IRClass-Noise Prediction Analysis

For Acceptable Acoustic Environment

Purpose

At early stage of designing a new vessel or rebuilding, Noise and thermal insulation, walls, ceilings and floors are being selected in order to fulfill the noise criteria.

The purpose is to determine the noise levels to be expected in all relevant areas of ship at the design stage. If excessive noise levels are predicted based on noise prediction analysis, decisions can be made on the necessary noise reducing measures.

Airborne Noise in Receiver Space
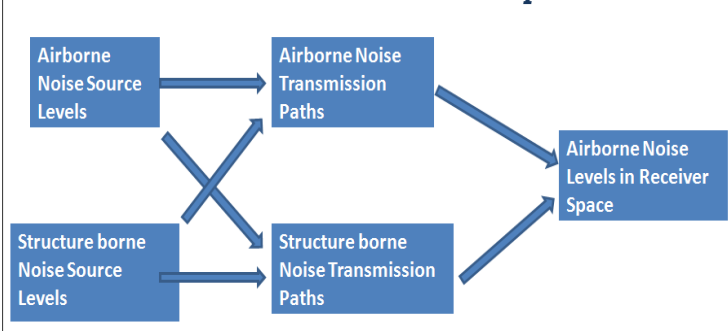
Basics of Noise Prediction Analysis

A systematic approach of predicting noise levels and designing solution are necessary to deal with noise problems in ships. Noise prediction requires the orderly consideration of three elements: the source, the transmission path and the receiver.

The noise limit for a ship compartment specifies the noise environment required for that receiver space. When the predicted or measured noise levels at the receiver exceed the noise limit, a noise problem exists and any three of the above elements are potential candidates for noise prediction and control.

Following elements are considered in source path – receiver approach of noise prediction.

Noise Sources

A noise source generates airborne and structure borne noise that propagates along various paths to the receiver space. Any equipment or unit, which generates noise, is considered as noise source.

- Main Engine, Generators, Gearbox, Pumps
- HVAC Systems and Fans
- Propeller & Thruster induced vibrations
- Exhaust Pipe, Wave Impact Noise, etc

Noise Transmission Paths

Airborne and Structure borne noise generated by a source may reach a single receiving space via several paths. Two types of transmission paths are considered in analysis.

Airborne path: Noise directly transmitted through Air, e.g. Direct Noise, Noise Transmitted through Partitions, HVAC Duct Systems, etc.

Structure borne path: The vibration passes through all the possible structural components. e.g. Machinery Foundations, Bulkhead & Decks, Intersection of Ship Structures (T-junction & Cross-junction).

Structure Borne to Air Borne transfer function used to convert structure borne noise to airborne noise.
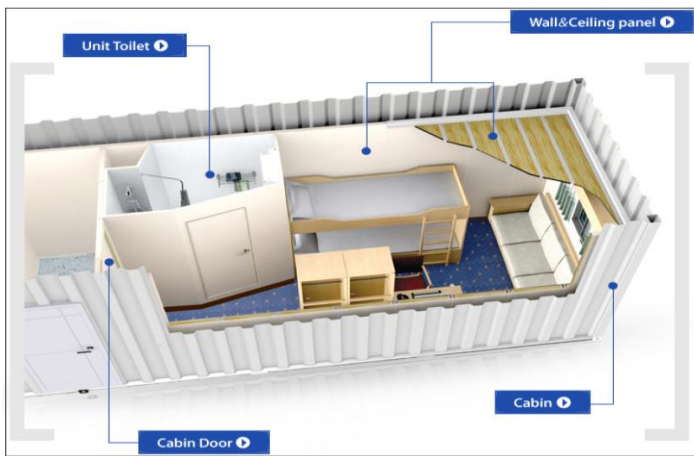

Sound Paths
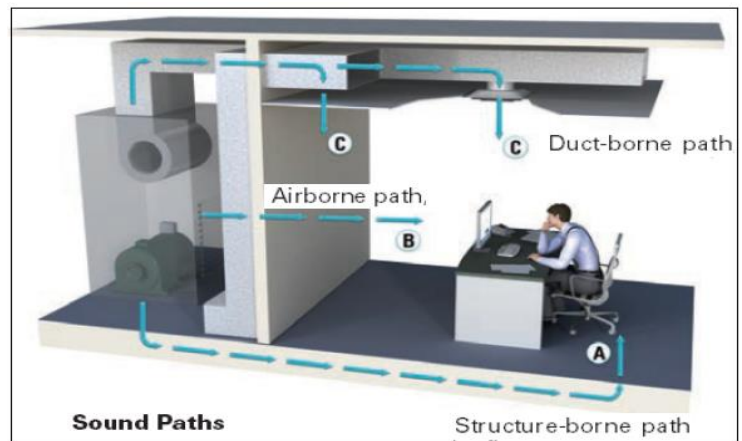
Receivers

The spaces, where the measurements are estimated are termed as receiver spaces. The acoustic properties of receiver spaces considered in the analysis are expressed in terms of the Room Constant, which accounts for the amount of exposed surface area in the space and the acoustic absorption properties of those surfaces.

IRClass-Noise Prediction Analysis

Eliminating noise and vibration problems requires careful engineering and proper attention. IRS has Indigenously developed software for Shipboard Noise Prediction.

Various inputs are entered in a specified format such as Detail of Engine, Reduction Gears, Compressors, HVAC, Fans, etc. In addition to these, Details of paths of transmission, Properties of rooms in terms of the size and the Sound absorbing materials attached to the inner side, etc. are also to be entered. It will take care of both airborne noise and Structure borne noise


General sketch of a "floating" accommodations system
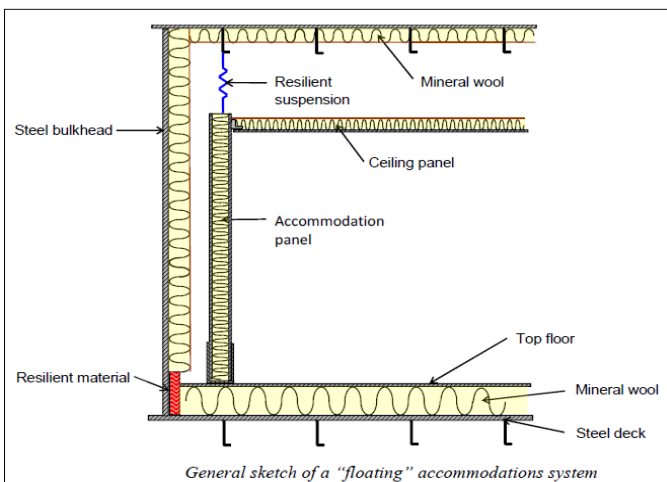
Benefits

- To determine in which areas of the vessel the noise levels may be excessive and how much the levels must be reduced in order to comply with relevant noise requirements.
- The results may serve as a basis for the design specifications of a new building and as a basis for modifications to an existing vessel.
- Where the required noise levels are not met, noise reducing measures are towards possible modification to the design in order to attain a vessel with an acceptable acoustic environment.

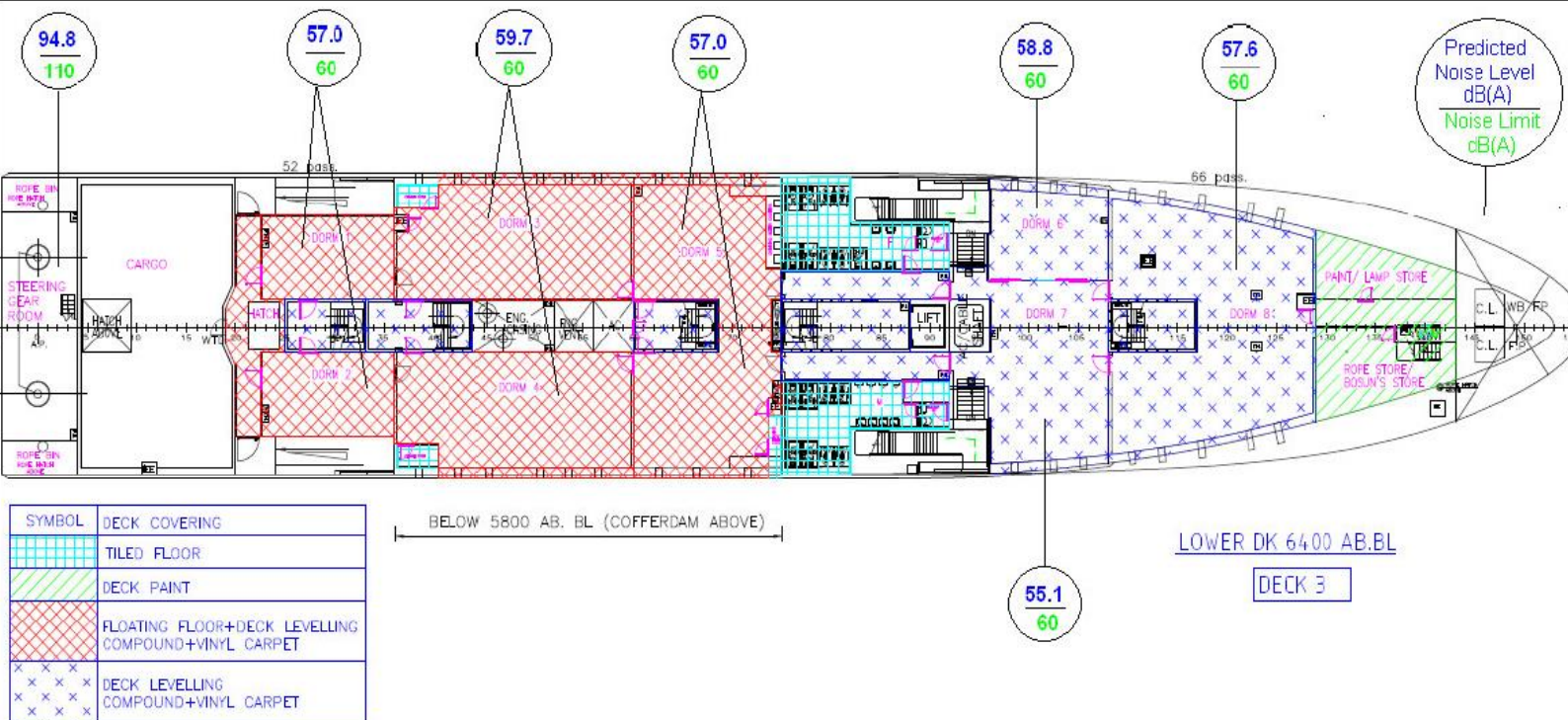## Features of IRClass Noise Prediction Software

- Latest research & developments towards "Structure borne Noise" and "Airborne Noise" are incorporated in the software.
- This program calculates the contribution to air- and structure-borne sound induced by the all main noise sources. E.g. such as main engine, propeller, HVAC & other machinery.
- The above analyses will be carried out for a normal service transit condition of the vessel. On request, the operating condition with the bow thrusters in operation (DP-condition) may also be included.
- The results are presented as dB (A) levels for the various accommodation spaces, open deck areas and engine room/working spaces.
- The predicted levels are compared to the specified noise limits as per the required Standard and Class Requirements.
- A Comprehensive report on analysis will be submitted to client.
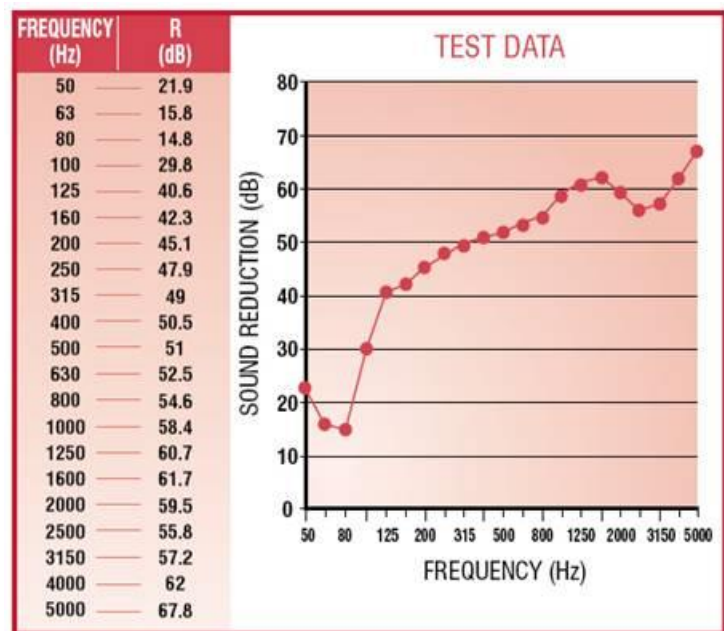
We have extensive experience of undertaking Noise Prediction Analysis on Various types of vessels and, as a result, the IRClass- Noise Prediction Analysis is preferred.

IRClass -Noise Prediction Analysis Advantages

- ➢ *Indigenously developed Software*
- ➢ *Experience and Knowledge*
- ➢ *Prompt Services Response*
- ➢ *Quality and excellence*
- ➢ *Overall Ship Building Cost Reduction*
- ➢ *Worldwide network*
- ➢ *Optimum Solutions for Noise Problems*

Noise Prediction Analysis Report

Client : Colombo Dockyard PLC
Ship Type : 400 Passenger Vessel
Report No. : MAS / Noise Prediction / 1301/Rev.00
Date of Issue : 28th June 2013

Report by
Indian Register of Shipping

SYMBOL	DECK COVERING
	TILED FLOOR
	DECK PAINT
	FLOATING FLOOR+DECK LEVELLING COMPOUND+VINYL CARPET
	DECK LEVELLING COMPOUND+VINYL CARPET

BELOW 5800 AB. BL (COFFERDAM ABOVE)

LOWER DK 6400 AB.BL

DECK 3

Predicted Noise Level dB(A) / Noise Limit dB(A)

IRCLASS
Indian Register of Shipping