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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 hydrodynamicphenomena. The surface texturation influence study on journal bearing performances requiresunavoidably experimental investigations followed by a numerical modelling of the problem. This work consistsin modellization and understanding of the journal bearing characteristics in both cases of presence orabsence of textures onto the bearing surface. The finite difference method is used as numerical approachin the analysis. The textured bearing performance enhancement passes essentially by an improvement of aminimum film thickness, a maximum pressure and a friction torque through an appropriate surface texturegeometry and appropriate texture distribution on the contact surface. It is found that the simulationsresults are in good concordance with litteratures. The texture area position on the bearing surface is theprimary endpoint for journal bearing performance enhancement. The best design of textured area dependsstrongly on the geometrical parameters and the journal bearing operating conditions.

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