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Frictional Behavior of Ferro Fluid Lubricants in Misaligned Journal Bearings

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This paper considered lubricating journal bearings with ferro fluids which are widely used now to overcome many difficult problems such as sealing, thermal effects, and damping problems. Ideally when a journal bearing is installed the axis of the journal and the axis of the bush are parallel. Nevertheless, in practice, this ideal condition rarely exists, and the shaft tends to suffer from some degree of misalignment while rotating inside the bush. Misalignment could cause overheating, wear, vibration and eventually failure. A pressure differential equation is used for journal bearing lubricated by Ferro fluid taking into consideration that the misalignment of the shaft is considered in magnitude as well as direction with respect to the bearing boundaries. It is found the bearing performance characteristics can be enhanced by using Ferro fluid and the problems caused by misalignment may be significantly reduced by the proper selection of the magnetic field model and the careful choice of design parameters of the model used The analysis reveals that the magnetic force is able to decrease the side leakage and the frictional forces arise due to misalignment of the journal axis

Biography:

Dr. Zeinab Safar is Emeritus Professor of Mechanical Engineering Department at Cairo University; she had her B.S. degree from Cairo University, M.S. degree and Ph.D from University of Pittsburgh, USA. In addition to Cairo University Dr Safar worked in many universities as visiting professor such as University of California Berkeley, Aachen University and the American University in Cairo. She has more than 80 publications in the areas of Tribology, Energy, and Environment in International Journals and Conferences. Dr. Safar has received the Change Agent Award from ABI and the Community Research Prize from Cairo University. She is a member of the Board of the Electricity Holding Company and the National Committee of Women in Science and Technology in the Academy of Scientific Research.