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Short Professional details and affiliation:

Irina Goryacheva is a Professor and Head of the Tribology Laboratory of Ishlinsky Institute for Problems in Mechanics RAS with more than 50 years of experience in the Mechanical Engineering. Specializing in the contact mechanics, Irina Goryacheva is the author of more than 200 papers and 8 books and has developed analytical methods of solutions of various contact mechanics problems taking into account friction and wear of contacting bodies. Irina Goryacheva holds a Ph.D. degree from Lomonosov Moscow State University and is passionate about microgeometry effects in contact interaction.

Plenary lecture

Modeling of contact fatigue fracture of deformable bodies in frictional interaction

Abstract: The accumulation of contact fatigue damage is one of the main causes of the fracture of the surface layers of the contacting bodies in cyclic loading. This process exists at different scales: at microscale, it leads to fatigue wear of friction pair materials, at macroscale - to the formation of a contact fatigue cracks under the contacting surfaces.

The approach to modeling the contact fatigue fracture of deformable bodies under cyclic loading is based on calculation of a damage function, which depends on the amplitude values of the internal stresses inside the contacting bodies. These stresses are determined by both the macro- and microgeometry of the contacting bodies.

The lecture provides the approach for studying the contact and internal stresses and modeling the accumulation of fatigue damage in sliding and rolling with slippage of elastic bodies of given shapes. The influence of the contact conditions on the subsurface damage accumulation process and fatigue crack formation is analyzed. The similar approach is also used to study the contact fatigue wear process for the given surface microgeometry and loading conditions.