



ALERT Geomaterials

NEWSLETTER – July 2011
N°9 - year 5

<http://alert.epfl.ch>

Summary

Editorial

page 1

Olek Zienkiewicz Course 2011

page 2

Invited Lecturer 2011

page 2

ALERT Workshop 2011

Page 3

ALERT School 2011

page 3

ALERT PhD Prize 2011

page 4

ALERT Poster Session 2011

page 4

LARAM International School

page 4

EDITORIAL

Dear Alert member,

This is the last editorial I am writing for this Newsletter as Director of our Association. Six years have passed since Felix asked me to help him in the management of the Association. Indeed, one year before that, I started collaborating with him in the writing of the Alert Statute. At that time, Felix's greatest concern was to guarantee the continuity of our scientific community. He was aware that a sort of generational succession was very soon going to occur, and he did not want the existing scientific experience, based on strict and warm friendships, to vanish with the chief protagonists of that season. He could not suspect, at that time, that tragic events had dramatically accelerated such a natural process!

Felix was also conscious, as were many of us with him, that the organisation of the meeting, of the school necessarily implies an effort that had been sustained, up to that time, chiefly, if not solely, by himself.

For all these reasons, he strongly wanted to found an International Association by involving in such an action all the already active partners of Alert Geomaterials, but with the perspective of coopting, in the near future, new European and non-European laboratories and scientific institutions. The future of our community and its development, in a certain sense, were considered by those "fathers" to be essential for the formation of the next generations of researchers working in geo-mechanics, and this is still really important, because the scientific research in our field continues to be characterised by a surprising vitality, although in many countries the economic climate is not particularly favourable to scientific research.

The complexity, both of the materials we have to deal with and of the problems that we are called to solve, is sufficient to provide many future generations of researchers with the stimulus to progress.

You will remember how the transformation of a sort of "scientific club", as Iannis liked to define our community, into an International Association worried many of us. The prospect of giving rise to the umpteenth international association did not interest anyone: the "Alert spirit", strengthened by the free circulation of knowledge, by the will of all the members to collaborate rather than compete, and by the

awareness that the ultimate objective of our scientific work is not to promote ourselves but to accelerate the "global growing", had to be preserved.

I am very often so pleased to listen to the enthusiastic comments made by many Italian and European colleagues about Alert members, surprised not only by their scientific value but in particular by their broadmindedness. This is, in my opinion, the most precious treasure we have inherited from a generation that became adult in the late sixties and believed that success is never personal but the result of the friendship within a community.

In the last six years many new initiatives have been born. I think above all of the Olek Zienkiewicz courses, one-week local doctorate Schools held three times so far, once in Madrid, once in Lausanne and once in Grenoble, and greatly appreciated by the students, not only those from Alert but also many from other external Universities. I think also of the Alert PhD prize and the Alert invited lectures.

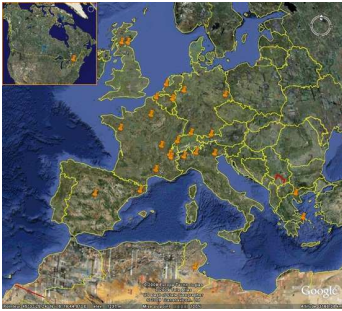
Finally, I want to stress the relevance, growing greater and greater every year, of the role played by our web-site, where our history and identity, together with that of the Paul Langevin Centre in Aussois, are deposited. The practical use of the web-site for activating initiatives and dealing with inscriptions and advertisements has obviously become absolutely necessary. Moreover, our web-site, in the absence of a seat for the Association, is also becoming our virtual centre, testifying to our history and past experience. Many thanks to Lyesse for having conceived it and for keeping it continuously updated. In fact, as you know, an updated web-site is like a home, while a neglected one turns into a museum of memories.

I do not want to bore you any longer with this leave-taking. I am sure that the next Alert Board, the next Alert Bureau and the next Director will be still better able to interpret the "Alert spirit" by conceiving new initiatives and by making our Association still more active! See you in Aussois - and do not forget the candidatures for the Alert Board of Directors!

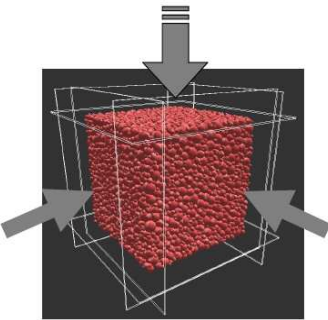
Un abbraccio,
Claudio di Prisco



Olek Zienkiewicz Course 2011 on “Discrete Mechanics of Geomaterials”



The Network of ALERT Institutions



A DEM sample of spheres

This year the ALERT Zienkiewicz local course was organized by Professors Bruno Chareyre and Cino Viggiani with the collaboration of the geomechanical research group at the Laboratoire 3S-R.

The school took place in Grenoble from June 27th to July 1st and was attended, as usual, by students coming from both ALERT and external Institutions.

The course aimed at providing a fundamental understanding of the behavior of geomaterials starting from the recognition of their particulate nature. A variety of topics concerning the mechanics of discrete geomaterials has been expounded. Topics tackled include the interplay between particle characteristics and inter-particle arrangement, the physics of particle interaction and interconnected porosity and the solid-fluid

interaction at small scale. These subjects have been addressed by providing an overview on the state-of-the-art research concerning theoretical aspects, numerical methods and advanced experimental techniques.

The course consisted of lectures and practical sessions, given by Edward Andò, Emanuele Catalano and many other young researchers. All the students enjoyed in particular the visit to the experimental facilities of the Laboratoire 3S-R.

Thanks to Bruno and Cino for giving our PhD students this very stimulating opportunity and for the brilliant direction of the event and thanks, too, to all the lecturers and the young members of the Grenoble group for the excellent lectures and the management of the logistical aspects.



Course participants

Invited Lecturer 2011: Prof. Tomasz A. Hueckel



*Prof. Tomasz A. Hueckel
Duke University (USA)*

This year we will have the pleasure of hosting as invited lecturer prof. Tomasz Hueckel. As many of us well know, Tomasz obtained his PhD degree in Applied Mechanics from the Polish Academy of Sciences, Warsaw, Poland under the supervision of Zenon Mróz. He also obtained a D.Sc. from the University in Grenoble, France, 1985. He spent his post-doc with Giulio Maier at the Politecnico di Milano, before returning to the Polish Academy of Sciences. In 1981 he moved to Italy. He briefly worked at the University of Rome “La Sapienza” and Politecnico di Milano as graduate professor and from 1983 to 1987 at ISMES (Institute of Experimental Structures and Materials) in Bergamo, Italy at a unit dealing with the nuclear waste disposal. Since 1987 he is professor at Duke University. He spent various periods of time as a visiting professor at Ecole Polytechnique, Paris-Palaiseau, Ecole Nationale Polytechnique de Grenoble, University of Liege, Polytechnic University of Catalunya (UPC), Barcelona, University of Athens,

Federal Institute of Technology of Lausanne (EPFL), University of Minnesota, University of Montpellier-2.

He received the 2008 John Booker Medal from IACMAG for distinguished contributions to geomechanics “for pioneering work in the area of Environmental Geomechanics, in particular for his seminal papers on thermo-plasticity of geomaterials and on chemo-mechanical coupling”

Plasticity of geomaterials in a variable environment

Abstract

Irreversible deformation of geomaterials and especially their failure may be critically affected by varying environmental conditions. These include: elevated temperature, exposure of soils to contaminant, effects of natural or enhanced geochemical processes, changes in pore water salinity, acidity, or ion type, electrical charge, phase changes of pore water, both freezing and evaporation. This



lecture discusses mechanisms through which the above changes affect the mechanical properties of soils: their compressibility, failure conditions and permeability. In particular, the interest is focused on the mechanisms and variables controlling plastic, damage and failure behavior within the framework of plasticity theory both at the macro- and micro-

scale. Examples are discussed that are of engineering importance and pedagogic value.

As was done for the previous ALERT invited lectures, also this year the movie of the presentation will be available on our website.

ALERT Workshop 2011: Preliminary Program

This year the **ALERT Workshop** will be held in Aussois on October 3rd to 5th 2011. The titles and brief descriptions of the session programs are reported here below.

1. Multiscale geomechanics: from fabric to material properties

coord. G. Couples & B. Chareyre
gary.couples@pet.hw.ac.uk
bruno.chareyre@hmg.inpg.fr

In this session experimental, constitutive and numerical issues related to the influence of microstructure on material properties will be addressed. Special attention will be devoted to flow properties of geomaterials, to the use of DEM and to constitutive models for microstructure-based continuum theories.

2. Geomechanical issues in CO₂ storage

coord. G. Pijaudier-Cabot & J.M. Pereira
Gilles.Pijaudier-Cabot@univ-pau.fr
jeanmichel.pereira@enpc.fr

The second day will be devoted to the most geomechanical relevant issues in CO₂ storage. Most contributions will concern the

numerical simulation of gas migration and fluid leakage phenomena in pressurized storage formations. Attention will be also paid to the definition of thermodynamically-consistent modelling frameworks, as well as to the effect of chemical degradation processes.

3. Localised versus diffuse failure in geomaterials

coord. M. Hicks & G. Viggiani
M.A.Hicks@tudelft.nl
cino.viggiani@hmg.inpg.fr

The last session will address the problem of failure in geomaterials, distinguishing the occurrence of localised versus diffuse modes. Both experimental and DEM results will be presented to clarify the transition from the former to the latter failure mode, as well as to confirm the validity of theoretical approaches for instability analyses.

Finite element simulations of failure observed during laboratory tests and of real scale geostructures (such as excavations, boreholes and landslide propagation) will be also discussed.



Organizing Institutions

ALERT Doctoral School 2011

The Alert Doctoral School 2011 will be devoted to **Prevention and Protection against Hazard**. It will be organised by prof. C. di Prisco (Politecnico di Milano) and prof. Y. Malécot (Université J. Fourier Grenoble). As usual, the school will last three days, from October 6th to 8th.

The fast anthropization of the Earth is, without any doubt, the most amazing peculiarity of this historical period. This makes increasingly crucial the problem of implementing managing policies for the reduction of natural risks, such as landslides, avalanches and earthquakes

The topics of the School will essentially concern two different types of natural risks, *gravitational* and *seismic*. In both cases, the problem will be approached in terms of both phenomenological and theoretical/numerical approaches, regarding the statics and dynamics of the natural processes involved.

The School will emphasize the relevance of recent scientific advances for engineering

design purposes. Several problems will be addressed, starting from the comprehension of the mechanical behaviour of the materials involved (snow, sand, concrete) under thermal or dynamic/impact loading.

Modern computational issues will be extensively considered, with special emphasis on the numerical simulation of impacts on protection structures and the propagation of fast gravitational movements, such as debris flows and snow avalanches.

Lecturers:

- P.Y. Bard (*Université J. Fourier de Grenoble*)
- F. Calvetti (*Politecnico di Milano*)
- L. Daudeville (*Laboratoire 3S-R Grenoble*)
- C. di Prisco (*Politecnico di Milano*)
- J. Mazars (*Laboratoire 3S-R Grenoble*)
- F. Nicot (Cemagref, Grenoble)
- M. Pastor (*Universidad Politecnica de Madrid*)
- L. Vuillet (*École Polytechnique Fédérale de Lausanne*)



Protection against rockfall: boulder impact test on sheltering structure



Poster Session: Call for Proposals

Also this year, with the aim of promoting information exchange and cooperation among researchers, all the Alert PhD students are invited to participate in a poster session which will be held during the annual Alert Workshop. **The poster session is open to all scientific topics in the field of soil, rock and concrete mechanics.** Abstracts of the posters will be included in the Poster Session Booklet of the ALERT annual Workshop. The posters of interested presenters will be posted on the ALERT website after the workshop.

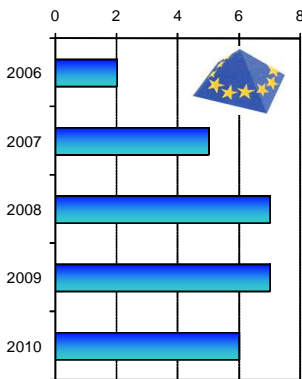
Submission of proposals

The deadline for submission of proposals is **August 31, 2011**. Students are requested to prepare an abstract of one page according to the instructions. Proposals should be submitted using the provided online template.

For further details see the Alert website:

<http://alert.epfl.ch/index.htm>

For any questions please contact the organizer of the 2011 session, Ali Seiphoori (ali.seiphoori@epfl.ch).



Number of candidates for the ALERT PhD Prize in the last five years

ALERT PhD Prize 2011

Also this year Alert Geomaterials funds the Alert PhD Prize in order to disseminate scientific results obtained by PhD students. The amount of the prize is 1000 €. To be eligible, the PhD thesis must be defended during the preceding calendar year (i.e. in the period January 1st to December 31st, 2010) and judged original and scientifically stimulating. Only PhD students from one of the institutions belonging to ALERT are eligible candidates for the prize.

This year the Jury of the prize will be composed of Jean SULEM (*ENPC de Paris*), Frans MOLENKAMP (*TU Delft*), Tomasz HUECKEL (*Duke University*) and Felix DARVE (*Institut National Polytechnique de Grenoble* and Alert President) as duty member.

The winner will be invited to present his research in Aussois and the movie of his presentation will be uploaded on our website.

LARAM: the international School on "Landslide Risk Assessment and Mitigation"

As many of you already know, our Association collaborates with the International School on "LAndslide Risk Assessment and Mitigation" (LARAM) organised by the University of Salerno, since its foundation. Many of the members of the Scientific Committee and many of the lectures of the LARAM School are also active members of ALERT.

For this reason, we like to advertise this initiative which is so close to the declared objectives of our Association.

The main objectives of LARAM are: (i) to develop high educational interdisciplinary programs for assessing, forecasting and mitigating landslide risk over large areas; (ii) to promote the creation of vocational training programs "on the job" aimed at solving real landslide risk problems using the most advanced theories and methodologies in the fields of geotechnical engineering, geomechanics, geology, mathematical modelling, monitoring, GIS techniques, etc.. To this aim, starting from 2006, every year in the month of September the following two initiatives are organized:

- a 2 week residential School directed at PhD students working in the field of Civil Engineering, Environmental Engineering, Engineering Geology or similar Engineering background;
- an International Workshop on topics related to "Landslide Risk"

A brief description of the two activities of

LARAM are summarised here below.

The LARAM School

Every year 40 PhD students are selected to attend the School's residential Courses, with 10 places reserved to Italian PhD students. The Courses consist of frontal lessons, tutorials and field training. Over the years, the students who have been attending the LARAM School's lectures belonged to over 150 different European and extra-European Universities from many different Countries.

The LARAM Workshop

The LARAM Workshops are organized as forums to disseminate the latest developments in Landslide Risk Management methodologies among researchers, professionals and authorities in charge of the territory governance in Italy and Europe. In 2011, the Workshop will be held from 7th to 9th September and will be devoted to the dissemination of the results of the SAFELAND Project, a 3-year large-scale integrating collaborative research project funded by the seventh framework programme for research and technological development (FP7) of the European Commission.

Further details about the LARAM School and Workshop are available on the LARAM web site:

<http://www.laram.unisa.it>



LARAM International School

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alertdirector@stru.polimi.it