



2017/2018 Executive Committee

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2017 CGS-SOS Dinner Lecture

Performance-based Design in Geotechnical Engineering (Reprise of 52nd Rankine Lecture)

Wednesday, November 15, 2017

St. Bernard Church, 1789 Lawrence Ave W, Toronto, ON, M6L 1E3 (<https://goo.gl/maps/66Eah9RwiFv>)

Evening Program:

5:15 PM
6:15 PM
7:00 PM

Cocktails and Socializing
Dinner
Lecture

Abstract: Engineering design should consist of a sequence of decisions that lead to the creation of an artefact, a geo-structure in this case, that satisfies the client's performance requirements. This lecture will argue that any assessment of geotechnical performance must involve ground displacements. The traditional approach of specifying safety factors on soil strength (whether in the LSD Eurocodes or the LRFD codes in North America) fails to recognize that both structural unserviceability and structural failure are likely to precede soil failure, and that soil stiffness does not correlate well with soil strength. If engineers want to offer economic designs that successfully control displacements and avoid structural damage, they must measure soil deformability and account for it somehow in routine design calculations. But how is that to be achieved in practice? A new design approach will be proposed, the Mobilizable Strength Design (MSD) method.

Central to the MSD approach will be an assessment of the possible deformability and strength of the soil that lies within the deformation mechanism of the proposed geo-structure. The lecture will focus on clays. Regarding deformability, the shear strain required to mobilize half the peak undrained strength should be assessed, together with the slope of stress versus strain on log-log axes. This enables immediate displacements under working loads to be estimated almost as easily as the factor of safety. A simple method of extending this to short-term creep displacements will also be demonstrated. Estimates of long-term movement require additional information on volumetric behaviour, as is provided in current practice by oedometer data. In critical cases these new design methods should be checked by Finite Element Analysis (FEA), and design assumptions should ultimately be validated by monitoring settlements during and after construction. Examples will be given of the application of MSD to shallow foundations, piles and excavations in clay.

Speaker: Dr. Malcolm Bolton, is now Emeritus Professor of Soil Mechanics at Cambridge University, where he was Director of the Schofield Centre for Geotechnical and Construction Modelling between 1995 and 2013. He is a Fellow of the Royal Academy of Engineering and holds various prizes of the UK Institutions of Civil and Structural Engineering, the British Geotechnical Association and the Canadian Geotechnical Society. He was founding chairman of the ISSMGE Technical Committee on Geo-Mechanics from Micro to Macro (GM3). He has collaborated on piles with the Giken company of Japan for 24 years, and is the founding chairman of the International Press-In Association. And he served for 4 years on the Slope Stability Technical Review Board for the Hong Kong Government. He helped to draft BS8002 Earth Retaining Structures, and hopes to see fundamental improvements made to Eurocode 7 which has subsumed it. He has 250 publications on topics ranging from fundamental soil mechanics to a wide variety of geotechnical engineering applications.

**The Canadian Geotechnical Society
Southern Ontario Section**



**La Société Canadienne de Géotechnique
Section Sud de l'Ontario**

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The location of the venue and available parking lots is presented below.



CGS Members/Government Employees – Early Bird:	\$30.00	<p>*Students: Please note that a limited number of tickets are available.</p> <p>Student Sponsors, who subsidize CGS-SOS events, will be recognized at the Dinner Lecture. Please purchase student sponsorships on Eventbrite to contribute to this worthwhile initiative and your company will be recognized at the event. We thank you for your support!</p>
CGS Members/Government Employees:	\$40.00	
Non-Members – Early Bird:	\$35.00	
Non-Members:	\$45.00	
Student:	\$15.00	

Please confirm your attendance by November, 3 2017, 11:30 PM to qualify for the Early Bid price or by November 13, 11:30 PM, using Eventbrite: <https://www.eventbrite.ca/e/november-15-2017-cgs-sos-dinner-lecture-performance-based-design-in-geotechnical-engineering-tickets-39092763508>
This event will be booked solely through Eventbrite.

If you have difficulties using Eventbrite, please contact Veronica Ayetan (Veronica.Ayetan@ontario.ca) for assistance.