

FITMENT OF MR MOUNTS ONBOARD NAVAL SHIP

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Abstract

1. Magneto Rheological (MR) mount is based on magneto rheological smart fluid which when subjected to a magnetic field, the viscosity of the fluid increases substantially to a point it becomes a visco-elastic solid. The yield stress of the fluid can be controlled by varying the magnetic field with the help of its control system. Conventional passive mounts attenuate vibration in non resonant and high frequency range. Damping and stiffness of the passive mounts are not simultaneously controllable to meet imposed performance criteria. To overcome the drawback of passive mounts, MR mounts have been developed by NPOL, which operate both in active and passive mode. The vibration transmissibility characteristics of MR mounts indicates higher SBN isolation and much lower attenuation initiation frequency as compared to passive resilient passive mounts.

2. MR mounts have been subjected to various laboratory tests to anticipate their efficacy and performance onboard ships. The various tests include Vibration Transmissibility, Salt Fog, Oil contamination, EMI/EMC, Shock endurance, Static load deflection and Cold storage test. Onboard evaluations of these mounts have also been undertaken and performance was found to be satisfactory. Comparative study of SBN values indicated that MR mounts have greater decibel reduction between 10-50 Hz regions as compared to rubber mounts.

3. Post successful test bed trials, the MR Mounts Ver II have been fitted onboard a Naval Ship. Post fitment trials of the MR mounts indicates higher decibel reduction at lower frequency regions. The observed values of vibration are also lower as compared to previously fitted passive mounts.