SCOPE OF ACTIVITIES

Development of a Disc Cutter Load Monitoring (DCLM) system

The goal is to detect and identify changing geological conditions during the excavation process on tunnel boring machines (TBMs) through online measurement and visualisation of the disc cutter load.

DCLM-system

The DCLM-sensors are integrated in the disc cutter fastening sets and cable-connected to the LAN data acquisition in the monitoring box. The DCLM-components inside the monitoring box are mounted in a closed steel construction within the cutting wheel housing to protect them from mechanical impacts. The power and data lines are contained within a protective cable and connect the LAN data acquisition with the data-processing and visualisation in the control cabin via a rotary coupling in the centre of the cutting wheel. The prototype for the DCLM-system is planned to be installed on the TBM in the tunnelling project (S-833_Bossler-Tunnel) for testing under real conditions.

Rock strength is one of the major assessment criteria for the classification and use of excavated material from TBMs. It may be possible to use online monitoring of the disc cutter load to give an indication of rock strength. Even if it is found that the disc cutter load and compressive strength of the rock are not completely correlated the specific load progression on the disc cutter in cutting hard rock material could be an indicator for the characterisation of the rock properties. Therefore a Disc Cutter Load Monitoring system is going to be developed within the DRAGON-project. Furthermore there might be a chance to calibrate this system by a standard method.