

Kolloquium für Mechanik

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Titel: **Positive effect on tribological performance by means of active lubricant transport in laser textured surfaces**

Abstrakt

In recent years laser surface texturing has emerged as a viable tool to enhance surface functionality. In this study, an ultrashort pulsed laser is used to create advanced surface textures in order to improve tribological properties of steels. The objective is to decrease friction and wear especially for the mixed lubrication regime in which body and counterbody are in contact. In this talk, we will present recent results on the characterization of laser textured surfaces for tribological applications. In a first step, the textures created with two different laser texturing methods (Direct Laser Writing and Direct Laser Interference Patterning) are evaluated tribologically. The results show that lubricant transport phenomena are important. Therefore, in a second step, the study focuses on elucidating the fluid dynamical behavior of the lubricant in the surroundings of the tribocontact (where channel-like surface textures are left after the abrasion wear inside the tribocontact area). To this end, numerical investigations of lubricant wetting phenomena are performed applying OpenFOAM. The phase-field method is applied to model two-phase wetting phenomena of a droplet on differently structured surfaces. The results show that narrow channels (width of 10 μm) allow higher spreading than wide channels (width of 30 μm). In the experimental part, the lubricant flow behavior in the different laser textures is investigated. As a conclusion, the lubricant transport in the channel-like textures helps to avoid starvation in the tribocontact and therefore reduces the coefficient of friction.

Alle Interessenten sind herzlich eingeladen.
Prof. Dr.-Ing. Bettina Frohnäpfel