

This study presents a dynamic model to investigate the effects of lubricant viscosity due to oil degradations or oxidations on the vibration signal of helical gear system. The modelling has been extended to consider the effect of elastohydrodynamic lubrication (EHL) to include frictional effects between meshed gears. A ten degree-of-freedom (10-DOF) model has been developed to combine lateral, torsional and axial vibrations of helical gear transmissions with supporting bearings, powerful motor and applied load. The variation of viscosity takes into account through the time-varying of EHL friction coefficient. The results conclude that higher lubricant viscosity could increase internal fluid friction and vibrational excitation, where higher motor power is required to overcome the higher friction of thicker lubricants. The vibration signal can be a good indicator for lubrication condition and it is possible to be used for monitoring the lubrication condition and obtain accurate diagnostic result for tooth surface defects.