



Lightweight Structural Vibration Control System at Curtin Maritime

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OVERVIEW

Curtin Maritime operates a fleet of marine construction vessels, barges, and support equipment along the California coast, offshore marine construction zones, and high-load operational environments.

In these demanding conditions, controlling onboard vibration and noise is essential for maintaining operational efficiency, crew safety, and acoustic clarity.

Unlike heavy offshore vessels, marine construction platforms rely on lighter structural panels, making them more susceptible to mid-frequency vibration and resonance caused by dredging activity, equipment operation, and continuous mechanical loads.

This results in:

- Radiated noise across working areas
- Reduced communication clarity
- Lower operational efficiency

Curtin Maritime required a lightweight damping solution capable of reducing panel resonance at the source while performing in high-humidity, salt-exposed, and continuous-duty marine environments.

WHAT CAUSES VIBRATION IN MARINE STRUCTURAL PANELS?

Vibration in marine panels is caused by:

- Mechanical equipment and dredging activity
- Continuous operational loads
- Lightweight structural materials
- Direct excitation of panel surfaces

HOW LOUD CAN PANEL VIBRATION BE ON MARINE VESSELS?

Panel resonance can produce:

- 70–95 dB(A) radiated noise in work zones

Continuous exposure can cause:

- Reduced communication clarity
- Increased fatigue
- Lower acoustic performance

CHALLENGES

Marine construction vessels rely on lighter structural panels compared to heavy offshore platforms, making them more susceptible to vibrational excitation. Steel and aluminum panels with limited internal damping can resonate when exposed to mechanical energy from onboard equipment.

This resonance generates radiated noise that travels across deck surfaces and adjacent compartments, impacting crew communication and overall operational clarity. Traditional marine soundproof barrier systems alone cannot address vibration at the structural level. Curtin Maritime needed a solution that could be applied directly to vibrating surfaces, reduce resonance at the source, and improve acoustic conditions without adding excessive weight or interfering with vessel operations.

SOLUTION:

To address these challenges, All Noise Control implemented the MassiCore® Marine Vibration Tile 9 (ANC-VDT9-M), a high-performance structural damping solution engineered specifically for mid-frequency vibration control in marine environments.

The system utilizes 5 mm thick damping tiles (1.52 kg/m² / 2.7 lb/ft²) in a 308 x 308 mm (12" x 12") format, selected to provide an effective balance between performance and weight. Formulated with advanced visco-elastic polymer compounds, the tiles absorb vibration energy and dissipate it as heat, reducing panel resonance and improving overall marine acoustic insulation.

Installed directly onto structural panels using a two-part adhesive system, the tiles create a continuous damping layer that minimizes vibration at the source. This approach reduces radiated noise, enhances vessel acoustic performance, and supports broader offshore noise control strategies when integrated with acoustic barrier systems.

The system was applied directly onto:

- Wall panels and structural partitions
- Ceiling systems
- Deck panels and equipment zones
- High-activity work areas

Installed using a two-part adhesive system, the tiles form a continuous damping layer across vibration-prone surfaces.

HOW THE SYSTEM WORKS

MassiCore® Marine Vibration Tile 9 functions by:

- Absorbing vibration energy at the panel surface
- Converting energy into low-level heat
- Reducing mid-frequency resonance

The system is specifically designed for:

- Marine construction vessels
- Offshore and coastal environments
- Lightweight structural applications

WHERE IS THIS SOLUTION USED?

- Marine construction vessels and barges
- Walls, ceilings, and deck panels
- Equipment enclosures and work zones
- High-traffic operational areas

WHAT RESULTS CAN LIGHTWEIGHT DAMPING SYSTEMS ACHIEVE?

- Reduced panel resonance across structural surfaces
- Improved mid-frequency vibration control
- Enhanced communication and acoustic clarity
- Reduced radiated noise in operational areas
- Lightweight solution without structural impact
- Long-term durability in harsh marine environments

This solution significantly reduced panel resonance and radiated noise, improving acoustic performance and operational clarity across marine construction vessels.

MassiCore® Marine Vibration Tile 9 (ANC-VDT9-M) is a proven solution for mid-frequency vibration control across California coastal operations, offshore marine environments, and global vessel applications, delivering reliable performance in real-world conditions.