

Surface texturing effect comparative analysis in the hydrodynamic journal bearings

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Abstract: The journal bearing is a complex system with high film convergence and with cavitation hydrodynamic phenomena. The surface texturation influence study on journal bearing performances requires unavoidably experimental investigations followed by a numerical modelling of the problem. This work consists in modelling and understanding of the journal bearing characteristics in both cases of presence or absence of textures onto the bearing surface. The finite difference method is used as numerical approach in the analysis. The textured bearing performance enhancement passes essentially by an improvement of a minimum film thickness, a maximum pressure and a friction torque through an appropriate surface texture geometry and appropriate texture distribution on the contact surface. It is found that the simulation results are in good concordance with literatures. The texture area position on the bearing surface is the primary endpoint for journal bearing performance enhancement. The best design of textured area depends strongly on the geometrical parameters and the journal bearing operating conditions.

Keywords : Journal bearings, Reynolds equation, Hydrodynamic lubrication, Stribeck curve, texture