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crew

TECH TALK

engineer

NOISE AND VIBRATION

By Rich Merhige and Teresa Drugatz



Vibration can be brushed off as inconsequential, with the assumption that it can't or doesn't need to be corrected. When a noise or vibration is noticeable, it's often a symptom that there's an underlying mechanical or structural issue. Besides being detrimental to machinery, it also affects crew habitability. In fact, noise is one of the most common occupational hazards facing workers around machinery today.

Vibration sources on a vessel include unbalanced and misaligned running gear; noise is a byproduct of vibration. Around 10 million Americans suffer from hearing issues attributed to noise-induced hearing loss (NIHL). A one-time exposure to a loud sound or long-term exposure to noises at different levels can cause NIHL, which occurs when micro hair cells in the cochlea of the human ear become damaged.

A sound's "loudness" is measured in decibels (dB). Humans can hear sounds down to 0 dB (e.g. breathing or rustling leaves), and the length of time a person listens to a high dB sound (equal to or greater than 80 dB) will affect how much damage will occur. On a vessel, the main source of noise comes from the engine room machinery. In most vessels, the noise is greater than 80 dB and can sometimes be as high as 110 dB.


Class has recognized the issue's seriousness, and ABS has established guidelines for crew habitability on passenger vessels (12+ passengers) in:

1. Accommodation areas where crewmembers eat, sleep, recreate, and perform routine daily activities.
2. Ambient environment — work, leisure, and rest areas with a focus on whole-body vibration, noise, lighting, and indoor climate.

Noise can also affect the cardiovascular, immune, endocrine, and nervous systems. It can induce negative psychological reactions like emotional changes, demotivation, sleep disruption, communication, and discomfort — all of which can impair concentration and affect job performance. Whole-Body Vibration can cause motion sickness, bone damage, varicose veins, heart conditions, and muscular disorders. Recommended dB ranges depend on vessel size but there's a general guideline that's been established:

- Crew accommodation spaces/open deck recreation areas: 50–75 dB
- Navigation and control spaces: 55–75 dB
- Services spaces: 65–70 dB
- Machine spaces: 110 dB
- Other operating and maintenance spaces: 80–110 dB

Be proactive and protect yourself: Use double support (earplugs and earmuffs) when in/around the engine room. Schedule vibration and noise surveys biannually — they can identify issues causing vibration. Don't overlook alignment. Checks can be performed in and out of the water — invest in them. Ask how old the rubber elements in your mounts and couplings are. (Rubber begins to deteriorate between eight to 10 years.) Replace them so the engines' forces are properly absorbed.

Do you know how much noise and vibration you're exposed to? A vibration analysis can do you and your machinery a world of good. 

Richard Merhige founded Advanced Mechanical Enterprises in 2002, and has 34 years of expertise in vibration, noise & alignment analysis. +1 954 764 2678; www.AMEsolutions.com