Performance of Slot-Entry Hybrid Worn Journal Bearing under Turbulent Lubrication

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Abstract : In turbomachinery, the turbulent flow occurs due to the use of high velocity of low kinematic viscosity lubricants and used in many industrial applications. In the present work, the performance of symmetric slot-entry hybrid worn journal bearing under laminar and turbulent lubrication has been investigated. For turbulent lubrication, the Reynolds equation has been modified using Constantinescu turbulent model. This modified equation has been solved using the finite element method. The effect of turbulent lubrication on bearing's performance has been presented for symmetric hybrid journal bearing. The slot-entry hybrid worn journal bearing under turbulent/laminar regimes have been investigated. It has been observed that the stiffness and damping coefficients are more for the bearing having slot width ratio (SWR) of 0.25 than the bearing with SWR of 0.5 and 0.75 under the turbulent regime. Further, it is also observed that for constant wear depth parameter, stability threshold speed gets increased for bearing operates at slot width ratio 0.25 under turbulent lubrication.

Keywords : hydrostatic bearings, journal bearings, restrictors, turbulent flow models, finite element technique
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