



Marine Deck Vibration Control System for Structure-Borne Noise Reduction on Vessels at Eastern Shipbuilding Group

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OVERVIEW

Eastern Shipbuilding Group is a leading shipbuilder specializing in the construction and retrofit of commercial vessels, offshore support ships, and government marine assets operating across Florida shipyards, coastal routes, and offshore marine environments.

In modern vessel construction, managing both airborne noise and structure-borne vibration is critical to ensuring crew comfort, operational efficiency, and compliance with acoustic standards.

Unlike traditional engine room noise, deck systems introduce impact and vibration-related noise that travels through steel structures and spreads across the vessel.

This type of noise affects:

- Crew quarters
- Control rooms
- Operational spaces

Eastern Shipbuilding required a solution capable of reducing structure-borne vibration at the source, while performing in high-humidity, salt-exposed, and continuous-duty conditions.

WHAT CAUSES VIBRATION NOISE ON SHIPS?

Vibration noise is caused by:

- Mechanical equipment operating on deck
- Foot traffic and operational movement
- Impact forces transmitted through steel structures
- Direct contact between structural layers

This creates structure-borne noise that travels throughout the vessel.

HOW LOUD CAN STRUCTURE-BORNE NOISE BE ON SHIPS?

Structure-borne vibration can create noise levels comparable to: 80–100 dB(A) in adjacent compartments

Continuous exposure can cause:

- Reduced comfort
- Communication challenges
- Increased fatigue

CHALLENGES

Marine deck systems are major pathways for vibration transfer. Mechanical equipment, foot traffic, and operational impacts generate structure-borne noise that travels through steel decking and supporting structures. This creates noise in adjacent compartments that cannot be addressed by standard marine noise barrier or marine soundproof barrier systems alone.

Additionally, modern vessel construction requires solutions that can be integrated directly into flooring systems without adding excessive weight or compromising structural integrity. Eastern Shipbuilding needed a system that could function as both a vibration isolator and a complementary solution to marine acoustic insulation, reducing impact noise while supporting overall offshore noise control solutions.

HOW DOES VIBRATION TRAVEL THROUGH SHIP DECKS?

Vibration travels through:

- Steel deck plating
- Structural supports and framing
- Direct contact between materials

Once transmitted, vibration converts into audible noise in adjacent spaces. This makes deck systems one of the primary noise pathways in marine vessels

WHAT IS THE BEST WAY TO REDUCE STRUCTURE-BORNE NOISE ON SHIPS?

Resilient Acoustic Underlayment Systems

For this project, All Noise Control used:

MassiCore® Marine SilentStep Underlayment (ANC-SSP-M)

KEY SPECIFICATIONS:

- High-density resilient acoustic underlayment
- Designed for vibration isolation and impact noise reduction
- Density: 850 kg/m³
- Thickness: 5 mm
- Flexible roll form for large-area installation
- Engineered for deck systems and flooring assemblies

SOLUTION:

To address structure-borne noise and vibration across deck systems, All Noise Control implemented the MassiCore® Marine SilentStep Underlayment (ANC-SSP-M) as part of the vessel's flooring assembly.

MassiCore® Marine SilentStep is engineered as a resilient acoustic underlayment designed to isolate vibration at the structural level. For this application, the system utilized a high-density configuration of 850 kg/m³ with a 5 mm thickness, providing an optimal balance between vibration isolation, durability, and load-bearing performance. Installed directly beneath deck finishes, the material acts as a decoupling layer that reduces impact noise, mechanical vibration, and structure-borne sound transmission.

By interrupting the path of vibration through the deck structure, MassiCore® Marine SilentStep significantly improves overall marine acoustic insulation and enhances the performance of surrounding systems, including acoustic barrier for engine rooms and high density vinyl sound barrier applications. Its flexible roll form allows for efficient installation across large deck areas, making it a practical and scalable solution for shipbuilding environments requiring reliable offshore noise control solutions.

The system was installed directly within:

- Deck assemblies and structural flooring systems
- Beneath finished flooring materials
- High-traffic and equipment zones

Installed as a decoupling layer, the system isolates vibration before it enters the structure.

HOW THE SYSTEM WORKS

MassiCore® Marine SilentStep functions by:

- Interrupting vibration paths within deck structures
- Decoupling contact between structural layers
- Reducing impact and mechanical energy transfer

MassiCore® Marine SilentStep is specifically designed for:

- Shipbuilding and retrofit applications
- Offshore and marine environments
- High-load deck systems requiring vibration isolation

WHERE IS THIS SOLUTION USED?

- Ship deck systems and flooring assemblies
- Tugboats and offshore support vessels
- Crew quarters and control rooms
- Machinery platforms and high-traffic areas

WHAT RESULTS CAN VIBRATION CONTROL UNDERLAYMENTS ACHIEVE?

- Reduced structure-borne vibration across deck systems
- Minimized impact and mechanical noise transmission
- Improved acoustic performance in adjacent compartments
- Enhanced crew comfort and operational clarity
- Increased effectiveness of overall marine acoustic systems
- Long-term durability in harsh marine environments

This solution significantly reduced structure-borne vibration and impact noise, improving onboard comfort and acoustic performance across vessel compartments.

MassiCore® Marine SilentStep Underlayment is a proven solution for deck vibration and structure-borne noise control across Florida shipbuilding, offshore, and global marine environments, delivering reliable performance in real-world conditions.