

Short Course on Deep Excavation with GeoStudio (SIGMA/W Plus) **22nd January 2007 and 23rd January 2007 (Optional Hands-on Session)**

National University of Singapore

Professional Engineers Board accredited 7 PDU for One Day, and 14 PDU for Two Days

By

Dr Chew Soon Hoe
National University of Singapore

AND

Special guest speaker:
Dr John Krahn
Developer of SIGMA/W

Jointly Organised by:

Department of Civil Engineering & Professional Activities Centre
Faculty of Engineering, National University of Singapore
Company Registration: 200604346E

Supported by BCA and IES Geotech & Transportation Committee

COURSE OBJECTIVE

One of the lessons learnt from the Nicoll highway incident is the importance of the proper use of software in deep excavation design. The proper modeling techniques, boundary conditions and choice of input parameters are all critically important. This requires not only a proper understanding of the basic fundamentals in soil mechanics but also the understanding of the development and proper usage of the software.

Among the numerous geotechnical FEM software available for excavation analysis, GeoStudio (SIGMA/W Plus) stands-out as a fully coupled, well integrated, and user friendly finite element program that facilitate the proper modeling. This program has excellent pre and post processing, which are critical for the interpretation of the results, and the debugging of the correctness of the numerical model. The interactive stage construction input system enables engineers to systematically define and check the various stages of the deep excavation problem at hand.

This course is aimed at providing the soil mechanics fundamentals relevant to the deep excavation analysis, and the guidance on the use of SIGMA/W Plus in deep excavation, so that the user is aware of the advantages as well as the pitfalls of this FEM program. Numerous examples on Singapore will be discussed.

COURSE OUTLINE

Day 1 (Basic Fundamentals)

Part 1: Dr Chew Soon Hoe (National University of Singapore)

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| Lecture 1 | Introduction to deep excavation |
| Lecture 2 | Concept of plasticity and yielding in soft clay |
| Lecture 3 | Stiffness and deformation behavior of soil |
| Lecture 4 | Drained /Undrained behavior of soil |
| Lecture 5 | Effect of Groundwater and seepage in excavation |
| Lecture 6 | Uncoupled and coupled consolidation |

Part 2: Dr John Krahn (Developer of SIGMA/W Plus)

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| Lecture 7 | Basic theory used in the development of SIGMA/W Plus |
| Lecture 8 | Effective modeling techniques** |
| Lecture 9 | Do and don't with SIGMA/W Plus** |

Part 3: Dr Chew Soon Hoe and Dr John Krahn

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| Lecture 10 | Illustrations of deep excavations** <ul style="list-style-type: none">- With multi level strutting/anchoring system- In soft clay with jet grouting- Adjacent to tunnels- With severe seepage flow |
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**** The detailed modeling and hands-on session of these examples will be covered in the second day SIGMA/W Plus workshop.**

Day 2 (Workshop - Optional)

By Dr Chew Soon Hoe and Dr John Krahn

- Lecture 1 Detailed modeling techniques - *J Krahn*
- Meshed design
 - Boundary conditions
 - Initial stress
 - Structural element
- Lecture 2 Using the appropriate soil model. – *S H Chew*
- Lecture 3 Modeling water flow and seepage in excavation
- Lecture 4 Detailed hands on examples on excavations with SIGMA/W Plus (*S H Chew + J Krahn*)
- With multi level strutting/anchoring system
 - In soft clay with jet grouting
 - Adjacent to tunnels
 - With severe seepage flow

SPEAKER PROFILE



Dr. CHEW Soon-Hoe

Ph.D, MASCE, MIGS, MASTM, SrM-IES

Dr. Chew Soon Hoe graduated with Ph.D from the University of California at Berkeley, USA. He is currently an Assistant Professor with the Department of Civil Engineering, National University of Singapore. He is also the Deputy Director of the Centre for Protective technology (CPT), jointly established by the Defence Ministry and NUS.

His research interests include geosynthetics, slope engineering, land reclamation, soil improvement, numerical modeling in geotechnical engineering and geo-environmental engineering. He is actively involved in research and consultancy relating to various applications of geosynthetics in Singapore and this region. He is also actively consulted in general area of geotechnical engineering including land reclamation, slope stability, seepage analysis, pile foundation, soil improvement and excavation related problem. He is also an expert in using numerical modelling, e.g. GeoStudio (SLOPE/W, SEEP/W and SIGMA/W), SAFE and PLAXIS, for design and analysis of geotechnical problems.

He was elected to be a council member of the Institution of Engineers, Singapore, IES 2006.



Dr. John KRAHN,

Ph.D., P.Eng., F.E.I.C.

Dr. John Krahn obtained his Ph.D. at the University of Alberta, Edmonton, Canada in 1974. He joined the faculty at the University of Saskatchewan Civil Engineering Department where he taught both graduate and undergraduate courses and conducted research. Six years later he left the University and joined a consulting firm in Calgary, Alberta where he was the manager of engineering for large industrial and resource-based development projects.

Since 1987, Dr. Krahn has been with GEO-SLOPE International Ltd. in Calgary, Alberta, where he currently is President. GEO-SLOPE develops and markets geotechnical and geo-environmental engineering software - software that is being used throughout the world and is considered the most advanced and comprehensive available world-wide. The software is widely used in practice, as well as at universities for teaching and research. Dr. Krahn is the key architect in the design and development of this software.

He has received various awards, including the *R.F. Legget Medal* which is the most senior and prestigious award conferred on Canadian geotechnical engineers. In 2005 Dr. Krahn was made a FELLOW of the Engineering Institute of Canada (F.E.I.C.).

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ADMINISTRATIVE DETAILS

Short Course on Deep Excavation with GeoStudio (SIGMA/W Plus)

Date: 22nd January 2007 and 23rd January 2007 (Optional Hands-on Session)

Venue: National University of Singapore

Time: 9am – 5.30pm

Enquires: Please contact Ms. LIM Hui Leng for more information at
Tel: +65 6516 5113 Fax: +65 6874 5097 or Email: enghl@nus.edu.sg

Fee : **One Day: SGD350 + prevailing GST**
Two Days: SGD 600 + prevailing GST
Foreign participants/ companies: GST exempted

Payment: Payment is required prior to the course. Crossed cheques should be made payable to “**National University of Singapore**” and mailed together with the registration form to the mentioned address.

Discount: Ten percent (10% max) discount is applicable to:
☛ Employees of the NUS Technology Associates registered with INTRO (Industry and Technology Relations Office);
☛ NUS Alumni members;
☛ Organisations / Companies sending three or more participants.

Refunds and Cancellations: A 50% refund will be made for withdrawals (received in writing) ten working days before the commencement of the course. No refunds will be made thereafter. However, a replacement will be accepted upon prior arrangement at no extra cost. Please inform us of the changes, if any, by fax. The Professional Activities Centre reserves the right to cancel the course and fully refund the participants, should unforeseen circumstances warrant it. Every effort will be made to inform participants of any changes.

REGISTRATION FORM

N1: Dr / Mr / Ms: _____ Designation: _____

NUS Alumini No: _____

N2: Dr / Mr / Ms: _____ Designation: _____

NUS Alumini No: _____

N3: Dr / Mr / Ms: _____ Designation: _____

NUS Alumini No: _____

Name of Organization: _____

Address: _____

Contact Person: _____ Email: _____

Tel No: _____ Fax No: _____

***Dietary Preference: No Pork No Lard/Vegetarian*

Payment Mode:

Cheque/Bank draft No: _____ Amount (SGD): _____

VISA/MSTR: _____ Expiry Date: _____

Authorized Signature/ Company Stamp:

Closing Date: 19th January 2007