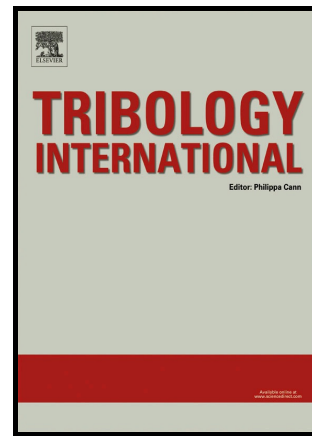


Author's Accepted Manuscript

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

Christian Kim Christiansen, Jens Honore Walther, Peder Klit, Anders Vølund



www.elsevier.com/locate/jtri

PII: S0301-679X(17)30174-3
DOI: <http://dx.doi.org/10.1016/j.triboint.2017.04.013>
Reference: JTRI4679

To appear in: *Tribology International*

Received date: 16 January 2017
Revised date: 6 April 2017
Accepted date: 9 April 2017

Cite this article as: Christian Kim Christiansen, Jens Honore Walther, Peder Klit and Anders Vølund, Investigation of journal orbit and flow pattern in a dynamically loaded journal bearing, *Tribology International* <http://dx.doi.org/10.1016/j.triboint.2017.04.013>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain

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, Tegholmegade 41, 2450 Copenhagen SV, Denmark*

^d*Center for Bachelor of Engineering Studies, Technical University of Denmark, Laurrupvang 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)

Download English Version:

<https://daneshyari.com/en/article/4986017>

Download Persian Version:

<https://daneshyari.com/article/4986017>

[Daneshyari.com](https://daneshyari.com)