

Abstract

Mohamed N. El-Shaib

Monitoring of Deep Groove Ball Bearing Defects Using the Acoustic Emission Technology

One of the essential components in rotating machinery are Rolling element bearings and their failure proved to be one of the most common reasons behind machine breakdown. Acoustic Emission (AE), a passive listening technique, has evolved as a significant opportunity to diagnose and monitor the mechanical integrity of rolling element bearings. The investigation reported in this paper mainly focuses on the application of the AE technology for detecting the defect on a radially loaded bearing. In order to undertake this task, a special purpose test-rig was designed so that defect could be seeded onto the outer race of a test bearing using an electrical engraver. By applying varying rotating speed and radial load, twenty tests were carried out. The structure mechanism allows locating an AE sensor directly on the bearing outer race. The AE wave signal has been analyzed in time and frequency domain. It was concluded that the AE can provide good indications of bearing defects. Moreover, it has been noted that the amplitude, absolute energy, and RMS provided indications of bearing condition.