University of Belgrade, Mechanical Engineering Faculty
Invitation Lecture at Monday November 23. 2026. at 12:00 in room 211

Lecture title:

**Tribology Studies: Expanding Reynolds Equation to Unsteady Hydrodynamic Lubrication, Controlling Boundary Friction and Repairing Wear Scars**


ABSTRACT

Tribology is the science and technology of friction, lubrication and wear, and it is of fundamental significance for modern engineering, materials, electronics, geology and biology.

High speed and frequent start-up/stop-down of vehicles, such as high speed trains and electrical vehicles (EV) , during operation bring about instantly acceleration/deceleration movements of either or both solid surfaces of contacts lubricated with a fluid film. The fluid lubrication film formation and vanishing processes during a quick start-up and a stop down are investigated in the study for the contacts between a rotating disk and a lever-supported slider or a lever-supported rollable ball under a deadweight load experimentally and theoretically.

The predictions of the increase of fluid film thickness during start-up and decrease of it during stop down based on the classical Reynolds equation do not accord well with the experiment measurements done on a fast acceleration/deceleration test apparatus, either in a sliding or a rolling contact condition. New lubrication equations have been derived for analyzing fluid hydrodynamic and elastohydrodynamic lubrication. In this lecture, recent progresses in tribology studies of expanding Reynolds equation to unsteady hydrodynamic lubrication, controlling boundary friction with external electric fields and repairing wear scars on bearing surfaces are introduced.

In addition, outlines of Tsinghua University and research activities in the State Key Laboratory of Tribology in Advanced Equipment are presented.



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BIOGRAPHY

Prof. Yonggang Meng, tenured full Professor in Mechanical Engineering, Tsinghua University, and Adjunct Professor in the State Key Laboratory of Tribology in Advanced Equipment. His research area covers over lubrication theory and its applications, friction mechanisms and active control technology, wear of materials and its control as well as tribological design of machine components. He is the winner of National Award of Technology Invention, National Award of Progress in Science and Technology, and Natural Science Award of MOE. He is the author or co-author of more than 340 peer-reviewed publications, and the holder of more than 20 China and/or PCT patents.