MSc Assignment

GREASE PERMEABILITY APPARATUS DESIGN

To facilitate efficient rotation of machine elements, bearings are often used. These bearings are lubricated with oil or grease. For semi-permanent lubrication, high loads and speeds, grease is often the preferred lubricant. Grease is a semi-solid consisting of base oil in a thickener matrix, often including special-purpose additives. The lubrication mechanism of oil is well understood, whereas for grease, the mechanism is still being explored. Grease lubrication primarily involves oil bleeding out of the grease. Models have been developed to better understand grease bleeding. These models include two important parameters: affinity, the ability of the grease to retain the oil inside the thickener matrix; and permeability, the ability of the grease to allow oil to flow through it.

Permeability can be determined experimentally using different methods. One approach uses hydrostatic pressure to drive oil through a grease patch. The drop in oil level after a specified time period is recorded, from which, via Darcy's law, permeability can be evaluated.

Project aim: Improve the existing apparatus to yield consistent and repeatable measurements of permeability. Compare the measured permeability values with data from the standardized DIN 51817 test.

Research group

The **Tribology-Based Maintenance** (TBM) and *Surface Technology and Tribology* (STT) groups will organize the research with a focus on engineering design and fabrication of the permeability apparatus.

Project tasks:

The following tasks have been identified:

- Design, fabricate and test an improved permeability measurement setup consisting of an oil column on top of a grease patch.

Contact:
Dr. Jude Osara, email: j.a.osara@utwente.nl, Phone: +31534897642