Graz University of Technology
Institute for Rock Mechanics and Tunnelling

Master Thesis (MA, 30 ECTS)

Evaluation of Gripper Forces from the TBM-drive in the exploratory tunnel "Ahrental – Pfons" of the Brenner Base Tunnel

Description

Tunnel boring machines continuously record a variety of parameters. In case of an open gripper TBM one of the data-sets is the gripper force.

The knowledge of rock mass parameters is of utmost importance to ensure an economical tunnel design. To meet this goal a proper geomechanical characterization is imperative. In order to gain detailed information about the properties and the mechanical behavior of the surrounding rock mass an in-situ test program would be necessary. This thesis describes the difficulties in performing in-situ tests to determine rock mass parameters in tunnels. The thesis is looking into existing experiences with various insitu methods, such as "Stempelpresse and Radialpresse".

The goal of the thesis is to explore if and how monitored gripper forces can be used to determine rock mass parameters (with the focus on the rock mass stiffness of the surrounding ground).

Workflow

1. Literature research (focus on insitu measurements to determine rock mass parameters in tunnels)
2. Describe mechanisms and interactions of gripper/rock mass for the open gripper TBM under consideration
3. Identify analogies and discrepancies of insitu measurements and gripper forces
4. Evaluation of rock mass stiffness using gripper forces from TBM-data sets
5. Optional: Identify rock load acting on TBM-gripper during standstills
6. Interpretation and outlook

Start: by appointment

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