ALERT Geomaterials

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http://alertgeomaterials.eu

Summary

EDITORIAL

Dear ALERT member,

the new time schedule of the ALERT annual meeting seemed to work very well last year. Having the second session of the workshop only in the morning allowed us to embed the ceremony of the PhD prize with the subsequent ALERT special lecture to a worthy framework. The ALERT Bureau is convinced that this experiment should become a rule for the next years.

The number of the participants to the workshop and to the doctoral school was slightly lower than in the previous years. We believe that such fluctuations are natural and do not suggest any future trend. The quality of the workshop presentations and of the school lectures remained on a traditionally high level. The school book on Soil-Structure Interaction, which is freely available as a download from the website of the ALERT Geomaterials, can be considered as its testimony.

The popularity of the webpage of ALERT Geomaterials increases steadily. There have been in average 149 hits per day during 2013 which is an ordinary amount taking into account the non-profit and a very specialized content of the site. We are also aware of some weak points of the webpage design based on the Wordpress software and are working on improvements.

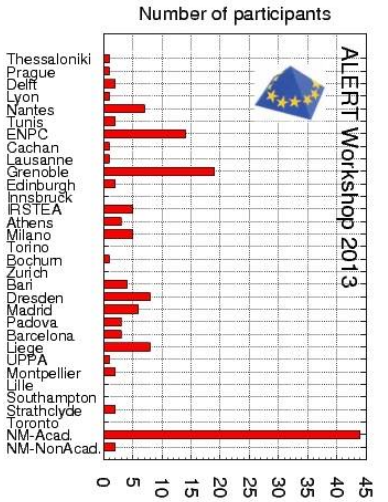
The number of the ALERT member institutions remained constant last year but there are already new applications announced for this year. Still, there are several European countries which are not participating in the ALERT activities yet. We hope to attract also their attention and to enrich the European dimension of the ALERT network, enabling an exchange of ideas with research schools of a different background.

This year, the election of the new Board of Directors will take place by the General Assembly. All permanent teachers, researchers and technicians belonging to an ALERT member institution are eligible candidates. I hope that you will actively support this event either as a candidate or a voter.
See you in September in Aussois!

Yours sincerely

Ivo Herle
Director of ALERT Geomaterials

Impressions of Aussois
Photographs by David Mašín



Participants of the ALERT Workshop 2013

ALERT Workshop 2013

In 2013 the annual ALERT Workshop was held on September 30th till October 2nd again in Aussois, France. The regional distribution of the participants from the institutional members of ALERT Geomaterials is shown on the left hand side. In total, 148 participants registered for the ALERT workshop 2013.

To give more room for inspiring discussions during the Workshop, for the first time the Tuesday session was shortened and the presentations were scheduled only half a day. This procedure will be carried on also during the ALERT Workshop in 2014.

In total, the number of the selected contributions was 13 for session 1, 5 for session 2 and 16 for session 3, respectively.

The three topics of the ALERT Workshop 2013 are listed below:

1. Geomechanics of slopes

coord. C. di Prisco & L. Cascini

This session was organized within the framework of the institutional cooperation between ALERT and LARAM (International School on Landslide Risk Assessment and Mitigation)

2. Contact problems in geomechanics

coord. E. Papamichos & J. Sulem

3. Degradation in geomaterials

coord. E. Bauer & C. Dano

The presentations of the speakers can be downloaded from the ALERT website.

http://alertgeomaterials.eu/presentations-of-the-alert-workshop-2013/

We thank all active participants and coordinators for their effort.

The ALERT Special Lecturer 2013 Prof. Ronaldo Borja

Special Lecture 2013: Prof. Ronaldo Borja

The ALERT Special lecture 2013 was a delivered by Prof. Ronaldo Borja from Stanford University, California, USA.

The title of the lecture was

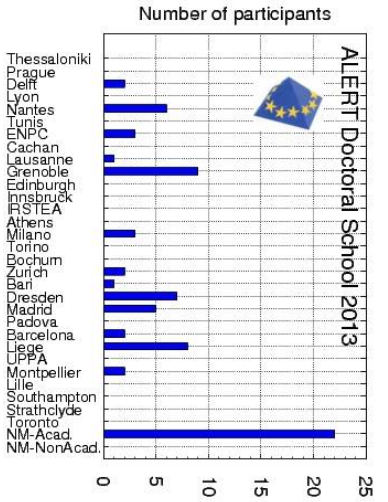
Triggering a shear band in heterogeneous porous media

The lecture was digitized during the presentation and will be soon available for downloading on the ALERT website.

The next Special lecture during the ALERT Workshop 2014 will be presented by Prof. Itai Einav from University of Sydney, Australia. He will talk about

Geomaterials under extrems.

On the ALERT website a summary of his presentation will be published soon.



Participants of the ALERT Doctoral School 2013

ALERT Doctoral School 2013

The ALERT Doctoral School 2013 lasted from Thursday October 3rd to Saturday October 5th and was attended by 72 PhD students. The topic of the school was dedicated to

Soil-Structure Interaction

and the organization was carried out by Panagiotis Kotronis (*École Centrale de Nantes*), Claudio Tamagnini (*University of Perugia)* and Stephane Grange (*Laboratoire 3SR/ Univer-sité Joseph Fourier Grenoble*). The accompanying book, containing articles referring to the lectures, can be downloaded from the ALERT website.

The lectures were presented by

- P. Kotronis *(École Centrale de Nantes)*
- C. Tamagnini *(Universitá di Perugia)*
- S. Grange *(Laboratoire 3SR)*
- R. Borja *(Stanford University*)
- C. Lai *(Università di Pavia)*
- M. Martinelli *(Università di Pavia)*
- L. Thorel *(IFSSTAR, France)*
- S. Escoffier *(IFSSTAR, France)*
- P. Gueguen *(Laboratoire 3SR)*

In the lectures a general overview of the soil-foundation-superstructure interaction analysis and its importance when assessing the response of structures subjected to earthquakes was given. Moreover, it was presented on how weak motions can be utilized to study the dynamic characteristics and the response of buildings considering soil-structure interaction. With regard to laboratory work, detailed presentations on centrifuge modelling of foundations subjected to cyclic and to earthquake loading were given. Furthermore, one part of the school focused on the modelling of soil-structure interaction of piled foundations and on simplified modelling strategies for soil-structure interaction problems based on the multifiber beam and the macro-element concepts.

In the name of all the ALERT members we want to thank the lecturers and the organizers for their commitment.

ALERT PhD Prize 2013

Dr. Minh-Ngoc Vu (École des Ponts ParisTech)

The jury of the ALERT PhD Prize 2013 was composed of the professors Manuel PASTOR (*Universidad Politécnica de Madrid*), Ronaldo BORJA (*Stanford University, California*), Cino VIGGIANI (*Grenoble INP, Université Joseph Fourier, CRNS*) and Marcos ARROYO (*Universiat Politècnica de Catalunya)*.
Only PhD students from one of the institutions belonging to ALERT are eligible candidates for the prize which is dated to 1000 €.

The jury had to pick three PhD students out of 4 applicants for a closer selection. For the prize were considerd the theses of Minh-Ngoc Vu *(École des Ponts ParisTech)*, Dirk Wegener *(Technische Universität Dresden)* and Emanuele Catalano (*Grenoble INP, Université Joseph Fourier, CRNS*).

The jury awarded the PhD student Minh-Ngoc Vu for his work entitled

Modeling fluid flow and effective permeability of fractured porous media by singular integral equations method

The thesis by Dr. Vu focused on the fluid flow through fractured porous geological formations and aimed to develop a method for the numerical modelling of this process.

The governing equations for flow in such materials were reviewed first and mass conservation at the fracture intersections was expressed explicitly. Using the theory of potential, the general potential solutions were proposed in the form of a singular integral equation that describes the steady-state flow in and around several fractures embedded in an infinite porous matrix under a far-field pressure condition. Numerical programs have been developed based on the singular integral equations method to resolve the general potential equations. These allowed modeling the fluid flow through a porous medium containing a great number of fractures.

The effective permeability model is applied to study the hydromechanical behaviour of a fault zone constituted by a clay core surrounded by fractured zones in the context of CO2 geological storage. The pressure injection induces an overpressure in the reservoir that may affect the permeability of the fractured zones leading to complex coupled hydromechanical phenomena. The simulation results allow evaluating the risk of leakage of the reservoir brine to higher aquifers as well as the risk of fault reactivation.

The abstract of the PhD thesis of Dr. Minh-Ngoc Vu is available at the ALERT website.

ALERT Workshop & School 2014

Organizing Institutions of ALERT Workshop & School 2014

The **ALERT Workshop** in 2014 will be organized from Monday September 29th till Wednesday October 1st. The workshop will again take place in the *Centre Paul Langevin* in Aussois, France.

The focus of the three workshop sessions and the responsible coordinators are listed below:

1. Constitutive modelling – What's new?

coord. R. Nova & C. di Prisco
cdiprisc@stru.polimi.it

2. Railway geomechanics

coord. A. Zervos & F. Radjai
a.zervos@soton.ac.uk
franck.radjai@univ-montp2.fr

3. Multiphysics coupling

coord. R. Charlier & L. Sanavia & J. Vaunat
robert.charlier@ulg.ac.be
lorenzo.sanavia@unipd.it
jean.vaunat@upc.edu

Please do not forget to submit your abstract by email directly to the coordinators using the abstract form which can be downloaded at the ALERT site http://alertgeomaterials.eu.

The deadline for the submission of abstracts is 30th April 2014.

The workshop is followed by the ALERT Doctoral School which will be hosted from Thursday October 2nd to Saturday October 4th also in Aussois. The topic of the ALERT School will be dedicated to

Stochastic analysis and inverse modelling

and will be organized by Cristina Jommi and Michael Hicks (both *TU Delft*).

The online registration for the ALERT Workshop & School will open in June 2014 on the ALERT website and will be announced in advance again.

ALERT Olek Zienkiewicz Course

The 6th edition of the *Olek Zienkiewicz* Course will be held from Monday June 2 to Friday June 6, 2014 in Madrid, Spain. It will be dedicated to

Advanced Numerical Modelling in Geomechanics

The course has the main objective to provide students with a sound basis for the study of computational geomechanics. The course will cover the main aspects of the problem including the mathematical model, the constitutive equations, the numerical model and application. Further details are provided at the ALERT website. The registration deadline is May 2, 2014.

The ALERT Summer school 2013 was held in September in Innsbruck, Austria. The school focused on

Geology and Mechanics

.

The content of the school was prepared and presented by the lecturers:

- Dimitrios Kolymbas (Innsbruck)
- Helen Lewis (Edinburgh)
- Gary Couples (Edinburgh)
- Boris Kaus (Mainz)
- Taras Gerya (Zurich)
- Hemin Koyi (Uppsala)
- Fernando O. Marques (Lisboa)
- Hannah Pomella (Innsbruck)
- Daniela A. Engl (Graz)
- Matthias Kinkmüller

During school lectures topics like the

- Role of Simulations and Experiments in Understanding Folding, Flexure and Fault Zones
- Numerical Modelling of plate tectonic processes
- Slope Instabilities regarding field observations, mechanical explanation and analysis tools
- Salt structures and their significance as radioactive waste disposal

but also an introduction to the

- Tectonic evolution of the Alps

were presented.

In addition to the lectures, a geological excursion was organized by Prof. Kolymbas and his team and was guided by the geologist Dr. Heißel. The excursion took the participants of the Summer School to geological interesting sites in the surrounding area of Innsbruck and the Kaunertal.

The ALERT Summer school was attended by 34 participants from 10 different countries.

Lecturing Institutions

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Newsletter production:
Kornelia Nitzsche