

Documents

Sawalhi, N., Ganeriwala, S.

Analysis and signal processing of a gearbox vibration signal with a defective rolling element bearing
(2016) *Applied Condition Monitoring*, 4, pp. 71-85.

Abstract

This paper provides a systematic signal processing of a vibration signal measured from a gearbox driven by a three phase motor, which is controlled by a variable frequency drive (VFD). The vibration signal being processed was obtained from a test rig with a defective bearing, thus the signal represents a rich content of different types of signals. Power spectrum density (PSD) and time-frequency analysis (using Morlet wavelets) were used after a visual inspection of the signal in the time domain. The sidebands in the vicinity of the VFD carrier frequencies were used to verify the speeds of each shaft in the gearbox and to provide information about the amount of slippage between the VFD frequency and the shaft speed. As no information was provided at the time of analysis about the number of teeth of each gear, order tracking and harmonic/sideband cursors were used to deduce this information and to later obtain a synchronous average for each shaft and a residual signal for the diagnosis of the bearing fault. Finally, Bearing diagnosis was performed on the residual signal obtained earlier using a semi automated bearing diagnosis tool which includes whitening the signal, removing the transfer path effect using minimum entropy deconvolution (MED) and finding the best band for envelope analysis using spectral kurtosis (SK). © Springer International Publishing Switzerland 2016.

2-s2.0-85063737274

Document Type: Book Chapter

Publication Stage: Final

Source: Scopus