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CONSIDERATION OF ANY ISSUE ARISING FROM THE FINAL REPORT OF THE CORRESPONDENCE GROUP ON CARBON INTENSITY REDUCTION

The critical need for an adverse weather voyage adjustment, to ensure the CII mechanism is fit for purpose

Submitted by Malaysia, Panama, United Arab Emirates, ICS, INTERTANKO, INTERCARGO and WSC

SUMMARY

Executive summary:	This document comments on the work and final report of the Correspondence Group on Carbon Intensity Reduction as set out in document MEPC 78/7/11 (China et al.), highlighting and restating the specific need for the previously proposed adverse weather voyage adjustment for use in the CII calculation mechanism. This adjustment is considered critical to minimise negative impacts on Member States. Without adoption of the currently rejected adverse weather voyage adjustment, the CII rating mechanism will not be fit for purpose, which would unjustly and unreasonably impact the ratings of efficient and well operated ships because of a fundamental flaw in the mechanism. Ships operating predominantly throughout the year in a harsh metocean region, cannot, and should not be graded on the same basis as those operating in a benign metocean region, without an appropriate weather adjustment being applied. The co-sponsors fully support the development and implementation of the CII system without delay, however, the CII rating mechanism must be fit for purpose and it would be an error to go forward with an incomplete system that unfairly penalizes well designed and efficiently operated ships. Such an outcome would provide perverse incentives and be inconsistent with the objective of decarbonization.
Strategic direction, if applicable:	3
Output:	3.2
Action to be taken:	Paragraph 22
Related documents:	MEPC 78/7/11 and MEPC 76/7/25

Background

1 MEPC 76 adopted amendments to MARPOL Annex VI to incorporate the CII rating mechanism. To further consider proposals for CII correction factors and voyage adjustments, otherwise known as the G5 guidelines, the Committee established a Correspondence Group which has presented its report on G5 guidelines in document MEPC 78/7/11 (China et al.) to be considered first by ISWG-GHG 12. Within the report, the proposal for the adverse weather voyage adjustment was not taken forward. This is of great concern to the shipping industry, as this risks making the CII mechanism not fit for purpose, and making it impossible for ships operating within harsh metocean regions to be appropriately graded, as compared to identical ships being operated in more favourable weather conditions. Ships will be graded individually each year and not averaged across fleets and the grading mechanism must allow for corrections to take into account factors, such as weather which are outside the control of an individual ship. Two sister ships being operated equally efficiently cannot be allowed to be graded differently, simply because one ship has to operate in more adverse weather conditions for longer periods of time due to the area of operation governed by the ship's charter.

Objections to the adverse weather voyage adjustment

2 Within the Correspondence Group, the main issues relating to agreeing the adverse weather voyage adjustment were:

.1 difficulties in verifying the claimed adjustments, and recording of adverse weather in a robust and transparent manner;

.2 adverse weather is already included within the reference lines for the various ship types; and

.3 a preference to wait until 2026 to consider the need for an adverse weather voyage adjustment.

3 The co-sponsors address the three issues detailed above as follows.

Verification

4 Of the various technologies for shipboard measurement of wave height, X-band radar systems were first introduced in the mid-1990s, and are well established. There are hundreds of such systems in operation from several suppliers. Up to a significant wave height of 10 meters, the achieved accuracy is within 10%, and the achieved uptime is about 99%. The systems may also be interfaced with a ship's anemometer, enabling real time recording of both significant wave height and wind speed. The technology has been used in an operational support role, including offshore construction, diver support and safe helideck operations. It has also been accepted by classification societies for interfacing with hull strain monitoring systems. For example, ABS's *Hull Condition Monitoring Guide* states:

> "Vessels equipped with direct sea state monitors, such as radar, acoustic and laser/optic wave meters in compliance with 2/1.5.1 to 2/1.5.2 can be assigned an optional descriptive notation ST, followed by the number of devices used".

5 The systems carry classification society type approval, and are available at a typical capital cost in the range of $60,000 to $100,000. It is also possible to rent on an annual basis. Options are available for onboard storage of data and/or cloud based storage.

6 For ships equipped with such equipment, recorded sea state data can either be provided for a complete year, just for periods of claimed voyage adjustments, or for any nominated period for purposes of random or spot checks. The co-sponsors propose that such systems would enable robust and transparent verification of claimed voyage adjustments.

7 Other technical solutions for verification are available. The co-sponsors are merely highlighting this technology as one practical way to address the concerns expressed within the Correspondence Group, and hence enable the application of the adverse weather voyage adjustment to those ships that voluntarily adopt such technology.

8 The adverse weather correction factor could be implemented without delay using the highlighted wave height, X-band radar technology as a default means of verification, with alternatives being considered in parallel (e.g., acoustic and laser/optic wave meters, ship motion detectors and weather bureau services). Further methodologies and techniques could then be added to the guidelines at the time of the 2024 review, based on in-service experience, data and analysis.

Inclusion of adverse weather within the CII reference lines

9 During the analysis and definition of the CII reference lines, a range of each ship type was considered, and the reference lines will therefore reflect the average metocean conditions experienced by the whole sample of ships. However, there is significant variation in global metocean conditions, and the sea states experienced by individual ships may be harsher than the average. If such ships, will not be able to claim the adverse weather voyage adjustment, they will achieve lower CII ratings than similar ships that operate in more benign regions. This will be the case, even if such ships are well designed and efficiently operated. In effect, ships serving routes with frequent adverse weather will be unfairly treated relative to ships operating on routes with more benign conditions. Unfair treatment may result in less ships being made available, affecting trade and costs to Member States in regions of the world that experience harsher weather conditions.

10 To illustrate this point, Table 1 below summarises the annual prevalence of 4 metre significant wave height, this being one of the limits for the proposed adverse weather voyage adjustment. Data is included for a harsh metocean region (North Atlantic), average worldwide conditions and also for the benign region of West Africa.

Table 1: Comparison of prevalence of 4.0 metres significant wave height

Region	Annual prevalence of 4.0 metres significant wave height	Reference
North Atlantic	31.4%	DNV-RP-C205
Worldwide	19.6%	DNV-RP-C205
Offshore Nigeria, West Africa	0%	DNVGL-OS-E-301

11 The 100 year significant wave height is also an often quoted metric that can provide an indication of regional metocean conditions. The data within Table ***2*** below is taken from DNVGL-OS-E301 and provides a comparison:

Table 2: Comparison of 100 year significant wave height for various regions

Region	100 year significant wave height (metres)
Offshore Norway	16.5
Gulf of Mexico (hurricane)	15.8
South China Sea (Typhoon)	13.6

Offshore Egypt	12.1
Offshore Brazil	8.0
Timor Sea (Typhoon)	5.5
Gabon	4.0
Nigeria	3.8

12 Hence, when comparing regions of the world, there are very significant variations in the metocean conditions, and this will impact on the relative fuel consumption and CII rating of ships. It is emphasised that an individual ship, due to its charter, may operate within one region for the entire year so the weather conditions it experiences are not averaged out.

Impact on fuel consumption and CII rating

13 The impact of adverse weather on fuel consumption will depend on ship type and size, and on relative heading to the weather. Crew tactics also vary, with some ships maintaining constant speed up to a certain sea state, whilst others may maintain constant power and sacrifice speed. However, for guidance, Anthony Molland et al., 2017, have presented the data within Table 3 for a cargo ship in head seas. For a fully developed sea, Bf6 corresponds to a 4 metres significant wave height, and in this sea state the ship would need to increase power by 85% to maintain speed, or reduce speed by 17% if maintaining constant power. In either scenario, the ship would consume more fuel than in calm conditions. In higher sea states the effect on power, speed and fuel consumption is even more pronounced.

Table 3: Effect of adverse weather on ship power at constant speed and ship speed at constant power

Beaufort number BN	ΔP (%)	ΔV (%)	Approximate wave height (m)
0	0	–	–
1	1	–	–
2	2	–	0.2
3	5	1	0.6
4	15	3	1.5
5	32	6	2.3
6	85	17	4.2
7	200	40	8.2

14 Figure 1 below is also taken from Anthony Molland et al., 2017, and confirms there is no equivalent compensating effect in following seas.

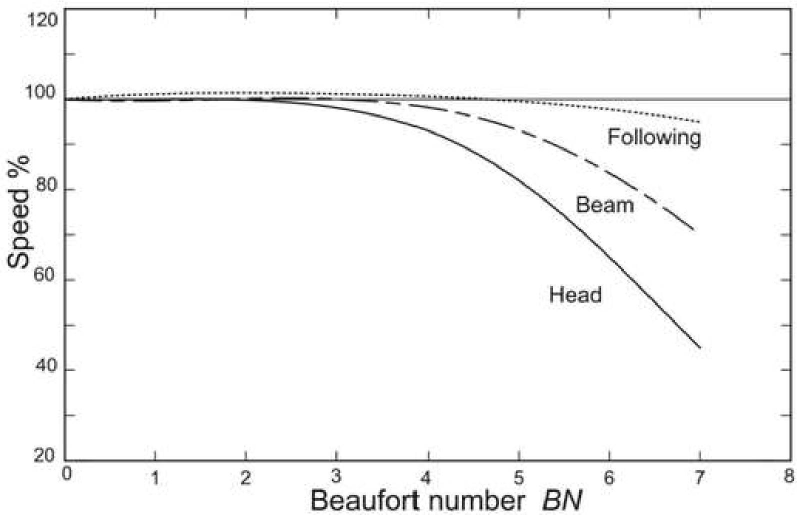

Figure 1: Speed loss in following, beam and head seas

15 Hence when experiencing adverse weather, a ship will consume more fuel than in calm conditions. There is significant regional variation in the metocean conditions, and this factor is beyond the control of a ship's crew. Even if well designed and efficiently operated, a ship operating in a harsh metocean region will consume more fuel than the equivalent ship operated in a benign region. Without the adverse weather voyage adjustment, such a ship will unfairly incur a worse CII rating than an equivalent ship operating in a benign region.

Preference to wait until 2026

16 At this stage, the co-sponsors believe the Committee's intention is to put in place a fit for purpose CII system, with all the key components necessary to function robustly. The experience gained during the implementation period will then be used to fine tune the system. However, the co-sponsors believe that similar to the voyage adjustment for ice, the adjustment for adverse weather is an essential component of the system. The co-sponsors believe that reassessment in later years will only serve to further highlight this need, and the consequential late adoption of the adverse weather voyage adjustment, and allowance for a further trial period, will risk delaying the finalization of the CII system, and therefore hamper the decarbonization process. It should also be noted that even in the early stages of implementation, the CII ratings will be used by a number of stakeholders including financiers, etc. to base their decisions upon, it is therefore imperative from the outset that a CII mechanism is robust and fit for purpose, ensuring individual ships are treated/graded fairly and not unduly penalized.

Way forward

17 Within this document, the key concerns relating to the adverse weather voyage adjustment have been addressed and it is proposed that the group agrees to include the adjustment within the CII calculation mechanism and G5 Guidelines.

18 Paragraph 4 provides a means of verification which could be incorporated into the guidelines to allow rapid agreement of the proposed adverse weather adjustment at ISWG-GHG 12. Alternative technical solutions are also available and could be considered separately. The 2024 review provides an opportunity to add additional verification techniques based on in-service experience, data and analysis.

19 The adverse weather adjustment, albeit critical, is just one of several correction factors and voyage adjustments that have not been taken forward by the correspondence group, and which the co-sponsors believe are essential parts of the CII system. Adverse weather should be treated in the same way as ice navigation and assigned an adjustment without delay, since both are a consequence of environmental conditions outside the control of ship operators, and both degrade CII ratings.

20 Providing sufficient justifications for all of these has been an onerous task for the group, and it has not been able to provide all the necessary data and analyses, and fully answer all the concerns within the time available. This document provides analysis that could not be shared with the correspondence group, building on work done on the matter by the group and allowing finalisation of the adverse weather correction factor at ISWG-GHG 12.

21 The co-sponsors fully support the development and implementation of the CII system without delay. However, it is strongly believed that it would be an error to go forward with an incomplete and inaccurate system. To do so would risk unfairly penalising well designed and efficiently operated ships and promote perverse operational incentives and modal shifts, which could increase rather than decrease carbon emissions. Such outcomes are contrary to the objective of decarbonisation.

Action requested of the Working Group

22 The Group is invited to note the proposals provided in paragraphs 17 to 21, and take action as appropriate.

References

Anthony F. Molland, S. R. (2017). *Ship Resistance and Propulsion - Practical Estimation of Ship Propulsive Power.* Cambridge University Press.

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