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Lubrication film generation in slider-on-disc contact under limited lubricant supply

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ABSTRACT

Experimental studies were carried out for the characterization of lubrication films under limited lubricant supply (LLS) using an optical slider-bearing test rig. A starvation area which was influenced by capillary effect appeared at the inlet of the bearing contact under LLS. At increasing speed, film thickness increased initially and then remained nearly unchanged. Relative film thickness was defined for the assessment of the reduction of load-carrying capacity, which tended to increase with starvation development. Results show that the lubricant viscosity and the reflow time between two slide-overs markedly affect the lubricant replenishment and film construction. Numerical calculations show that the inlet starvation area may bear some load only when starvation becomes severe.

Keywords: Limited lubricant supply, hydrodynamic lubrication, film thickness, slider-on-disc contact; interferometry