Silence is Golden

Precise prediction of noise and vibration levels is just one service in the RINA MAXIMA package that sees the Italian Class society leverage its cross market experience and the latest software tools in a consulting role during the design and construction of custom superyachts.

BY JUSTIN RATCLIFFE

NEW TECH | SOUND & VIBRATION

Previous page: A SoundCam Bionic acoustic camera.

Left: Vibro-acoustics simulation software is used to represent the enclosed volumes or cavities and the dynamic properties of the structure.

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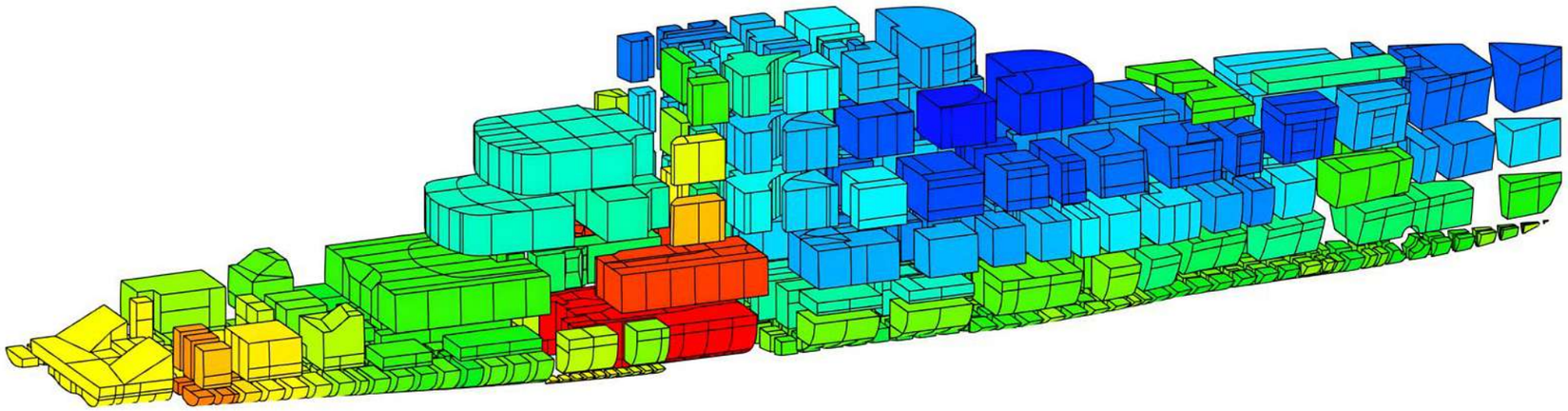

Ever higher standards of onboard comfort mean undesirable sound and vibration from running machinery or hull induced turbulence are unacceptable. This is as relevant for crew as it is for guests as noise impacts not just on our comfort, but also on our performance and can induce irritability, lack of concentration and errors in judgment. What constitutes annoying noise, from low-frequency booming to high-frequency hissing, varies from person to person, but it’s not completely subjective and RINA – like other Class societies – has specific thresholds for its Comfort Class notation (see sidebar).

“Being able to offer the quietest environment possible with low vibration, and without sacrificing seagoing performance, has become a determining factor of onboard comfort,” says Matteo Magherini, RINA’s Yachting North Europe Business Development Manager. “The main objective of our consulting service is to attain all of this without increasing weight and costs or restricting the vessel’s operations, which is why we have a five-person team dedicated solely to noise and vibration prediction and analysis.”

The N&V team’s remit goes beyond Finite Element Models and Computational Fluid Dynamic calculations to assess noise and vibration levels early in the design cycle; it can also help to formulate contract specifications and design choices, adjust insulation and structural plans to achieve specific goals, carry out on-site inspections during construction work, compare results amongst similar builds, and propose the best cost-benefit solutions.

“Powerful software has made the measurement and prediction of noise and vibration much more accurate,” says Elisa Fassola, a naval architect, marine engineer, and noise and vibration engineer at RINA headquarters in Genoa who oversees the development of new regulations and provisions at the design stage. “But just as important is experience when to comes to formatting these digital tools and assigning the many sources of noise and vibration, from main engines and thrusters to pumps and pressure pulses from the props. Because RINA has surveyed thousands of vessels, we have a huge database we can draw on.” »

COMFORT CLASS

When full-scale measurements made at the early design stage verify that the desired noise and vibration limit levels are respected, the additional RINA class notations COMF-NOISE and COMF-VIB can be issued. Below are the required thresholds.

Transit min-max noise levels: **50 - 60 dB(A)**

Anchor condition min-max noise levels: **40 - 50 dB(A)**

Min-max vibration levels in transit: **1 - 4 mm/sec (RMS)**

Min-max vibration levels at anchor: **1 - 3 mm/sec (RMS)**

Cabin-to-cabin noise: **>Rw 40**