

Master thesis (MT, 30 ECTS)

Working title Back-calculation of rock mass parameters at the Semmering Base Tunnel based on the convergence confinement method

Description

The monitoring of geodetic targets installed at the tunnel lining provides reliable information on the ground- and system behaviour of the underground construction. At the Semmering Base Tunnel the engineers use the software Tunnel:Monitor to visualise displacements of monitored geodetic targets and to process the data for short term predictions. Recently, a toolbox to apply the convergence confinement method (referred to hereafter as **CCM**) to the recorded displacements has been added to the Tunnel:Monitor.

The CCM bases on plane strain- (i.e. infinite long tunnel, no strain in the direction of the drive) and homogeneous rock mass conditions and on an axisymmetric excavation- and support geometry and -pattern, respectively. Despite these simplifications, the CCM allows for a fast estimation of the final displacements (in the design phase; rock mass-, excavation- and support parameters are assumed) or for a fast back-calculation of the rock mass parameters (after the construction; excavation- and support parameters and final displacements are known).

The student should complete following tasks:

- Learn basics of the CCM including a literature research (state of the art)
- Learn the CCM-toolbox implemented in the software Tunnel:Monitor
- Apply the CCM-toolbox at selected rock mass sections of the Semmering Base Tunnel to back-calculate the rock mass parameters including plausibility checks and comparisons with rock mass parameters from design phase
- Highlight application errors and -limitations
- Presentation of findings to engineers responsible for the software Tunnel:Monitor
- Elaborate measures to improve CCM-toolbox together with software developer (IGT Geotechnik und Tunnelbau Ziviltechniker G.m.b.H.)
- Preliminary- and final presentation and written report (master thesis)

Requirements Interest on software development and -testing; Knowledge on conventional tunnelling and on support methods and -properties; Systematic, detailed and accurate way of working; Interest to work and discuss with several engineers

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Start Immediately / by agreement

Duration approx. 6 months

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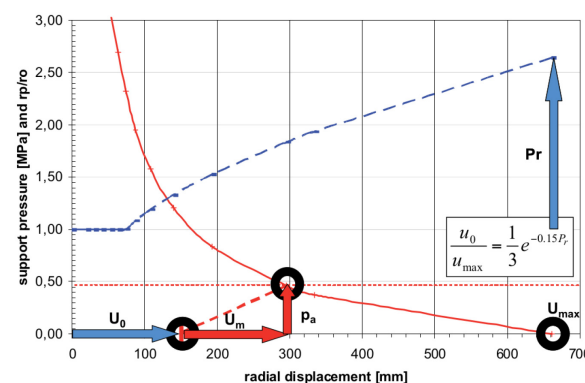


Figure 1. Essential components of the convergence confinement method and the method of back analysis. [Schubert, Hölzl, Sellner & Fasching. 2010. Geomechanical knowledge gained from the Paierdorf investigation tunnel in the section through the Lavanttal main fault zone. Geomechanics and Tunnelling Vol. 3, No. 2.]