

Thermo-hydrodynamic study of the journal bearing under static load

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Abstract: A number of studies have been carried out on the hydrodynamic lubrication of journal bearings. This article seeks to summarize this work, presenting it in the form of a flow chart. The treatment of rupture and reformation of the film fluid in the contact region, for a steady loaded circular journal bearing, are accomplished using the Reynolds and the Jakobsson–Floberg and Olsson (JFO) boundary conditions. A flow chart taking into account the resolution of some of the hydrodynamic lubrication problems is elaborated. A computer code is carried out for solving the Reynolds equation and for calculating the most important parameters relating to a hydrodynamic contact. The obtained results for a finite-length bearing are compared with those obtained from the short-bearing hypothesis. In addition, a global thermal study is carried out in order to evaluate the effect of temperature.

Keywords : hydrodynamic bearing, static load, thermal effect, Jakobsson–Floberg and Olsson, Elrod, Reynolds