

# Study of Hydrodynamic Plain Journal Bearing

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## Abstract

This paper presents the 3D model of hydrodynamic plain journal bearing using COMSOL Multiphysics®. Using 3D Model, plain journal bearing is analyzed to get pressure distribution and related functioning parameters. Results obtained for bearing parameters by using COMSOL are compared with analytical results as well as with previous investigations made on plain journal bearing.

Generalized Reynolds equation is used for analyzing hydrodynamic journal bearing by COMSOL as well as by analytical method by applying Sommerfeld boundary conditions. This Reynolds equation is solved for two theories of hydrodynamic journal bearing called infinitely short journal bearing and infinitely long journal bearing.

Using COMSOL model results are obtained for pressure distribution for each theory and this pressure is used for analyzing the functioning parameters such as load carrying capacity, attitude angle, friction coefficient, lubricant flow rate, and the angle of maximum pressure. For these parameters results are obtained, discussed, presented and comparisons are made.

Keywords - hydrodynamic plain journal bearing, COMSOL, Reynolds equation, infinitely short journal bearing, infinitely long journal bearing, Sommerfeld boundary conditions.