

Acoustic design of lightweight cabin walls for cruise ships

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Ship design is increasingly moving towards the use of lightweight materials to reduce operational costs and increase the payload, but the acoustic transmission loss of composite panel materials for partition walls is generally worse than their metal counterparts. Furthermore, the effectiveness of materials in preventing sound transmission is assessed in the laboratory using the Weighted Sound Reduction Index (R_w), whereas in-situ measurements for cabin walls uses the Weighted Apparent Sound Reduction Index (R_w'), and significant differences may occur between these two metrics due to a number of installation effects. As a result, engineering design to meet the contrasting weight and acoustic requirements demands a full understanding of both the sound transmission characteristics of the partition wall and the acoustics of the cabin interior.

This paper will provide a review of the acoustic design problem for a lightweight cabin structure being developed for future cruise ships: the origin of differences between R_w and R_w' , some typical modelling and test results from an in-depth study of the problem, and also consideration of whether R_w is the best metric for the cabin noise problem.

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