



Navy SBIR/STTR Success

HydroActive Shaft Sealing Technology

Midé's HydroActive shaft seal technology provides a reliable, on-demand seal around a ship's propulsion shaft to stop progressive flooding into adjacent compartments or past the stern tube seal.



Midé Technology

Founded 1989
Technology and Engineering firm
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N04-073

SBIR INVESTMENT:
\$2,683,029

PHASE III FUNDING:
\$41,739,778

THE TECHNOLOGY

HydroActive Shaft Seals function as an emergency flooding system providing reliable and low total ownership cost sealing solution for ships. Under normal operating conditions, hydrogel embedded foam and a lip seal operate as a non-contacting seal around the ship's spinning propulsion shaft. When a flooding event occurs, the hydrogel foam rapidly absorbs water. The expanding foam forces the lip seal into contact with the operating propulsion shaft to stem flooding. The lack of the lip seal contact on the shaft during normal operation eliminates premature wear, reduces installation and operation requirements, and ensures an effective seal when needed.

THE CHALLENGE

Legacy shaft seal design has the seal in contact with the propulsion shaft at all times. Wear on the seal can cause a reduction in watertight effectiveness. The wear necessitates increased periodic maintenance, and risks jeopardizing the seals ability to successfully function during flooding events.

THE NAVAL BENEFIT

Midé's HydroActive bulkhead seals were first installed on DDG Class ship in 2009. Those seals were tested more than five years later to show insignificant operational wear with little to no maintenance needed, providing for a lower total cost of ownership. As proven on both DDG and LCS class ships, the Navy gained a simplified installation of a lighter weight bulkhead shaft seal that provides reliable emergency response to flooding events, extends seal life, and allows for greater shaft motion and vibrations during operation.

Midé's newly developed LCS stern tube seals with HydroActive automatic backup seals allow for maintained operation of the propulsion shafts in the event of primary seal failure.

THE TRANSITION

Since 2009, Midé has installed 334 HydroActive shaft seals on multiple vessel classes including the Arleigh Burke DDG Destroyers, both LCS variants, and Amphibious Transport Dock ships. Midé's bulkhead shaft seal technology is also being used on the Mark VI Patrol Boats. Further commercialization of HydroActive seals is occurring in the dredger vessel industry. The seals have demonstrated flooding containment in the high shaft angle and vertical operation seen in dredger applications. When Midé developed a new stern tube seal for the unique operating conditions of LCS Freedom Variant, they incorporated the HydroActive shaft seal technology as an emergency, dynamic backup seal.

THE FUTURE

Under a recently awarded contract, Midé will replace the bulkhead shaft seals on the San Antonio-class LPDs. Midé's LCS Freedom Variant stern tube seal with HydroActive backup technology has passed successful shock, vibration and operational lifetime tests. The first stern tube seal installation on an LCS Freedom Variant vessel is planned for Q4 2017.

"Midé's innovative bulkhead shaft seal solution has met a critical US Navy need, reduced long term Navy maintenance costs. We look forward to helping the Navy improve capability and reduce long term costs with its stern tube seals and other systems."

Chris Ludlow, Vice President of Engineering / Chief Financial Officer, Midé Technology

"SBIR funding has enabled the Navy Technical Community to be exposed to cutting edge technologies and to develop new solutions to unsolved issues on Navy ships. By investing in small businesses the Navy has been able to collaborate with highly technical organizations to achieve results focused on total ownership cost savings and improving operability, reliability and safety."

David W Gloeckner, NSWC PD, Senior Engineer and Branch Manager for Propulsion Shafting Systems