

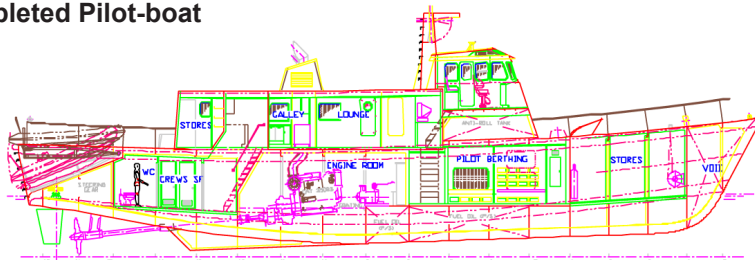


Kinetics Noise Control's 4-inch KIP pads part of highly successful quiet boat design

In 1998 the San Francisco Bar Pilot's Association began the effort of replacing its aging fleet of Pilot-boats, as its youngest vessel was more than twenty years old. One of the design concepts for the new Pilot-boat was driven by the need to provide comfort. A vessel design specification was prepared for the Pilot's Association which included stringent noise requirements. The sound pressure level (SPL) in all accommodation spaces and the Pilothouse were required to be less than or equal to 65 dB(A) at full speed. This sound level is routinely specified and achieved on larger vessels such as passenger ferries, research vessels, and offshore/platform supply vessels. However, the critical situation for the Pilot-boat was that all of the accommodation compartments: the Aft Crew Berths, the Forward Pilot Berth, the Galley and the Lounge surrounded the Engine Room. In addition, the original specification for the new vessel included rare liquidated damages for sound levels above the 65 dB(A) limit.

The contract to build the Pilot-boat was awarded to the former Marco Seattle Shipyard (Seattle, WA). The noise control analysis was performed by Noise Control Engineering, Inc., Billerica, MA. This included sound testing in existing vessels of similar size and the use of noise prediction software which eventually became Designer-NOISE®. This proprietary software developed by Noise Control Engineering predicts both airborne and structure-borne shipboard noise. Noise control treatments recommended by Noise Control Engineering based on this analysis included engine vibration mounts, damping tiles, absorptive ceiling panels and a "high performance" floating room. It was determined that without the floating floor using Kinetics KIP isolation pads in conjunction with damping tiles on the hull and bulkhead, noise levels would be predicted to be up to 75 dB(A) in the Aft Crew Berths.

Inboard Profile & Completed Pilot-boat on Sea Trials





The “high performance” floating room was recommended for the Crew Berth, Pilot Berth, Galley, and Lounge. It was designed jointly by Noise Control Engineering, the shipyard and Kinetics Noise Control. It consisted of 4 inch high elastomeric coated fiberglass blocks called KIP Pads from Kinetics. The KIP Pads were mounted on steel beams at 12 inch centers. Deadened marine plywood called dB-Ply was placed on top of the KIP Pads and the finish flooring was placed over the dB-Ply. All joiner bulkheads were placed on top of the dB-Ply floating floor

in rubber-lined channels and were further isolated from the ship’s structure at all attachments above the floor via elastomeric connections. In December 2000, sea trials were conducted on the first of two of the Pilot-boats, the P/V San Francisco. Testing during sea trials showed that the treatment selections were just what was needed as shown in Table 1. Measurements during sea trials showed that the sound levels were just under the noise limits and within ± 3 dB of the predicted sound level.

Compartment	Noise Levels, dB(A)		
	Limit	Predicted	Measured
Pilothouse	65	64	62-65
Lounge/Mess	65	65	62-64
Galley	65	65	62-65
Pilot Berth	65	60	61-62
Aft Crew Berths (4)	65	67	65-68

Table 1: Pilot-boat Full Speed Noise Survey Results (14+ Knots).



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