended.

2.2 IMO DCS means the data collection system for fuel oil consumption of ships referred to in regulation 27 and related provisions of MARPOL Annex VI.

2.3 For the purpose of these Guidelines, the definitions in MARPOL Annex VI, as amended, apply.

2.4 The metrics indicating the average CO2 emissions per transport work of a ship are generally referred to as operational carbon intensity indicator (CII) in these Guidelines.

.1 A specific CII calculated based on the actual or estimated mass or volume of the shipment carried on board a ship is generally referred to as demand-based CII; and

.2 A specific CII, in which calculation the capacity of a ship is taken as proxy of the actual mass or volume of the shipment carried on board, is generally referred to as supply-based CII.

2.5 The supply-based CII which uses DWT as the capacity is referred to as AER, and the supply-based CII which uses GT as the capacity is referred to as cgDIST.

3. Application

3.1 For all ships to which regulation 28 of MARPOL Annex VI applies, the operational carbon intensity indicators defined in section 4 should be applied.

3.2 The operational carbon intensity indicators defined in section 5 are encouraged to be additionally used by ships, where applicable, for trial purposes.

4. Operational Carbon Intensity Indicator (CII) of individual ships for use in implementing regulation 28 of MARPOL Annex VI

In its most simple form, the attained annual operational CII of individual ships is calculated as the ratio of the total mass of CO2 (M) emitted to the total transport work (W) undertaken in a given calendar year, as follows:

$$attained\ CII_{ship} = M/W$$

4.1 Mass of CO_2 emissions (M)

The total mass of CO2 is the sum of CO2 emissions (in grams) from all the fuel oil consumed on board a ship in a given calendar year, as follows:

$$M = FC_j \times C_{Fj}$$

where:

j is the fuel oil type;

FC_j is the total mass (in grams) of consumed fuel oil of type j in the calendar year, as reported under IMO DCS; and

C_{Fj} represents the fuel oil mass to CO2 mass conversion factor for fuel oil type j, in line with those specified in the Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships, as may be further amended. In case the type of the fuel oil is not covered by the guidelines, the conversion factor should be obtained from the fuel oil supplier supported by documentary evidence.

4.2 Transport Work (W)

In the absence of the data on actual transport work, the supply-based transport work (Ws) can be taken as a proxy, which is defined as the product of a ship's capacity and the distance travelled in a given calendar year, as follows:

$$W_s = C \times D_t$$

where:

C represents the ship's capacity:

- For bulk carriers, tankers, container ships, gas carriers, LNG carriers, general cargo ships, refrigerated cargo carrier and combination carriers, deadweight tonnage (DWT) should be used as Capacity;

- For cruise passenger ships, ro-ro cargo ships (vehicle carriers), ro-ro cargo ships and ro-ro passenger ships, gross tonnage (GT)2 should be used as Capacity; and

D_t represents the total distance travelled (in nautical miles), as reported under IMO DCS.

5. Operational Carbon Intensity Indicator (CII) of individual ships for trial purpose

The following metrics are encouraged to be used for trial purposes, where applicable:

.1 Energy Efficiency Performance Indicator (EEPI)

$$EEPI = \frac{M}{C \times D_t}$$

.2 cbDIST

$$cbDIST = \frac{M}{ALB \times D_t}$$

.3 clDIST

$$clDIST = \frac{M}{Lanemeter \times D_t}$$

.4 EEOI, as defined in MEPC.1/Circ.684 on Guidelines for voluntary use of the ship energy efficiency operational indicator (EEOI).

In the formulas above:

• the mass of CO2 (M), the ship's capacity (C) and the total distance travelled (Dt) are identical with those used to calculate the attained CII of individual ships, as specified in section 4.1 and 4.2;

• Dl means the laden distance travelled (in nautical miles) when the ship is loaded;

• ALB means the number of available lower berths of a cruise passenger ship; and

• Lanemeter means the length (in metres) of the lanes of a ro-ro ship.