



**Vancouver
Geotechnical
Society**
A Local Section of the
Canadian Geotechnical
Society

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NOTICE OF UPCOMING TECHNICAL PRESENTATION

Thursday, May 5, 2016

SUBJECT: Progressive Failure in Overconsolidated Brittle Clay – Lessons from the Failure of a Tailings Dam

Canadian Geotechnical Society (CGS) Cross Canada Lecture Tour – Spring 2016

SPEAKER: Dr. Antonio Gens – *Technical University of Catalonia (Barcelona)*

Antonio Gens graduated from the Technical University of Madrid and he obtained a M.Sc. and a Ph.D. degree from Imperial College in London. He is a professor of Geotechnical Engineering at the Technical University of Catalonia in Barcelona where he has been Head of the Department of Geotechnical Engineering and Geosciences and member of the Governing Council of the University.

He has been involved in geotechnical research, consulting and education for more than 30 years. He is the author or co-author of more than 250 scientific papers and he sits in the Editorial Board of several International Journals. He is a member of TC105 (unsaturated soils) and TC215 (environmental geotechnics) of the ISSMGE. He has consulted widely and has given geotechnical advice on a series of landmark projects, both at home and abroad.

In recent years, he has been presented with the Case History Award by the American Rock Mechanics Association in 2006, the R.M. Quigley Award by the Canadian Geotechnical Society in 2009 and the Outstanding Contributions Award by the International Association for Computer Methods and Advances in Geomechanics (IACMAG) in 2011. Also, the UK Institution of Civil Engineers has awarded him the Telford Medal twice (in 1994 and 2007), the George Stephenson Medal also twice (in 2008 and 2012) and the Geotechnical Research Medal in 2014. In 2007, he delivered the 47th Rankine Lecture. He is a member of the Royal Academy of Doctors of Spain and in 2011 he became a Fellow of the UK Royal Academy of Engineering. In 2014, he has been awarded a Doctorate Honoris Causa by the University of Grenoble in France and the Honour Medal of the Colegio de Ingenieros de Caminos (Institution of Civil Engineers) of Spain. He has been elected Vice-President for Europe of the ISSMGE for the period 2013-2017.

CONTENT: Progressive failure of brittle materials exhibit two very undesirable characteristics: i) they usually occur without warning, and ii) consequences are often catastrophic. Brittle low-permeability materials also involve significant challenges for design such as the selection of the operational strength and the slow dissipation of pore pressures. All those issues are examined in the context of the failure of a tailings dam that caused an important environmental disaster affecting a very large area. The lecture describes in detail the features of the case, the failure event and the subsequent investigation. The forensic investigation led to the

unambiguous identification of the mechanism of failure that is consistent with the observations before, during and immediately after the failure.

It was conclusively shown that the main causes underlying the failure were the occurrence of progressive failure in the brittle foundation clay and the presence of very high pore water pressures in the foundation. The mechanism of the failure also explains the large post-failure movements (more than 50 m) that were responsible for the large spill of tailings. The study of the failure was supported by numerical analyses of increasing degree of complexity that provided additional insights into the problem.

The lecture concludes with some general lessons that can be extracted from the case and applied to other problems involving the potential failure of brittle stiff clays.

DETAILS: **Location:** Executive Inn, 4201 Lougheed Highway, Burnaby, BC V5C 3Y6
Social Hour: 5:30 to 6:30 pm (drinks available at the hotel bar)
Technical Presentation: 6:30 to 7:30 pm (No need to RSVP)
Dinner: 7:45 pm (\$30 will be charged for dinner)

If you would like to stay for dinner, please RSVP to Shane Magnusson via email or at the door shane.magnusson@amecfw.com

The VGS would like to thank the following companies (in alphabetical order) for sponsoring this Cross Canada Lecture Tour:

- *BGC Engineering*
- *Clifton Associates*
- *ConeTec*
- *Thurber Engineering Ltd.*

The Cross Canada Lecture Tour is organized by the Canadian Geotechnical Society and its various local sections, and travel funds are provided by the Canadian Foundation for Geotechnique.