

SUB-COMMITTEE ON SHIP DESIGN AND
CONSTRUCTION
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Agenda item 5

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**REVIEW OF THE GUIDELINES FOR THE REDUCTION OF UNDERWATER NOISE
(MEPC.1/CIRC.833) AND IDENTIFICATION OF NEXT STEPS**

Comments on documents SDC 9/5, SDC 9/INF.2 and SDC 9/5/1

Submitted by FOEI, WWF, IFAW, Pacific Environment and CSC

SUMMARY

Executive summary: This document comments on the provisional work plan submitted by Canada in document SDC 9/5/1 and proposes several recommendations for the Sub-Committee to consider as it continues its revision of the draft Guidelines and identification of next steps.

*Strategic direction, 1
if applicable:*

Output: 1.16

Action to be taken: Paragraph 17

Related documents: MEPC 74/INF.36; MEPC 76/15; SDC 8/14/6, SDC 8/18; SDC 9/5, SDC 9/5/1 and SDC 9/INF.2

Introduction

1 This document is submitted in accordance with the provisions of paragraph 6.12.5 of 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.5/Rev.3) and comments on documents SDC 9/5/1, SDC 9/INF.2 and SDC 9/5.

2 In January 2022, SDC 8 established a correspondence group under the coordination of Canada (SDC 8/18, paragraph 14.28) to continue the urgent work to review the *Guidelines for the Reduction of Underwater Noise from Commercial Shipping to Address Adverse Impacts on Marine Life* (MEPC.1/Circ.833) and to identify next steps (MEPC 76/15, paragraph 12.3). The co-sponsors of this document wish to acknowledge and thank Canada for its dedicated and effective coordination of the CG and would like to commend the delegations that participated in the CG for advancing a significant body of work.

3 The co-sponsors support the recommendation of the CG, articulated in SDC 9/5, to establish a working group at SDC 9. The co-sponsors also support the proposed strategy and work plan outlined in annex 1 to document SDC 9/5/1, proposed by Canada, and initial recommendations for the strategy discussion is offered.

4 Furthermore, this document reflects on the additional input provided in SDC 9/INF.2 and proposes several recommendations for the proposed working group to consider as it continues its revision of the draft guidelines and identification of next steps.

Comments on document SDC 9/5/1 – Provisional workplan

5 SDC 9/5/1 proposes a work plan that ensures the development of a programme of action to be presented at MEPC 80 with a call to Member States to submit additional proposals and recommendations (SDC 9/5/1, paragraph 7). The co-sponsors strongly support the proposed strategy, work plan and timeline.

6 The proposed work plan includes engagement with other committees of the Organization to provide input on the revision of the Guidelines, development of next steps and a programme of action (SDC 8/18, paragraph 14.22). It is believed that it is useful to seek input from other committees, both on the revised guidelines and annexes as well as on developing a programme of action and that, in addition to the PPR Sub-Committee, it would be useful to engage with committees and sub-committees working on reducing biofouling and on operations in polar waters, as these issues likewise influence underwater noise.

7 By focusing on finalization of next steps and development of a programme of action, the proposed work plan effectively responds to the urgent calls for action from scientists, the international community and civil society to reduce ship underwater radiated noise (URN) (SDC 8/14/6).

8 The SDC 8 Working Group on the Review of the Guidelines identified barriers to the uptake and implementation of the Guidelines (SDC 8/WP.8, paragraph 20) and was requested to evaluate a suite of options or solutions to overcome these barriers, noting that these solutions shall inform the development of the proposal for a programme of action (SDC 8/18, paragraph 14.18.4). A primary barrier noted by the Working Group, and also identified through two separate surveys of industry, is the non-mandatory nature of the Guidelines. As such, the programme of action should include options for mandatory measures that can successfully, and feasibly, reduce ship-based URN. Such measures include:

- .1 The revised draft Guidelines describe the components of a Noise Management Plan for any given ship, which is well-aligned with other management planning approaches of the Organization. For example, mandatory Ship Energy Efficiency Management Plans are used, inter alia, to identify the specific measures a ship will adopt to improve its energy efficiency, recognizing that ships are unique and operate under a wide range of conditions (MEPC 70/18/Add.1). Given the co-benefits and trade-offs between energy efficiency and URN reduction, requiring each ship to develop a Noise Management Plan, which is integrated with its SEEMP, is a logical and feasible solution for a ship to identify the means by which it will reduce its URN or meet URN goals. In this way, ships can optimize and/or build upon the design and operational measures best suited to each ship that can both increase efficiency and minimize URN.
- .2 A 2019 Technical Workshop, held at IMO Headquarters, invited 140 subject-matter experts from around the world to discuss "Quieting Ships to Protect the Marine Environment" (MEPC 74/INF.36). A conclusion of this workshop was a recommendation that a noise target be established for individual ships (by class, speed, tonnage or other). Such targets could guide the setting of URN goals in Noise Management Plans. Targets could be phased in over time or could be based on current URN emissions (e.g. by class) and

gradually reduced over some period. Quantitative noise targets would provide shipowners, designers and operators with clarity about meaningful URN goals, which is a key component of Noise Management Plans.

- .3 There has been recent and ongoing work to develop practicable and cost-effective estimation of noise levels, which can support evaluating alignment of a ship with URN targets. This includes predictive methods based on computational fluid dynamics (e.g. Sezen and Atlar, 2022a,¹ b)² and methods based on hull-mounted monitoring systems (e.g. Han et al. 2022)³ as well as full-scale measurements.

9 The Arctic Ocean is a special case for underwater sound and necessitates further consideration. Since 2014, there has been a doubling of underwater noise in some parts of the Arctic alongside a 75% increase in ship distance travelled between 2013-2019. New modelling work (published in 2022) discerns areas of rapidly increasing ship noise emissions that cover most of the Arctic Ocean.⁴ The changing Arctic underwater soundscape is of particular concern because marine mammals are important to many Arctic indigenous peoples who have expressed concern about the impacts of noise from transiting vessels. As such, the co-sponsors urge thorough consideration of document SDC 9/5/3, paragraph 9, submitted by the Inuit Circumpolar Council (ICC), that requests the Sub-Committee to consider an annex to the guidelines related to operations in the Arctic and further consider the development of mandatory measures to ensure noise levels in Inuit Nunaat, and globally, are significantly reduced.

Comments on SDC 9/5 and SDC 9/INF.2

10 The CG made significant progress in revising the Guidelines, and SDC 9/5 summarizes the areas where additional discussion is warranted. To help progress discussions within the proposed working group, the co-sponsors offer several recommendations for consideration.

Shipboard echosounders and acoustic antifouling systems

11 With regard to which sounds the Guidelines should apply to (SDC 9/5, paragraph 18), the co-sponsors urge the inclusion of significant noise sources associated with the regular operation of commercial ships, such as acoustic anti-fouling systems and standard echosounders. Both of these types of acoustic devices have been found to adversely impact odontocetes (toothed whales), including killer whales and beaked whales, and could impact

¹ Sezen, S. and M. Atlar (2022a). Numerical investigation into the effects of tip vortex cavitation on propeller underwater radiated noise (URN) using a hybrid CFD method. *Ocean Engineering*: 112658.

² Sezen, S. and M. Atlar (2022b). Marine propeller underwater radiated noise prediction with the FWH acoustic analogy part 3: Assessment of full-scale propeller hydroacoustic performance versus sea trial data. *Ocean Engineering* 266: 112712.

³ Han, H., S. Jeon, Y. Kim, C. Lee, D. Lee and G. Lee (2022). Monitoring of the cavitation inception speed and sound pressure level of the model propeller using accelerometer attached to the model ship in the cavitation tunnel. *Ocean Engineering* 266: 112906.

⁴ Jalkanen, JP, L Johansson, M Andersson, E Majamaki, P Sigray. (2022). Underwater noise emissions from ships during 2014-2020. *Environmental Pollution* 311. <https://www.sciencedirect.com/science/article/pii/S0269749122009800>

other forms of marine life.⁵ Because of their widespread use in the shipping industry, the Guidelines should offer insight into best practices to minimize the impacts of these devices, and should provide such information to other relevant committees of the Organization.

URN goal setting

12 Document SDC 9/5, paragraph 26 affirms that there is strong support for including direction in the Guidelines on setting ship-based URN goals, though there remains further work in terms of content. It is noted that in document SDC 9/INF.2, the United States proposes possible text for section 7 (URN Goals Setting) of the draft revised Guidelines. The co-sponsors support using this proposed text as a starting point for finalizing the content of this section.

Proposed annex 1 to the Revised Guidelines – Noise Management Planning Tools

13 Document SDC 9/INF.2 includes proposed draft flowcharts, submitted by Canada, to assist with development of annex 1 to the Guidelines: An Underwater Noise Management Planning Integrated Tool, including separate Tools for new and existing vessels. The co-sponsors of this document support the approach proposed, although the annex will require further discussion and development before it is finalized.

14 In particular, the proposed flowcharts should link to a repository of materials that can provide technical guidance on each component of a Noise Management Plan. This repository would draw on the technical output of existing and future projects (e.g. SONIC, AQUO, SATURN, etc.), and will need mechanisms to ensure it is kept up to date and can include new findings.

15 Linking the information gathered for annex 2 with the flowchart in annex 1 can assist in making the Tool more efficient. The flowchart could incorporate information from a matrix of compliance approaches for EEXI, EEDI and CII and what is currently understood regarding their relationship with URN. Additionally, the Tool should provide guidance on undertaking an iterative design process that optimizes both URN and energy efficiency goals, including by providing a quantitative evaluation of expected changes to URN with changes to design parameters. Similarly, the Tool could include quantitative predictions for how other design or operational measures, such as hull cleaning schedules or wind-assist propulsion, could impact URN.

16 The co-sponsors of this document suggest that a specialist workshop be held to advance work on the Tools. This may require a dedicated contractor to help build out the repository of materials to support effective use of the Tools, and to design efficient means to update the Tools as needed.

⁵ Trickey, JS, G Cardenas-Hinojosa, L Rojas-Bracho, GS Schorr, BK Rone, E Hidalgo-Pla, A Rice and S Baumann-Pickering. (2022). Ultrasonic antifouling devices negatively impact Cuvier's beaked whales near Guadalupe Island, Mexico. *Comm. Bio.* 5:1005. <https://doi.org/10.1038/s42003-022-03959-9>
Cholewiak, D, Al DeAngelis, D Palka, PJ Corkeron, and SM Van Parijs. (2017) Beaked whales demonstrate a marked acoustic response to the use of shipboard echosounders. *R.Soc. open sci.* 4:170940. <http://dx.doi.org/10.1098/rsos.170940>; Burnham, R, S Vagle, P Van Buren and C. Morrison. (2022). Spatial impact of recreational-grade echosounders and the implications for killer whales. *J. Mar. Sci. Eng.* 10:1267. <https://doi.org/10.3390/jmse10091267>.

Action requested of the Sub-Committee

17 The co-sponsors urge the Sub-Committee to support the strategy and work plan proposed by Canada in SDC 9/5/1, and the additional elements and considerations expressed in this document in paragraphs 5-16 and take action, as appropriate.
