



TECHNICAL CIRCULAR

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To: : **All Surveyors/Auditors**

Applicable to flag : **All Flags**

Subject: : **Noise Control at Sea and in Port**

Reference: : **IMO, MEPC.1/Circ.833**

Noise Control at Sea and in Port

The control of shipping-related noise is an issue that can no longer be ignored. Regulations, studies and technology developments are taking effect around the world, targeting both human and animal welfare, but the news is not all bad for shipowners' bottom line.

Eligible options for reduced rates include ship classification society quiet vessel notations:

- * Bureau Veritas Underwater Radiated Noise (URN)
- * DNV GL Silent-Environmental (E)
- * RINA DOLPHIN.

Cavitation and wake flow reduction technologies also qualify for fee reductions including the use of the Becker Mewis duct, Propeller Boss Cap Fins and the Schneekluth duct.

Power and Propulsion

Sound propagates four times faster in water than in air (1484 m/s versus 343 m/s). The low absorption rate of water makes sound, especially low frequency sound, travel hundreds of kilometers in open sea.

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The audible range of hearing for marine fauna spans from five Hz up to about 200 kHz. A propeller-driven ship has a number of noise sources: the main and auxiliary engines, electric motors and the flow noise due to turbulence in the boundary layer and the wake of the hull and appendages.

The propeller is a dominant source, generating the highest noise level at frequencies below 200 Hz. If cavitation occurs on propeller blades, the noise level is increased further. Cavitation contributes to both tonal and broadband noise.

As with naval vessels, noise needs to be considered at the initial design stage of commercial ships. A well-designed hull form will require less power and provide more uniform inflow to propellers, thus increasing the propulsive efficiency and reducing the underwater radiated noise caused by the uneven wake flow.

The propeller design should be carefully matched to optimal efficiency with the most frequently operated speed/draft condition(s). For commercial ships, it is hard to avoid cavitation for efficiency reasons, but cavitation can be controlled and kept to moderate levels. Done correctly, the result is a quieter ship with higher efficiency and lower emissions.

Control Measures

Noise above and below the water line can be controlled effectively.

There are some simple approaches. Avoid environmentally sensitive areas or slow down when operating in these areas. Other steps are to design for acoustic and economic operation of the propulsion.

-Diesel generators may be mounted on two-stage resilient mounts, and the source vibration of the electric motor may be low. Noise in the forward stateroom may be controlled by secondary structure-borne noise alone.

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-Equipment manufacturers are adding to the body of knowledge available to designers. Study were made to quantify the reduction of structure-borne noise by measuring the dampening properties of its flooring products.

Improving Operational Safety

ABS and Singapore Innovation and Research Center are working on using noise and vibration analysis to help improve operational safety. Appropriate noise and vibration levels can enhance safety by improving task performance, habitability, proper functioning of sound sensitive equipment, such as sensors and modern monitoring technologies, as well as whole-body structural integrity at sea. Because vibration on an asset can be global (vibration of the entire structure), local (vibration of selective structural components) or a mix, it has to be considered in a comprehensive way.

ABS is working with partners in Singapore to specifically address tanker noise. The project's main objective is to validate the development of the noise analysis procedure for large commercial vessels and to address noise issues for existing and newbuild tankers.

Port-side Solutions

Shoreside, noise guidelines and regulations are being established for ports and terminals. For example, the E.U. has a Noise Management in European Ports (NoMEPorts) document providing guidance and examples of best practice on noise management.

Industry-Wide Action

The quest for both understanding and regulation continues to expand across the maritime space. The IMO published MEPC.1/Circ.833 *Guidelines for the Reduction of Underwater Noise from Commercial Shipping to Address Adverse Impacts on Marine Life* in 2014. Additionally, the IMO recently made changes to onboard noise limits that are mandatory for vessels over 1,600 tons in resolution MSC.337(91). The noise limits provided in the Code on noise levels on board ships are now mandatory under SOLAS.

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ATTACHMENTS: No

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