

Gearbox is an important power transmission component in a wide range of industrial applications. Wear is a common failure mode induced between the contact surfaces of the engaged gear teeth, which result in higher vibration and noise in the gearbox. The early detection of wear is very important for reliable working and better operational performance. Monitoring of gear vibration signature can develop early detection and accurate diagnosis of gear wear fault, and thereby extend the life span of the transmission system. This study focuses on applying an early detection of gear wear that was naturally produced in industrial gearbox system. An experiment gearbox test comprises of back to back two-stage helical gearboxes has been used, where vibration signal was measured and analysed to monitor the health condition of the attached gearboxes under different operation circumstances. Time synchronous averaging (TSA) and wavelet bicoherence (WBC) methods have been used to identify the nonlinearity effect due to induced wear between the contact tooth surfaces. The used methods have the capability to characterize the nonstationary signal and detect the wear at early stages.