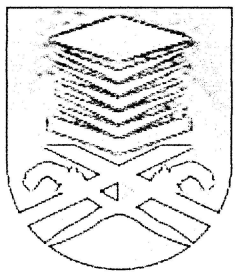

NUMERICAL STUDY OF TEMPERATURE DISTRIBUTION IN HYDRODYNAMIC LUBRICATION OF JOURNAL BEARING

MOHAMAD AZRI BIN ZAKARIA
(2006690345)

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Faculty of Mechanical Engineering
Universiti Teknologi MARA (UiTM)

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"I have declared this final year project report is the result of my own work except the idea, theory and summary which I have referred from the truth sources. This final year project report is belonging to me and it cannot be accepted for other degree course or others and it cannot be copy to others material without my permission."

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Date : 24/5/10

Mohamad Azri bin Zakaria

UiTM No : 2006690345

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ABSTRACT

Journal bearing is common yet important part of many machines such as steam turbines, centrifugal compressors, pumps and motor vehicles. Journal bearing as is typically used as rotor supports to provide a frictionless environment to support and guide a rotating shaft. Journal bearing used in the heavy industries is designed for high loads and speeds. In this environment, the journal bearing is exposed to high temperature because of the contact between metal (shaft) and metal (bearing) itself. When increasing in speeds, a hydrodynamic lubrication of journal bearing experiences an increasing of temperature gradient in the fluid film. The rising of temperature come from the contact point of both journal bearing and shaft and soon would contribute wear on the bearing, shaft and the bush. This project involves theoretical and numerical studies in order to profile the temperature distribution of the hydrodynamic lubrication of journal bearing. This study needs focus on the numerical approach by using Computational Fluid Dynamics (CFD) method via commercial software STAR CCM+ and execute the simulation. Journal bearing temperature distribution is presented for a length over diameter (L/D) ratio of 1/2. Different rotational speeds were also introduced in the project in order to vary the result of temperature profile of the hydrodynamic lubrication of journal bearing. Based on previous theoretical investigation, the high temperature would be recorded at the angle range of 120^{o} to 180^{o} (in the converging section of the flow) from the oil inlet. Last but not least, the recommendations for future used are included in this report for the future student whose is enthusiastic with Lubrication Engineering.

TABLE OF CONTENT