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MOUNTS AND VIBRATION ANALYSIS

By Rich Merhige

Poor quality or worn engine mounts may be the cause of excessive vibration and misalignment on board. Damaged or worn engine mounts should be replaced as soon as possible in order to avoid misalignments that can result in machinery failure.



The force of a high revving engine can produce a large amount of force and vibration. In severe conditions, such as a dangerous storm, the engine mount, which is essentially rubber bonded to metal, takes considerable abuse over time. It's important that the engine mount not be too soft or too hard as choosing an incorrect mount can make your problem worse.

In the quest to reduce vibration, the theory of isolation is extremely important to understand, especially when it pertains to engine mounts. All machines while in operation emit vibration of some sort that will vary in intensity or amplitude. To succeed at "isolating" the vibration, you need to assess the installation's environment, namely, three important factors:

- 1 The weight of what is supported
- 2 The disturbing frequency of the machine
- 3 The rigidity of the machine's structure

When seeking to reduce the transmission of vibration, a robust material that – when exposed to a static load – deflects appropriately should be introduced. The material must be so resilient that it returns to its original height after the load is removed.

Rubber in engine mounts is a perfect example. When engine mounts deflect, they establish the natural frequency of the isolation system. When this is a lower frequency than that of the machine's excitation forces, vibration is absorbed by the rubber in each phase of its cycle. The greater the ratio between the two frequencies, the more efficient the isolation system. Successful isolation systems also aid in noise reduction, as it breaks the flow of vibration going into the structure.

Vibration analysis uses collected data to break down vibration into individual frequency components. The test data can then be compared to the established control, usually a database. Based on the comparative data, mechanical issues can be detected – such as old or incorrect engine mounts, bent shafts, engine misfire, and exhaust deficiencies.

The benefits of vibration analysis go way beyond forecasting mechanical failures. It provides valuable information backed up by science. By making educated maintenance decisions that have sound, scientific backing, objectivity is eliminated, making your approach to your vessel's maintenance a targeted one, which allows for efficient and more cost-effective yard periods. ©

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