

## Condition Monitoring *A Better Form of Vessel Maintenance*

No one wants to be surprised by a mechanical outage, especially in the middle of a sale. How a vessel runs says a lot about how well it's been maintained, and can forecast the longevity of its mechanical health.

Too many times in the yachting industry, maintenance dollars are spent for corrective maintenance rather than predictive or preventative maintenance. Predictive maintenance through the utilization of condition monitoring can give an owner (and a buyer) peace of mind and save on maintenance expenses in the long run.

Today, online condition monitoring can be described as the process of gathering data from machinery to assess the overall operating capacity of the system. Data is compared either against an existing database (trending), or a model (model-based), to diagnose existing issues and show the beginnings of wear and tear on mechanical components.

The origins of condition monitoring date back to the 1700s. While we'd consider them primitive now, these early processes were actually ahead of their time, including monitoring cylinder pressure in steam engines, then diesel engines, and later critical compressors. Portable diagnostic monitoring gained footing in the 1960s when oscilloscopes were used for data collection and analysis in the field. In the 1990s, amidst a booming economy, the oil and gas industry started utilizing online monitoring as an extension of its use of portable engine and compressor analyzers. Over the last two decades, these systems have evolved rapidly as hardware computing power and software capabilities have advanced. Data collections that used to take days to gather and analyze on mechanical systems using hand calculations can now be done instantaneously and presented in easily readable graphics and reports.

Over the past few decades, marine engineering professionals have taken notice of online condition monitoring technology used in the oil fields and started applying it to naval fleets and later, commercial and workboat fleets. Yachts have caught on, and more and more are jumping on the bandwagon to reap the same benefits.

Modern-day condition monitoring equipment can be either portable or stationary, but both types are used to monitor, analyze, and troubleshoot machinery. When choosing a system, be sure to look for one that can collect data to trend any vibration, stress, temperature, proximity, and cylinder pressure from reciprocating or rotating machinery. When you collect data like this over an extended period of time, you're able to get a very good picture of how your machinery is

performing, and see how it will hold up in the near future.

Condition monitoring systems are surprisingly easy to set up, which can be done with minimal downtime. The system's sensors are easily placed on engines, gear boxes, frames, and cylinder heads. Data collection can begin immediately once setup is complete, and data collected over a span of only 15 minutes can produce viable readings for analysis.

Despite its growth in popularity, there aren't many studies that provide statistical data on cost savings by incorporating condition monitoring into scheduled maintenance programs. Rough estimates from other industries incorporating such technologies cite savings up to \$9 per horsepower while shaving about 20,000 hours off of maintenance schedules.

Aside from the time and cost benefits of condition monitoring, much can be said for its environmental benefits, as well. It's much easier to maintain efficiency and minimize emissions when machinery is monitored on a regular basis. Class has taken notice, and has already started setting forth standards relating to this.

The better educated the yachting community becomes about condition monitoring, the more accessible and affordable it will come, which will set new standards for maintenance programs.

