



SFB 837 – PROJECT OBJECTIVES

Mechanized tunneling is an established flexible and efficient technology for the construction of underground infrastructure, characterized by a dynamic advancement of tunnel boring technologies, increasing diameters and a broadening range of applicability. This rapid development in association with the inherent heterogeneity of the ground poses new challenges to prognosis models.

Considering this background, the subject of the Collaborative Research Center SFB 837 "Interaction models for mechanized tunneling" is the research and development of models, methods and design concepts, which, when adequately inter-linked, can deal with the manifold complex interactions of the components and processes involved in mechanized tunneling.

Research within the four project areas of the SFB includes the ground exploration and modeling of the ground, the tunnel boring machine, the lining and annular gap grouting, and the interactions between tunneling and existing structures. Furthermore, the cutting, advancement and logistics processes will be represented using adequate models integrated by means of a consistent SFB-wide information management system.



EFFECTIVE STRESS IN MULTIPHASE POROUS MEDIA

To date there is an ongoing discussion about how to describe the effect of soil water interaction (in terms of suction) when dealing with the mechanical behavior of partially saturated soils.

One approach is to describe the macroscopic effect of suction in terms of effective stress. This has the fundamental advantage that classical soil mechanic principles can be applied to partially saturated soils.

A growing number of lab tests indicate that the effective stress concept is sufficient to describe macroscopic effects of soil water interaction when dealing with limit state, e.g. shear strength, related problems.



EFFECTIVE STRESS IN MULTIPHASE POROUS MEDIA

However, a systematic experimental validation, taking into account the full mechanical stress and suction range as well as different failure modes is still missing and different aspects of this approach are under discussion.

On this workshop the state of the art concerning this research field will be discussed. Different invited speakers will present their experimental data, analyze existing and new data sets and present theoretical background and investigations on the level of microstructure.

The workshop is organized by the Chair of Foundation Engineering, Soil and Rock Mechanics.

WORKSHOP PROGRAM – SEPTEMBER 15TH, 2016

IC-Building, Floor 03, Room 604 – 14:00 - 18:00

- 14:00 **Opening**
[Tom Schanz](#)
(Ruhr University Bochum)
- 14:30 **Microstructure of compacted soils and its evolution**
[Eduardo Alonso](#)
(Universitat Politècnica de Catalunya)
- 15:15 **Microstructural evolution of normal and high activity compacted clays**
[Alessio Ferrari](#)
(École Polytechnique Fédérale de Lausanne)
- 16:00 **Coffee break**
- 16:30 **A unified normal compression line for saturated and unsaturated soils**
[Domenico Gallipoli](#)
(Université de Pau et des Pays de l'Adour)
- 17:15 **A dynamic model for unsaturated soil including hydraulic hysteresis**
[Nasser Khalili](#)
(UNSW Australia)

WORKSHOP PROGRAM – SEPTEMBER 16TH, 2016

IC-Building, Floor 03, Room 604 – 08:30 - 14:00

- 08:30 **Experimental validation of effective stress concept in fine grained soils – proposed procedure and first test results**
[Diethard König¹](#), [Gunnar Heibrock²](#)
(Ruhr University Bochum¹, Hochschule Kaiserslautern²)
- 09:15 **Bishop's parameter: A two-way hydro-mechanical coupling coefficient controlled by soil fabric**
[Jean Vaunat](#)
(Universitat Politècnica de Catalunya)
- 10:00 **Coffee break**
- 10:30 **Effective stresses for unsaturated states stemming from an experimental investigation into the micro-mechanics of unsaturated clays**
[Matteo Pedrotti](#), [Alessandro Tarantino](#)
(University of Strathclyde Glasgow)
- 11:15 **Effective stress in clays of various mineralogy**
[Wiebke Baille¹](#), [Snehasis Tripathy²](#)
(Ruhr University Bochum¹, Cardiff University²)
- 12:00 **A Meshfree Method for Fully Coupled Analysis of Flow and Deformation in Unsaturated Porous Media**
[Arman Khoshghal](#)
(UNSW Australia)
- 12:45 **Lunch**

