Workshop & Lectures on Soft Clay Behaviour and Case Studies of Embankments & Excavations with and without Ground Improvements

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

Date: **December 4-6, 2006**
Venue: **Building G06- Lecture Theatre 1.04**
Griffith University Gold Coast Campus

See "Registration form" for daily registration

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

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Introduction

We have just finished our undergraduate lectures and this give some free time to look into possible workshop and lectures for the industry until we once again start in the last week of February 2007. Since 1965, I have been exposed to Soft clay behaviour and also many major projects associated with such deposits. Similar problems are here as well as encountered by Main Roads, Port of Brisbane, Brisbane Airport Authority etc. As such this Workshop is designed for day to day type of Geotech engineers and mostly engineers with few years of experience. The idea of giving this Workshop came about after reviewing our teaching to undergraduates wherein it is impossible to cover most of the material presented here. Also, very often I found when young engineers use computer softwares, they need good understanding of undrained and drained behaviour in clays for stability and settlement computations. Also, the material contained in this course may well be useful to understand the behaviour of sands and other granular materials. I do understand the Industries are very much stressed and often find it difficult to release both young and senior engineers to follow such Workshops and courses. In this respect I am most grateful to Connell Wagner, QDMR, BCC, GCCC, Golders, Coffeys, GHD, Soil Surveys, Bowler Consultants, Arups, PB, Franki and many other organizations in sending participants and keep this activity alive. This is indeed a great service to our main stream Geotechnical Civil Engineering at what appears to be a very tough time in the current climate.

Even though with the progress of time, expenses related to site investigation works are made rather tight, the Worshop begins with site investigation works in soft clay deposits. Then the interpretation of data from the laboratory tests such the Oedometer tests and the triaxial tests will be covered. The soft clay behaviour is then looked at from a normalization concept as adopted as well as from the so-called critical state concept, wherein the water content or voids ratio plays a dominant role in characterizing the engineering properties. Also, simple concepts of soft clay models as developed originally and used in teaching extensively to familiarise with the prediction of pore pressures in undrained mode as well as deformations in undrained and drained modes will be discussed. The relevant small scale in-situ tests such as the vane tests and penetrometer tests will also be included. This will then be followed by methods used in stability analysis and deformation computations. Case studies will then be included in the case of embankments and excavations with ground improvement techniques. These case studies relate to South-east Queensland conditions as well. The use of vertical drains and surcharge as preloading techniques will be covered extensively. Also, the use of deep mixing methods. Aspects such as negative skin friction in piling works will also be covered.

Registration Form / Tax Invoice

Griffith University ABN 78 106 094 461

Workshop & Lectures on Soft Clay Behaviour and Case Studies of Embankments & Excavations with and without Ground Improvements

Griffith University, Gold Coast, December 4-6, 2006

TO REGISTER: email, fax, mail

Email: a.bala@griffith.edu.au | **Fax**: +61(0)7 5552 8065 | **mail**: Prof. A. S. Balasubramaniam, Griffith School of Engineering, Gold Coast Campus, Griffith University, PMB 50, Gold Coast Mail Centre Queensland 9726, Australia

DETAILS OF ATTENDEE

First Name:	**Last Name:**
Organisation:	
Email:	
Phone:	**Mobile:**
Fax:	
Post Address:	
State:	**Postcode:**

WORKSHOP FEES (December 4-6, 2006)

Please indicate day of participation and total amounts

☐ **AUD $ 390 (GST included) for Monday- December 4, 2006**

☐ **AUD $ 390 (GST included) for Tuesday-December 5, 2006**

☐ **AUD $ 390 (GST included) for Wednesday -December 6, 2006**

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, Griffith School of Engineering, Gold Coast Campus, Griffith University, PMB 50, Gold Coast Mail Centre, QLD 9726, Australia. Please enclose your registration form.

☐ **CREDIT CARD**

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☐ **PLEASE FORWARD ME AN INVOICE**

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Please send your REGISTRATION / TAX INVOICE FORM **by 18th September** that will help us to operate this workshop more efficiently.

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

DAILY PROGRAMME—First Day

Monday - December 4, 2006

08:30 – 09:00 am Registration

09:00 – 10:15 am Boring, Sampling and Site investigation Practice

10:15 – 10:45 am Coffee break

10:45 – 12:00 am Site Investigation Practice-Case studies

12:00 – 01:30pm Lunch

01:30 – 02: 30 pm Interpretation of consolidation tests data

02:30 – 03:15 pm Stresses and strains in triaxial tests

03:15 – 03:30 pm Coffee break

03: 30 – 05:00 pm Normalized stress strain behaviour and role of water content and voids ratio—interpretation of triaxial test data

DAILY PROGRAMME – Second day

Tuesday- December 5, 2006

09:00 – 10:15 am Soft Clay Model—Simple Concepts and Modelling with Critical State Theory -1

10:15 – 10:45 am Coffee break

10:45 – 12:00 am Soft Clay Model—Simple Concepts and Modelling with Critical State Theory-2

12:15 – 01:00 pm Lunch

01:00 - 3:00 pm **Stability & deformation computations for embankments on soft clays**

03:00 – 03: 45pm **Excavations in soft clays-1**

03:45 – 4:00pm **Coffee Break**

04:00 – 05:00pm **Excavations in soft clays – 2 (Case studies)**

DAILY PROGRAMME – Third day

Wednesday – December 6, 2006

09:00 – 10:15 am **Ground improvement with sand wicks and sand drains**

10:15 – 10:45 am **Coffee break**

10:45 – 12:00 am **Use of PVD and surcharge in ground improvement**

12:15 – 01:00 pm **Lunch**

01:00 - 02: 00 pm **Case studies with GI- Muar Flat Case studies with eight ground improvement techniques**

02:o0 – 03: 315pm **Case studies with GI- Airport site with different forms of vertical drains and preloading**

03: 15 – 3:30pm **Coffee Break**

03:30 – 04:30 pm **Applications of deep mixing methods in soft clays**

04: 30 - 05:00 pm **Negative skin friction in piles**

Prof. Bala (Bio-data)

Prof. Bala graduated in Civil Engineering from University of Ceylon, Colombo in 1963. He obtained his Ph. D from Cambridge University at a time when Ken Roscoe was the Head of the Soil Mechanics Group. He was also a post-Doctorate Fellow at the Norwegian Geotechnical Institute (NGI) from 1969 to 1970 when Dr. Bjerrum was the Director of the Institute. Prof. Bala taught for three years in Sri Lanka and then moved to AIT in Bangkok to work under the leadership of Dr. Za-Chieh Moh. There he stayed for twenty-seven years and retired as a Chair Professor in 2001. Prof. Bala spent a year at the Nanyang Technological University as a Visiting Professor and now serves as a Professor of Geotechnical Engineering at the Griffith University, Gold Coast Campus. Prof. Bala hold or held the Fellowship in the Geological Society of London, ICE (London), ASCE, EA(Australia), IEM (Malaysia), and IE Hong Kong etc.

He has been actively involved in research and practice on soft clay behaviour and he has been associated with most of the major projects in Bangkok during his stay at AIT from 1973 to June 2001. The projects include dockyards, expressways, tall buildings, pipelines and tunnels for natural gas and water supply, the MRT works and the international airport among other similar projects. At the Griffith University he has continued to carry out practice oriented research work in South-east Queensland similar to what he has been engaged before in his entire career in Geotechnics working in main stream Geotechnical Civil Engineering.