
Friction and wear of non-ferrous materials under artificially created vibration for machine design

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Abstract: In this study, variations of friction and wear with the variation of the amplitude and frequency of normal vibrations were observed experimentally when mild steel pin slides on copper, aluminium and gunmetal using pin on disc test rig. The background of the study was to find the way of reduction of friction and wear under vertical vibration using artificially created external vibration mechanisms. The test parameters included the sliding speed (1 m/s), normal force (10 N), relative humidity (70%), amplitude (10–200 μm), and frequency (50–250 Hz). Results reveal that the friction coefficient decreases with increased in amplitude and frequency of vibration within the observed range. The reduction rate of friction coefficients and wear rate are different for different tested materials. Roughness affected the friction in conjunction with vibration. The results can be used in the selection of the most appropriate non-ferrous material in mechanical and tribological applications.

Keywords: friction coefficient; wear rate; copper; aluminium; gunmetal; mild steel; amplitude of vibration; frequency of vibration.