The Institute of Machine Elements and System Engineering researches the fundamental structural and tribological behaviour of machine elements and represents them in experimentally validated model descriptions. These model descriptions are used to analyse and design the functional, loss and noise behaviour of entire technical systems with a focus on drive technology. The developed models are also used to research and develop methods of Model Based Systems Engineering as a central element of future inductive product development processes.
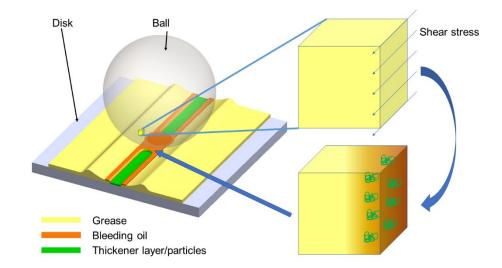
Greases, as a typically lubricant used for wind turbines drivetrain, consist of a thickener, which stores the oil within its sponge-like structure. During operation, oil is slowly released, which is referred to oil bleeding. This ensures an efficient operation with long service life for rolling element bearings. However, only simple fluid models exist so far to simulate their tribological behaviours. Therefore, the objective of the MA/BA work is to develop a more detailed digital twin lubrication model of rolling contacts within the framework of OpenFOAM by relating oil bleeding with shear-degradation of thickener structure. In addition, oil bleeding volume will be evaluated and compared with the previous CFD results and experimental results for validation.

<u>If interested, please contact:</u>
Shuo Zhang, M.Eng.
R 304
Tel. 0241 80-90877
shuo.zhang@imse.rwth-aachen.de

Institute for Machine Elements and Systems Engineering (MSE)
Prof. Dr. Georg Jacobs
Schinkelstraße 10
52062 Aachen | GERMANY
www.imse.rwth-aachen.de
04/21

Disk / Ball / Shear stress

- Grease
- Bleeding oil
- Thickener layer/particles

Master/Bachelor Thesis

Shear-degradation bleeding model of starved grease lubricated rolling contacts
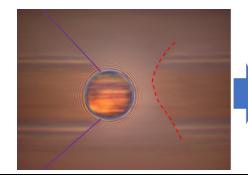
Tasks:

- Literature research on oil bleeding of greases
- Development of shear-degradation model of grease thickener structure
- Evaluation oil bleeding using this model within simulation tool OpenFOAM
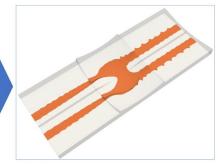- Validation with the EHL tribometer

Requirements:

- Independent and reliable working
- Interest and open mind to learn new things
- Previous knowledge of Computational Fluid Dynamics is an advantage, but not mandatory

We offer:

- Intensive supervision
- Immediate start or by appointment
- Excellent working atmosphere
- Suitbale for homeoffice
- Promising topic and experience for a future career

MSE — Institut für Maschinenelemente und Systementwicklung

RWTH AACHEN UNIVERSITY