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Research Article

Performance of an Orifice Compensated Two-Lobe Hole-Entry Hybrid Journal Bearing

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Abstract

The work presented in this paper aims to study the performance of a two-lobe hole-entry hybrid journal bearing system compensated by orifice restrictors. The Reynolds equation governing the flow of lubricant in the clearance space between the journal and bearing together with the equation of flow through an orifice restrictor has been solved using FEM and Galerkin's method. The bearing performance characteristics results have been simulated for an orifice compensated nonrecessed two-lobe hole-entry hybrid journal bearing symmetric configuration for the various values of offset factor (δ), restrictor design parameter ($C^{-}S2$), and the value of external load ($W^{-}0$). Further, a comparative study of the performance of a two-lobe hole-entry hybrid journal bearing system with a circular hole-entry symmetric hybrid journal bearing system has also been carried out so that a designer has a better flexibility in choosing a suitable bearing configuration. The simulated numerical results indicate that for the two-lobe symmetric hole-entry hybrid journal bearing system with an offset factor (δ) greater than one provides 30 to 50 percent larger values of direct stiffness and direct damping coefficients as compared to a circular symmetric hole-entry hybrid journal bearing system.