



ALERT Geomaterials

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<http://alert.epfl.ch>

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Editorial

Dear Alert Geomaterials member,

with the aim of renewing the Association and by obeying to the Association Statute, this year, for the first time, all the responsables of the Alert Institutional members will be called to elect the new Board of Directors. Obviously, even the Bureau is expected to be renewed and its election will be the first act of the new Board of Directors. The mandate of both organisms will lack three years. During the month of January a lively discussion took place among the members of the current Board of Directors on the rules that should govern this election. This testifies positively the interest of members in defining the future of the Association. These comments were actively discussed during the Bureau meetings and at the end, by trying to take into account the diversified observations, the Bureau decided to slightly modify the text already sent to the Alert Board of Directors members during the month of December. Here below, you will find the full text of the rules.

Another important novelty concerns the possibility given to all Alert members to activate Local Doctorate Courses with the financial support of the Association, that will also be charged to advertise the initiative. This should allow the Alert Laboratories to more strictly collaborate in the field of doc and post-doc researcher training. Hereafter you will find a frame of reference: the Bureau judged to be necessary to give homogeneity to the different actions that are expected to be activated. I think it will be a great opportunity for building a sort of European Doctorate in Geomechanics.

At last, since this year even the Alert Bureau is expected to be renewed, in this issue of the Alert Newsletter, I want to gratefully acknowledge Felix Darve for giving to me the stimulating opportunity of guiding the evolution of the ALERT Association and in particular Lyesse Laloui, who makes it possible, thanks to his continuous fruitful cooperation, enormous organising effort and creative suggestions.

Claudio di Prisco
Alert Geomaterials Director

A Stimulating Future For Our Association

Environmental questions are more and more on the forescene today and probably for a long time! In this domain some in field observations, measurements, analyses and data bank achievements are essential, and Geologists-Geophysicists are progressing fast in these directions with new metrology sensors and new tools like LIDAR, ... But when it is necessary to predict, prevent or to mitigate the risks coming from the natural or technological environment, Geomechanics - in its broad sense - provides the methods and tools from engineering sciences to define the actions necessary to be taken to protect the Citizens.

In this perspective the future of ALERT is very promising and the European teams, members of ALERT, are probably on first rank in the world for the modelling of multi-physics coupling in geomechanics and for the application of modern multiscale approaches to geomaterials. The annual ALERT Workshops and Schools are now the essential forums in these areas. These exchanges at the best scientific level represent an invaluable tool for circulating ideas as fast as possible. Since 3 years the progress is significant in scientific quality, as indicated by the strong discussion in the

choice of the annually treated topics and by the selection of the lecturer contributions.

ALERT has also another crucial role to play with respect to more political issues. In our European countries – generally speaking - the evaluation is becoming the “ultimate” basis of any efficient (or expected like that!) scientific politics. With respect to this question a scientific community is today visible through a large amount of papers in ISI journals, through strong contractual activities but also through an internationally recognized European network. These last years – thanks to the enthusiastic and creative leading team of ALERT – the improvements have been drastic in this perspective of a worldwide recognition. Just let us think of ALERT annual Lecture, of ALERT PhD Prize, of ALERT Newsletter,... as recent breakthrough initiatives. ALERT can be – for example - extremely proud for the prestigious contributions as ALERT Lecturers of Malcolm Bolton in 2006, of Kolumban Hutter in 2007 and of Peter Cundall in 2008.

The exciting ALERT future is now firmly in the hands of all of us: it's a great challenge, we do not have to waste it!

Felix Darve
Alert Geomaterials President



Activation Of Local Doctorate Courses



The Network of the 21 Universities
ALERT members

The Alert Geomaterials is an international Association with the scope of promoting engineer and researcher pre and post doc training. In order to persecute this goal the Alert Bureau initiated the activation of local Alert-Geomaterials Doctorate courses on topics related to Geomechanics.

The activation of LDC will request the fulfilment of the following guidelines:

1. The financial support from Alert Geomaterials for the activation of a LDC can be requested only by Alert member Institutions, through their Alert responsible.
2. The involved lecturers may either come from the host Institution and/or other research teams but not necessarily belonging to Alert network.
3. The program of the course will have to be approved by the Alert Bureau on the basis of the scientific contents and its financial support will be given according to the current financial availability.
4. The courses will be devoted to doc and post-doc fellows and will be free of charge for all students belonging to Alert member Institutions.
5. The courses will take place at the host Institution and their duration will allow the participation of students coming from external universities (one to two weeks).
6. Alert bureau will advertise the action and support travel and accommodation expenses for external teachers as well as for the payment of all the teachers (on the usually applied financial basis in the Alert activities)
7. All the students coming from Institutions not belonging to Alert will pay inscription fees to Alert, that will be fixed in agreement with the host Institution.
8. In case from the action it derives an income for the Association, the 50 % of this latter will be paid to the host Institution for the hospitality.

Invited Lecturer 2008: Prof. Peter Cundall



Prof. Peter Cundall
Itasca (Minneapolis)

Some words about his professional and scientific career

Dr Cundall performed his doctoral work at Imperial College, London, where he originated the Distinct Element Method for modeling jointed rock and granular material. In addition to being an independent consultant for several years, he worked for Dames and Moore for five years, was a faculty member at the University of Minnesota for seven years, and is now Principal at Itasca Consulting Group in Minneapolis and an Adjunct Professor at the University of Minnesota. Dr Cundall is the original author of many computer codes, including *TRUBAL*, *FLAC*, *UDEC*, *3DEC* and *PFC*, which all enjoy widespread use. His main interest is in applied computer modeling, particularly in the areas of micromechanics, dynamics, plasticity, fracture damage, localization and coupled problems. He has written many papers including the most-cited paper for the journal *Géotechnique* (published in 1979, with co-author Strack). Dr Cundall has received several awards for his work in rock mechanics, and is Fellow of the Royal Academy of Engineering and Member of the National Academy of Engineering.

Abstract of the invited lecture:

A long-standing problem in rock mechanics is the estimation of rock-mass strength. The term "rock mass" denotes a large volume of fractured rock, in which yield of intact material

and discontinuities (joints) must *both* occur for overall failure to take place. The difficulty in characterizing a rock mass arises from the impossibility of testing directly (to failure) a large extent of rock. Since the proportion and configuration of the discontinuities (relative to the proportion of intact rock) determine the strength of the composite material, there is a pronounced size effect, such that large volumes appear weaker than small volumes. Empirical methods of estimating rock-mass strength do not account for the size effect, which implies that the design of large structures in rock may be non-conservative. Recently a numerical approach, called synthetic rock mass (SRM), has been developed and applied in several projects. The SRM is a bonded-particle assembly representing brittle rock that contains multiple joints, each one consisting of a planar array of bonds that obey a special model, the smooth joint model (SJM). The SJM allows slip and cracking at particle contacts, while respecting the given joint orientation rather than local contact orientations. Overall failure of an SRM element depends on both fracture of intact material (bond breaks) as well as yield of joint segments. Results are presented from a series of numerical experiments on 3D elements of various sizes. For the first time, we are able to quantify the variation of rock-mass strength as a function of size. The results are compared with empirical relations commonly used in design.



Organizing Universities

ALERT Workshop 2008

The **ALERT Workshop 2008** will be held in Aussois on October 6th to 8th 2008. The titles of the three sessions are listed here on the right.

On line registration will be available in few days on the Alert Geomaterials website (<http://alert.epfl.ch>). Please don't forget to fill in all the records of the registration form.

1. Multiphysics of multiphase materials

coord E.Papamichos and L.Sanavia
epapamic@civil.auth.gr
sanavia@dic.unipd.it

2. Field and laboratory testing

coord P.Delage and M.Arroyo
delage@cermes.enpc.fr
marcos.arroyo@upc.edu

3. Localisation in Geomaterials

coord J.Desrues and A.Zervos
Jacques.Desrues@hmg.inpg.fr
a.zervos@soton.ac.uk

2007 ALERT Books

All the Alert members are invited to send us the titles of the books recently written/edited by themselves, complete of a Pdf copy of the cover and a brief presentation. The publications will be advertised in a complete manner and permanently within the ALERT web site, whilst they will be only cited in the first annual issue of the ALERT Newsletter.

This has been judged to be useful for creating a sort of common cultural environment and to facilitate the circulation of editorial news within our groups. As is evident from the list reported here on the right, the number of these editorial initiatives for 2007 is large and the topics are quite wide.



Election of the New Board of Directors

ALERT INTERNAL RULES

Article 1: COMPOSITION AND ROLE OF THE GENERAL ASSEMBLY (GA)

The GA is composed by all the teachers, researchers, PhD students and technicians belonging to ALERT member Institutions. The GA meetings are held at least once per year during the annual ALERT Workshop, by disposition of the President, under the request of the Board of Directors, or of $\frac{1}{4}$ at least of the ALERT member Institutions (each one having a named representative). The GA is normally involved in debating on all the topics concerning the financial report of the previous year and on the budget of the next year.

Article 2: ELECTION OF THE BOARD OF DIRECTORS (BoD) MEMBERS

- The BoD is composed of 15 members elected by the GA, together with the members of the ALERT Bureau, as defined in the Article 8 of the ALERT Statute.
- All permanent teachers, researchers and technicians belonging to an ALERT member Institution are eligible candidates for the BoD.
- Each Institution has one (1) vote. The vote is cast by the named representative of

the Institution (whose name is specified on the ALERT website), or by another person belonging to the same Institution, delegated by written mandate by named representative. The election takes place during the ALERT Workshop, before the meeting of the new BoD.

- Candidates for election to the BoD must send their applications by email to the ALERT director before September 30th; the list of candidates is published and advertised on the ALERT website during the first week of October.
- The ballot contains the list of declared candidates in alphabetical order, starting from a letter randomly chosen.
- Each voter must tick a maximum number of names equal to 15. Otherwise the ballot will be considered void.
- The 15 names which receive the largest number of votes are elected. In case of a tie, the youngest candidate is chosen.
- The count of votes is controlled by three scrutineers, chosen among the ALERT members by the outgoing ALERT President. The names of the 15 new BoD members are announced at the end of the count, and published on the ALERT website.



PhD Prize 2008

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 awarded a PhD thesis, discussed during the preceding calendar year (i.e. in the period January 1st to December 31st, 2007) must be judged original and scientifically stimulating. Only PhD students coming from one of the institutions belonging to ALERT are eligible candidates for the prize. This year the Jury of the prize will be composed by Robert CHARLIER (Université de Liège), Frans MOLENKAMP (Delft University of Technology), Peter CUNDALL (Itasca Consulting Group) and Felix DARVE (Institut National Polytechnique de Grenoble

ALERT Doctoral School 2008

The 2008 edition of Alert School (Aussois, October 9th –11th 2008) will be devoted to “Discrete modeling of Geomaterials”, with particular emphasis for numerical methods and their applications to Soil and Rock Mechanics and Geotechnical Engineering. The structure of the School will be characterized by a first section, devoted to fundamentals, and a second one, where the focus will be on applications. The School lectures will start from the mechanics of contacts and its numerical implementation; with reference to this specific issue, both the “Molecular dynamics” and the “Contact Dynamics” approaches will be presented and critically discussed. The different fundamental hypotheses of the two methods, and the consequent peculiar suitability for different applications will be in particular considered. In addition, specific lectures will present the class of “Event Driven” methods and the “Combined Finite-Discrete Element Method”. The second part of the School will provide a critical overview of the applications of discrete methods to the analysis of Engineering problems, starting from the modeling of the mechanical behavior of frictional and cohesive materials. The discrete approach to classical geotechnical problems and to the analysis of jointed rock masses will be discussed, and a selection of some specific problems for which the discrete approach is particularly suited

and Alert President) as duty member. The applications must be sent by each candidate to the director of Alert **before June the 30th**. Each dossier must collect:

- CV of the candidate (in English)
- Abstract of the thesis (5 pages, in English)
- The two most representative papers deriving from the thesis work (in English)
- Full text of the thesis (original language).

All documents must be burnt on a CD-ROM in pdf version; the dossiers have to be sent to
Prof. Claudio di Prisco
Politecnico di Milano
Dipartimento di Ingegneria Strutturale
Piazza Leonardo da Vinci 32
 20133 – Milano (Italy)

(impacts, rapid flows), will be presented. The School format will remain similar to the one of the previous editions, with the exception of the introduction two complementary “late” (post dinner) sessions which will be respectively devoted to practicing with free software that will be distributed during the School (students are invited to bring their laptops), and to the presentation of the Yade project (an Open Source GNU/GPL Software framework). The preliminary program of the school can be downloaded from

<http://alert.epfl.ch/School/School.html>

On line registration will be available in few days on the Alert Geomaterials website (<http://alert.epfl.ch>). Please don't forget to fill in all the records of the registration form.

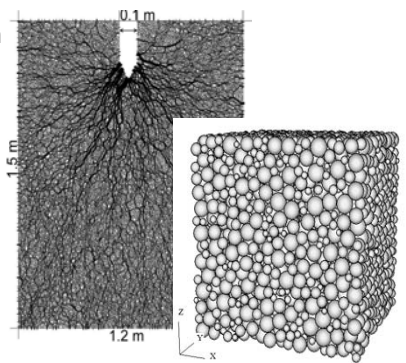
F. Calvetti and H. Hermann

Suggested references and websites:

- **M. Oda & K. Iwashita (eds.)**
 Mechanics of Granular Materials, an Introduction. Balkema, 1999 – ISBN 90-5410-461-9 (hardbound) or -462-7 (student paper edition)
- **B. Cambou & M. Jean (eds.)**
 Micromécanique des matériaux granulaires. Hermes Science, 2001. ISBN 2-7462-0229-8.
- **T. Pöschel and T. Schwager.**
 Computational Granular Dynamics - Models and Algorithms. Springer, 2005.
- **A. Munjiza.**
 The Combined Finite-Discrete Element Method. Wiley, 2004 - ISBN: 978-0-470-84199-0.
<http://yade.wikia.com/wiki/Yade>



Covers of ALERT books



Examples of Distinct Element models

Poster Session: call for poster proposals

Also this year, with the aim of promoting information exchange and cooperation among researchers, all the Alert PhD students are invited to participate to 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 listed in the Poster Session Booklet of 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 **July 30, 2008**. The students are requested to prepare an abstract of one page according to the instructions. Proposals should be submitted using the provided online electronic form. For further details see Alert website on

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

Questions about poster session should be directed to the organizer of the 2008 session:

suzanne.chalindar@epfl.ch
marta.rizzi@epfl.ch

To subscribe or unsubscribe to our mailing list, please contact:

alertydirector@stru.polimi.it