Reducing friction in tilting-pad bearings by the use of enclosed recesses

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A three-dimensional thermoelastohydrodynamic model is applied to the analysis of tilting-pad bearings with spherical pivots and equipped with deep recesses in the high-pressure regions. A potential for a 10-20% reduction in the friction loss compared to conventional plain bearing pads is documented. Design suggestions minimizing the power loss are given for various length-to-width ratios. The tilting angle in the sliding direction is more sensitive to correct positioning of the pivot point than conventional bearing pads. Improving the performance by equipping a tilting-pad bearing with a deep recess therefore requires accurate analysis and design of the bearing. Similarly, a high sensitivity perpendicular to the sliding direction suggests that this method of reducing friction is more feasible when using line pivots or spring beds than when using spherical pivots for controlling the tilting angle.

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