# Australian Geomechanics Society

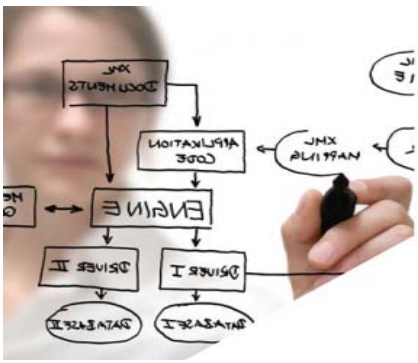
*Sydney Chapter*

Auditorium: Ground Floor, 8 Thomas Street, Chatswood

**TECHNICAL PRESENTATION**

**Wednesday 13th July 2011**

Light refreshments at 5.30 PM prior to 6.00 PM meeting



# Young Geotechnical Professionals' Night

The Young Geotechnical Professionals' Night is an opportunity to see four selected presentations by young geotechnical professionals discussing interesting and challenging aspects of their work. After the presentations, you will have a chance to catch up with friends and the presenters over drinks and finger food, and see additional posters prepared by YGP's. The following presentations will be given during the evening.

## FINITE DIFFERENCE MODELLING OF SOIL-STRUCTURE INTERACTION FOR SEISMIC DESIGN OF MOMENT RESISTING BUILDING FRAMES

Presenter: Hamid Reza Tabatabaiefar

The importance of Soil-Structure Interaction (SSI) both for static and dynamic loads has been well established and the related literature spans at least 30 years of computational and analytical approaches for solving soil–structure interaction problems. In the present study, a ten storey moment resisting building frame, resting on shallow foundation, is selected in conjunction with three different soil types with different properties. The structure is modelled considering the three types of the soil deposits employing Finite Difference approach using FLAC 2D software. Fully nonlinear dynamic analysis under influence of different earthquake records is conducted, and the results of the different cases are compared and discussed.

## THREE DIMENSIONAL GEOMETRIC MODELLING FOR THE CONSTRUCTION OF THE NORTHWEST CORNER OF THE PORT BOTANY EXPANSION PROJECT

Presenter: Keiran Wright

The Port Botany Expansion (PBE) project involves the construction of an extension to the existing port in Botany Bay, Sydney. A new Tug Berth is located in the North-West corner of this port expansion, and provides berthing for tug vessels associated with the operation of the port. The design and construction of this berth, and the North-West corner of the PBE project was heavily constrained by the geometric requirements of the project. This geometric complexity posed significant challenges in the staging of construction. As a consequence, three dimensional (3D) construction staging models were developed by the design team to assist in knowledge transfer through the construction process. This paper discusses the development of these staging models, and the benefits that were seen on the project as a result. It also presents some lessons learnt through the design and construction process which could be beneficial for similar future projects.

*Attendance may be credited (1 point) towards Continuing Professional Development requirements. Members are responsible for recording CPD for audit purposes.*

Booking is not required.
For further information contact Clint Every (clinton.every@aecom.com)

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Sydney Division

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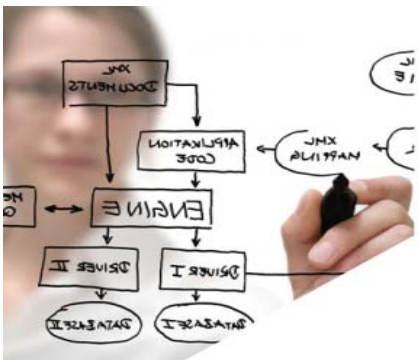

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### ANALYSIS, DESIGN, AND CONSTRUCTION STAGES OF MILAD GEOSYNTHETIC REINFORCED SOIL BRIDGE ABUTMENT IN TEHRAN-IRAN

Presenter: S.Alireza Mirlatifi (Sam)

Reinforced soil walls are one the most cost effective options for retaining structures, and are being increasingly used in recent years around the world. They have also proved that they have performed to an acceptable level under earthquake loading conditions. This paper presents the analysis, design, and construction stages of the first major geosynthetic reinforced soil bridge abutment built in Iran. This abutment is analysed using both Limit Equilibrium Methods (LEM) for stability analysis and Finite Element Method (FEM) for deformation analysis under static and seismic loads. This project was undertaken on behalf of the Tehran Municipality with the aim of bringing this new method of abutment construction to the country. This project is likely to be the first of many to adopt this cost effective solution and presents lessons learned in the design and construction phases.

### TUBE-A-MANCHETTE GEO-NAILS AS APPLIED AT TOOMBUL ON THE BRISBANE AIRPORT LINK

Presenter: Tecwyn Griffiths

Brisbane Airport Link (BAL) is a $4.8 billion infrastructure project, the largest road infrastructure project in Australia. The Airport Link will be the first major motorway linking Brisbane city to the Northern suburbs and airport precinct, with the majority of the 6.7km toll road being underground.

A section of the Airport Link at Toombul involved constructing a tunnel underneath a live railway line embankment. To do this a box culvert road tunnel is to be jacked underneath the live railway embankment. This presented many geotechnical challenges to the client, and a solution involving the construction of contiguous bored piled walls, diaphragm walls, jet grouting, canopy tubes, and soil nails was implemented.

The solution Keller Ground Engineering (KGE) offered consisted of installing Tube-a-Manchette Geo-Nails (TGNs). TGNs provide slope reinforcement in the same manner as a regular soil nail; however, where a TGN differs from a regular soil nail is the addition of a second phase grouting which improves surrounding soil strengths.

The project provided many technical challenges for KGE such as drilling to 55m with a target deviation of less than 500mm. This and other aspects presented many difficulties with lessons learnt along each stage of the construction process. These challenges and obstacles were overcome, with KGE providing an innovative solution to stabilising the site in advance of the major tunnel jacking process.

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