Next event

Title: **Advances in the testing of the thermo-hydro-mechanical behaviour of shales**

Author: **Alessio Ferrari**

Date: **17.01.2013**

Time: **17h00 - 18h00**

Location: **GCD0 386, EPFL**

Summary

The geomechanical behaviour of shales is quickly becoming one of the most important issues in modern geomechanics, largely driven by petroleum industries (i.e., the extraction of shale gas), the sequestration of CO2 and the nuclear waste geological storage. In any such application, a deep understanding of the hydro-mechanical behaviour of the involved materials is of primary significance. Advanced experimental techniques and apparatuses have been developed at the Laboratory for Soil Mechanics of the EPFL for testing the thermo-hydro-mechanical behaviour of shales. Some of these advances in shale testing are presented. A methodology established for the analysis of the water retention behaviour in non-isochoric conditions is introduced; the method allows for the determination of the main drying and wetting paths in addition to the volume change response upon total suction variations. A high-pressure oedometric cell is then presented; the apparatus allows for the analysis of the transition from the pre-yield behaviour to the normally consolidated state. The analysis of the settlement versus time curves yields information on the permeability of the material as a function of the void ratio. The test results are illustrated for two Mesozoic shales from the northern region of Switzerland, namely, the Opalinus Clay from Mont Terri and the so called "Brown Dogger" from the Schlattingen site in the Molasse Basin.

Speaker

Dr. Alessio Ferrari is research fellow at the Swiss Federal Institute of Technology in Lausanne (EPFL, Switzerland) since 2009. He earned an MSc in Environmental Engineering and a PhD in Geotechnical Engineering. He was appointed as a Marie-Curie post-doctoral fellow at the EPFL and at the Polytechnic University of Catalonia (UPC, Spain). His current main research interests are in geomechanics for man-made and natural systems (thermo-hydro-chemo-mechanical behaviour of geomaterials, development of advanced testing facilities, pore scale testing, and natural hazard assessment). He is lecturer of the course in "Experimental Geomechanics" at the EPFL. He has recently published a book on the topic "Multiphysical Testing of Soils and Shales" in the Springer Series of Geomechanics and Geoengineering.

Recent publications on the topic

An experimental and constitutive investigation on the chemo-mechanical behaviour of a clay, P. J. Witteveen, A. Ferrari and L. Laloui, Geotechnique, 2013

Advances in the Testing of the Hydro-mechanical Behaviour of Shales, A. Ferrari and L. Laloui, Published in Multiphysical Testing of Soils and Shales, Springer Series in Geomechanics and Geoengineering, p. 57-68, 2012.

Testing the Thermo-Hydro-Mechanical Behaviour of a Shale, L. Laloui, A. Ferrari and S. Salager, 3rd EAGE Shale Workshop, Barcelona, 2012.

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The seminar room GC D0 386 is located at the following link: http://plan.epfl.ch/?lang=en&room=gcd0386
The seminar will be followed by refreshments. Thank you for registering by e-mail to lms@epfl.ch before Jan 11th, 2013.
It is helpful for the organisers to know the number of attendees.

Layout: Chao LI

LMS Seminar Series 2013

The laboratory of soil mechanics (LMS) is pleased to invite you to the seminar series introducing state of the art and practise in geotechnical engineering. Topics covers the environmental impact of natural hazards as well as new technologies such as nuclear waste disposal, energy structures and activites related to CO2 storage.

- Prof. Lyesse Laloui

Thermo-hydro-mechanical testing of shales
17.01.2013
Alessio Ferrari, P.E., Ph.D, Researcher
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Heat exchanger anchors for thermo-active tunnels
07.02.2013
Thomas Mimouni, P.E., Ph.D student
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Gas flow propagation and related chemo-hydro-mechanical response of sand-bentonite mixture - 07.03.2013
Donatella Manca, P.E., Ph.D student
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Multiphase hydromechanical processes induced by CO2 injection into deep saline aquifers - 10.04.2013
Chao Li, P.E., Ph.D student
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Analysis of opalinus clay behaviour in a thermo-hydro-mechanical Framework - 10.05.2013
Valentina Favero, P.E., Ph.D Student
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Experimental investigation on the mechanical behaviour of reservoir materials as a result of CO2 injection and storage - 10.06.2013
Samuel González Maceda, P.E., Ph.D Student
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Thermo-hydro-mechanical modeling for opalinus clay
12.07.2013
Francesco Parisio, P.E., Ph.D Student
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Hydromechanical coupling in landslides induced by rainfall
13.09.2013
Abudushalamu Aili, P.E., Ph.D student
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Geotechnical design of energy pile foundations
17.10.2013
Alice Di Donna, P.E., Ph.D student
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Thermo-hydro-mechanical behaviour of bentonite
07.11.2013
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