

Fault diagnosis of self-align roller bearing at various speed using frequency domain

Hyun-Chul Bae¹ and Jin-Woo Park
Chulalongkorn University, Thailand

Abstract

To minimize the faults of the self-align roller bearing in the different types of machines in the workshops or industries before any kind of a huge failure, it's mandatory to monitor them. The main objective of this experimentation is to detect the defective bearing and differentiate with the healthy bearing. The two processing techniques which is used are frequency domain and time domain which helps to find their response of defective one and the healthy one and differentiation between them. The parameter which is followed are Velocity, Mach, and Displacement Spectrum. The self-align roller bearing used is with the number 1205. The speed of rotation input parameters are changed. 500, 750, 1000. The comparison between the fresh and the used one using the time domain and the frequency audit of the vibration signals represent that the healthy bearing gives more stable and stationary signals as compared to unhealthy bearing.

Most of the industries in this competitive world depend upon the roller bearing to make effortless work done in different parts of the mechanism in the machines. The machine efficiency is based on the condition of the bearings. The main object of the bearing is to reduce the friction between the mating parts as much as possible to give higher efficiency. So the maintenance of the bearing is necessary. The parameters of maintenance are surveillance temperature, lubrication, vibration, wear, noise etc. The maximum occurring factor in unhealthy operation of machine is vibrating the rolling element that is cylindrical roller. Furthermore different types of cracks, wear and spalls of the inner and the outer race of the roller bearing which causes vibration in the machine. It is mandatory to check and cross verify the functioning of the bearing which is used in the machine without any breakout. To measure the vibration in this study, depends on the machine work without affecting it. The piezoelectric accelerometer is a device which is used to employ the piezoelectric effect of certain materials to measure dynamic changes in mechanical variables. It also measures vibration velocity, power spectrum and shock pulse during the whole process of bearing.

The difference of both healthy and unhealthy bearing is detected by these faults. In this monitoring system handy data, vibration analyzer and intelligent online system these are some basic element for measurement. The self-align roller bearing is been used in this study. As it has high performance at high speed and light to medium axial load self-align roller bearing is being used widely in the industry. The inner and the outer race of roller bearings having circular arc with radius comparatively bigger than the radius of the rollers of the bearing. It takes the advantage of the silent operation startup torque. Pressed steel which is to be considered as made cage. This experiment's main objective is to taper the inner ring from the shaft side and the adapter sleeve is fitted with it. On vibration, signals are influence by the effect produced by speed.

Hyun-Chul Bae
Chulalongkorn University, Thailand Email: ctfl@chula.ac.th