



## Monitoring Marine Machinery Bearings

### Onboard gearbox and bearing fault detection systems

Stress Wave Analysis (SWAN™) technology is highly effective at detecting gearbox and bearing damage onboard seagoing vessels. A commercial operator of a fleet of modern self-unloading bulk cargo ships with 11,000 ton cargo capacity, had been experiencing critical bearing failures in engine room machinery. Three sister ships of the fleet, with similar propulsion and electric power generation installations, were surveyed to establish standard Stress Wave Energy (SWE) levels.



*SWAN systems ensure the health of operating equipment on ships in private, commercial, and military use.*

On each of these ships, Stress Wave Analysis sensors were mounted on the generator bearing housing and on four main propulsion reduction gear pinion housings.

The measured Stress Wave Energy levels were used to compare bearing friction between ships and spectral data was analyzed to isolate the specific mechanical source of the abnormal SWE.

During the initial SWE survey, the port forward pinion bearing on one vessel's reduction gearbox was found to have a significantly higher reading than its counterpart on the starboard side, or the aft pinion bearings. When the bearing was subsequently disassembled and examined, significant outer race damage was found and the bearing was replaced.

The following year, a Stress Wave Analyzer was permanently installed on one ship, and the crew was trained in making entries into the engine room log. During the next two years, this monitoring system revealed one case of debris contamination in a bearing and one case of abnormal bearing preload due to misalignment between one of the engines and the main propulsion gear. The early detection and correction of these conditions prevented the expense and service interruptions that would have occurred due to premature failures.

The remaining normal bearings showed very consistent SWE levels during the entire observation period, demonstrating the system's ability to provide a reliable and repeatable measure of machine health, even when used by operators with minimal training.

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