

## INVESTIGATION OF THE AFFECT OF OIL POCKET GEOMETRY ON THE PERFORMANCE OF JOURNAL BEARINGS USING A CFD-TEHL MODEL

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### KEYWORDS

Hydrodynamic Lubrication; Fluid lubrication; Modelling in tribology; CFD

### ABSTRACT

Journal bearings remain an integral component which applies the principle of hydrodynamic lubrication to minimize wear and energy loss in high power transmission systems. Maintaining a full film in the bearing is a primary factor in the operational performance which requires a consistent supply of fresh oil through oil pockets in the bush. The shape of the oil pocket has been investigated previously in [1] using a computational fluid dynamics (CFD) methodology and affects the mixing between the recirculating and supply oil, and further affects the lubrication performance in the hydrodynamic lubrication region of the bearing.

Commonly, the effects of mixing in the oil pocket are approximated based on continuity to estimate the temperature of the fluid entering the film. To physically simulate the flow within the oil pocket requires a computational fluid dynamics (CFD) approach, such as in [2] which uses a CFD approach to model a journal bearing where flow in the groove is integrated. CFD models are comparatively intensive compared to Reynolds based methodologies in TEHL regimes, increases simulation time and reduces the potential range of investigation. This paper uses the integrated CFD-TEHL methodology described in [3] to investigate the effect of the oil pocket geometry on the lubrication performance of journal bearings, expanding on previous studies such as [1].

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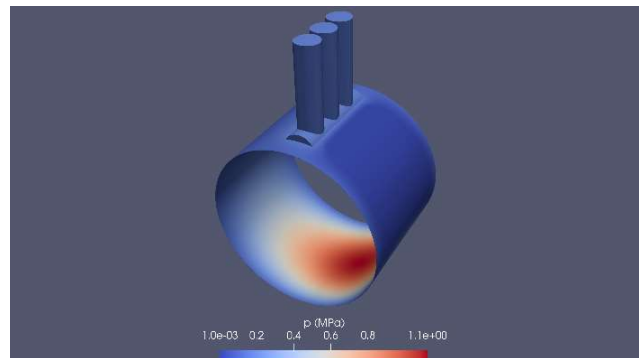


Fig.1 Pressure in the film and groove.

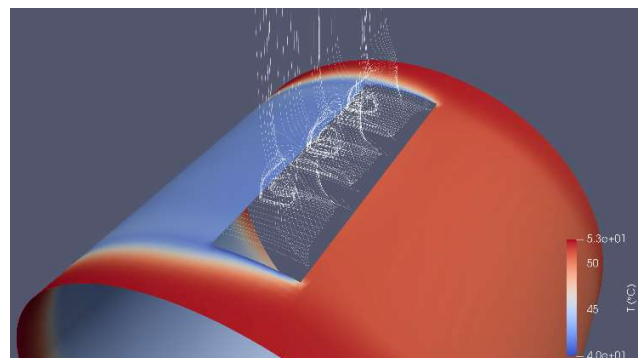


Fig.2 Film temperature and streamlines of the flow in the groove.

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