Wear simulation

IMA-TechSheet #103050 V2

University of Stuttgart
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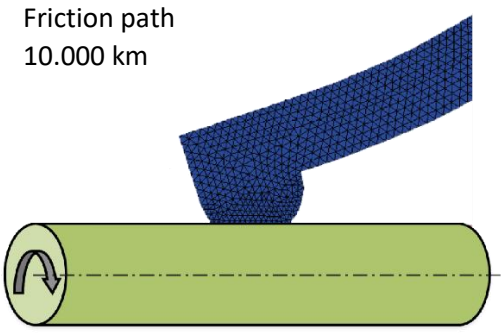
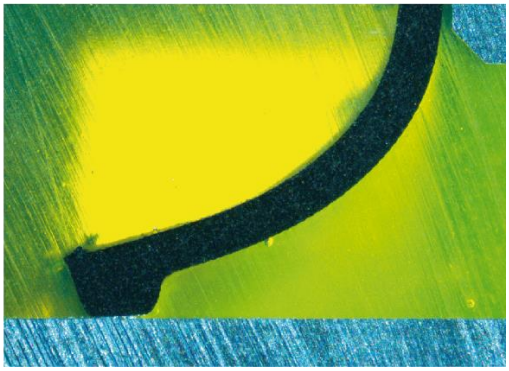
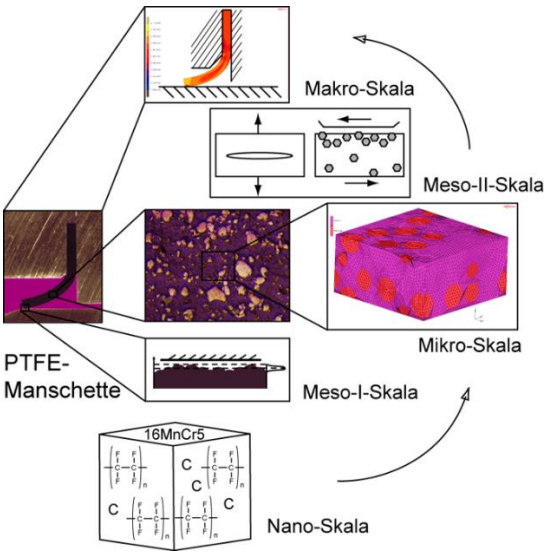


Wear simulation of a PTFE seal collar in cross-section



Cross-section geometry made of resin casting



Multiscale wear approach according to DAUBNER

Description:

- Simulation of material removal due to wear in contacting dynamic sealing systems
- Implemented as a subroutine in the FEM software MSC Marc Mentat
- Wear increment connects to an assembly simulation
- Determination of thermo-mechanical and wear-specific material parameters in standard tests

Available Test Methods:

- Wear laws implemented in wear subroutine:
  - ARCHARD:
    speed-dependent
  - WEBER:
    speed- and pressure-dependent
  - DAUBNER:
    energetically motivated
- Multi-scale approach according to DAUBNER:
  - Meso-Scale:
    Substitute model for nano-scale, correlation of friction and wear
  - Mikro-Scale:
    Consideration of heterogeneous microstructure
  - Makro-Scale:
    Methodology for volume reduction
- Results of wear simulation:
  - modified geometry
  - Wear volume
  - Radial force over operating time