

DYNAMIC MODELLING OF SPUR GEAR PAIR INCLUDING A CRACK

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ABSTRACT

Gears are one of the most common and important elements in any rotating machine. Dynamic modeling of gear vibration is useful in understanding the vibration generation mechanism. Many researchers are developing advanced dynamic models of gear vibration to understand the effect of different gear damages. This paper describes a six-degree of freedom gear dynamic model including a crack. The model consists of a spur gear pair, two shafts, bearings, and two inertias representing load and prime mover. The model has been run for extending crack depth. The simulated results were validated by experimental results. The experimental results support the effectiveness of the gear dynamic model and can be used for predicting crack depth. Two scalar indicators namely crest factor and kurtosis have been calculated for the follow up of the defects. The effect of tooth crack on the frequency spectrum has been shown.

Keywords: Gear vibration, dynamic model, crack, crest factor, kurtosis