



11th Australia - New Zealand Conference on Geomechanics  
**Ground Engineering in a Changing World**

**15 – 18 July 2012**

Crown Conference Centre, Melbourne, Australia

# ANZ 2012

## CONFERENCE PROCEEDINGS

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# Foreword

The first Australia New Zealand Conference on Geomechanics was held in Melbourne, Australia, on 9-13 August, 1971.

It was sponsored by the then just formed Australian Geomechanics Society and the New Zealand National Society of Soil Mechanics and Foundation Engineering, both technical units of the Australian and New Zealand Institutions of Engineers, respectively. There were 85 listed authors; Bill Bamford, Ted Davis, Charles Gerrard, Peter James, Geoff Just, Marcis Kurzeme, Peter Moore, Harry Poulos and Len Walker are among the notable ones who presented more than one paper at that time.

Bill Bamford and John Styles, witnesses of the 1st ANZ, today remember that the meeting was the first in the region to use the title “Geomechanics”, embracing rock mechanics and engineering geology alongside soil mechanics, and welcomed major participation from the mining industry as well as the traditional civil engineering supporters. For many young engineers who attended, it was the first time to meet people they knew only as authors of technical papers. To discuss issues and gain insights as to thinking beyond problem solving was of particular benefit.

The Australia New Zealand Conference on Geomechanics is the regional conference of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE) and is held approximately every 4 years. The 11th ANZ conference has returned to Melbourne, where it all began, more than 40 years later. It focused on “Ground Engineering in a Changing World”. The spirit of the theme of the 1st ANZ, “Geomechanics – A Tool in National Development”, was still embraced in the recent 11th ANZ. However, the world has changed, and the conference encompassed not just geomechanics, but a more comprehensive ground engineering. Changes around the world seem to have accelerated with time, and ground engineers are learning to react to those: climate change, financial systems change, legislative change, clients’ sophistication change, not to mention the tremendous technological changes. This conference aimed to explore and better understand these changes and the risks and opportunities they present to the profession.

The main themes of the 11th ANZ conference included:

1. Supporting our Structures
2. Evolving Geotechnics & Site Characterisation
3. Mining and Underground Geotechnics
4. Sustainable Geotechnics and Geo-Environmental Engineering (in a Resource Hungry World)
5. Near-shore and Off-shore Geotechnics
6. Geo-Hazards and Risk

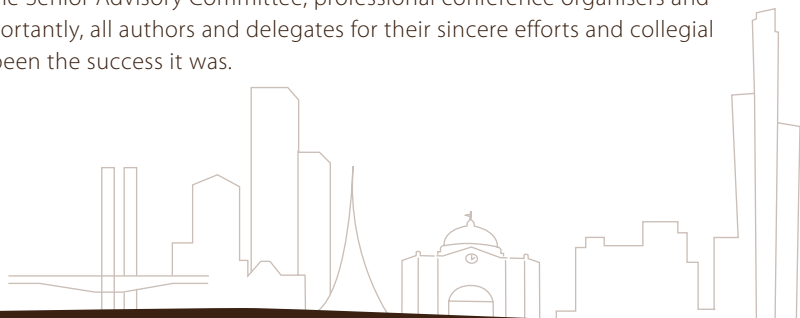
During the conference, 5 invited speakers, from both Industry and Academia, local and global, provided a review of topics and innovations that are pivotal to ground engineering in our changing world. In addition, a total of 270 peer-reviewed technical papers were presented and discussed, in oral and poster presentations, throughout the conference. This allowed exchange of advanced knowledge and ideas, cross fertilisation, and promotion of a true community of colleagues in ground engineering. Authors of the 15 highest ranked papers have been invited to resubmit an extended version to the International Journal of Geotechnical Engineering, for publication in a special edition. In addition, papers of particular relevance to Australasia will be included in the AGS Australian Geomechanics Journal.

We would like to thank all members of the Organising Committee, the Senior Advisory Committee, professional conference organisers and helpers, invited speakers, our reviewers, our sponsors, and more importantly, all authors and delegates for their sincere efforts and collegial collaboration. Without them Melbourne ANZ 2012 would have not been the success it was.

Guillermo A. Narsilio

Arul Arulrajah

Jayantha Kodikara



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All papers were peer-reviewed by two reviewers from a selected panel.

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Edited by G Narsilio, A Arulrajah, and J Kodikara.

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# Program at a Glance

## SUNDAY 15 JULY 2012

|                  |  |   |                                 |
|------------------|--|---|---------------------------------|
| 8.00am – 5.00pm  | Morrington Peninsula Technical Tour                  |   |                                 |
|                  | <b>Master Class 1 M11</b>                            | <b>Master Class 2 M12</b>   | <b>ISSMGE Board Meeting M13</b> |
| 10.00am – 5.00pm | Selection and Application of In Situ Testing Methods | Design and Application of Geosynthetics for Hydraulic and Marine Applications | ISSMGE Board Meeting            |
| 6.00pm – 8.00pm  | Welcome Reception                                    |   | Crown River Room                |

## MONDAY 16 JULY 2012

|                   |   |                                       |  |   |
|-------------------|---|---------------------------------------|--|---|
|                   | <b>Plenary Session</b>  |                                       |  | <b>Plenary Hall</b>   |
| 8.30am – 9.00am   | Welcome   |                                       |  |   |
| 9.00am – 10.00am  | <b>Keynote Speaker: Jean-Louis Briaud</b>                                       |                                       |  |   |
| 10.00am – 10.30am | ISSMGE 75th Anniversary Celebration Session – Past                              |                                       |  |   |
| 10.30am – 11.00am | Morning Refreshments and Trade Expo   |                                       |  | Exhibition Hall   |
|                   | <b>Sustainable Geotechnics &amp; Geo-Environmental Engineering Plenary Hall</b> | <b>Supporting Our Structures CCH3</b> | <b>Evolving Geotechnics and Site Characterisation M11</b>              | <b>Mining &amp; Underground Geotechnics M12/M13</b>           |
| 11.00am – 12.15pm | Sessions 1.1.1 - 1.1.5  | Sessions 1.2.1 - 1.2.5                | Sessions 1.3.1 - 1.3.5   | Sessions 1.4.1 - 1.4.5  |
| 12.15pm – 1.15pm  | Lunch and Trade Expo  |                                       |  | Exhibition Hall   |
|                   | <b>Supporting Our Structures Plenary Hall</b>                                   | <b>Geohazards and Risks CCH3</b>      | <b>Supporting Our Structures M11</b>                                   | <b>Evolving Geotechnics and Site Characterisation M12/M13</b> |
| 1.15pm – 2.30pm   | Sessions 1.1.6 - 1.1.10   | Sessions 1.2.6 - 1.2.10               | Sessions 1.3.6 - 1.3.10  | Sessions 1.4.6 - 1.4.10                                       |
| 2.30pm – 3.00pm   | Afternoon Refreshments and Trade Expo   |                                       |  | Exhibition Hall   |
|                   | <b>Evolving Geotechnics and Site Characterisation Plenary Hall</b>              | <b>Supporting Our Structures CCH3</b> | <b>Sustainable Geotechnics &amp; Geo-Environmental Engineering M11</b> | <b>Supporting Our Structures M12/M13</b>                      |
| 3.00pm – 4.15pm   | Sessions 1.1.11 - 1.1.15  | Sessions 1.2.11 - 1.2.15              | Sessions 1.3.11 - 1.3.15   | Sessions 1.4.11 - 1.4.15                                      |
|                   | <b>Plenary Session</b>  |                                       |  | <b>Plenary Hall</b>   |
| 4.20pm – 5.20pm   | <b>Keynote Speaker: Frances Badelow</b>   |                                       |  |   |
| 5.20pm – 5.30pm   | Day 1 Closing Remarks   |                                       |  |   |
| 5.30pm – 6.30pm   | Happy Hour and Poster Presentations   |                                       |  | Plenary Hall Foyer  |



# TUESDAY 17 JULY 2012

|                   | Plenary Session   |   |                                   |   | Plenary Hall             |
|-------------------|---|---|-----------------------------------|---|--------------------------|
| 8.30am – 8.45am   | Welcome   |   |                                   |   |                          |
| 8.45am – 9.45am   | <b>Keynote Speaker: David Bell</b>                                      |   |                                   |   |                          |
| 9.45am – 10.15am  | ISSMGE 75th Anniversary Celebration Session – Present                   |   |                                   |   |                          |
| 10.15am – 10.45am | Morning Refreshments and Trade Expo                                     |   |                                   |   | Exhibition Hall          |
|                   | Evolving Geotechnics and Site Characterisation<br>Plenary Hall          | Geohazards and Risks<br>M12/M13                           | Supporting Our Structures<br>CCH3 | Evolving Geotechnics and Site Characterisation<br>M11 |                          |
| 10.45am – 12.15pm | Sessions 2.1.1 - 2.1.6  | Sessions 2.2.1 - 2.2.6                                    | Sessions 2.3.1 - 2.3.6            | Sessions 2.4.1 - 2.4.6                                |                          |
| 12.15pm – 1.15pm  | Lunch and Trade Expo  |   |                                   |   | Exhibition Hall          |
|                   | Evolving Geotechnics and Site Characterisation<br>Plenary Hall          | Mining & Underground Geotechnics<br>M12/M13               | Supporting Our Structures<br>CCH3 | Supporting Our Structures<br>M11                      |                          |
| 1.15pm – 2.30pm   | Sessions 2.1.7 - 2.1.11   | Sessions 2.2.7 - 2.2.11                                   | Sessions 2.3.7 - 2.3.11           | Sessions 2.4.7 - 2.4.11                               |                          |
| 2.30pm – 3:00pm   | Afternoon Refreshments and Trade Expo                                   |   |                                   |   | Exhibition Hall          |
|                   | Sustainable Geotechnics & Geo-Environmental Engineering<br>Plenary Hall | Evolving Geotechnics and Site Characterisation<br>M12/M13 | Supporting Our Structures<br>CCH3 | Evolving Geotechnics and Site Characterisation<br>M11 |                          |
| 3.00pm – 4.15pm   | Sessions 2.1.12 - 2.1.16  | Sessions 2.2.12 - 2.2.16                                  | Sessions 2.3.12 - 2.3.16          | Sessions 2.4.12 - 2.4.16                              |                          |
|                   | Plenary Session   |   |                                   |   | Plenary Hall             |
| 4.20pm – 5.20pm   | <b>Mercer Lecture: Dr Michael Heibaum</b>                               |   |                                   |   |                          |
| 5.20pm – 5.30pm   | Day 2 Closing Remarks   |   |                                   |   |                          |
| 7.30pm – 11.30pm  | Conference Dinner   |   |                                   |   | Crown Palladium Ballroom |





## WEDNESDAY 18 JULY 2012

|                   | Plenary Session                                      |                                   |  | Plenary Hall  |
|-------------------|--|-----------------------------------|--|---|
| 9.00am – 9.15am   | Welcome  |                                   |  |   |
| 9.15am – 10.15am  | <b>Keynote Speaker: Nick O’Riordan</b>               |                                   |  |   |
| 10.15am – 10.45am | ISSMGE 75th Anniversary Celebration Session – Future |                                   |  |   |
| 10.45am – 11.15am | Morning Refreshments and Trade Expo                  |                                   |  | Exhibition Hall                                       |
|                   | Near-Shore & Off-Shore Geotechnics<br>Plenary Hall   | Supporting Our Structures<br>CCH3 | Sustainable Geotechnics & Geo-Environmental Engineering<br>M12/M13 | Evolving Geotechnics and Site Characterisation<br>M11 |
| 11.15am – 1.00pm  | Sessions<br>3.1.1 - 3.1.7                            | Sessions<br>3.2.1 - 3.2.7         | Sessions<br>3.3.1 - 3.3.7  | Sessions<br>3.4.1 - 3.4.7                             |
| 1.00pm – 2.00pm   | Lunch and Trade Expo                                 |                                   |  | Exhibition Hall                                       |
|                   | Mining & Underground Geotechnics<br>Plenary Hall     | Geohazards and Risks<br>CCH3      | Mining & Underground Geotechnics<br>M12/M13                        | Supporting Our Structures<br>M11                      |
| 2.00pm – 3.00pm   | Sessions<br>3.1.8 - 3.1.11                           | Sessions<br>3.2.8 - 3.2.11        | Sessions<br>3.3.8 - 3.3.11   | Sessions<br>3.4.8 - 3.4.11                            |
|                   | Plenary Session                                      |                                   |  | Plenary Hall  |
| 3.05pm – 3.30pm   | Conference Closing Remarks & Award Presentation      |                                   |  |   |



# Keynote Presentations

## MONDAY 16 JULY 2012

9.00am – 10.00am

Keynote Presentation: **Design Guidelines and Full Scale Verification for MSE Walls with Traffic Barriers Impacted by Vehicles**

Jean-Louis Briaud, President of ISSMGE, and Professor, Texas A&M University

## MONDAY 16 JULY 2012

4.20pm – 5.20pm

Keynote Presentation: **Forensic Foundation Engineering and Rectification Design**

Frances Badelow, Senior Principal, Coffey Geotechnics

## TUESDAY 17 JULY 2012

8.45am – 9.45am

Keynote Presentation: **Geo-Logic and the Art of Geotechnical Practice**

David Bell, Senior Lecturer in Engineering Geology, University of Canterbury, Christchurch and Principal and Director, Geoconsulting Ltd, Christchurch

## TUESDAY 17 JULY 2012

4.20pm – 5.20pm

Mercer Lecture: **Geosynthetics for waterways and flood protection structures - controlling the interaction of water and soil**

Dr Michael Heibaum, BAW – Federal Waterways Engineering and Research Institute, Karlsruhe, Germany

## WEDNESDAY 18 JULY 2012

9.15am – 10.15am

Keynote Presentation: **Sustainable and resilient ground engineering**

Nick O'Riordan, Arup



# Concurrent Session 1

MONDAY 16 JULY 2012

## Sustainable Geotechnics & Geo-Environmental Engineering Plenary Hall Chair: Asadul Haque

|                   |   |
|-------------------|---|
| 11.00am – 11.15am | 1.1.1 - Key strategies for managing acid sulphate soil (ASS) problems on the south-eastern coast of NSW, Australia<br><b>Laura Banasiak</b> , Buddhima Indraratna                     |
| 11.15am – 11.30am | 1.1.2 - Feasibility of using bentonite, lime and fly ash in permeable reactive barriers for acid sulphate soils<br><b>Ivan Gratchev</b> , Ali Shokouhi, Alistair Inoue, Angus Brennan |
| 11.30am – 11.45am | 1.1.3 - Development on a derelict landfill<br>Geoffrey McIntosh, Anthony Barthelmess  |
| 11.45am – 12.00pm | 1.1.4 - Field behaviour of buried water and gas pipe in expansive soil<br><b>Pathmanathan Rajeev</b> , Jayantha Kodikara  |
| 12.00pm – 12.15pm | 1.1.5 - Experimental study of shrinkage and swelling behaviour of an Australian compacted expansive clay soil<br><b>Sasika Wijesooriya</b> , Jayantha Kodikara                        |

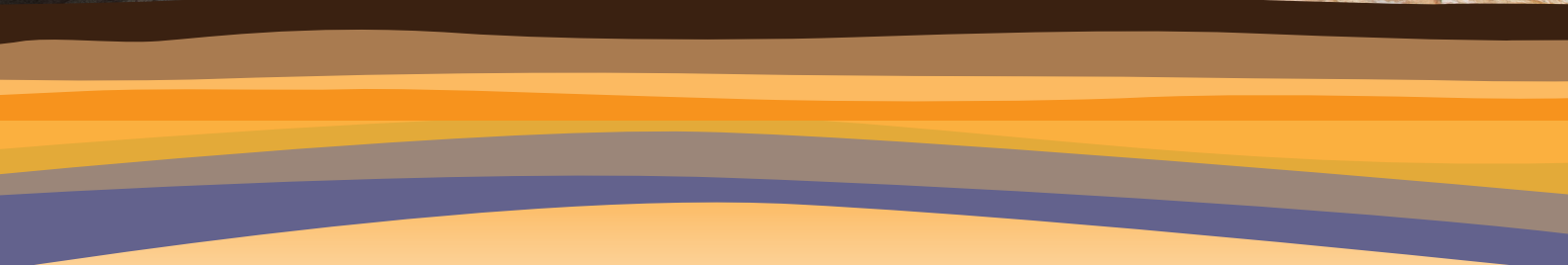
## Supporting Our Structures CCH3 Chair: Michael Heibaum

|                   |   |
|-------------------|---|
| 11.00am – 11.15am | 1.2.1 - Lateral capacity of steel piles embedded in revetment rockfill<br><b>Viet Duong Nguyen</b> , Brett Hawkins                                      |
| 11.15am – 11.30am | 1.2.2 - Simulation of Auger Displacement Pile Installation<br><b>Martin Larisch</b> , Erik Nacke, Michael Arnold, David Williams, Alexander Scheuermann |
| 11.30am – 11.45am | 1.2.3 - Pyrites Creek Bridge Embankments and Piling<br>Anthony Mann, <b>Chris Boyd</b>  |
| 11.45am – 12.00pm | 1.2.4 - Uplift load testing to failure of grooved tension piles in Waitemata Group Sandstone for the Manukau Rail Link<br><b>Darrell Oosterbeek</b>     |
| 12.00pm – 12.15pm | 1.2.5 - Analysis of pile behavior adjacent to a deep excavation<br><b>Ravintharakumaran Nishanthan</b> , Samanthika Liyanapathirana, Chin Jian Leo      |

## Evolving Geotechnics and Site Characterisation M11 Chair: Hadi Khabbaz

|                   |  |
|-------------------|--|
| 11.00am – 11.15am | 1.3.1 - Accelerated consolidation of soft clays and mine tailings using a desktop centrifuge<br><b>David Reid</b> , Stephanie Watson   |
| 11.15am – 11.30am | 1.3.2 - Controls on slope failures at the Te Toto Amphitheatre, Raglan, New Zealand<br><b>Christopher Ritchie</b> , Marc-Andre Brideau   |
| 11.30am – 11.45am | 1.3.3 - An Engineering Geological Analysis of the Tutira Landslide Dam, Hawke's Bay, New Zealand<br><b>Saskia De Vilder</b> , Marc-Andre Brideau   |
| 11.45am – 12.00pm | 1.3.4 - Geotechnical Characterisation of Compacted Ground: Interpretation of the HVSr curve<br><b>Pavlick Harutoonian</b> , Chin Jian Leo, Samanthika Liyanapathirana, Robert Golaszewski, Richard Moyle |
| 12.00pm – 12.15pm | 1.3.5 - Construction Implications from Geological Modelling at the Enlarged Cotter Dam site, ACT, Australia<br><b>Andrew Barclay</b> , Greg Kotze  |

|                   |   |
|-------------------|---|
| 11.00am – 11.15am | 1.4.1 - Interpretation of pull test results of grouted rock bolts<br><b>Strath Clarke</b>   |
| 11.15am – 11.30am | 1.4.2 - Design of Low Cover Road Tunnels in Jointed Rock in an Urban Environment:<br>Example from CLEM7 Tunnel, Brisbane<br><b>Les McQueen</b> , Stephen Barrett, Ardie Purwodihardjo |
| 11.30am – 11.45am | 1.4.3 - Victoria Park Tunnel Drawdown and Settlement in the Auckland Central<br>Business District<br><b>Sian France</b> , Grant Newby, Ann Williams                                   |
| 11.45am – 12.00pm | 1.4.4 - A rational approach to model the ground movements around a tunnel boring<br>machine<br><b>Subhash Soni</b> , K.G. Sharma, G.V. Ramana   |
| 12.00pm – 12.15pm | 1.4.5 - Effects of normal stress and shear displacement on water flow through rock joint<br><b>Zhenyu Zhang</b> , Buddhima Indraratna, Chandrasiri Kumara, Jan Nemcik, Winton Gale    |





# Concurrent Session 2

MONDAY 16 JULY 2012

## Supporting Our Structures **Plenary Hall** **Chair: Jeremy Barber**

|                 |   |
|-----------------|---|
| 1.15pm – 1.30pm | 1.1.6 - Geotechnical Engineering for Condor Tower<br><b>Doug Stewart</b>  |
| 1.30pm – 1.45pm | 1.1.7 - Modelling of the seawater intake pump station of the Southern Seawater Desalination Plant, Western Australia: benefits and lessons learnt<br><b>Caroline Chopier</b> , Alan Berry |
| 1.45pm – 2.00pm | 1.1.8 - Strain influence factors for footings on an elastic medium<br><b>Mohammad Shahriar</b> , Nagaratnam Sivakugan, Braja Das  |
| 2.00pm – 2.15pm | 1.1.9 - Saving on the geotechnical investigation - a false economy<br><b>Geoff Young</b> , Warwick Ellis  |
| 2.15pm – 2.30pm | 1.1.10 - Foundation considerations for buried pipes on soft ground<br><b>Burt Look</b> , Vipman Tandjiria   |

## Geohazards and Risks **CCH3** **Chair: David Starr**

|                 |  |
|-----------------|--|
| 1.15pm – 1.30pm | 1.2.6 - GIS-based Assessment of Rainfall-induced Riverbank Instability<br><b>Chen Liang</b> , Mark Jaksa, Bertram Ostendorf  |
| 1.30pm – 1.45pm | 1.2.7 - Development of a Slope Risk Rating System for New Zealand Rail<br><b>Richard Justice</b>   |
| 1.45pm – 2.00pm | 1.2.8 - Identification, Management and Reduction of slope instability hazards within the Wellington Regionals Metro Railway, New Zealand<br>Richard Justice, <b>Guy Cassidy</b>                        |
| 2.00pm – 2.15pm | 1.2.9 - Mitigating the risk of slope instability and rockfall to railway lines in Wellington, New Zealand<br><b>Dougal Mason</b> , Pathmanathan Brabhakaran, Janet Duxfield, Richard Justice           |
| 2.15pm – 2.30pm | 1.2.10 - Design parameters for rockfall protection barriers in the Narrabeen sandstone and its equivalents<br><b>Michele Spadari</b> , Ryan De Carteret, Stephen Fityus, Anna Giacomini, Olivier Buzzi |

## Supporting Our Structures **M11** **Chair: Buddhima Indraratna**

|                 |  |
|-----------------|--|
| 1.15pm – 1.30pm | 1.3.6 - Consolidation of embankments on soils with anisotropic permeability<br><b>John Small</b>   |
| 1.30pm – 1.45pm | 1.3.7 - Design of reinforced soil structures using a two-part wedge mechanism based on AS4678-2002<br><b>Michael Dobie</b>                                     |
| 1.45pm – 2.00pm | 1.3.8 - Foundation and Approach Embankment Design for Coronation Drive Viaduct in Brisbane<br><b>Qijing Yang</b> , Zakir Hossin                                |
| 2.00pm – 2.15pm | 1.3.9 - Nonlinear analysis of soft ground consolidation at Ballina Bypass<br><b>Geng Xueyu</b> , Buddhima Indraratna, Cholachat Rujikiatkamjorn, Richard Kelly |
| 2.15pm – 2.30pm | 1.3.10 - Seismic Performance of Ground Improvements on Christchurch Southern Motorway<br>Richard Young, Marcus Gibson, <b>Grant Newby</b>                      |



|                 |  |
|-----------------|--|
| 1.15pm – 1.30pm | 1.4.6 - Comparison of Pile Shaft Capacity Predictions vs Test Results for Different Construction Methods and Different Construction Time<br><b>Tristan McWilliam</b> |
| 1.30pm – 1.45pm | 1.4.7 - Seasonal Impacts upon Geotechnical Structures<br><b>Tim Hull</b> , Andrew Leventhal, Andrew Steindler  |
| 1.45pm – 2.00pm | 1.4.8 - REMOVABLE SBMA - Advancements in Temporary Ground Anchor Systems<br><b>Matthew Sentry</b> , Devon Mothersille  |
| 2.00pm – 2.15pm | 1.4.9 - A Test Procedure for Particle Sizing via Digital Image Processing<br>A.K. Kho, <b>David Williams</b>   |
| 2.15pm – 2.30pm | 1.4.10 - Experimental study of ground energy systems in Melbourne, Australia<br><b>Stuart Colls</b> , Ian Johnston, Guillermo Narsilio                               |



# Concurrent Session 3

MONDAY 16 JULY 2012

## Evolving Geotechnics and Site Characterisation Plenary Hall Chair: Jan Krestyn

|                 |   |
|-----------------|---|
| 3.00pm – 3.15pm | 1.1.11 - Fibre reinforcement of Prior Stream sands<br><b>Adnan Sufian</b> , Adrian Russell  |
| 3.15pm – 3.30pm | 1.1.12 - Material Characteristics and Leaching Behaviour of Recycled Bassanaite as Soil Improvement Effects from Waste Plaster Boards<br><b>Kenichi Sato</b> , Toshiro Oshikata             |
| 3.30pm – 3.45pm | 1.1.13 - Field Monitoring of the Performance of Ballasted Rail Tracks with Geosynthetic Reinforcement<br><b>Pongpipat Anantanasakul</b> , Buddhima Indraratna, Sanjay Nimbalka, Tim Neville |
| 3.45pm – 4.00pm | 1.1.14 - Preloading of Soft Ground for a Highway Embankment in Newcastle<br><b>Henry Zhang</b> , B Chandrasekaran, Kaiyu Lin  |
| 4.00pm – 4.15pm | 1.1.15 - The Effectiveness of Vibration Trenches in a Dynamic Compaction Project<br><b>Babak Hamidi</b> , Serge Varaksin, Hamid Nikraz  |

## Supporting Our Structures CCH3 Chair: Rob Day

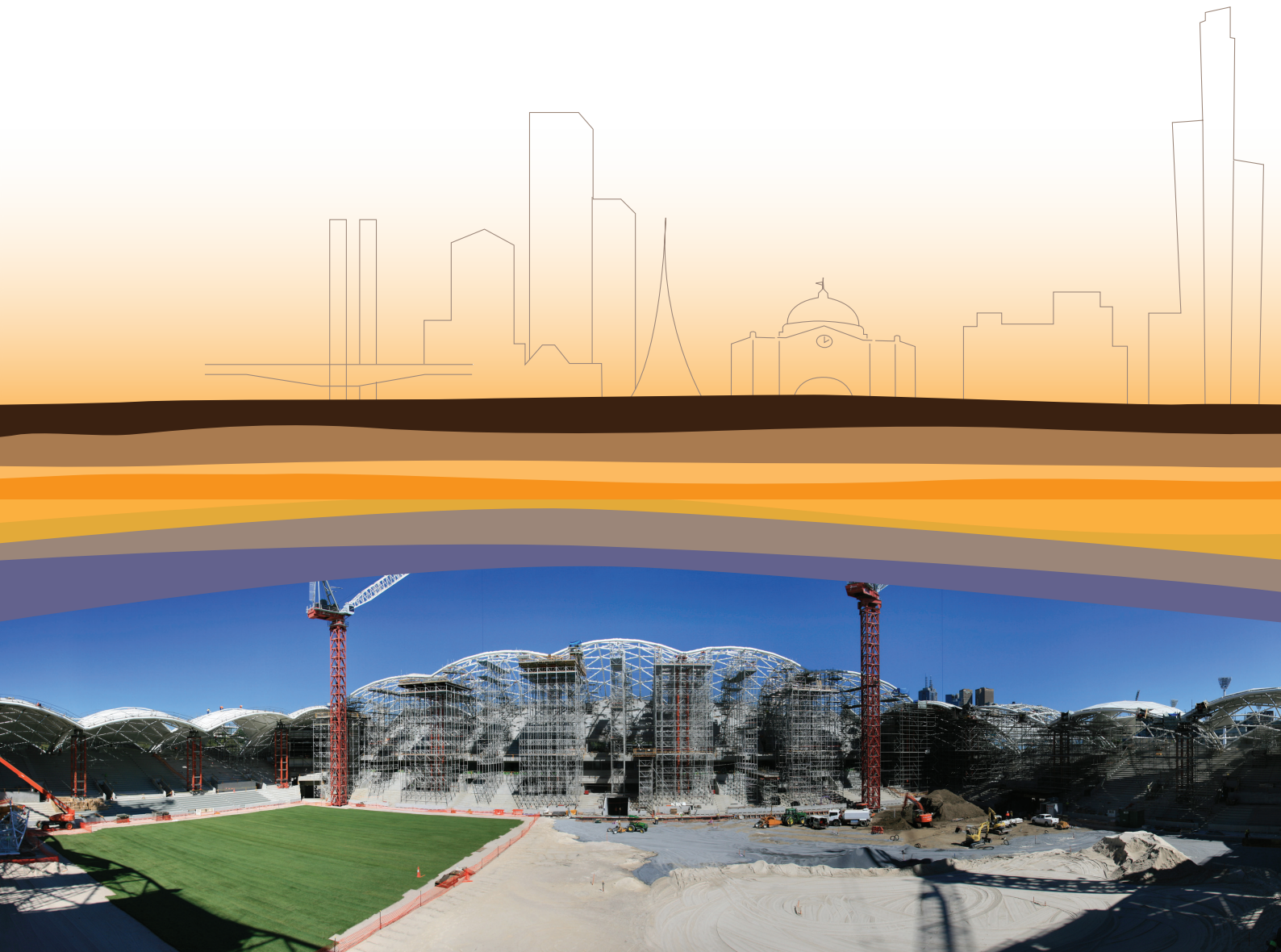
|                 |   |
|-----------------|---|
| 3.00pm – 3.15pm | 1.2.11 - Remediation of flood damage on the Toowoomba Range Railway, Queensland, Australia<br><b>Greg Rogos</b> , David Starr, Peter Booth, Jun Sugawara, Netra Gurung          |
| 3.15pm – 3.30pm | 1.2.12 - AS2870-2011 and the Australian Geomechanics Society's Landslide Risk Management Guidelines<br><b>Bruce Hargreaves</b> , RP Geo   |
| 3.30pm – 3.45pm | 1.2.13 - Management appraisal, condition assessment & remedial treatment for ageing Infrastructure earthworks<br><b>Chris Power</b> , Tim Spink, Roger Chandler, Victoria Sayce |
| 3.45pm – 4.00pm | 1.2.14 - An Investigation of the Impact of Pavement Material Temperature for Foamed Bitumen Stabilisation<br><b>Robert Evans</b> , Abdullah Lav                                 |
| 4.00pm – 4.15pm | 1.2.15 - Remediation of a major urban rock slope - Howard Smith Wharves, Brisbane<br>Chris Thorley, <b>Troy Weingarth</b>   |

## Sustainable Geotechnics & Geo-Environmental Engineering M11 Chair: Burt Look

|                 |   |
|-----------------|---|
| 3.00pm – 3.15pm | 1.3.11 - Footing Design for Tree Effects Considering Climate Change<br><b>Peter Mitchell</b>  |
| 3.15pm – 3.30pm | 1.3.12 - Tensile Strength of Consolidated Clay Using Indirect Tests Under Desiccation and Mechanical Loading<br><b>Benjamin Shannon</b> , Jayantha Kodikara |
| 3.30pm – 3.45pm | 1.3.13 - Simulating the effect of vibratory pile driving on far field of a driven pile<br><b>Sanka Ekanayake</b> , Samanthika Liyanapathirana, Chin Leo     |
| 3.45pm – 4.00pm | 1.3.14 - Rock Fill Specification and Construction For Large Embankments<br><b>Simon Keane</b>   |
| 4.00pm – 4.15pm | 1.3.15 - Evaluation of environmental costs associated with landslide repair<br>Kam Choy Chew, Burt Look, <b>Matthew Boyer</b>                               |

|                 |   |
|-----------------|---|
| 3.00pm – 3.15pm | 1.4.11 - Experimental setup for the investigation of ageing effects in pile shaft friction<br><b>Jit Kheng Lim</b> , Barry Lehané                           |
| 3.15pm – 3.30pm | 1.4.12 - Comparison of two piled raft analysis programs<br><b>Harry Poulos</b> , Vincenzo Abagnara, John Small  |
| 3.30pm – 3.45pm | 1.4.13 - Observational and numerical study on the behaviour of piled raft<br>Balakumar Venkatraman  |
| 3.45pm – 4.00pm | 1.4.14 - Piling in ancient coral formations, Simberi Island, Papua New Guinea<br>Natalie Connor, <b>Phil Woodmansey</b> , Gary Chapman                      |
| 4.00pm – 4.15pm | 1.4.15 - Application of Piled Raft for Embankment in Normally Consolidated Clay<br>Helen Chow, Harry Poulos, Sang-Kyu Kim, <b>Robert Turner</b> , S. G. Han |

WITHDRAWN





# Concurrent Session 4

TUESDAY 17 JULY 2012

## Evolving Geotechnics and Site Characterisation **Plenary Hall** **Chair: Harry Poulos**

|                     |  |
|---------------------|--|
| 10.45am – 11.00am   | 2.1.1 - Pseudo-N-value from the S-wave velocity: a proposal for communication between engineers and geophysicists<br><b>Koya Suto</b>  |
| 11.00am – 11.15am   | 2.1.2 - Evaluation of Geological Conditions Ahead of Tunnel Face Using Seismic Reflector Tracing and New Seismic Tomography between Tunnel and Surface<br><b>Yasuhiro Yokota</b> , Takuji Yamamoto, Suguru Shirasagi, Yu Koizumi |
| 11.15am – 11.30am   | 2.1.3 - Stiffness Measurement and Stratigraphy Profiling using a Continuous Surface Wave System<br><b>David Gu</b> , Chris Haberfield, Abdelmalek Bouazza, Daniel King   |
| 11.30am – 11.45am   | 2.1.4 - Shake, rattle and grind: characterisation of the Rowallan Dam foundations using sonic drilling<br><b>Paul Southcott</b> , Gavan Hunter   |
| 11.45am – 12.00pm   | 2.1.5 - Investigation of tube sampling disturbance using transparent soil and Particle Image Velocimetry<br><b>Eyre Hover</b> , Qing Ni, I. Guymer   |
| 12.00pm – 12.15pm - | 2.1.6 - A new dynamic cone penetrometer to predict CBR for fine-grained subgrade soils in the laboratory and field conditions<br><b>Bao Thach Nguyen</b> , Abbas Mohajerani  |

## Geohazards and Risks **M12/M13** **Chair: Richard Kaser**

|                   |  |
|-------------------|--|
| 10.45am – 11.00am | 2.2.1 - Lateral Spreading Measurements from the 2010 Darfield and 2011 Christchurch Earthquakes<br><b>Kelly Robinson</b> , M. Cubrinovski, B. A. Bradley                               |
| 11.00am – 11.15am | 2.2.2 - Case Study: Using limiting equilibrium analysis in landslide risk assessments<br>Geoff Hurley, <b>David Pollock</b> , Chris Haberfield   |
| 11.15am – 11.30am | 2.2.3 - Developing of Ground Remediation Options for residential property repair following the Canterbury earthquakes<br><b>Peter Millar</b> , H. J. Bowen, N. J. Traylen              |
| 11.30am – 11.45am | 2.2.4 - Sinkhole formation in central Victorian alluvial mining areas<br><b>Darren Paul</b> , M. Skelley, G. Daniel  |
| 11.45am – 12.00pm | 2.2.5 - Shear Strength Anisotropy within an Aged Fill<br><b>David Lacey</b> , Burt Look, David Williams  |
| 12.00pm – 12.15pm | 2.2.6 - Mine subsidence treatment and validation strategies on Minmi to Buchanan section of the Hunter Expressway<br>Robert Kingsland, Ken Mills, <b>Olaf Stahlhut</b> , Yuffrey Huang |



## Supporting Our Structures CCH3 Chair: Ian Johnston

|                   |  |
|-------------------|--|
| 10.45am – 11.00am | 2.3.1 - <b>Assessment of ballast fouling and its implications on rail track drainage</b><br>Nayoma Tennakoon, <b>Buddhima Indraratna</b> , Cholachat Rujikiatkamjorn, Sanjay Nimbalkar               |
| 11.00am – 11.15am | 2.3.2 - <b>Real time monitoring of rail track adjacent to deep excavation</b><br><b>Jeremy Toh</b> , Garry Mostyn, Steven Garlinge   |
| 11.15am – 11.30am | 2.3.3 - <b>Cardinia Road Railway Station: Pedestrian Underpass Jacking</b><br><b>Chris Lyons</b> , Martin Holt, Mark Ager, Carmine Ciavarella, Darren Muscat   |
| 11.30am – 11.45am | 2.3.4 - <b>Geotechnical Challenges Associated with Construction of MacKays to Waikanae Double Tracking, Wellington, New Zealand</b><br><b>Alexei Murashev</b> , Janine O'Dea                         |
| 11.45am – 12.00pm | 2.3.5 - <b>Contribution of a geotextile towards the improvement of subballast filtration criteria under cyclic stress pulses</b><br>Mau Ip, <b>Asadul Haque</b> , Bishwajit Chowdhury, Abdel Bouazza |
| 12.00pm – 12.15pm | 2.3.6 - <b>Effect of Coal Fines on the Shear Strength and Deformation Characteristics of Ballast</b><br><b>Sanjay Nimbalkar</b> , Buddhima Indraratna, Cholachat Rujikiatkamjorn, Michael Martin     |

## Evolving Geotechnics and Site Characterisation M11 Chair: Michael Broise

|                   |  |
|-------------------|--|
| 10.45am – 11.00am | 2.4.1 - <b>Assessment of Embankment Behaviour on Soft Clay from Measurements of Pore Pressure and Lateral Deformation</b><br><b>Richard Kelly</b> , Firman Siahaan |
| 11.00am – 11.15am | 2.4.2 - <b>Use of High Strength Geogrid Reinforcement for Embankments on Soft Soil in Western Australia</b><br><b>Paul Woodroof</b> , Srijib Chakrabarti           |
| 11.15am – 11.30am | 2.4.3 - <b>MacKays to Peka Peka Expressway: Road Embankment Construction on Peat Deposits</b><br><b>Lucy Coe</b> , Gavin Alexander                                 |
| 11.30am – 11.45am | 2.4.4 - <b>1D Compression Calculation for Composite Geomaterial</b><br><b>An Deng</b> , Yadong Zhou  |
| 11.45am – 12.00pm | 2.4.5 - <b>Goulburn River Pump Station Geotechnics - Sugarloaf Pipeline Project</b><br><b>Jeremy Barber</b> , Trevor O'Shannessy                                   |
| 12.00pm – 12.15pm | 2.4.6 - <b>Elastic Modulus of Soils Treated with Lignosulfonate</b><br><b>Jayan Vinod</b> , M. A. A. Mahamud, Buddhima Indraratna                                  |



# Concurrent Session 5

TUESDAY 17 JULY 2012

## Evolving Geotechnics and Site Characterisation **Plenary Hall** **Chair: Jayantha Kodikara**

|                 |   |
|-----------------|---|
| 1.15pm – 1.30pm | 2.1.7 - Ground Engineering - technology, common sense and good value?<br><b>Grant Murray</b>  |
| 1.30pm – 1.45pm | 2.1.8 - The Future of Structural Data from Boreholes<br><b>Felicia Weir</b>   |
| 1.45pm – 2.00pm | 2.1.9 - Photogrammetric Mapping of As-Constructed Geotechnical Works – Obi Obi Rock Slide, Queensland<br><b>Peter Booth</b> , D. C. Starr, J. Z. Woodsford                                    |
| 2.00pm – 2.15pm | 2.1.10 - The role of geotechnical data in Building Information Modeling<br><b>Roger Chandler</b> , Ian McGregor, Gary Morin   |
| 2.15pm – 2.30pm | 2.1.11 - A Novel Approach for the Determination of Moisture Content of Soil using Artificial Neural Network and Automatic Electronic Control<br><b>Nisat Sarwar Shetu</b> , Md Abdullah Masum |

## Mining & Underground Geotechnics **M12/M13** **Chair: Bill Bamford**

|                 |   |
|-----------------|---|
| 1.15pm – 1.30pm | 2.2.7 - Modelling of geostructure fracture and fragment muck-piling using hybrid finite-discrete element method<br><b>Hongyuan Liu</b>  |
| 1.30pm – 1.45pm | 2.2.8 - Spoil Piles- Limit Equilibrium Analyses<br><b>Alex Duran</b>  |
| 1.45pm – 2.00pm | 2.2.9 - A Discrete Fracture Network Approach to Open Pit Slope Design<br><b>Mark Fowler</b> , F. M. Weir, T. D. Sullivan, G. R. Mostyn  |
| 2.00pm – 2.15pm | 2.2.10 - Reasonable Variation between Slope Stability Analysis Methods<br><b>Murray Fredlund</b> , T.Q. Feng, D.G. Fredlund, and D. van Zyl                                   |
| 2.15pm – 2.30pm | 2.2.11 - Block modelling for the purpose of visualising geotechnical borehole data at Tritton Copper Mine<br>Sarrah Hayes, Ben Pang, <b>Wouter Hartman</b> , Simon Fitzgerald |

## Supporting Our Structures **CCH3** **Chair: Chris Boyd**

|                 |  |
|-----------------|--|
| 1.15pm – 1.30pm | 2.3.7 - A comparison of two and three dimensional finite element modelling of geosynthetic reinforced pile-supported embankments<br><b>Priyanath Udayanga Ariyaratne</b> , Deepa Samanthika Liyanapathirana, Chin Jian Leo           |
| 1.30pm – 1.45pm | 2.3.8 - Pull-out Resistance Characteristics of Galvanised Steel Mesh Reinforcement Embedded in Silty Sand<br><b>Md. Jahid Iftekhar Alam</b> , S C R Lo   |
| 1.45pm – 2.00pm | 2.3.9 - Design and construction of a large reinforced soil embankment for the East Taupo Arterial Project<br><b>Kevin Anderson</b> , Wataru Okada, Grant Murray  |
| 2.00pm – 2.15pm | 2.3.10 - Numerical Analysis of Geogrid Reinforced Soil Retaining Walls with Oblique Reinforcement<br><b>Mohammadali Rowshanzamir</b> , Mehdi Aghayarzadeh  |
| 2.15pm – 2.30pm | 2.3.11 - 2D Numerical Modelling of Geosynthetic Reinforced Embankments over Deep Cement Mixing Columns<br><b>Yapage Namal Nuwan Sanjeewa</b> , Deepa Samanthika Liyanapathirana, Harry George Poulos, Richard B Kelly, Chin Jian Leo |



|                 |   |
|-----------------|---|
| 1.15pm – 1.30pm | 2.4.7 - Role of engineering geology in design of large road cut, Ballina, NSW<br><b>Peter Volk</b> , Max Foweraker, Andrew Hunter   |
| 1.30pm – 1.45pm | 2.4.8 - Vertical stresses within granular materials in silos<br><b>Sankha Widisinghe</b> , Nagaratnam Sivakugan   |
| 1.45pm – 2.00pm | 2.4.9 - A p-y approach to predict lateral load capacity of piles socketed into Melbourne mudstone<br><b>Wai Loong Chong</b> , Asadul Haque, PG Ranjith, AKM Shahinuzzaman                         |
| 2.00pm – 2.15pm | 2.4.10 - Improvement of Soft Clays Using Deep Soil Mixed Columns at Bridge Approaches<br><b>Ahm Kamruzzaman</b> , Kim Chan  |
| 2.15pm – 2.30pm | 2.4.11 - Probabilistic Analysis of Foundation Settlement on Multilayered Soil with Complex Layer Boundary<br><b>Ahrufan Ghalba</b> , Mark Jaksa, William Kaggwa, Gordon Fenton, Vaughan Griffiths |



# Concurrent Session 6

TUESDAY 17 JULY 2012

## Sustainable Geotechnics & Geo-Environmental Engineering Plenary Hall Chair: Guillermo Narsilio

|                 |   |
|-----------------|---|
| 3.00pm – 3.15pm | 2.1.12 - Numerical modelling of ground loop configurations for direct geothermal applications<br><b>Asal Bidarmaghz</b> , Guillermo Andres Narsilio, Ian William Johnston                       |
| 3.15pm – 3.30pm | 2.1.13 - Numerical modelling of ground temperature evolution and soil subsidence as a result of underground coal fire<br>Xianfeng Liu, Frederic Collin, <b>Olivier Buzzi</b> , Scott Sloan      |
| 3.30pm – 3.45pm | 2.1.14 - Geothermal energy pile subjected to thermo-mechanical loading<br><b>Bill Wang</b> , Abdelmalek Bouazza, David Barry-Macaulay, Rao Singh, Chris Haberfield, Gary Chapman, Serhat Baycan |
| 3.45pm – 4.00pm | 2.1.15 - Thermal Conductivity of Melbourne Siltstone and Sandstone<br><b>David Barry-Macaulay</b> , Malek Bouazza, Martand Singh, Bill Wang   |
| 4.00pm – 4.15pm | 2.1.16 - Development of Ground Thermal Conductivity Model of multi-layer's soils<br><b>Seok Yoon</b> , Jianfeng Xue, Seung-Rae Lee  |

## Evolving Geotechnics and Site Characterisation M12/M13 Chair: Adrian Russell

|                 |  |
|-----------------|--|
| 3.00pm – 3.15pm | 2.2.12 - Experimental investigation of the size effect of Gosford Sandstone<br>Hossein Masoumi, <b>Kurt Douglas</b> , Adrian Russell |
| 3.15pm – 3.30pm | 2.2.13 - Aspects of Soil Mechanics Teaching<br>Laurie Wesley, <b>Michael Pender</b>  |
| 3.30pm – 3.45pm | 2.2.14 - Modelling the behaviour of sand with fines using equivalent void ratio<br><b>Md. Mizanur Rahman</b>                         |
| 3.45pm – 4.00pm | 2.2.15 - Saturated hydraulic conductivity of various engineering barriers<br>M. Choghri, <b>Rao Martand Singh</b> , A.Bouazza        |
| 4.00pm – 4.15pm | 2.2.16 - Site Control Using Seismic Technology<br><b>Jeremy Fredericks</b> , James Tayler  |

## Supporting Our Structures CCH3 Chair: Mahdi Miri Disfani

|                 |  |
|-----------------|--|
| 3.00pm – 3.15pm | 2.3.12 - Estimating Composite Properties of an SMC-improved Soil under Lateral Loading<br><b>Chris Haberfield</b> , David Nolan                            |
| 3.15pm – 3.30pm | 2.3.13 - Economic Design of Controlled Modulus Columns for Ground Improvement<br><b>Patrick Wong</b> , Thevaragavan Muttuvel                               |
| 3.30pm – 3.45pm | 2.3.14 - Quality Control and Performance Monitoring of Ground Improvement using Continuous Flight Auger (CFA) Columns<br><b>Muliadi Merry</b> , Jiping Pan |
| 3.45pm – 4.00pm | 2.3.15 - Seismic retro-fit of an historic earth dam using grouted stone columns<br><b>Derek Avalue</b> , Barry Kok, Tim Lennie                             |
| 4.00pm – 4.15pm | 2.3.16 - Ground Improvement of Sabkha, Abu Dhabi Emirate, UAE<br><b>Nidhal Al-Alusi</b> , Peter Sharp, Ala Sainak  |



|                 |   |
|-----------------|---|
| 3.00pm – 3.15pm | 2.4.12 - Liquefaction behaviour and assessment in engineering practice<br><b>Doru Bobei</b>   |
| 3.15pm – 3.30pm | 2.4.13 - Approximate Deaggregation Method for Determination of Design Earthquake Magnitudes for Australia<br><b>James Dismuke</b> , Timothy Mote                              |
| 3.30pm – 3.45pm | 2.4.14 - Eight years of monitoring reactive soils along the Epping to Chatswood Rail Link<br><b>Agustria Salim</b> , Strath Clarke, Garry Mostyn                              |
| 3.45pm – 4.00pm | 2.4.15 - Characterisation of Ground Conditions in the Christchurch Central Business District. A mid-project summary<br><b>Merrick Taylor</b> , Misko Cubrinovski              |
| 4.00pm – 4.15pm | 2.4.16 - The effect of CO <sub>2</sub> on micro structure and mechanical properties of Australian black coal<br>Mohsen Masoudian Saadabad, <b>David Airey</b> , Abbas El-Zein |



# Concurrent Session 7

WEDNESDAY 18 JULY 2012

## Near-Shore & Off-Shore Geotechnics Plenary Hall Chair: Michael Davies

|                   |  |
|-------------------|--|
| 11.15am – 11.30am | 3.1.1 - Geotechnical and Marine Geophysical Investigations of Near Shore Directional Drilling Alignments: A case study from the Hawkesbury River, Sydney<br><b>Peter Waddell</b> , Bob Whiteley, Daryl Gilchrist     |
| 11.30am – 11.45am | 3.1.2 - Coastal Geomorphic Features in Northern Tasmania with Implications on Engineering Risk<br><b>Al Ahmed-Zeki</b> , Michael Stevenson, Colin Mazengarb  |
| 11.45am – 12.00pm | 3.1.3 - Effects of Deep Vibratory Compaction near Retaining Structures<br><b>Philip Davies</b> , Jamie McIlquham   |
| 12.00pm – 12.15pm | 3.1.4 - Anisotropy in the permeability and consolidation characteristics of dredged mud<br><b>Dhanya Ganesalingam</b> , Jay Ameratunga, Guy Schweitzer, Peter Boyle, Nagaratnam Sivakugan                            |
| 12.15pm – 12.30pm | 3.1.5 - Performance and Prediction of Vacuum Combined Surcharge Consolidation at Port of Brisbane<br><b>Buddhima Indraratna</b> , Jay Ameratunga, Cholachat Rujikiatkamjorn, Harry G. Poulos, A. S. Balasublamaniyam |
| 12.30pm – 12.45pm | 3.1.6 - Geomechanics of Deep Sea Mining<br><b>Adrian Smith</b> , Michael Habte, Guy Grocott, Glen Jones  |
| 12.45pm – 1.00pm  | 3.1.7 - Axial load-displacement of offshore pipelines using numerical analysis<br><b>Senthilkumar Muthukrishnan</b> , Rajeev Pathmanathan, Jayantha Kodikara   |

## Supporting Our Structures CCH3 Chair: Max Ervin

|                   |  |
|-------------------|--|
| 11.15am – 11.30am | 3.2.1 - 2D and 3D FEM Assessment of "Trouser Leg" Diaphragm Wall Panels in a Deep Excavation in Singapore Soft Clay<br><b>S.A. Tan</b> , N. Mace, H.B. Yang, C.K. Toh, S.S. Chuah  |
| 11.30am – 11.45am | 3.2.2 - Application of Observational Method in Dubai Metro Underground Excavations<br><b>Weimin Deng</b> , Salah Al-Dilimi, Tomohiro Shishikura  |
| 11.45am – 12.00pm | 3.2.3 - Selection of Rock Mass Design Parameters for Assessing Excavation Induced Movements in Sydney CBD<br><b>David Oliveira</b> , Patrick Wong  |
| 12.00pm – 12.15pm | 3.2.4 - 3-Dimensional Numerical Modelling of a Deep Basement Excavation Adjacent to Rail Tunnels and Geological Fault Zone in Sydney CBD<br><b>Chun Yean Tey</b>   |
| 12.15pm – 12.30pm | 3.2.5 - An Anchored Bored Pile Wall Design – A Case History<br>Li-Ang Yang, <b>Jason Williams</b>  |
| 12.30pm – 12.45pm | 3.2.6 - A case study of ground response due to diaphragm wall installation<br><b>An-Jui Li</b> , Horn-Da Lin, Richard Merifield, Andrei Lyamin   |
| 12.45pm – 1.00pm  | 3.2.7 - Three-Dimensional One Strut Failure Soil-structure Interaction Analysis for Strutted Diaphragm Wall Design by a New Mathematical Model - Two-Dimensional Plane Strain Finite Element Analysis combined with Plate Bending Theory<br><b>Raymond Lo</b> , Daniel S.M. Bali |



## Sustainable Geotechnics & Geo-Environmental Engineering M12/M13 Chair: Mizanur Rahman

|                   |   |
|-------------------|---|
| 11.15am – 11.30am | 3.3.1 - Performance of Recycled Glass-Biosolids Blends under Repeated Loading<br><b>Mahdi Miri Disfani</b> , H. Haghighi, M. M. Y. Ali, Arul Arulrajah  |
| 11.30am – 11.45am | 3.3.2 - Sustainable application of recycled glass blended with crushed rock<br>M. M. Younus Ali, <b>Jegatheesan Piratheepan</b> , Arul Arulrajah, Mahdi Miri Disfani  |
| 11.45am – 12.00pm | 3.3.3 - Armouring by precipitates and the associated reduction in hydraulic conductivity of recycled concrete aggregates used in a novel PRB for the treatment of acidic groundwater<br><b>Punyama Udeshini Pathirage</b> , Buddhima Indraratna, Long Duc Nghiem, Laura Banasiak, Gyanendra Regmi |
| 12.00pm – 12.15pm | 3.3.4 - The Effects of Compaction Methods on Tensile Strength of Foamed Bitumen Mixture<br><b>Yue Huan</b> , Peerapong Jistangiam, Hamid Nikraz, Komsun Siripun   |
| 12.15pm – 12.30pm | 3.3.5 - Sustainable Use of Crushed Concrete Waste For Thin Flexible Pavement<br><b>Komsun Siripun</b> , Peerapong Jitsangiam, Hamid Nikraz, Colin Leek  |
| 12.30pm – 12.45pm | 3.3.6 - Sustainable aggregates for unbound granular pavements<br><b>Don Cameron</b> , Mizanur Rahman, Peter Mitchell, Bob Andrews, Alaa Gabr, Abdelhalim Azam   |
| 12.45pm – 1.00pm  | 3.3.7 - Professional Performance, Innovation and Risk (PPIR) for Engineers<br><b>Neil Benson</b>  |

## Evolving Geotechnics and Site Characterisation M11 Chair: Paul Hewitt

|                   |   |
|-------------------|---|
| 11.15am – 11.30am | 3.4.1 - Undrained Cyclic Shear Behaviour of Pumice Sand<br><b>Rolando Orense</b> , Michael Pender, Andy Tai                   |
| 11.30am – 11.45am | 3.4.2 - Discretisation of constant rate loading<br><b>Julie Lovisa</b> , Nagaratnam Sivakugan, J. Ameratunga                  |
| 11.45am – 12.00pm | 3.4.3 - Effects of fines on stress-strain behaviour of sands<br><b>M. Jawad Arefi</b> , Misko Cubrinovski, Md. Mizanur Rahman |
| 12.00pm – 12.15pm | 3.4.4 - Unsaturated strength behaviour and its prediction for silty sand<br><b>Dejin Hu</b> , R.S.C. Lo, N.Khalili            |
| 12.15pm – 12.30pm | 3.4.5 - Characterisation of Structural Fills for Industrial Developments<br><b>Bernard Shen</b> , Garry Mostyn                |
| 12.30pm – 12.45pm | 3.4.6 - Effect of Apparatus Response on Small-Strain Stiffness of a Cement-treated Soil<br><b>Abbas Taheri</b> , F. Tatsuoka  |
| 12.45pm – 1.00pm  | 3.4.7 - Testing for Young's Modulus – A Technician's Perspective<br><b>Alan Cocks</b> , Patrick Wong                          |





# Concurrent Session 8

WEDNESDAY 18 JULY 2012

## Mining & Underground Geotechnics **Plenary Hall** **Chair: Don Cameron**

|                 |  |
|-----------------|--|
| 2.00pm – 2.15pm | 3.1.8 - A new ring shear apparatus for determination of the residual shear resistance of remoulded brown coal<br><b>Jiangfeng Xue, Rae Mackay</b> , Wayne Powrie, Boyd Dent      |
| 2.15pm – 2.30pm | 3.1.9 - Effect of abutment angle on stress distribution under supercritical longwall panels<br><b>Anastasia Suchowerska</b> , Richard Merifield, John Carter                     |
| 2.30pm – 2.45pm | 3.1.10 - Evaluation of simple beam experiments to determine the long-term deformation characteristics of brown coal<br><b>Boyd Dent</b> , Rae Mackay                             |
| 2.45pm – 3.00pm | 3.1.11 - Effectiveness of Polymers on Attenuating the Influence of Sulfuric Acid Solutions on Engineering Properties of Bentonite<br><b>Yang Liu</b> , Will Gates, Malek Bouazza |

## Geohazards and Risks **CCH3** **Chair: David Bell**

|                 |  |
|-----------------|--|
| 2.00pm – 2.15pm | 3.2.8 - Managing a ground stability hazard in a residential area<br><b>Geoffrey Farquhar</b> , David Burns   |
| 2.15pm – 2.30pm | 3.2.9 - Use of 'Lean Construction' and Risk Management techniques in the design and construction management of the realignment of part of State Highway 35 at Maraenui Bluff<br><b>Kenneth Read</b> , Nigel D'Ath, Matt Naughten |
| 2.30pm – 2.45pm | 3.2.10 - An Inventory of Landslides within the Sydney Basin to aid the development of a refined Susceptibility Zoning<br><b>Phil Flentje</b> , David Stirling, Darshika Palamakumbure  |
| 2.45pm – 3.00pm | 3.2.11 - GIS Assessment of Regional Landslip Susceptibility, Mornington Peninsula Shire<br><b>John Piper</b> , Davin Slade   |

## Mining & Underground Geotechnics **M12/M13** **Chair: Darren Paul**

|                 |   |
|-----------------|---|
| 2.00pm – 2.15pm | 3.3.8 - Management of Mine Subsidence Impact Upon Mainline Railway Infrastructure – The Flirtation of LW25 with the Brick Arch Culvert at Myrtle Creek, Tamoor<br><b>Andrew Leventhal</b> , Tim Hull, Andrew Steindler, John Matheson, Daryl Kay, David Christie, Graeme Robinson, Ian Sheppard |
| 2.15pm – 2.30pm | 3.3.9 - Risk-managed design and construction of flood exclusion embankments for the Kogan Creek Mine in the Condamine River floodplain<br><b>John Simmons</b>   |
| 2.30pm – 2.45pm | 3.3.10 - Mining Applications and Case Studies of Rolling Dynamic Compaction<br><b>Brendan Scott</b> , Mark Jaksa  |
| 2.45pm – 3.00pm | 3.3.11 - Economic Risk Associated with Geotechnical Uncertainty<br><b>Frank Lai</b> , W. E. Bamford, S. T. S. Yuen, T. Li   |

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|-----------------|--|
| 2.00pm – 2.15pm | 3.4.8 - <b>Compaction and Strength Testing of Industrial Waste Blends as Potential Port Reclamation Fill</b><br><b>Cholachat Rujikiatkamjorn</b> , Buddhima Indraratna, Gabriele Chiaro, Shaghayegh Naeeni, S.M.A. Tasalloti |
| 2.15pm – 2.30pm | 3.4.9 - <b>Foamed Bitumen Stabilised Pavements towards Western Australia Experience</b><br><b>Peerapong Jitsangiam</b> , Colin Leek, Komsun Siripun, Hamid Nikraz  |
| 2.30pm – 2.45pm | 3.4.10 - <b>Performances of Hydrated Cement Treated Crushed Rock Base as a Road Base Material in Western Australia</b><br><b>Suphat Chummuneerat</b> , Peerapong Jitsangiam, Hamid Nikraz                                    |
| 2.45pm – 3.00pm | 3.4.11 - <b>Use of expanded polystyrene geofoam on a motorway project in New Zealand</b><br><b>Joel Gniel</b> , Fred Gassner, Gary Chapman   |





# Poster Presentations

|    |   |
|----|---|
| 1  | Softening effect of CO2 and its influence on reservoir simulation and permeability prediction - Mohsen Masoudian Saadabad, <b>David Airey</b> , Abbas El-Zein                                   |
| 2  | Viscous Rate Effects in Shear Strength of Clay - Shiao Huey Chow, F. Alonso-Marroquin, <b>David Airey</b>   |
| 3  | Design and construction of shallow foundations for a multispan viaduct for the East Taupo Arterial - <b>Kevin Anderson</b> , Grant Murray   |
| 4  | Seismic assessment of the Terrace tunnel in Wellington - <b>Kevin Anderson</b> , Lars Schmidt   |
| 5  | Re-levelling and ground improvement in Canterbury -the Christchurch experience - Mark Koelling, Dean Quickenden, <b>Derek Aivalle</b>   |
| 6  | Initial Soil Springs Stiffness for laterally loaded Piles - <b>Amir Bahrami</b> , H.Nikraz  |
| 7  | Ground movement control during construction of underground structures - <b>Balasundrem Chandrasekaran</b> , B Vaidya  |
| 9  | Numerical Analysis of Sand Reinforced With Small Diameter Model Steel Piles - <b>Donovan Mujah</b> , Hemanta Hazarika, Naoto Watanabe, Fauziah Ahmad  |
| 10 | Applicability of a new strength criterion in comparison to failure criteria - <b>Hossein Bineshian</b> , Abdolhadi Ghazvinian, Zahra Bineshian  |
| 11 | Turning geostructures into sources of renewable energy - <b>Abdelmalek Bouazza</b> , Dietmar Adam   |
| 12 | Use of 3 dimensional geological modelling for site characterisation on a challenging road project in Victoria - <b>Chris Boyd</b> , Chris Coulson   |
| 13 | Strain rate effects in consolidated undrained triaxial testing and implications on design strengths - <b>Glen Burton</b> , David Airey  |
| 14 | Unsaturated soil mechanics and implications for clayey soils compacted dry of optimum moisture content - <b>Glen Burton</b> , Jamie Anderson  |
| 15 | Monitoring of an encapsulated embankment for the validation of a dimensionless model for soil swelling - <b>Olivier Buzzi</b> , Stephen Fityus, Robert Kingsland, Sudar Aryal, Geoffrey Russell |
| 16 | Effective Plate Load Tests on natural residual soil and compacted fill, derived from anchor proof load testing - <b>Luke Chapman</b> , Sjoerd Van Ballegooy                                     |
| 18 | Monitoring and Risk based Assessment of Stabilised Treated Sediment Bund - <b>Ching Dai</b>   |
| 20 | Ground Conditions and Geotechnical Parameters for the Perth Waterfront Development, Perth CBD - Michael Wade, <b>Richard David</b> , Tanel Andry  |
| 21 | Geotechnical Design and Construction of the Northern Missing Link - <b>Tony Davies</b> , Graeme Jardine   |
| 22 | Use of Preloading in Rectification of Large Settlement Piles - Abdussamie Himoni, <b>Weimin Deng</b> , Salah Al Dilimi, Harry Poulos  |
| 23 | Geotechnical Investigations for the Oil Refinery in Novi Sad, Serbia - <b>Mitar Djogo</b> , Milinko Vasic   |
| 24 | Performance of a reinforced soil retaining wall during the Christchurch earthquakes - <b>Michael Dobie</b> , Gordon Stevens, S. J. Collin   |
| 25 | Relationship between insitu stress magnitudes and mineralogy in the Hawkesbury Sandstone - Brigitte Martel, Ian Graham, <b>Kurt Douglas</b> , David Och   |
| 26 | Finite Element Simulation of EPS Geofoam Behaviour: Explicit Integration Method - <b>Sanka Ekanayake</b> , Samantha Liyanapathirana, Chin Leo   |
| 27 | Sustainable pavement construction by the use of recycled glass - <b>Ansgar Emersleben</b> , Norbert Meyer   |
| 28 | Leave protection and crest stabilisation with geocells - <b>Ansgar Emersleben</b> , Norbert Meyer, Daniel Groeger   |
| 30 | Grouting to improve the rotational stiffness of piles in sand - Barry Lehane, J. A. Doherty   |
| 31 | Site Control Using Seismic Technology - <b>Jeremy Fredericks</b> , James Tayler   |



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| 32 | Assessment of Landfill Site for Residential Development - <b>David Gallagher</b> , Max Ervin   |
| 33 | Study of truss bolt system for highly stressed rock mass using finite element modelling techniques - <b>B. Ghabraie</b> , G. Ren, Y. M. Xie, K. Ghabraie   |
| 34 | A Simplified Design Method Approach for Predicting the Response of Rigid Plies Due to Lateral Soil Movement - <b>Eng How Ghee</b> , Wei Dong Guo   |
| 35 | Consolidation of soft soil by means of vertical drains: field and laboratory observations - <b>Ivan Gratchev</b> , Chanaton Surarak, Aramugan Balasubramaniam, Erwin Oh  |
| 36 | Seismic Vulnerability of Australian buried pipeline Industry - <b>Indranil Guha</b> , Beau Whitney   |
| 37 | The Application of Dynamic Compaction on Marjan Island - <b>Babak Hamidi</b> , Hamid Nikraz, Serge Varaksin  |
| 38 | Geotechnical Characterisation of Compacted Ground: Forward Modelling of the HVSR curve - <b>Pavlick Harutoonian</b> , Chin Jian Leo, Samanthika Liyanapathirana, Robert Golaszewski, Richard Moyle   |
| 39 | Frederickton Levee: an innovative approach to Sheet Pile Wall Design - <b>Samuel Henwood</b>   |
| 40 | Ground treatment techniques for road embankments - <b>Paul Hewitt</b> , Yuffrey Huang  |
| 41 | Solidification of Dredged Marine Clay with Steel Slag: Reusable Geomaterials for the Construction Industry - <b>Chee-Ming Chan</b> , Taka-aki Mizutani, Yoshiaki Kikuchi   |
| 42 | Soil movement induced by installing unreinforced concrete displacement ground improvement columns - <b>Yuffrey Huang</b> , K. Lin, B. Choi   |
| 43 | Some Aspects of Modelling EPS Geofoam Behaviour - Le Ta, <b>Tim Hull</b> , Andrew Leventhal  |
| 44 | Investigation of engineering performance of gravels mixed with additives for unsealed pavement stabilisation - <b>David Huxtable</b> , Jianfeng Xue, Susanga Costa   |
| 45 | Shear strength model for sediment-infilled rock discontinuities and field applications - <b>Buddhima Indraratna</b> , Wuditha Premadasa, Jan Nemcik, Mylvaganam Jayanathan   |
| 46 | Shear Behaviour of Rock Joints Under Cyclic Loading - Ali Mirzaghobanali, <b>Buddhima Indraratna</b> , Wuditha Premadasa, David A.F. Oliveira  |
| 47 | Characterising compacted fills at Penrith Lakes development site using shear wave velocity and matric suction - Ana Heitor, <b>Buddhima Indraratna</b> , Cholachat Rujikiatkamjorn, Robert Golaszewski   |
| 48 | Performance of Geosynthetic-Reinforced Rail Ballast in Direct Shear Conditions - Sd K Karimullah Hussaini, <b>Buddhima Indraratna</b> , J. S. Vinod  |
| 49 | The behaviour of two closely spaced strip footings placed on stiff clay - <b>Md. Ariful Islam</b> , C. T. Gnanendran   |
| 50 | Three-dimensional numerical modelling of geosynthetic reinforced pile-supported embankments over soft ground - <b>Priyanath Udayanga Ariyaratne</b> , Deepa Samanthika Liyanapathirana, Chin Jian Leo  |
| 51 | Analysis and design of unconventional remedial measures for the flood damaged Comet River North rail bridge abutments - <b>Adam Kemp</b> , Graham Irvine, Natalie Campbell   |
| 52 | Finite Element Methods against Limit Equilibrium Approaches for Slope Stability Analysis - <b>Hadi Khabbaz</b> , Behzad Fatahi, Clare Nucifora   |
| 53 | Reviewing Landslide Hazard Assessment Systems within South East Queensland - <b>Patrick Kidd</b>   |
| 54 | Management of reactive and carbonaceous materials in the earthworks design for the Hunter Expressway, Minmi to Buchanan section - <b>Robert Kingsland</b> , Sudar Aryal, David Och, Athena Sooklall, Glen Burton, Geoff Russell, Olivier Buzzi |
| 55 | Use of geophysical survey and sonic drilling for site characterisation and material property derivation for a municipal waste landfill - <b>David Lacey</b> , Stafford Griffiths   |
| 56 | Use of drilling rig instrumentation to assess subsurface profile and material characteristics during piling operations - <b>David Lacey</b> , Adam Kemp, Mogana Sundaram   |
| 57 | Effectiveness of Recycled Material Utilisation in Road Bases on a Local Government Scale in Sydney - Christopher Latsinos, <b>Abdullah Hilmi Lav</b>   |
| 58 | Numerical analysis of the suction pile behavior with different lateral loading locations - <b>Juhyung Lee</b> , Dongwook Kim, Kiseok Kwak, Younghoon Jung  |

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| 59 | Ground model conception, development and verification, Meridian Energy Te Uku Windfarm, Te Uku, New Zealand - <b>Kori Lentfer</b> , Ken Read   |
| 60 | Victoria Road Landslide 2009, Woollahra, NSW - <b>Andrew Leventhal</b> , Tony Colenbrander, Cheryle Burns  |
| 61 | Landslide Risk Management in Australia 2012 - <b>Andrew Leventhal</b> , Bruce Walker, Tony Miner, Tony Phillips, John Carter   |
| 62 | Case Studies of Geotechnical Risk Management of Excavations Next to Live Motorway Traffic - <b>Weiwei Li</b> , A. Bulcock  |
| 63 | Case Studies of Geotechnical Risk Management of Constructions Near Live Railway - <b>Weiwei Li</b> , A. Bulcock, E. Lo   |
| 64 | Numerical modelling of soft soil improvement using wick drains - <b>Hongyuan Liu</b> , David Williams  |
| 65 | Application of Decision Trees to Landslide Risk Management - <b>Burt Look</b>  |
| 66 | Remediation of the Kawakawa Bay Landslip, New Zealand - <b>Pierre Malan</b> , Sjoerd Van Ballegooy   |
| 67 | Numerical Analysis of Geosynthetic Reinforced Soil Wall as Bridge Abutment - <b>Sayed Alireza Mirlatifi</b> , Behzad Fatahi  |
| 68 | Application of Taguchi method in optimization of design of soil-nailed excavations - <b>Asieh Naeemi</b> , M. Yazdani  |
| 69 | Sustainable Landfill Treatments for Christchurch Southern Motorway - <b>Richard Young</b>  |
| 70 | The Effect of the Strain Rate on Soft Soil Behaviour under Cyclic Loading - <b>Jing Ni</b> , Buddhima Indraratna, Chalachat Rujikiatkamjorn, Guanghui Meng   |
| 71 | Assessment of Soil Liquefaction during the 2010/2011 Canterbury Earthquakes - <b>Rolando Orense</b> , Michael Pender, Nathan Hickman, Brian Hill   |
| 72 | Shear Strength Properties of Northland Allochthon Soils under Rainwater Infiltration - Samuel Harris, <b>Rolando Orense</b>  |
| 73 | Small strain behaviour of Auckland residual soils - Anas Ibrahim, <b>Rolando Orense</b> , Michael Pender   |
| 74 | Effect of Lime Column Group Configuration on Total Shear Strength of Clay Based on Experimental Modelling - <b>Siamak Pahlevanzadeh</b>  |
| 75 | Snap-back testing of piles to estimate nonlinear lateral stiffness and damping properties - <b>Michael Pender</b> , Rolando Orense, Liam Wotherspoon, Sherif Beskhyroun, Jeffrey Melster, Mark Liew, Michael Tidbury, Cecelia Lambert, Norazzlina Sa'Don |
| 77 | Different Forms of Cyclic Liquefaction Behaviours of Coal Ash - Md Abdul Lahil Baki, <b>Md Mizanur Rahman</b> , S. C-R Lo  |
| 78 | Soil Nailing on the A3 Hindhead Scheme, United Kingdom - Andrew Davis, Anthony Drake, Victoria Sayce   |
| 79 | Sequential Excavation Method Tunnelling in Weak Sandstone using Innovative Methods - Andrew Davis, Anthony Drake, Victoria Sayce   |
| 80 | Durability performance of CFRP strand in Permanent Ground Anchors - <b>Matthew Sentry</b> , Abdelmalek Bouazza, Riadh Al-Mahaidi   |
| 81 | Evaluation of Effectiveness of Soil Gas and Groundwater Monitoring for Underground Storage Tanks - <b>Hsin-Yu Shan</b> , Pei-Min Chen  |
| 82 | Engineering Characteristics of Ullungdo Volcanic rock - <b>Byungwoong Song</b> , Gunho Kim, Jinam YOON, Jeawoo LEE, Seungcheol Back, Chaho Yoo   |
| 83 | Bromelton Offstream Storage Foundation Seepage: Investigation, Analysis and Remedial Works - <b>Paul Southcott</b> , Gregg Barker, Jamie Campbell  |
| 84 | Rock Mass Classification of highly variable Lismore Basalts and its application to shallow cover tunnels - Leon Frylinck, <b>Hugh Stallard</b>   |
| 85 | Temporary Works for a Car Dumper in the Pilbara - <b>Doug Stewart</b> , Dale Screech, Daniel Brooks, Allan Lundorf   |
| 86 | Newmarket Park Closed Landfill Remediation - <b>Andrew Stiles</b>  |
| 87 | Port of Brisbane – Berth 11 Pile Load Tension Test - <b>Jun Sugawara</b> , Goeff Perryman, Gary Chapman, Neil Honeyfield,  |
| 88 | The effect of soil compaction through pile driving on reducing liquefaction potential - <b>Ashkan Tabatabaee Araghi</b>  |
| 89 | Study on variations of stiffness during multiple-step loading test on a cement-mixed gravel - <b>Abbas Taheri</b> , Fumio Tatsuoka   |
| 90 | Performance of Reinforced Soil Wall Supported by Stone Column - <b>Su Kwong Tan</b> , S. S. Liew   |

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| 91  | A better understanding of potential effects of underground construction induced settlements and its rational implementation into practice - Christophe Bragard, Owen Francis, <b>Timothy Thompson</b> |
| 92  | Trial embankments to reduce geotechnical risk - <b>David Tonks</b> , Jay Ameratunga   |
| 94  | Observation and characterisation of land damage due to liquefaction and lateral spreading - Kirsti Murahidy, <b>Shamus Wallace</b> , Amy Macdonald  |
| 95  | Determination of the True Electrical Conductivity of a Saline Clay - I Gde Budi Indrawan, <b>David John Williams</b> , Alexander Scheuermann  |
| 96  | Determination of Indirect Tensile Strength of Rocks - Nazife Erarslan, <b>David Williams</b>  |
| 97  | Damage Mechanism of Rock Fatigue - Nazife Erarslan, <b>David Williams</b>   |
| 98  | Information requirements in the immediate aftermath of a major natural disaster - <b>Kate Williams</b> , Nick Rogers  |
| 99  | Settlement and load sharing behaviour of a piled raft subjected to strong seismic motion - <b>Kiyoshi Yamashita</b> , Toshio Hashiba, Hidetoshi Ito   |
| 100 | A Rational Estimating Method of the Earth Pressure on a Shaft Wall Considering the Shape Ratio - <b>Yo-Seph Byun</b> , Young-Wan Shin, Hyun-Soo Cho, Byung-Sik Chun                                   |
| 101 | Case Studies of Filling Movements under Buildings - <b>Geoff Young</b> , Ray Blinman  |
| 102 | Characterization of pore space in soils: Micro CT imaging and Image processing - Dong Hun Kang, Yeon Jong Jung, <b>Tae Sup Yun</b> , Kwang Yeum Kim, Jinhyun Choo                                     |
| 103 | Evaporation in soils: Electrical conductance and optical observation - Daehyun Kim, <b>Tae Sup Yun</b>  |
| 105 | Interaction between Displacement Pile and Soil Ground - <b>Askar Zhussupbevkov</b> , R.E Lukpanov, G.A Sultanov, A Tulebekova, H.I Ling   |
| 106 | Numerical modeling of shear strength in a two-layer soil reinforced with geogrid - <b>Reza Ziaie Moayed</b> , Sakine Tamassoki  |
| 107 | Case Studies on Failure Characteristics of Embankments on Soil Deposit - <b>Tae-Seon Yang</b> , Nam-Jae Yoo, Yeon-Soo Jang, Kyu-Hwan Lee  |



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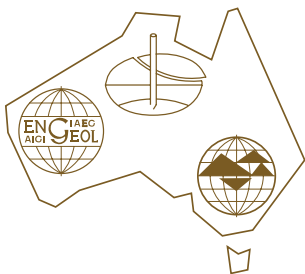


**The Australian Geomechanics Society** was founded in 1970. Its origins lie in the National Committee of Soil Mechanics of the Institution of Engineers, Australia established in 1953 and the call for a corresponding society in rock mechanics. In 1973 the society was expanded to include the third discipline of engineering geology and has remained substantially unchanged since that date. The society is affiliated with:

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- the International Society for Rock Mechanics (ISRM); and
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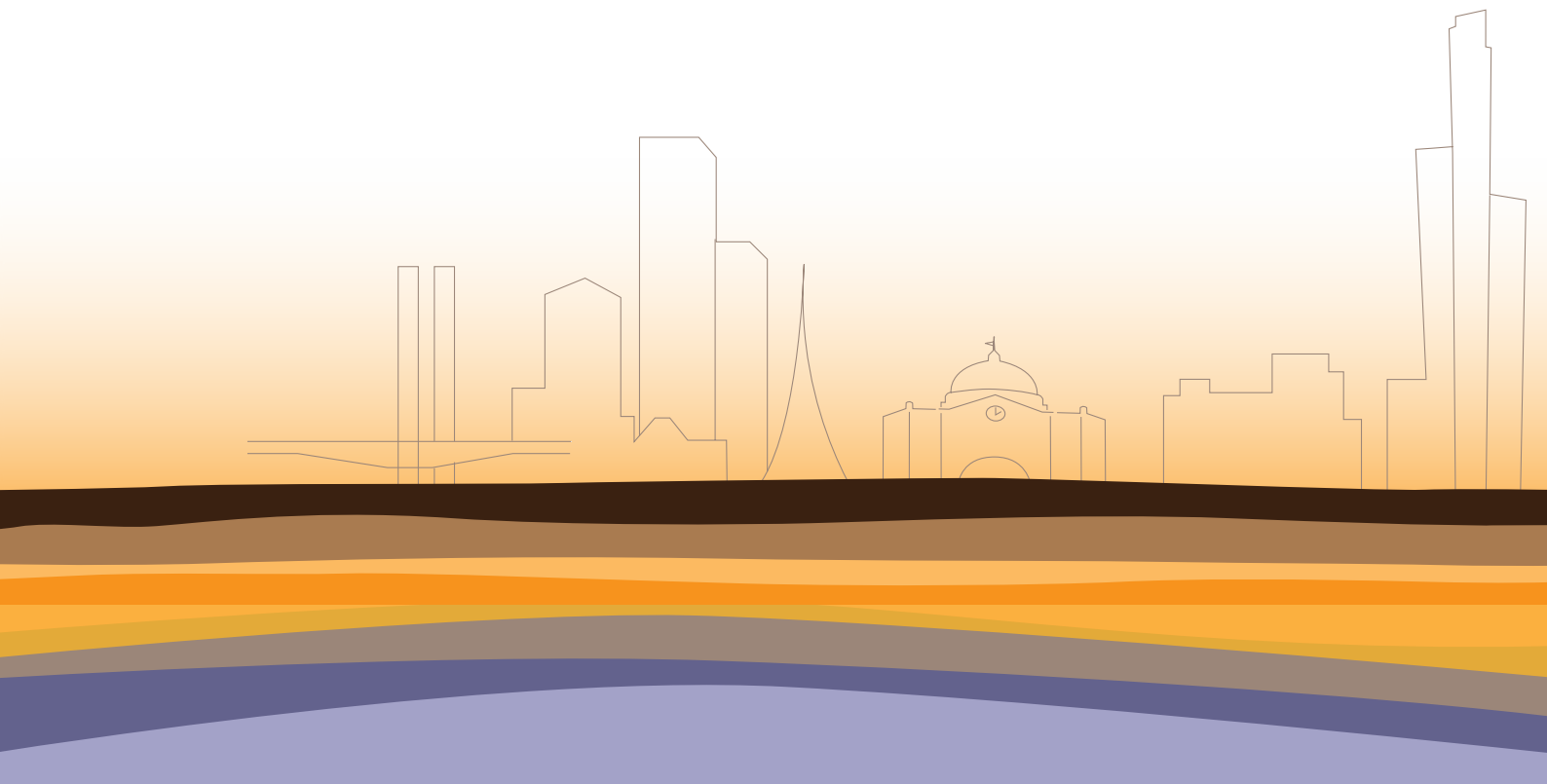


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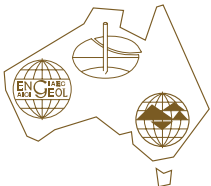
## Trade Booth 2 – Australian Geomechanics Society & New Zealand Geomechanical Society

The Australian Geomechanics Society was founded in 1970. Its origins lie in the National Committee of Soil Mechanics of the Institution of Engineers, Australia established in 1953 and the call for a corresponding society in rock mechanics. In 1973 the society was expanded to include the third discipline of engineering geology and has remained substantially unchanged since that date. The society is affiliated with:

- the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE);
- the International Society for Rock Mechanics (ISRM); and
- the International Association of Engineering Geology and the Environment (IAEG).

The AGS produces Australian Geomechanics newsletter and journal of the Society and specialty conferences, symposia, seminars and workshops, including the four yearly ANZ Geomechanics conference.

[www.australiangeomechanics.org](http://www.australiangeomechanics.org)



The New Zealand Geotechnical Society (NZGS) is registered as a charitable organization and currently has about 880 members. Membership of the Society is open to engineers, geologists, scientists, technicians, contractors, students and others who are interested in the practice and application of soil mechanics, rock mechanics, engineering geology, hydrogeology, environmental geotechnics and geotechnical engineering in general. The NZGS operates as a Collaborating Technical Society within the auspices of the Institute of Professional Engineers New Zealand.

The aims of the Society are to advance the study and application of soil mechanics, rock mechanics and engineering geology among engineers and scientists; to advance the practice and application of these disciplines in engineering; to implement the statutes of the

respective international societies in so far as they are applicable in New Zealand; and to ensure that learning achieved through these is passed on to the public.

The affairs of the NZGS are managed by a committee of 7 to 10 persons, elected by members of the Society, and an appointed secretary. The NZGS also has working relationships with the Structural Engineering Society, NZ Society of Earthquake Engineering, NZ Society of Large Dams, the Institute of Civil Engineers and the Australian Geomechanics Society.

[www.nzgs.org](http://www.nzgs.org)



## Trade Booth 3 – Chadwick Geotechnics

Chadwick Geotechnics is one of Australia's most diverse and experienced geotechnical testing companies, employing a team of highly experienced licensed drillers, technicians and support team.

We are a leading supplier of Field & Laboratory Testing, Drilling and Training Services to the Geotechnical, Civil, and Environmental Engineering disciplines, operating both Nationally and Internationally.

[www.chadwickgeotechnics.com.au](http://www.chadwickgeotechnics.com.au)



## Trade Booth 4 – Measurand

Measurand Inc. has been providing 3D shape instrumentation since 1993. Our geotechnical division design and produce "ShapeAccelArrays" (or SAAs) for automated 3D measurements for deformation monitoring of slopes, tunnels, dams, and other civil structures.

[www.measurandgeotechnical.com](http://www.measurandgeotechnical.com)



## Trade Booth 5 – Monash Geomechanics Group

The Monash Geomechanics Group offers a unique blend of research, development, consulting and practice skills backed by extensive and high level laboratory and computing facilities. The group concentrates on aspects of foundations, soil and rock mechanics, environmental geotechnics, geosynthetics, energy geotechnology, resource and infrastructure geomechanics and all the various attributes of soils, rocks and wastes as they relate to Civil Engineering.





## Trade Booth 6 – Keynetix

Keynetix will be showcasing their renowned Geotechnical Laboratory Data Management Software at ANZ 2012 as well as conducting free bespoke geotechnical data reviews by appointment and speaking on the use of geotechnical data within BIM.

Keynetix specialise in developing and supporting geotechnical data management solutions worldwide and is the Autodesk AEC Industry Partner for geotechnical data in AutoCAD. Solutions cover every stage of the geotechnical journey from planning, through site work and reporting to 3D modelling, BIM and National archives. Their products are used in 20 countries around the world including many customers in Australia and New Zealand.

Places are limited, to book your bespoke data review, please email [info@keynetix.com](mailto:info@keynetix.com)

[www.keynetix.com](http://www.keynetix.com)



## Trade Booth 7 – Maccaferri Australia

Maccaferri Australia is a leading distributor of engineered environmental solutions, and is part of the 130 year old Italian based Maccaferri Group. Our expertise includes solutions in Retaining Wall Structures, Slope Reinforcement, Hydraulic Structures, Drainage Systems, Rockfall Protection, Erosion Control, Mine Dump Walls, Sludge Dewatering, Landscaping & Architecture and Steel Fibres for Tunnelling, Shotcreting and Flooring.

Maccaferri Australia can provide in-house design assistance, training for your design or field staff and develop alternative solutions to best optimise your project requirements.

[www.maccaferri.com.au](http://www.maccaferri.com.au)



## Trade Booth 8 – Geotesta Pty Ltd

Geotesta Pty Ltd is well-respected in Australia for providing geotechnical consulting, design and monitoring services in our specialist areas of infrastructures, residential and commercial buildings and mining. We have completed successfully more than 1,500 projects in Australia. Our consulting group provide specialist geotechnical testing, investigation, design and engineering drawings.

Geotesta also supply and install geotechnical instrumentation and monitoring systems. Our core competence is in undertaking system integration for remote monitoring system, setting up automated data logging system utilizing the latest telecommunication technology and web based monitoring. We provide extensive monitoring and measurement solutions for infrastructures, mining, and building structures applications.

Field and in-situ testing: ground movement, earth and rock stress, displacement and ground settlement; Remote monitoring and automated data logging; Supply, install and monitor geotechnical instruments and structural sensors, for tunnels, deep excavation and other construction activities; Web based monitoring software and its system integration; Field installation and supervision

[www.geotesta.com.au](http://www.geotesta.com.au)



## Trade Booth 9 – Geobrugg

Geobrugg have been providing engineered, geohazard solutions for over 60 years. Our expertise and experience has driven the development of new, reliable and innovative flexible rock fall, debris flow, and landslide barriers, as well as slope stabilisation systems. All of our systems are 1:1 field tested, and used worldwide in both civil and mining applications. We utilise mesh made from high-tensile wire, which provides strong, yet light weight, cost effective solutions. Combined with the latest advances in corrosion protection, our products can satisfy the most stringent requirements for design life. With a new manufacturing plant in Perth and offices in Sydney, Melbourne and Cairns, we will continue successfully servicing Australia well into the future.

[www.geobrugg.com.au](http://www.geobrugg.com.au)



## Trade Booth 10 – The Reinforced Earth Company

The Reinforced Earth Company (RECO) designs, manufactures, supplies and advises on the installation of two major types of prefabricated construction systems to civil engineering and mining contractors: Reinforced Earth™ structures (mechanically stabilised embankments (MSE)) and TechSpan® precast concrete arch systems.

RECO's expert team of engineers and technicians offer assistance at every stage of the project life cycle: conception and feasibility, tendering, design, manufacture, construction, maintenance and upgrades.

[www.reco.com.au](http://www.reco.com.au)



## Trade Booth 11 – Techsoft Australasia / Plaxis

Techsoft is the sole representative of Plaxis in Australia and New Zealand. Under this brand Techsoft supplies a range of software tools, courses/seminars, and participates in events focused on geotechnical and civil engineering.

Plaxis software is based on the finite element method and is intended for 2-Dimensional and 3-Dimensional analysis of deformation and stability of soil structures. As well as groundwater flow, in geotechnical engineering applications such as excavations, foundations, embankments and tunnels.

Plaxis courses and seminars are primarily focused on knowledge transfer than on how to use Plaxis software. For further information please send an email to: [inquiry@techsoft.com.au](mailto:inquiry@techsoft.com.au)

[www.techsoft.com.au](http://www.techsoft.com.au)



## Trade Booth 12 & 13 – Geotechnical Engineering

Geotechnical Engineering (Geotech) is one of Australia's largest and most diversely skilled civil contracting businesses. Formed in 1972, Geotech is uniquely experienced to undertake various specialist geotechnical construction works which include piling, slope stabilisation, ground anchors, basement construction, tunnels, irrigation systems, shotcreting, dam upgrades, hydro-electric power stations, offshore contracting and laboratory services. Our project management skills have developed such that we are able to undertake the role of head contractor as naturally as we take on a specialist subcontractor role. We pride ourselves on undertaking projects with our own direct employees and equipment.

[www.geotech.net.au](http://www.geotech.net.au)



## Trade Booth 14 – Geovert

Geovert is an engineering and construction company that has a reputation for providing innovative solutions in the field of Ground Engineering and Improvement, including Slope Stabilisation and Rockfall Protection. The company has been operating for over 12 years providing turnkey solutions to our industry clients from pit to port operating throughout Australasia and the Pacific with offices in Sydney, Brisbane, Perth, Gladstone, Christchurch, Auckland and Jakarta.

The company operates in industry sectors including mining, oil & gas and infrastructure for road, rail, tunnels, dams and ports. With an experienced engineering team, the company provides clients with turnkey geotechnical solutions in any environment, regardless of site access constraints or ground conditions.

**GEOVERT**

## Trade Booth 15 – Piling Contractors

Piling Contractors is one of Australia's premier specialist engineering companies offering design and construction solutions, value engineering, Alliancing, partnering and construct only services for a wide range of load bearing, retaining or ground improvement foundation applications. We work for a variety of client types on projects associated with road, rail, port and airport transport infrastructure as well as utilities, commercial building, heavy engineering, resources and mining industries. Piling Contractors is one of the largest piling companies in Australia, with operational bases in Adelaide, Brisbane, Melbourne, Perth, Sydney.

[www.pilingcontractors.com.au](http://www.pilingcontractors.com.au)



## Trade Booth 16 – Southern Geosynthetics Supplies (SGS)

Southern Geosynthetics Supplies (SGS) is a specialist distributor of quality geosynthetic products. SGS represents some of the biggest names in the industry including Huesker soil reinforcement geogrids, DUX geotextiles, ABG drainage geocomposites and Rainsmart stormwater modules. Huesker has recently celebrated the 2010 IGS award for the development of geosynthetic reinforcements made of innovative polymers. Huesker offers specialist design advice on cutting edge soil reinforcement techniques.

Visit our trade stand and see well known products including Fortrac geogrid, Stablenka high-strength woven polyester Geotextile, Hatelit C asphalt grid as well as new products including Fortrac 3D, Robutec and Ringtrac.

[www.geosynthetics.com.au](http://www.geosynthetics.com.au)



## Trade Booth 17 – Australian Calibrating Services & GDS Instruments

Australian Calibrating Services (ACS), part of the Australian Calibrating Services Group of companies, has been servicing Australian and International customers for over forty years since its formation in 1969.

ACS is a family owned and operated business with a strong focus on providing outstanding customer support and service

ACS has three specific service offerings:

- The Design, manufacture and Sale of Materials Testing Equipment and Instrumentation
- The Calibration of testing Machines and assorted measuring equipment
- The Service and maintenance of Materials testing equipment

ACS products and services are used throughout Australia, New Zealand and the Asia Pacific region. Product sales, Customer service, advice and calibrations are supported by offices across the region. ACS will jointly be exhibiting products and systems for GDS Instruments whom they represent in Australia and New Zealand and are world leaders in software based Geotechnical Systems for Laboratory and Field.

[www.auscal.com.au](http://www.auscal.com.au)

[www.gdsinstruments.com](http://www.gdsinstruments.com)



## Trade Booth 18 – Datgel

Datgel is a specialist geotechnical data management software consultant, software developer, reseller and trainer. We are the Asia-Pacific product expert and reseller of Bentley Systems' gINT – Australia and New Zealand's number one geotechnical data management and reporting software. We also resell Bentley GeoStructural Analysis design suite, Bentley Desktop, Enterprise and Web GIS applications, Rockworks and Golden Software products. Datgel's gINT Add-ons have a worldwide foot print, and include the newly released CPT Tool version 3 incorporating user definable units, pile design and liquefaction potential.

[www.datgel.com](http://www.datgel.com)



## Trade Booth 19 – Durham Geo Slope Indicators (DGSI)

Durham Geo Slope Indicator (DGSI) manufactures and sells a comprehensive range of geotechnical instrumentation under the SLOPEINDICATOR brand. This includes permanently installed sensors used to monitor tilt, displacement, pressure and strain in soil, rock, concrete and steel structures. DGSI can provide system integration of sensors, data loggers, communications, and web-based monitoring. Slope Indicator is a well-respected brand since 1958 with instruments integrated in the measurement schemes for some of the world's most important construction projects.

[www.slopeindicator.com](http://www.slopeindicator.com)

### **SLOPE INDICATOR**

## Trade Booth 20 – SoilVision Systems

SoilVision Systems provides cutting-edge software products to geotechnical engineers, hydro-geologists, soil scientists, and geological engineers worldwide. We offer both database and finite element and limit equilibrium modeling products which allow the professional to move data seamlessly from the lab to the model. Our finite element modeling packages offer leading-edge features such as automatic mesh generation and automatic mesh refinement which greatly reduce convergence problems as well as model creation time.

[www.soilvision.com](http://www.soilvision.com)



## Trade Booth 21 – Kwik-ZIP Centralizers

Kwik-ZIP Centralizer and Spacer Systems are used extensively on Rock Bolts, Soil Nails, Anchors and other small diameter bar.

Manufactured from high grade thermoplastics, each unit is designed with price effectiveness and rapid on site assembly in mind.

Customers can cater to bar diameters from 18mm OD up to 240mm OD. In addition, models come in bow heights of 10mm up to 50mm to handle various annular clearances.

[www.kwikzip.com](http://www.kwikzip.com)





## Trade Booth 22 & 29 – Global Synthetics

Global Synthetics is a wholly owned Australian Company and is a leading independent distributor and manufacturer of Geosynthetics to the engineering, construction and building industries in the Australasia and Pacific Regions.

Global Synthetics is committed to delivering the highest level of quality and service with Global Expertise. Our qualified staff and experienced engineers have a wealth of knowledge in providing proven, cost effective solutions to Environmental, Civil Engineering and Hydraulic issues. Our products incorporate the latest technology and state of the art materials.

[www.globalsynthetics.com.au](http://www.globalsynthetics.com.au)



**Global Synthetics**

## Trade Booth 23 – CPTS

CPTS is preferred by engineers who value an efficient and professional service that delivers high quality, reliable CPT data every time. Owner, Yvo Keulemans has more than 20 years hands-on CPT experience and an enviable reputation for solving unique soil testing and site access challenges. He established ATV Hire to transport personnel, sensitive equipment and machinery across tailings dams, marshland and swamps, reclamation sites, tidal mud flats and more. For amazing site videos, visit [cpts.com.au](http://cpts.com.au) and [atvhire.com.au](http://atvhire.com.au).

[www.cpts.com.au](http://www.cpts.com.au)

[www.atvhire.com.au](http://www.atvhire.com.au)



## Trade Booth 24 – EVH Drill Engineering

"Manufacturers of little drills for big jobs"

Manufacturers of EVH rotary drills and sampling equipment  
Suppliers of Eziprobe multipurpose drills

Agents for:

- A.P. van den Berg CPT machines and equipment.
- AMS Push probe drills and sampling equipment
- SonicSampDrill drilling sampling equipment
- Eijkelpamp soil sampling and testing equipment.

[www.evh.com.au](http://www.evh.com.au)



## Trade Booth 25 & 26 – IDS Australasia

IDS is an independent engineering and systems technologies company, offering innovative products and radar systems in civil and structural engineering, geology, geophysics and the environment. For many decades, IDS has specialized in the design and production of ground penetrating radar products and IBIS interferometric radar products.

IDS is an international company with over 400 professional employees. Its headquarters are in Pisa, Italy and it has subsidiary companies in Australia, the UK, Canada and Brazil.

[www.idsaustralasia.com](http://www.idsaustralasia.com)



## Trade Booth 27 – GroundProbe

GroundProbe Geophysics provides economically essential high-resolution geophysical data to Geotechnical Engineers. Providing vastly superior decision making confidence, pre-emptive knowledge of unexpected subsurface conditions can often prevent the disputes and litigation that arise from the avoidable uncertainties that often attend civil engineering contract work. GroundProbe's technologies and solutions mitigate these risks by providing cost-effective non-invasive ways of measuring critical geotechnical parameters, thereby reducing geotechnical uncertainty.

The GroundProbe Geophysics team has decades of proven expertise in land, marine and airborne infrastructure surveys and has supported Geotechnical Engineering studies of numerous ports, LNG plants, roads, railways, pipeline routes and mine sites.

[www.groundprobe.com](http://www.groundprobe.com)



## Trade Booth 28 – HMA Geotechnical Systems Australia

Geotechnical Systems Australia was incorporated 25 years ago to design, manufacture and distribute instrumentation for the geotechnical and mining industries. All of our instruments are created from a combination of research, development and practical field experience whilst maintaining the highest possible quality.

Our portfolio is extensive and provides the following products and solutions for geotechnical, mining, dam and structural engineering applications.

- Pressure Monitoring
- Stress Monitoring
- Displacement Monitoring
- Inclination Monitoring
- Data logging and Telemetry communication systems
- Project management and “turnkey” services
- Comprehensive Field Installation and Supervision
- Workshop Repairs, Service and Calibration
- Short and long term hire instrumentation
- Evaluation of existing systems and installations
- Consulting and Technical Advice
- Custom Instrumentation

[www.hmagroup.com.au](http://www.hmagroup.com.au)



## Trade Booth 30 – Keller Ground Engineering

Keller Ground Engineering is an Australian based company working throughout Australia and neighbouring countries.

Our business is the improvement and treatment of soil and rock to solve foundation challenges covering the whole spectrum of industrial, commercial, environmental and infrastructure projects.

As part of the international Keller Group, where many ground engineering techniques now widely accepted in the construction industry were successfully developed, we offer our local knowledge and presence in combination with Keller's worldwide experience.

[www.kellerge.com.au](http://www.kellerge.com.au)



## Trade Booth 31 – Itasca

Itasca is an engineering firm that solves hydrogeological, geomechanics, and microseismological problems in many fields including the mining, civil, petroleum, waste isolation, and environmental industries.

The state-of-the-art numerical modeling codes that Itasca develops and sells for solving problems in geomechanics and hydrology are among the most widely used, widely respected tools of their kind. Operating as both consultants and software developers creates dynamic interplay: the technical capabilities of the consultancy are extended via direct access to the internals of the software tools it uses. In turn, the software is continuously developed, improved, and proven in the real-world problem-solving environment of the consulting practice.

Itasca is dedicated to providing its clients better insight into the behavior of the engineered earth environments where they operate. To do so, it maintains a staff of leading engineers in the fields of rock mechanics, hydrology, hydrogeology, geochemistry, mining engineering, petroleum engineering, geophysics, and software engineering.

[www.itasca.com.au](http://www.itasca.com.au)



## Trade Booth 32 – Earthmate Geosynthetics

Earthmate Geosynthetics has been established to provide dedicatedly the world class technical solutions in the area of geosynthetics applications. Earthmate Geosynthetics is the leading manufacturer and supplier in China and full lines Earthmate Geogrids are awarded with CE Marking by BTTG, U.K.

The production of reinforced geosynthetics at Earthmate began at the start of the 2000s. An effort by Earthmate Company a.s. to diversify its production program into the production of reinforcing geosynthetics was the cornerstone in production and development of geosynthetics materials.

[www.ccgeomate.com](http://www.ccgeomate.com)

[www.emgeogrid.com](http://www.emgeogrid.com)



## Trade Booth 33 – WorleyParsons

WorleyParsons recognizes that our customers face an increasing number of challenges, driven by a highly competitive operating environment in a world with increasing pressure to develop quickly, efficiently and sustainably. Continual innovation and flexibility is required to deal with the geotechnical risks inherent in the ground.

We recognise the need for:

- Developing holistic solutions with innovative multidisciplinary and experienced teams
- Rapid access to world class expertise
- Pressure to shorten investigation and development times, while also providing quality, best value, and a safe working environment
- Development of brownfield and marginal ground in congested environments
- Reducing risk and implementing sustainable approaches in design and construction

Operating from within the larger WorleyParsons organization, the team brings a unique blend of technical expertise and extensive practical and on-site experience. They are involved in diverse projects globally, providing geotechnical solutions to projects in the transport, marine, power, mining and hydrocarbons sectors.

We offer:

- Engineering Geology – desk study; aerial photo interpretation; site reconnaissance; onshore, nearshore and offshore site investigation; in situ testing; geophysics; laboratory testing; site instrumentation and monitoring
- Geotechnical Engineering – onshore, nearshore and offshore foundations; excavations, slopes, retaining structures, tunnels, ground improvement
- Numerical Analysis in 2D and 3D for the optimized design and assessment of ground displacements and soil-structure interaction

[www.worleyparsons.com](http://www.worleyparsons.com)



**WorleyParsons**

resources & energy

## Trade Booth 34 – Macquarie Geotechnical

Established in 2001, Macquarie Geotechnical is an independent NATA accredited testing authority with four offices and over 45 staff. We are one of the largest independent testing facilities with Engineering/Geology support for our clients.

Some of our current testing capabilities includes;

Rock – UCS, Youngs Modulus, Poisson's Ratio, Slake Durability, Tensile Strength, Peak & Residual Shear strength & Point Load

Soil – Triaxial, Consolidation, Peak & Residual Shear Strength, Dispersion, Permeability & Material Assessment

Coal – Calorific Value, Ash, Moisture, Sulphur, Volatiles, Fixed Carbon, Float sink, Drop Shatter, Wet Sizing & Dry Sizing

'We are Engineers that undertake testing for other Engineers.'

[www.macgeo.com.au](http://www.macgeo.com.au)



## Trade Booth 35 – Insitu Geotech Services

IGS is one of Australia's leading specialist in situ testing contractors.

The company started in the year 2000 under the vision of its owner, Allan McConnell, to introduce up-to-date in situ testing technology into the market with the objective of "reducing geotechnical uncertainty".

IGS is based in Melbourne, Sydney, Brisbane and Townsville, but works almost anywhere you want to go.

[www.insitu.com.au](http://www.insitu.com.au)



## Trade Booth 36 & 43 – Coffey Geotechnics

Coffey Geotechnics is a specialist ground engineering business renowned for solving complex technical challenges, pioneering new solutions and sharing knowledge on a diverse range of ground conditions to provide a customised solution for every project.

We have some of the world's best thought-leaders working across the mining, energy, infrastructure, property and government sectors. We pride ourselves on creating client value by reducing risks and providing exceptional quality work from our specialist knowledge.

Our services encompass high-end geotechnical design as well as site investigation, geotechnical interpretation, analysis, and design and construction advice from our offices across Australia, New Zealand, Canada and the United Kingdom.

Considering your future with a high calibre Geotechnical Consultancy? Excited by a global practice acclaimed for excellence on interesting projects around the world? ....Consider a career with Coffey.

[www.coffey.com](http://www.coffey.com)





## Trade Booth 37 – Uretek

Uretek Ground Engineering is devoted to the remediation and strengthening of foundation ground, and raising and re-leveling of on-ground structures.

Operating in Australia since 1995, New Zealand 2001 and Asian countries subsequently, we have primarily used the Uretek-patented method of injecting expanding structural resins to densify foundations and lift buildings, roads etc, treating over 10,000 sites in Australasia.

Very involved with earthquake and tsunami damage in Japan, we've now introduced additional technologies for NZ. These include Compaction Grouting (Low Mobility Grouting or LMG) and Jet Grouting plus the Uretek-based PowerPile system, giving a full armoury for remediation of earthquake damaged ground and liquefaction mitigation.

[www.uretek.com.au](http://www.uretek.com.au)



## Trade Booth 38 – Geofabrics

Geofabrics® has been providing geotextiles and geosynthetics solutions to engineering problems since 1978. Our core products, bidim® and Megaflo® are manufactured in Australia to the highest quality standards.

Our broad product range and geosynthetics expertise support designers, contractors and asset-owners across Australia, offering the highest level of technical support and technical tools; including design assistance, project specific testing, design software and installation detailing or advice to ensure we solve all our customers engineering problems.

[www.geofabrics.com.au](http://www.geofabrics.com.au)



## Trade Booth 39 – Aurecon

Aurecon provides world-class engineering, management and specialist technical services to government and private sector clients.

With more than 6,500 staff and over 80 offices worldwide, Aurecon has a presence in Australia, New Zealand, Africa, Southeast Asia, China, and the Middle East.

Aurecon's client centric business model gives us the agility to deliver our full range of services globally. We create best teams for our key clients, develop strong client relationships and deliver market leading solutions.

[www.aurecongroup.com](http://www.aurecongroup.com)



## Trade Booth 40 – ITM Soil

ITM-Soil Pty Ltd supply geotechnical and structural monitoring systems. Our product range covers piezometers, inclinometers, extensometers, load cells, crack meters, tiltmeters, pressure cells, settlement monitoring systems, vibration monitoring systems, strain gauges, and robotic total stations. All these are furnished with state of the art data acquisition systems and data presentation software packages.

Our field experience allows us to provide you with relevant data efficiently and conveniently. Our clients understand the value of high quality data in:

- measuring the performance of their design
- advancing their methods
- ensuring their project is completed as efficiently and as safely as possible.

We offer a spectrum of systems and services. Full turn-key solutions – from bed rock to desktop – supply, install, monitor and maintain, if required.

[www.itm-soil.com.au](http://www.itm-soil.com.au)



## Trade Booth 41 & 42 – IPC Global

For 15 years, IPC Global has been the leading designer and manufacturer of technology for performing advanced cyclic testing on soils. IPC advanced IMACS digital controllers and UTS software have been the driving force behind advanced soils testing systems from ELE, Wykeham Farrance and Controls.

IPC Global has developed equipment that enables researchers and engineers to perform advanced tests simply and to understand the critical behaviours and performance of soils under dynamic and vibration loading conditions.

[www.ipcglobal.com.au](http://www.ipcglobal.com.au)





# Australia for **ICSMGE** 2017!

Sydney, Australia has announced it will bid to host the Conference of the International Society for Soil Mechanics and Geotechnical Engineering. The Australian Geomechanics Society welcomes your support in the coming years to successfully bring our industry's premier event Down Under.

Photo: Daniel Boud, courtesy of Vivid Sydney





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Beca Geotechnical is built on sound thinking and diverse experience.

Our objective is to solve some of the most complex problems in the ground and bring these solutions to our clients in a timely and cost-effective outcome.

Collaborative working is our forté and leads to outstanding results for our clients.

What can we offer you?



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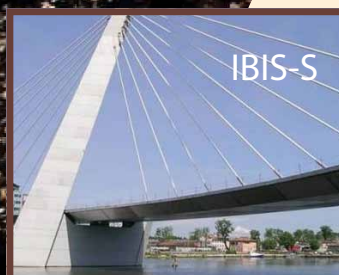
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- Thermal resistivity testing
- Laboratory and field testing of soils and rock
- Geotechnical and pavement investigations
- Non destructive digging
- Environmental sampling and monitoring
- Falling weight deflectometer
- Field instrumentation.

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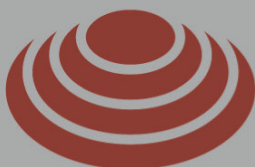


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The Monash Geomechanics Group (MGG) was formed in 1963 under the leadership of Dr Ian Donald and has since made significant contribution to the field of Geomechanics in Australia and in the world. The Monash Geomechanics Group provides much needed geotechnical education, research expertise and advancement within the local scene. In the past, prominent advancements were made in soft rock technology and piled foundations. Currently the group is particularly active in the areas of infrastructure geotechnics, geosynthetics, unsaturated geomaterial behaviour, rock mechanics, numerical modelling, geoenvironmental engineering and energy geotechnology including CO<sub>2</sub> sequestration, deep and shallow geothermal energy and climate adaptation.

The Monash Geomechanics Group comprises five full-time academics (Professor Malek Bouazza, A/Professor Jayantha Kodikara, A/Professor PG Ranjith, Dr Asadul Haque and Dr Ha Bui), 1 Adjunct Professor (Professor R. Kerry Rowe), seven research fellows (Drs Rajeev Pathmanthan, Martand Singh, Will Gates, Daniel Viète, Aruna Amarasiri, Robert Dialan, Rebecca McWatters), 1 research assistant, 1 technical officer, 25 post-graduate students and several affiliates from industry (Dr. Julian Seidel, Foundation Group Specialists, Dr. Chris Haberfield, Golder Associates, Dr. Xavier Choi, CSIRO, and Dr. Shushil Bandhari, ERTC, India). The current MGG Academia is well reputed locally and internationally with extensive publication records and awards, is very active in learned and professional societies and provides specialist advice for the industry on a regular basis. It is the largest Geomechanics/Geotechnical/Geoenvironmental Engineering Research Group in Victoria and one of the largest in Australia. The group also has extensive laboratory facilities including a large direct shear machine, a suite of high pressure rock triaxial machines including a 1 metre diameter triaxial, automated saturated and unsaturated soil triaxial and consolidation systems, a dynamic soil/geotextile filtration system, a specialised geosynthetic laboratory, a geoenvironmental engineering and energy geotechnology laboratory, a thermo-hydro-mechanical soil and rock laboratory, an advanced pipe testing system, a range of specialised field equipment such as a constant surface wave system (CSWS), thermal imagers and optical fibre measurement systems, and a field research facility for geothermal energy piles.

## Mission

The overall mission of the Group is to provide sustainable engineering solutions to geotechnical, geoenvironmental and related problems in the 21<sup>st</sup> Century, with particular emphasis to the local region. The advancement of knowledge and development of new technologies and expertise with multi-disciplinary input are key aspects of this endeavour.



Prof. Malek Bouazza



A/Prof. J. Kodikara



A/Prof. Ranjith P.G.



Dr. Asadul Haque



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Prof. R. Kerry Rowe

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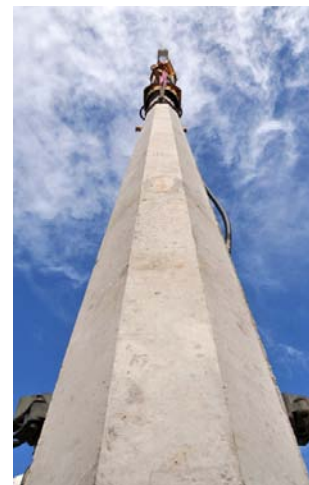
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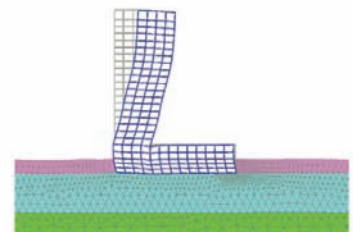
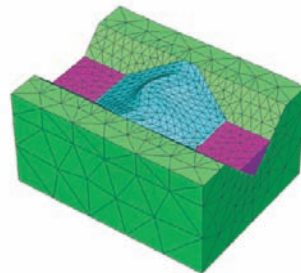
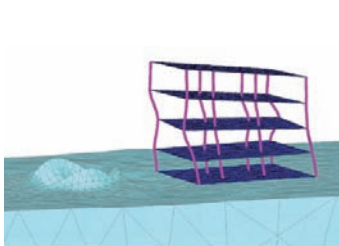
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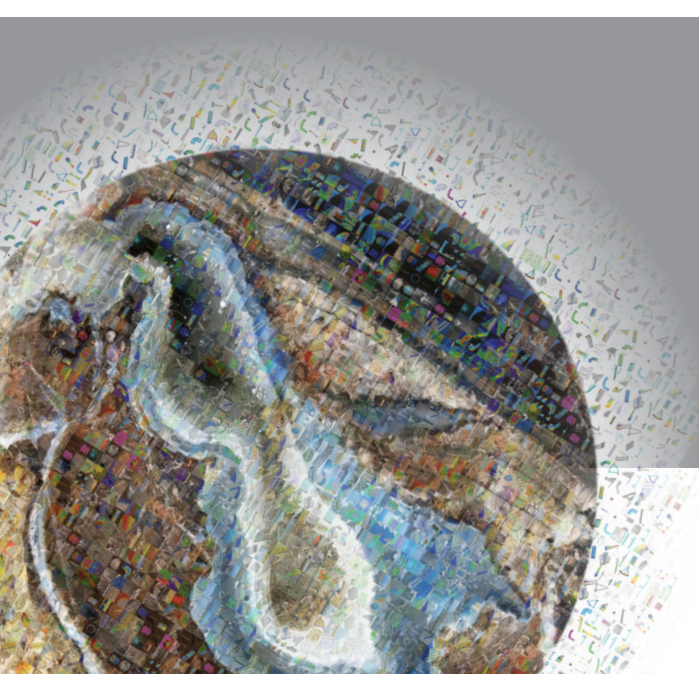
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