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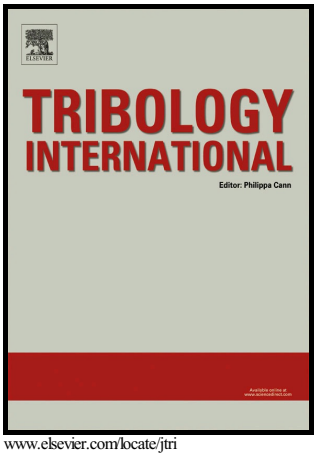

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Investigation of journal orbit and flow pattern in a dynamically loaded journal bearing

Christian Kim Christiansen[a,d,*], Jens Honore Walther[a,b], Peder Klit[a], Anders Vølund[c]

[a] *Department of Mechanical Engineering, Technical University of Denmark, Nils Koppels Allé, bld. 404, 2800 Kgs. Lyngby, Denmark*
[b] *Computational Science & Engineering Laboratory, ETH, Clausiusstrasse 33, Zürich, CH-8092, Switzerland*
[c] *MAN Diesel & Turbo SE, Teglholmsgade 41, 2450 Copenhagen SV, Denmark*
[d] *Center for Bachelor of Engineering Studies, Technical University of Denmark, Lautrupvang 15, 2750 Ballerup, Denmark*

Abstract

A hydrodynamic journal bearing has been investigated using both the traditional two-dimensional (2D) Reynolds equation, and the full solution being the three-dimensional (3D) Navier-Stokes equations.

The two approaches are compared by performing an investigation of two inlet groove designs: the axial and the circumferential groove, respectively, on a bearing with length-to-diameter ratio of 0.5 exposed to a sinusoidal load pattern. Pressure distributions, journal orbits and frictional losses are compared. The modelling of grooves by pressure boundary conditions versus geometric conditions is examined. It is investigated if the presence of a groove increases frictional losses and the increase relates to groove dimensions. Furthermore, the influence of the groove design on the flow field is studied using the 3D solution.

Keywords:
journal, simulation, Navier-Stokes equations, Reynolds equation

*Corresponding author
Email address: chkch@dtu.dk (Christian Kim Christiansen)