

Different gear failure modes are strongly correlated with lubricant status, for example low oil level or starved lubrication leads to significant gear damages. In order to develop an early detection and accurate diagnosis of gearbox lubricant serving conditions based on online vibration measurements, this study will investigate the effect of lubricant starvation on the gearbox vibration responses. A two-stage helical industrial gearbox was tested under different lubricant shortage conditions. The results show that the gearbox vibration signature changes significantly with lubricant starvation, which includes more consistent increase in the amplitudes of vibration responses at meshing frequency harmonics and their associated sideband components. These changes correspond that vibration signal can be considered to normalise condition indicator of gearbox lubricant starvations.