



Vancouver Geotechnical Society

A Local Section of the Canadian Geotechnical Society

www.v-g-s.ca

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NOTICE OF UPCOMING DINNER PRESENTATION

CANADIAN GEOTECHNICAL SOCIETY

2014 SPRING CROSS CANADA LECTURE TOUR

WEDNESDAY, MAY 07, 2014

SUBJECT: Embankment deformations include creep in compression and shear

SPEAKER: **Jim Graham, PhD DSc FEIC PEng,**
Professor Emeritus, University of Manitoba



Jim Graham has worked for many years on ‘undisturbed’ natural clays from Northern Ireland, Norway, Ontario and Manitoba. His early work showed how natural clays fit into an elastic-plastic framework with only small changes to Modified Cam Clay. More recently, his research developed elastic-plastic models for time- and strain-rate effects, temperature changes, incomplete saturation, and changes in pore fluid chemistry. In particular, his work with Jianhua Yin at Hong Kong Polytechnic University; and Curtis Kelln, Jitendra Sharma, and David Hughes at Queen’s University Belfast has shown the importance of viscoplasticity in simulating the performance of embankments on soft clays.

Jim Graham holds PhD and DSc degrees from Queen’s University Belfast. At the University of Manitoba he spent many years developing innovative courses for teaching geotechnical engineering at undergraduate and postgraduate levels. He has published over 200 papers on his interests in both clay behaviour and engineering education. He received the Legget Medal from the Canadian Geotechnical Society, the Stirling and K.Y. Lo Medals from the Engineering Institute of Canada, the Medal for Distinction in Engineering Education from Engineers Canada; the Saunderson Award for Excellence in Teaching from the University of Manitoba, and the Award of Merit from the Association of Professional Engineers and Geoscientists, Manitoba.

He is a professional engineer in the province of Manitoba, a Fellow of the Engineering Institute of Canada, a former Editor of the Canadian Geotechnical Journal, and President, then Secretary General of the Canadian Geotechnical Society.

CONTENT:

Clays exhibit creep at all stages of loading; not only after primary consolidation is complete. When a normally consolidated clay ‘ages’ under constant effective stress it develops an apparent preconsolidation pressure that affects creep rates. Creep is experienced, for example, in delayed compression and long term settlements. Elastic-viscoplastic modeling based on (1) an ‘instant’ elastic component and (2) a plastic component which contains viscous non-recoverable strains, has produced improved modeling of vertical and horizontal deformations. The model is expressed in terms of stress, stress rate, strain, and strain rate. It can accommodate tests at different constant strain rates, different load durations, creep and aging, and relaxation. The model is based on an extension of Modified Cam Clay and is easily calibrated using only simple, readily available oedometer and triaxial tests. Equations have been written so that strain rates vary with overconsolidation ratio, even though the creep coefficient ψ is defined as a soil constant like κ and λ . It does not vary with stress level like the traditional coefficient of consolidation c_v .

The model has received international attention, most recently for an instrumented 4.0 metre high embankment that settled 1.2 metres.

Kelln, C., Sharma, J., Hughes, D. and Graham, J. 2009. Finite element analysis of an embankment on soft estuarine deposit using an elastic-viscoplastic soil model. Canadian Geotechnical Journal 46: 357-368.

DETAILS

Executive Inn, 4201 Lougheed Highway, Burnaby, BC V5C 3Y6 (Phone: 604-298-2010)

Social Hour: 5:30 to 6:30 pm (drinks available at the hotel bar)

Technical Presentation: 6:30 to 7:30 pm

Dinner: 7:45 pm (\$30 will be charged for dinner)

RSVP: Dinner reservation to ali.amini@shaw.ca or at the door with Robyn Barnett

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

- *BGC Engineering Inc.*
- *DYWIDAG-Systems International*
- *MEG Consulting Limited*
- *Tetra Tech EBA*

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