

Simultaneous Measurement of Pressure and Temperature Profile of Lubricating Oil-Film along Orthogonally Displaced Non-Circular Journal Bearing: An Experimental Study

Authors : Amit Singla, Amit Chauhan

Abstract : The non-circular journal bearings provide better thermal stability and lesser oil-film temperature rise as compared to circular journal bearings. Experimentation on simultaneous measurement of pressure and temperature of lubricated oil-film along the profile of the bearing will help the designer to design journal bearings. In this paper, pressure and temperature of oil-film along orthogonally displaced non-circular journal bearing have been measured on a designed journal bearing test rig. The orthogonal non-circular journal bearing has been fabricated by displacing two circular halves away from the centers in the orthogonal direction. The data acquisition for oil film pressure and temperature has been carried out at journal speed=3000 rpm and by increasing the static radial load from 500 N to 2000 N in steps of 500 N using three different grades of oil (ISOVG 32, 68, and 150) named as oil-1, oil-2, and oil-3 respectively. The results show that the oil-film pressure and temperature increases with increase in radial load and change of lubricating oil towards increasing viscosity. Further, two lobes in the pressure and temperature profiles have been obtained which accounts for better thermal stability as it reduces cavitation zone inside the bearing.

Keywords : cavitation, non-circular journal bearing, orthogonally displaced, thermal stability

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