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Balance Below: Surveys, alignments keep machinery in top shape

Posted on Aug 25, 2019 by Rich Merhige in Balance Below | 0 Comments

Balance Below: Rich Merhige

Keeping vessel machinery aligned cannot be underestimated. Alignment on yachts typically refers to shaft alignment – the positioning of two machines so the shaft centerlines of each machine line up, at the coupling, as close as possible under normal operating conditions. Common outcomes of misalignment are damaged bearings, couplings, seals and shafts, as well as elevated vibration contributing to engine mount and reduction gear damage.

As a captain or chief engineer on a vessel, be aware that your machinery will require alignment on numerous occasions throughout its lifetime. Warning signs of misalignment are often noticeable and include increased vibration, engine load, leaking seals, and higher temperatures on components.

This results in a lack of mechanical efficiency causing increased fuel consumption, and consequently, higher carbon emissions. If ignored, mechanical systems will result in unplanned failures, putting strain on maintenance budgets and severely affecting charters – and peace of mind.

Misalignment can be caused by numerous mechanical factors, the most common being worn resilient engine mounts. Engine mounts are made with rubber components that harden, delaminate and degrade over time. This prevents the mount from properly isolating forces transmitted from the engine.

If left uncorrected, improper support will cause the engine to shift, therefore compromising running gear alignment. The typical lifespan for engine mounts is 10 years; this is when the rubber elements start to degrade and lose their elasticity. Mounts should also be kept free of oil, as this will cause premature wear.

The best way to diagnose misalignment is a vibration survey. A trusted vibration analyst analyzes collected data and proposes accurate,

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sensible recommendations for corrective action. A vibration survey can pinpoint mechanical problems a yacht might be experiencing, such as engine/exhaust issues, misalignment, propeller issues, etc. It's recommended that a vibration survey be conducted once a year, particularly prior to any maintenance. Machinery alignment should be checked once per year, after a repair, and during a new install.

Laser and/or optical alignments are the most precise methods for correcting shaft misalignment. Optical alignments utilize optical scopes and precision machined wire targets to align the strut, stern tube and reduction gear to each other. This type of alignment must be performed on the hard after the running gear has been removed.

Laser alignment measures misalignment between two machines, typically across couplings. It's a precise way to align machinery while simultaneously eliminating guesswork and possibilities of human error, and automatically documenting results. It uses laser transmitters and a receiver to achieve alignment with extremely tight tolerances (less than 0.05mm).

Prior to the creation of laser alignment systems, piano wire and dial indicators were often used to correct alignment. This presented an inherent flaw: Over longer distances, the piano wire and dial indicator linkage would tend to sag due to the weight, causing inconsistent and inaccurate measurements. Laser alignment was the solution. In addition to providing documented results and reporting, light does not sag, allowing for repeatable, accurate alignment results with resolution to the thousandth of a millimeter.

In summation, approximately 50% of mechanical failures are directly related to misalignment. Vibration analysis should be used as a diagnostic tool to identify mechanical issues, such as misalignment.

Accurate and sensible corrective recommendations should be made drawing on formal education, hands-on training and field experience. This, coupled with access to state-of-the-art alignment systems, can prove to be extremely beneficial for maintenance budgets, often with an immediate and noticeable ROI.

Bottom line: An investment in alignment pays dividends when it comes to mechanical health.

Rich Merhige is owner of Advanced Mechanical Enterprises and Advanced Maintenance Engineering in Fort Lauderdale (AMEsolutions.com). Comments are welcome below.

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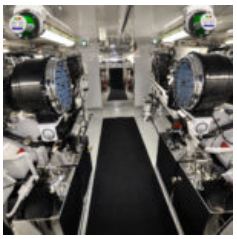

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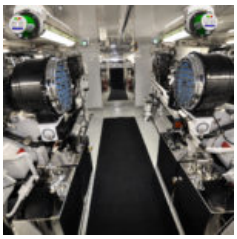

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