

FRICITION ON A BORDER OF MIXED EHL CONTACT

P. Sperka^{a*}, I. Krupka^a, M. Hartl^a

*sperka@fme.vutbr.cz

^a Brno University of Technology,
Technicka 2896/2, 616 69, Brno, Czech Republic,

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ABSTRACT

Numerous machine elements operate under conditions of mixed lubrication where load is carried by contact between asperities and elastohydrodynamic lubricating film. In this regime, generated mean film thickness is often lower than initial average surface roughness being deformed in the contact. Hence, there is an ongoing challenge in precise prediction of real transition to mixed lubrication. In classical theory, the initial point of transition is considered at increase of friction from EHL regime known from Stribeck curve. To further extend the knowledge it is necessary to simultaneously measure thin lubricating film and dynamic friction.

The aim of the study is to reveal relation between real surface separation and friction produced by thin-film lubricating film at the border between full film and mixed regime. Improved thin film interferometric technique and dynamic friction measurement are combined in ball-on-disc optical tribometer. Contacts between real rough surfaces were studied. Evolution of film thickness and friction during speed drop are presented for surfaces with various roughness. The results are discussed in relation with lubricant rheology and lubricant flow inside contact. This study presents new findings about origin of friction in thin-film lubrication.