

Graz University of Technology
Institute for Rock Mechanics and Tunnelling

Master Thesis (MA, 30 ECTS)

**Investigation of Rock Mass Anisotropy and Stress Redistribution via
Analysis of non-advance TBM Operational Data**

Description

Today's tunnel boring machines (TBM) continuously record big amounts of data. Whereas most analysis of TBM data focuses on the data that originates from the excavation itself, this project shall take a closer look on the data that is generated during standstills of the TBM. This data mainly comprises hydraulic pressure measurements from different cylinders and pistons on the machine (e.g. gripper forces, pressures on crown support shields etc.).

The working hypothesis is that the recordings of the various sensors are (amongst other influences) functions of the stress redistributions that occur within the rock mass during these standstills. Building on theories and already existing preliminary analyses from the construction site, this thesis' goal is to take a closer look at this kind of data.

The thesis will be dealing with data from the exploratory tunnel Ahrental-Pfons of the Brenner Base Tunnel. If possible, insights should be prepared in a way that they can be transferred to other TBM excavations as well.

Workflow:

1. Literature research concerning analysis of non-advance TBM data and technical characteristics of open gripper TBMs and the geology of the BBT.
2. Filtering and preprocessing of the data.
3. Data analysis.
4. Evaluation and interpretation of the results.

Due to the big amount of data, the analysis will require skills beyond MS Excel. Programming skills (Python) are recommended but can also be acquired during the thesis (additional efforts for this shall be considered).

The study will be done in close cooperation with the Brenner Base Tunnel BBT SE.



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