World Academy of Science, Engineering and Technology
International Journal of Aerospace and Mechanical Engineering
Vol:11, No:02, 2017

Acoustic Analysis of Ball Bearings to Identify Localised Race Defect

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Abstract : Each and every rotating part of a machine element consists of bearings within its structure. In particular, the rolling element bearings such as cylindrical roller bearing and deep groove ball bearings are frequently used. Improper handling, excessive loading, improper lubrication and sealing cause bearing damage. Hence health monitoring of bearings is an important aspect for radiation pattern of bearing vibration is computed using the dipole model. Sound pressure level for defect-free and race defect the prolonged life of machinery and auto motives. This paper presents modeling and analysis of Acoustic response of deep groove ball bearing with localized race defects. Most of the ball bearings, especially in machine tool spindles and high-speed applications are pre-loaded along an axial direction. The present study is carried out with axial preload. Based on the vibration response, the orbit motion of the inner race is studied, and it was found that the oscillation takes place predominantly in the axial direction. Simplified acoustic is estimated. Acoustic response shows a better indication in identifying the defective bearing. The computed sound signal is visualized in diagrammatic representation using Symmetrised Dot Pattern (SDP). SDP gives better visual distinction between the defective and defect-free bearing

Keywords : bearing, dipole, noise, sound
Conference Title : ICASV 2017 : International Conference on Acoustics, Sound and Vibration
Conference Location : Melbourne, Australia
Conference Dates : February 02-03, 2017