2009Workshops & Hands on Training: Geotechnical Engineering Practice via Plaxis

Organised by: Centre for Infrastructure Engineering and Management and School of Engineering, Griffith University Gold Coast Campus

Module 1: November 30, 2009- Plaxis analysis of Hard Soils
Module 2: December 1, 2009- Plaxis analysis of Soft Soils
Module 3: December 2, 2009- Plaxis 2D and 3D analysis of rock and tunnels
Module 4: December 3, 2009- Plaxis analysis of dynamic loading problems
Module 5: December 4, 2009- Plaxis 3D analysis of foundations

Please note: All five modules have exercises and hand-on training; the technical programs are upgraded with time.

Date: **November 30 – December 4, 2009**

Venue: Griffith University Gold Coast Campus

See "Registration form" for daily registration

For additional information please contact (preferably by e-mail)

Prof. A. S. Balasubramaniam,
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GRIFFITH UNIVERSITY QLD 4222
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EA Australia Web site:
http://qld.engineersaustralia.org.au/jetspeed/static/events/7151/GriffithGeotechnicalEngineeringWorkshops48.2.08.pdf

INTRODUCTION

The International Advanced course by Plaxis from 30 November-4 December, 2009 is titled Geotechnical Engineering Practice via Plaxis. In the recent years most of the computations in practice are conducted with Plaxis in many countries. The forthcoming course has a balanced blend of materials on the advanced soil behaviour, modelling aspects and hands on training. A novel feature of the program is the inclusion of guest lectures by practitioners who are using Plaxis in their day to day and specialised activities.

The first 2 days of the course is based on the Advanced Plaxis Course which incorporates computational geotechnics. Hands on training at various levels are included in all five days; a practical emphasis will be maintained throughout the whole period, while the third to fifth days are particularly devoted to a variety of major projects. Within these five days, the earlier subjects such as undrained and consolidation analyses previously treated in Advanced Courses only will now form a major part of the current course. The case studies include embankments with and without ground improvements; deep excavations piled foundations and tunnels.

The Plaxis 2D V9 code is used together with 3D features for the analysis of foundations and tunnels. The primary focus will be on the geotechnical aspects through lectures tutorials and hands on training.

The backbone of the Workshop and Hands on Training is in the use of finite element method (FEM) for stress and deformation analysis as well as stability assessments of earth structures and foundations. In achieving these objectives the following topics are covered: the schematisation of complex soil conditions and the choice of constitutive soil model; the procedure for obtaining basic input data for those soil models; the modelling of realistic projects during design and construction at various stages and the interpretation of the computed results in critically evaluating the design aspects. Both the undrained and consolidation behaviour will be treated in the analysis.

Day 1: Monday – 30th November 2009

On the first day of the course, experts will give lectures on the soil behaviour of so-called hard soils, e.g. sand and overconsolidated clay. Background theory on several soil models used within Plaxis is provided in order to give better understanding on the possibilities and limitations of the models. The importance of the models is discussed for excavation problems. Exercises will provide hands-on experience.

09.00-09.15	Opening
09.15-10.00	Concepts of plasticity
10.00-10.45	Density and Shear hardening of soils
10.45-11.00	Coffee Break
11.00-11.45	The Hardening Soil model
11.45-12.30	Simulation of lab tests (exercise)

12.30-13.30	Lunch
13.30-14.15	Simulation of lab tests (exercise)
14.15-15.00	Drained and Undrained soil behaviour
15.00-15.15	Coffee Break
15.15-16.00	Deep Excavations
16.00-16.30	Geometry and Mesh Selection
16.30-17.30	Analysis with HS and HS-Small (exercise)
17.30-18.00	Evaluation of the exercises

Day 2: Tuesday, 1st December 2009

On Day 2, the coverage is on modelling of soft soils including creep behaviour, consolidation and the use of drains. The practical application of soft soils will be shown by means of an embankment exercise.

09.00-09.45	Soil Stiffness in Oedometer Testing
09.45-10.30	The Soft Soil Creep model
10.30-10.45	Coffee Break
10.45-11.30	Consolidation and drains
11.30-12.30	Embankment with drains (exercise)
12.30-13.30	Lunch
13.30-14.15	Soil improvement
14.15-15.00	Plaxflow and groundwater flow
15.00-15.15	Coffee Break
15.15-16.30	Rapid drawdown (exercise)

Day 3: Wednesday, 2nd December 2009

On this day different models for rock will be analysed as well as the process of tunneling in rock. , embankments, excavations and foundations will be analysed with hands on experience

09.00-10.00	NATM Tunneling
10.00-10.45	Introduction to Plaxis 3D Tunnel
10.30-10.45	Coffee Break
10.45-12.15	3D Face stability (exercise)
12.30-13.30	Lunch

13.30-15.00	Modelling of rock
15.00-15.15	Break
15.15-15.45	Hoek-Brown and Jointed Rock in Plaxis
15.45-17.15	2D Tunnel in Rock (exercise)
17.15-17.45	What did we learn?

Day 4: Thursday, 3rd December 2009

On Day 4 the focus is on modelling of dynamic load problems. Lecturers will provide basic theory on dynamics problems for soil including the importance of modelling damping and soil-structure interaction under dynamic load conditions. The possibilities for dynamics calculations is shown by means of an earthquake problem exercise.

09.00-09.45	Modelling dynamics problems
09.45-10.30	Small strain stiffness and damping
10.30-10.45	Coffee Break
10.45-11.30	Dynamics features in Plaxis
11.30-12.30	Generator on elastic soil (exercise)
12.30-13.30	Lunch
13.30-14.15	Dynamic soil-structure interaction
14.15-15.15	Geotechnical earthquake engineering
15.15-15.30	Coffee Break
15.30-16.30	Case study discussion
16.30-17.45	Building subject to an earthquake (exercise)
17.45-18.00	Evaluation of the exercises

Day 5: Friday, 4 February 2008

On the fifth day the focus will be on analysis of foundations. Lecturers will give basics on foundation design as well as the analysis of such a design using 3D finite element analysis for both raft and pile foundations.

09.00-09.45	Shallow foundations
09.45-10.30	Analysis of deep (pile) foundations
10.30-10.45	Coffee Break
10.45-11.30	Applications of Plaxis 3D Foundation
11.30-12.30	Raft foundation analysis (exercise)

12.30-13.30	Lunch
13.30-14.15	Design of pile foundations
14.15-15.15	Pile-raft foundations
15.15-15.30	Coffee Break
15.30-16.30	Embedded piles in Plaxis
16.30-17.45	Piled-raft foundation analysis (exercise)
17.45-18.00	Evaluation of the exercises

Griffith UNIVERSITY **Registration Form / Tax Invoice**

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Workshop and Lectures for Practitioners and Academics

Griffith University, Gold Coast, 30 November – 4 December, 2009

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DETAILS OF ATTENDEE

First Name: Last Name:

Organisation:

Email:

Phone: Mobile:

Fax:

Post Address:

State: Postcode:

WORKSHOP FEES (30 November – 4 December, 2009)

Please indicate day of participation and total amounts

- ☐ **AUD $ 490** - Monday, 30th, November
- ☐ **AUD $ 490** - Tuesday, 1st December
- ☐ **AUD $ 490** - Wednesday, 2nd December
- ☐ **AUD $ 490** - Thursday, 3rd December
- ☐ **AUD $ 490** - Friday, 4th December

TOTAL AMOUNT: [AU$_____]

PAYMENT METHODS

☐ **CHEQUE ENCLOSED**

All Cheques crossed and payable to Griffith University (Griffith University is GST registered, ABN 78 106 094 461) Mail cheques to Prof. A. S. Balasubramaniam, School of Engineering, Gold Coast Campus, GRIFFITH UNIVERSITY QLD 4222

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Please send your REGISTRATION / TAX INVOICE FORM **by 20th Nov 2009;** this will help us to operate this workshop more efficiently.

***PLEASE NOTE*: THIS REGISTRATION FORM SERVES AS A TAX INVOICE WHEN COMPLETE. PLEASE RETAIN A COPY FOR YOUR RECORDS.**

LECTURES BIO-DATA

Prof. Helmut F. Schweiger

(Graz University of Technology)

Helmut obtained his Ph.D. form the University College of Swansea, UK and teaches courses on Advanced Soil Mechanics and Computational Geomechanics at the Graz University of Technology, Austria. He has over 15 years experience in development and application of the finite element method in geotechnics. As a member of several international committees Helmut is involved in formulating guidelines and recommendations for the use of finite elements in practical geotechnical engineering.

Dr. Juan Pestana Nacimento

(University of California in Berkeley)

Assistant Professor, University of California, Berkeley (July 1994- Present). Civil & Environmental Engineering, Massachusetts Institute of Technology 1994, M.S. Civil Engineering, Massachusetts Institute of Technology 1988, B.S. Civil Engineering, Universidad Católica Andres Bello (UCAB), Venezuela Numerical modeling of soil-structure interaction, soil property characterization and environmental geotechnics. Professor Pestana's research interests include constitutive modeling of soil behavior, geotechnical engineering, soil properties characterization, numerical modeling of soil-structure interaction, environmental geotechnics and geotechnical earthquake engineering.

Mr. Dennis Waterman, MSc.

(Plaxis bv)

Dennis obtained a Masters degree in Civil Engineering at Delft University of Technology before he joined Plaxis in 1996 as a programmer. He has been involved for several years in creating the Windows user-interfaces of the new Plaxis products before shifting his main field of activity to user support and lecturing courses in 2002. Since 2006 he is the international course coordinator. As a lecturer he is mostly involved in the courses in Latin-America and Australia and as such has received several teaching recognitions from universities in Mexico, Colombia and Ecuador.