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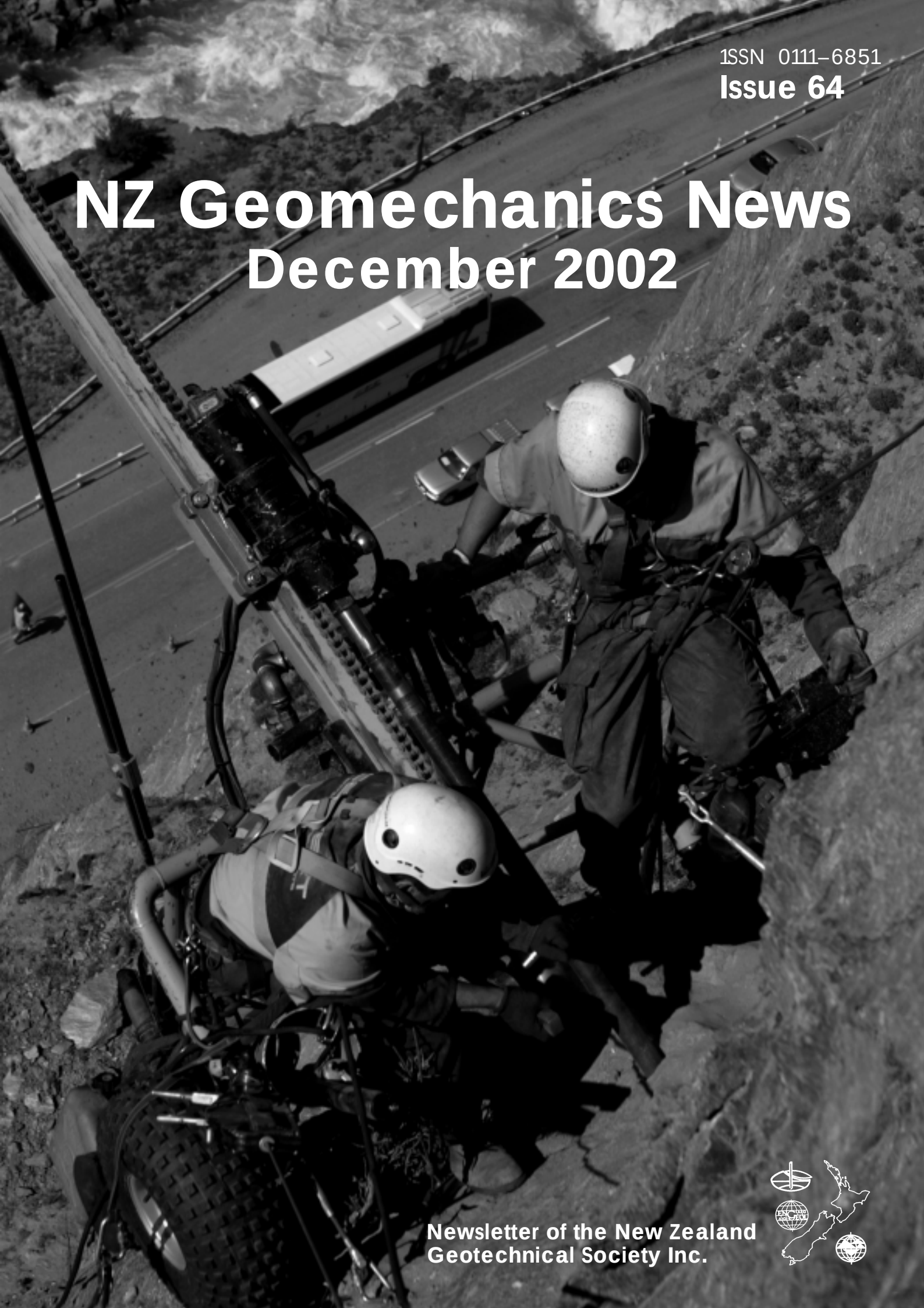
NZ Geomechanics News
December 2002



Newsletter of the New Zealand Geotechnical Society Inc.

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NEW ZEALAND GEOMECHANICS NEWS

DECEMBER 2002, ISSUE 64

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Cover photo: Geovert, high above State Highway 6 on the Nevis Bluff escarpment, Queenstown. Geovert specialises in geotechnical civil works projects at heights, here seen drilling and installing 8 m+ rockbolts 100 m above the road to stabilise a rock structure on the Nevis Bluff project.
www.geovert.co.nz
Photo Credit: Dean MacKenzie

CHAIRMAN'S CORNER

As I pen this note in mid-late October, to beat the printer's ink, it seems a little early to wish everyone a happy Christmas. No doubt the Christmas functions will be looming large as you open this issue of *NZ Geomechanics News* c/o the new Phil Glassey guidance. In my previous note from The Corner, I appealed to energetic members to rush forward and help out with branch activities. I'm pleased to report that Yan Chan (from Riley Consultants) and Damir Soric (from Soil & Rock Consultants) have jointly taken on the coordination of the Auckland branch and have developed an attractive series of topics over the coming months. Similarly, Brian Adams has taken up the reigns in Christchurch. We are now looking for energetic souls for Wellington and Dunedin.

Professor Kenji Ishihara to Visit

Prof. Ishihara will visit NZ as keynote speaker for the next Geotechnical Society Symposium to be held in Tauranga. On 28 March 2003 he will present an address on Earthquake-Induced Liquefaction Effects. This is especially relevant to NZ centres located on the coastal edges and along the alluvial plains. Prof. Ishihara is a world leader in the liquefaction field and is a past president of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE). He recently presented the prestigious 2nd Lumb Lecture to the Hong Kong Geotechnical Society. (The inaugural Lumb Lecture was given by NR Morgenstern). Known for his clarity and excellent presentation, Ishihara will make the short pilgrimage to Tauranga well worthwhile.

Tauranga Symposium, 28–30 March 2003

Registration for this event is now open. Brochures and advertisements are included in this issue. A full programme of papers is scheduled for the Friday-Saturday period with theme lectures presented by Dr Laurie Wesley and Dr Kevin McManus. Other well known NZ authors will be presenting along with notable younger Society members. A Sunday field trip, via the recently built PJK Expressways Project, to the Waihi mine area is organised. Three workshops will be available on the day preceding the Symposium including topics on Serviceability Limit State Design of Walls and Foundations, Engineering Geological Mapping on paper and in the field, and a practical hands-on presentation of the updated NZGS Soil & Rock Description Guidelines. This is a great opportunity to update yourself, enjoy the chance to meet up with other members and old friends, and experience the social events in the sunny Bay of Plenty. See you there!

A Series of Short Thank Yous

Firstly, thank you to John Blakeley for his significant service to the Society over his career. John has recently tried to retire from the Society. After many years of working for the Society and IPENZ, we're not letting him go that easily. We will nominate John for Life membership at the next Annual General meeting of the Society. Mick Pender has penned a few words in this issue of *NZ Geomechanics News* as tribute to John.

Next, thank you to Dr Bruce Riddolls for representing NZ and Australia for the past 3 years as regional vice-president of the International Association of Engineering Geology and the Environment (IAEG). Bruce has earned the respect of many in the engineering geology community for highlighting and coordinating issues for recognition of geologists in the region. Fred Baynes of West Australia will take over as 'VP'.

Ian McPherson is stepping down early next year and has handed over the responsibility of treasurer to John Marsh. Ian has worked consistently to manage the Society funds and books, along with his other role as Wellington Branch Coordinator. He takes a break after four years on the management committee.

I wish you all a happy and relaxing Christmas and look forward to seeing many of you in 2003.

Steve Crawford
Chairman

EDITORIAL

Being at the helm of the Society's official publication is a time consuming task, and at times, slightly daunting, but a position that needs to be treated with appropriate respect and diligence. John Blakeley initiated the magazine in 1970 and was appointed as the first editor. John has recently been nominated to be a life member of the society and his history of association with the geotechnical industry is included in this issue. Given this history, we need to continue to support the magazine and retain it as a forum to discuss and debate issues, as a source of industry news and information, and occasionally have a laugh at ourselves. In particular the magazine needs the continued support of members and our employers to make it work. Fortunately this support is forthcoming, so keep all the news and views rolling in.

With regard to humour and employer support, we are indebted to the last editor, Grant Murray, and his assistant, Sophie Pezaro, both of Sinclair Knight Mertz. They developed the magazine into a semi-glossy magazine with colour reproduction, instigated appropriate editorial standards, and provided a laugh occasionally. A special thank-you to Sophie for her work over the past few issues. Instead of magazine production and motorway inclinometer monitoring, I hear she has been holidaying in Italy.

The Geotechnical Symposium, *Geotechnics on the Volcanic Edge* to be held in Tauranga in March 2003, looks like it is going to be a cracker with Prof Kenji Ishihara presenting the Keynote Speech. A registration form and preliminary programme are included in this issue.

The Geomechanics Award is for the best published paper produced by a society member or members in the past three year period (to 31 July 2002) and carries a prize of $2000. The winner of the award for this current period is Warwick Prebble for his paper *Geomechanic Lecture 2001, Hazardous Terrain – An Engineering Geological Perspective* (see *NZ Geomechanics News*, December 2001, issue 62). Congratulations to Warwick. The committee inform me that this paper advanced the study of Engineering Geology in New Zealand to the widest possible audience. There were a surprising number of papers published in the past three years or so, ranging from case studies of the Golden Cross landslide and Candy's Bend roading to seismic analysis of buried arches.

This issue of Geomechanics news was supposed to focus on retaining wall design but tell God your plans and you'll only hear laughter. Instead, we have features on GeoNet and GeoNet Landslide response. Bruce Riddolls reports from the 9th Durban IAEG congress. Grant Murray reports on behalf of the ISSMGE and the nominees for technical committees form the Australian members are listed.

We are calling for photos regarding the *"habits of the species geotechnicalus"* to be published in the June 2003 issue. So get your photos of the weird and wacky things that the geotechnical practitioners get up to in to Debbie Fellows or me as soon as possible and win $200 for the next office shout.

We were to award a prize to the best Letter to the Editor for this issue, but alas the only letter we received withheld their name. We appreciate feedback and have held over the prize until the next issue. Looking forward to hearing from you.

Phil Glassey
Editor

The Editorial Team:

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Advertising Manager

Sally Fullam of ArtDesign
Design and typesetting

EDITORIAL POLICY

NZ Geomechanics News is a biannual newsletter issued to members of the NZ Geotechnical Society Inc. It is designed to keep members in touch with matters of interest within the Geo-Professions both locally and internationally. The statements made or opinions expressed do not necessarily reflect the views of the New Zealand Geotechnical Society Inc.

The editorial team is happy to receive submissions of any sort for future editions of *NZ Geomechanics News*. The following comments are offered to assist potential contributors. Technical contributions can include any of the following:

- Technical papers which may, but need not necessarily be, of a standard which would be required by international journals and conferences.
- technical notes
- comments on papers published in *Geomechanics News*
- descriptions of geotechnical projects of special interest.

General articles for publication may include:

- letters to the NZ Geotechnical Society
- letters to the Editor
- articles and news of personalities
- news of current projects
- industry news.

Submission of text material in camera-ready format is not necessary. However, typed copy in Microsoft Word is encouraged, particularly via email to the Editor or on floppy disk or CD. We can receive and handle file types of almost any format. Contact us if you have a query about format or content.

Diagrams and tables should be of a size and quality appropriate for direct reproduction. Photographs should be good contrast black and white gloss prints or high resolution digital images in jpeg format.

NZ Geomechanics News is a newsletter for Society members and articles and papers are not necessarily refereed. Authors and other contributors must be responsible for the integrity of their material and for permission to publish. Letters to the Editor about articles and papers submitted by members will be forwarded to the contributing member for a right of reply.

Persons interested in applying for membership of the Society are invited to complete the application form in the back of the newsletter. Members of the Society are required to affiliate to at least one International Society and the rates are included with the membership information details.

REPORT FROM THE SECRETARY

Society membership is currently flourishing with a total of 458 members.

New Members

It is a pleasure to welcome the following new members into the Society since the last issue of *NZ Geomechanics News*:

Stephen Temple	Christopher Chamberlain
Anthony Chin	Merrick Taylor
Grant Kneebone	Gani Cristien

Resignations

The following members have tendered their resignations from the Society:

Mike Fleming	Wayne Litherland	R P Smith
John Newsome	John Blakeley	M C N Taylor
Peter Norfolk	Sir Ron Carter	

My Humble Apologies

In preparing the secretary's report published in the June 2002 issue of *NZ Geomechanics News*, I inadvertently reported some members as having resigned. I apologise. Please note that Dev Affleck and Timothy Nash have not resigned.

Debbie Fellows
Management Secretary

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JOHN P. BLAKELEY – LIFE MEMBER NOMINEE

Autobiographical Profile

My first encounters with geotechnical engineering were during summer vacations as an engineering student in the early 1960s – the half-completed Ohakuri earth dam on the Waikato River; then earthworks for the southern outlet (Cobham Drive) in Hamilton and investigations for the railway lowering through the city centre; and finally reclamation and earthworks for the Wellington motorway near the Ngauranga Gorge.

After a brief period as a graduate on the Matahina power project at about the time of river diversion, I returned to Canterbury University to undertake a ME degree supervised by Pip (P. J.) Alley who was an earlier pioneer of soil mechanics in New Zealand. Some years earlier he had become an individual member of the International Society for Soil Mechanics and Foundation Engineering and had strongly advocated the formation of a New Zealand national committee.[1] This was my real introduction to geotechnical engineering and was followed by a year studying for a Masters degree on a Fulbright Travel Grant in the Civil Engineering Department at the University of Illinois. Key people there teaching my courses were Professors Ralph Peck (Earth Dams and Foundation Engineering) and Don Deere (Rock Mechanics and Engineering Geology). I returned to New Zealand in mid 1965 feeling that I now had a good grounding in the geotechnical field.

This was followed by three years as a site engineer supervising geological and geotechnical investigations and early construction work on tunnel approaches for the Kaimai Railway Deviation project (including the 5.5 mile long tunnel). Among the key geological people I worked with were the then Government Volcanologist in Rotorua, Jim Healy and the Chief Engineering Geologist for DSIR, Les Oborn.

I left the project shortly before underground construction work commenced in order to gain some design experience in Wellington, then was appointed a Lecturer in Civil Engineering at the University of Canterbury in early 1969 teaching soil mechanics courses. Soon after arrival there, one day I received a telephone call from Ralph Tonkin, then Chairman of the NZ National Society for Soil Mechanics and Foundation Engineering, inviting me to join the management committee as an IPENZ representative which I accepted with alacrity. The following year I put forward a proposal to establish NZ Geomechanics News and was appointed editor with the first issue being produced in November 1970.

In early 1971 I moved to Auckland to join Beca Carter Hollings & Ferner Ltd where I helped establish the geotechnical engineering section which I led for the next ten years. I was involved in a wide variety of geotechnical engineering work including two major overseas projects – the soils investigation for the Arun LNG plant in North Sumatra, Indonesia and providing geotechnical services to the Inco nickel mining project in Sulawesi, also in Indonesia. Key people I worked with over this period included Sir Ron Carter; Alan Watt and Warwick Prebble (during the earlier years); and Peter Riley and Dr Do Van Toan (in the later years).

After moving to Auckland I continued my involvement on the Society's management committee (which changed its name to the NZ Geomechanics Society in 1972), becoming convenor of Auckland activities in 1974 and Chairman of the Society from 1977–80 and during that period detailed planning was carried out for the 3rd Australia – NZ Conference on Geomechanics held in Wellington in May 1980.

In 1981 I left consulting engineering to move in new directions and also left the management committee of the Society soon after, but I have continued my membership of the Society since and taken pleasure in its continued growth and especially in the flourishing of *NZ Geomechanics News.*

Following a request from IPENZ, I became Chairman of a President's Task Force (with Terry Kayes, and Ken Hayman representing ACENZ) in 1983–85 which looked into the Ruahihi and subsequently the Whaeo canal collapses from the point of view of the profession and the lessons to be learned. This led on to my becoming a member of the IPENZ Council (and subsequently the Board) from 1988–99 including becoming President of IPENZ in 1997.

In my 12 years as Executive Director of the Centre for Advanced Engineering (CAE) at the University of Canterbury (1988–2000), although its principal activities were in the area of energy and electricity supply and waste and risk management, I took particular pleasure from the outcomes of the first CAE major project on "Lifelines in Earthquakes: Wellington Case Study" which I initiated and which led to ongoing lifeline engineering studies in New Zealand. CAE was also involved in studies on earthquake response including co-publishing with EQC the "Wellington after the Quake" conference proceedings in 1995 and also the Review of the Edgecumbe Earthquake in 1998.

Although my main field of professional engineering interest is now in sustainable energy, I will continue to take an interest in the Society and its activities and would be greatly honoured to become a Life Member.

[1] Blakeley, J.P. (1978): "Twenty Years on – a history of the NZ Geomechanics Society," *NZ Geomechanics News* No. 16, June 1978.

A Tribute to John P. Blakeley

By Mick Pender

Life membership is recognition of the contribution a member has made to the Society. In John's case the outstanding contribution was his initiation of New Zealand Geomechanics News in 1970. This publication has appeared twice a year ever since, John being editor for four years from 1970 to 1973. From modest beginnings it has grown into the sophisticated publication we receive now. No doubt John opens each new issue with a satisfied smile. The content has expanded to the extent that it has now moved well beyond the "news" function originally intended, having become a respectable technical publication which also fulfils a news function. In fact, the time might be right to consider a change in name to something like "NZ Geotechnics" or "NZ Geotechnical Engineering" or "Geotechnical Practice and Problems in NZ".

Another initiative John completed was a brief, but valuable, history of the first couple of decades of the Society, published in Geomechanics News 16, June 1978. Information such as this is so easily lost unless someone, in this case John, takes the initiative and talks with the early players and then commits the findings to print. From 1977 to 1980 John was Chairman of the Society and so had overall responsibility for the organisation of the 3rd Australia – New Zealand Conference on Geomechanics held in Wellington in 1980.

John's career moved beyond the geotechnical world in the early 1980s, but he has maintained an interest in the Society. He contributed to the development of a proposal for Practice Colleges within IPENZ and he gave a spirited address on this topic to the Society Symposium on Land Development held in Hamilton in 1996. As things came to pass the Practice College idea was not implemented but the Chartered Professional Engineers Act 2002 sees the realisation of many of John's proposals. He was President of IPENZ in 1997/1998.

My earliest memories of John Blakeley go back to undergraduate days at the University of Canterbury. John was a few years ahead of me and whilst I was in my first and second professional years he was doing a Masters degree on the compaction properties of Port Hills Loess. My fellow undergraduates and I were aware of a particularly industrious person in the laboratory and in the library. This awareness was heightened by the frequent references that the two academics teaching soil mechanics then, Pip Alley and Tom Dodd, made to the work that John was doing.

After completing this ME degree in 1964 John had the good fortune to be awarded a Fulbright Travel grant and went to the University of Illinois where he completed a taught masters degree in soil mechanics and foundation engineering. Ralph Peck and Don Deere were members of the teaching team at Illinois at that time.

On returning to NZ John worked on the Kaimai tunnel project and associated major infrastructure. This was followed by a period lecturing at the University of Canterbury, after which he spent about 10 years with Beca Carter Hollings and Ferner in Auckland.

In 1981 he became Executive Officer of the Applied Research Office at the University of Auckland (a predecessor of Auckland UniServices Ltd) until 1988 when he moved to the University of Canterbury as the first Executive Director of the Centre for Advanced Engineering, a position he held until 2000. He then moved back to Auckland and now practises as an engineering consultant, and a part-time Research Fellow in the Centre for Sustainable Engineering Initiatives at UNITEC where he also teaches environmental law, environmental impact assessment and professional practice in the School of Civil and Environmental Engineering. He is also the present Convenor of the Sustainable Energy Forum, a national body which promotes policies to encourage energy efficiency and renewable energy technologies and has also been working for IPENZ in co-ordinating efforts in Auckland to assist immigrant engineers in finding suitable employment, including running courses to help them in this regard. He is a Patron of the Register of Engineers for Disaster Relief NZ (RedR).

LETTERS TO THE EDITOR

Dear Ed,

I enjoyed the Bob Wallace column in the last issue of Geomechanics News (Issue 63, June 2002). I too have been subjected to similar personality assessment-type courses, ending up being an INSG (Incompetent No-good, Scholar of Geotechnics – or something such like). This meant that I should stay away from engineering. Good, as my career was heading toward management anyway.

Then I went to another course whereby I discovered my communication style, which indicated that under normal circumstances I communicated well with all my colleagues, but when I was under stress I tended to scream at them. Well… so what? Isn't this pretty normal? Not for managers apparently.

Anyway, on another course I discovered that the original assessment was wrong and that I was actually a GNS (Genuine, Nonchalent, Scientist). Perhaps this should be added to Bob Wallace's List.

By the way. Who is Bob Wallace?

Sincerely

AA (Assessed Acronym)

NZ Geomechanics News has come into possession of a special Commemorative Volume published by the Australian Geomechanics Society to mark the Golden Jubilee of the ISSMFE (International Society of Soil Mechanics and Foundation Engineering). It contains a selection of the best papers written by Australian authors over the last 50 years and includes such luminaries as Stapledon, Poulos, Parry, E H Davis, and Scala's original paper that launched dynamic cone penetrometers onto unsuspecting fingers worldwide. We want to give all NZGS members a chance to win this significant book: it will be awarded to the best letter to the Editor submitted for either the June 2003 or December 2003 edition of *NZ Geomechanics News*. Send your letters to the new Editor Phil Glassey (P.Glassey@gns.cri.nz) and be in to win.

WE NEED YOUR HELP!

- If you are a young geotechnical professional
- Have the yearning to be involved in the NZ Geotechnical Society
- Want activities for young geotechnical professionals

If this is you, don't be apathetic. You need to volunteer for the Young Geotechnical Professionals Co-ordinator Position on the Management Committee.

Simply email the Management Secretary now – dfellows@xtra.co.nz

New Services

Window Sampler

- Geotechnical investigations
- Environmental investigations
- Soil sampling
- Piezometer installation
- Coring to 10 m
- Cost effective
- Continuous core sample of 1 m or 2 m
- Excellent at identifying discrete bedding or layering
- Recovers sensitive soils i.e. liquifying sands
- Useful where access is difficult or there is a space constraint i.e basements, gardens

Hydrostatic Profilometer

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  - Oil tanks
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- Monitoring height range of 4 m
- Output
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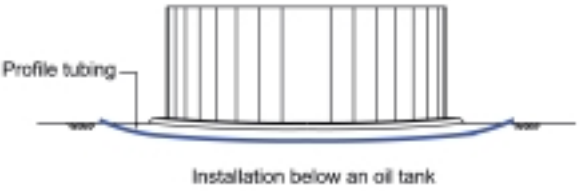
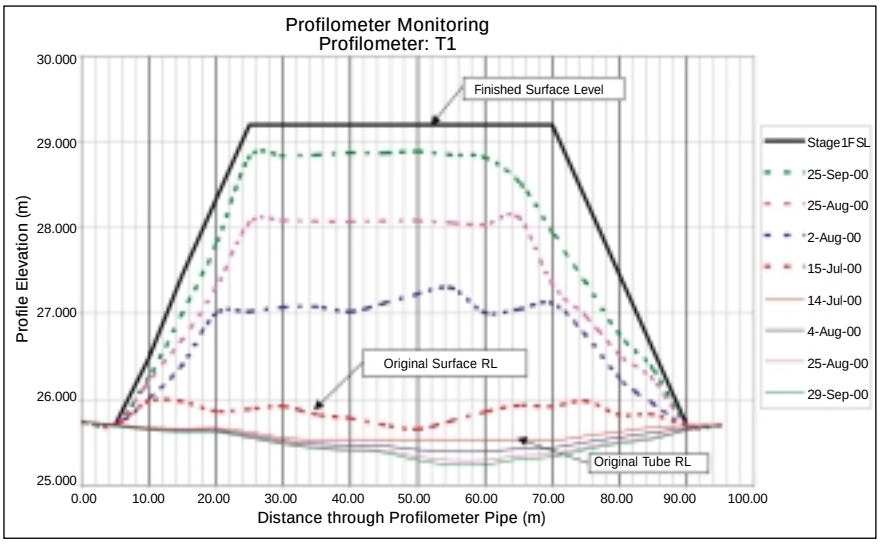
  - Settlement versus time at a discrete point



Installation below an oil tank



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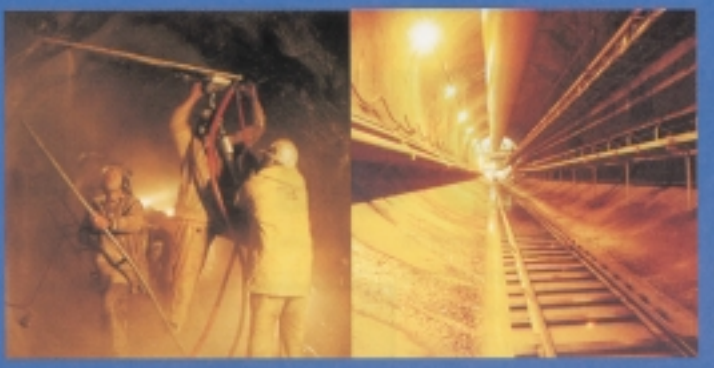

Design engineers,
Second Tailrace Tunnel
Manapouri Power Station,
Fiordland

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detail design
Cosseys Dam upgrade,
Hunua Ranges

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construction supervision
Gillies Ave widening,
Auckland

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INTERNATIONAL SOCIETY REPORTS

ISSMGE

Vice President's Report, October 2002

Board Meetings

A Board Meeting was held in Ghent in June. This was our second meeting in this term of office and a lot of ground was covered. The next Board Meeting will be held in South Africa in November. The mid term Board Meeting and next Council will be held in Prague 2003.

Technical Committees

After a review of Technical Committee's (TC) activity by the President all the existing TC's were disbanded in September 2001. The President subsequently identified those TC's that will be continued and new ones that will be instigated. The current list of new TC's is attached with the respective host/member societies and Chairman identified. All the core members of the TC's were appointed by the respective Chairmen. The NZGS and AGS have nominated members to the TC's and the complete list is attached with contact details.

Information Technology

The ISSMGE has entered into a commercial agreement with an IT/Website company that supports a Internet based Geotechnical Engineering Services Directory. This is beginning to generate some income and all the Member Societies are being encouraged to show support by recommending industry contacts to register.

There has been a lot of behind the scenes activity by an IT Task Force on the rejuvenation of the ISSMGE Website. We are currently in negotiation with an IT consultant for the development of an interactive website. It is hoped that this will provide a forum for disseminating information to the members and member societies about ISSMGE activity. It is also intended to provide a means of administrating the society, international conferences and the TC's. It is hoped that publications, proceedings and the work output of the TC's will be accessible to the members. This is proving to be a complex and expensive process but it is hoped that expenditure and programme will be approved in November that will see the changes being implemented in early 2003.

Industry Ambassadors

Another initiative instigated by this Board has been the establishment of Industry Ambassadors for each region. As reported in March for the Australasian Region I have asked and nominated Max Ervin to act as the Ambassador with support and input from NZ provided by Peter Miller. To the best of my knowledge there has been no further action or activity on this initiative.

Constitution, Subscriptions and Voting Policy

There has been further discussion on the problems associated with the current method of calculating subscription rates and voting policy at Council. A proposal is being drafted that will be presented to the Board in November and then the Council in Prague next year.

On subscriptions it will be proposed that a new formula be adopted that will effectively result in a uniform, fixed cost per member.

On voting issues it was agreed that a draft proposal will be prepared that provides for a weighting value to be applied on any recently received privilege. This weighting formula will only apply for the selection of international conference venues and council meetings. It will not be applied in voting for a new President.

Role and Format of International /Regional Conferences

There has been some discussion and movement on the role and format of international and regional conferences. A Manual is being prepared that is intended to provide organisers of Conference's undertaken under the auspices of the International Society guidance and suggestions on format.

J Grant Murray
Vice President for Australasia

Sinclair Knight Mertz
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Phone: 09 9138984
Fax: 09 9138901
Email: gmurray@skm.co.nz

International Society for Soil Mechanics and Geotechnical Engineering Australasian Nominees to Technical Committees 2001–2005

TC	Title	Hosting	Chairman	Australasian Nomination	Contact Details
TC1	**Offshore and near shore geotechnical engineering**	The Netherlands	H. Kolk	Mark Randolph	Professor Mark Randolph University of Western Australia Dept of Civil Engineering 35N Stirling Highway Crawley WA 6009 randolph@civil.uwa.edu.au
TC2	**Geotechnics of physical modelling and centrifuge testing**	(Canada) Singapore	(R. Phillips) C.F. Leung (Sing)	Mark Randolph	
TC3	**Geotechnics of pavements**	Portugal	G. Correia	Doug McInnes	Dr Doug McInnes Golder Associates Pty Ltd 182 Lord Street Perth WA 6000 golderpr@golder.com.au
TC4	**Earthquake geotechnical engineering**	Canada	L. Finn	Mick Pender	Professor MJ Pender Dept of Civil and Resource Engineering University of Auckland Private Bag 92019 Auckland m.pender@auckland.ac.nz
TC5	**Environmental geotechnics**	Italy	(R. Katzenbach) M. Manassero C. Shackelford	David Smith	Dr David Smith 4 Sakonia Close Wallsend NSW 2287 Australia david.smith@newcastle.edu.au
TC6	**Unsaturated Soils**	Spain	E. Alonso	Nasser Khalili	Dr Nasser Khalili University of New South Wales School of Civil and Environmental Engineering Sydney NSW 2052
TC9	**Earth reinforcement**	Japan	H. Ochiai	John Small	Dr JC Small Department of Civil Engineering University of Sydney NSW 2006 j.small@civil.usyd.edu.au
TC17	**Ground improvement**	France	J.M. Debats	Sergei Terzaghi	Mr Sergei Terzaghi Sinclair Knight Merz PO Box 9806 25 Teed Street Auckland Sterzaghi@skm.co.nz
TC18	**Deep foundations**	Belgium	A. Holeyman R. Katzenbach	Julian Seidel	Dr JP Seidel 18 Mulgrave Way Croydon VIC 3136 Australia julian@foundationqa.com

TC	Title	Hosting	Chairman	Australasian Nomination	Contact Details
TC19	**Preservation of historic sites**	Italy	C, Viggiani Ch. Tsatsanifos	John Berrill	Dr John Berrill School of Engineering University of Canterbury Private Bag 4800 Christchurch Berrill@civilaa.civil.canterbury.ac.nz
TC20	**Geotechnics and professional practice**	USA	?	David Starr	Mr DC Starr 7 Goldieslie Road Indooroopilly QLD 4068 Australia Dstarr@earthtech.com.au
TC28	**Underground construction in soft ground conditions**	UK	R. Mair	Jeff His	Dr JP His 26 Connecticut Avenue Five Dock NSW 2046 Australia jeff.hsi@smec.com.au
TC29	**Laboratory stress strain strength testing of geomaterials**	UK	R. Jardine	David Airey	Dr D Airey School of Civil and Mining Engineering University of Sydney NSW 2006 Australia
TC31	**Education in geotechnical engineering**	France	J.P. Magnan	Laurie Wesley, Mark Jaksa	Dr Laurie Wesley Civil Engineering Department University of Auckland Private Bag 92019 Auckland l.wesley@auckland.ac.nz
TC32	**Engineering practice of risk assessment and management**	Norway	F. Nadim	Mark Jaksa	Dr MB Jaksa 12 Paul Street Hectorville SA 5073 Australia mjaksa@civeng.adelaide.edu.au
TC34	**Prediction methods in large strain geomechanics**	Japan	F. Okia	Hans Muhlhaus Sergei Terzaghi	Prof H Muhlaus Queensland University Advanced CentreFor Earthquakes Studies (QUAKES) Department of Earth Sciences The University of Queensland St Lucia, QLD 4072, Australia
TC35	**Geotechnics of the particulate media**	UK	M. Bolton	Hackmet Joer	Dr HA Joer 5 Sterling Close Craigie WA 6025 Australia hackmetj@ag.com.au

IAEG

Vice President's Report, October 2002

Annual Executive Committee Meeting, Durban, 14 September, 2002

Financing of the IAEG Secretariat

The secretariat functions have been provided by staff of the Centre for Engineering Geology, Paris School of Mines largely on a voluntary basis. However, the centre is now obliged to charge IAEG more for clerical support, namely 15000 Euros. The proposal was endorsed by the Executive.

Commissions

A joint landslide commission of IAEG, ISSMGE, & ISRM has been proposed, and agreed to by the three sister societies. It was therefore proposed to discontinue the IAEG Landslide Commission, which has been inactive in recent times. The concept of setting up joint commissions of the three societies wherever possible was endorsed, and new commissions for sustainable development and soft rocks were agreed to be possibilities for further consideration.

Bulletin

Editor Brian Hawkins described the problem of getting good papers, especially due to the competition from conferences. Nevertheless, the Bulletin continues to meet its publication targets.

Annual Council Meeting, Durban, 15 September, 2002

Executive committee proposals

Proposals related to secretariat funding and new joint commissions were endorsed unanimously.

VP reports

I presented my annual VPs report for Australasia

New Executive Committee

The IAEG Executive Committee for 2003–2006 was elected. The new President is Dr Niek Rengers, of the Netherlands, currently a VP for Europe. Much of his professional career has been at the International Institute of Aerospace Survey and Earth Sciences (ITC), in Enschede. Dr Rengers stated objectives as President are to promote closer collaboration with ISRM and ISSMGE on such issues as:

- creation of a common secretariat
- combined technical commissions
- development of common approaches to professional and educational issues.

The Council also confirmed that the new VP for Australasia is Dr Frederick Baynes, Perth-based consultant with 25 years diverse project experience since completing post graduate degrees in Engineering Geology at Imperial College and Newcastle University.

Executive Committee and Council Meetings for 2003

These will be held in Istanbul, Turkey, in association with an IAEG-sponsored symposium on industrial minerals and building stones, from 15–18 September.

The 10th IAEG Congress

This is set down for 19–22 September, 2006 in London, theme "Engineering geology of tomorrow's cities".

Bruce Riddolls
Vice President for Australasia

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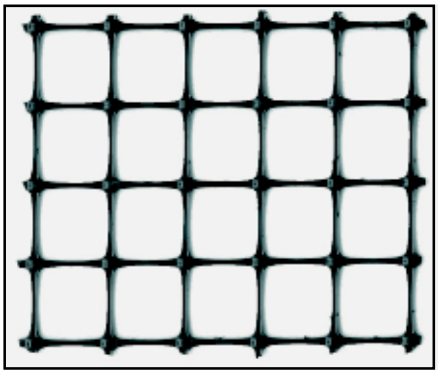

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NZGS BRANCH ACTIVITIES

Auckland Branch Activity Report

- July 2002 – The "2002 Activities Coordination Meeting" was held at Meritec to discuss on possible topics for future evening presentations. Various ideas were discussed by eleven participants.

- August 2002 – Four participants of the ANZ YGPC gave ten-minute presentations on their conference papers. Topics were wide ranging, covering the following:
  – property relationships of Waitemata Group
  – low angle instability in Tauranga Group
  – containment bund on soft marine sediment
  – slope failure in a complex volcanic terrain

- September 2002 – Dynamic Compaction (DC) was co-presented by Tim Sinclair and Alan Bell (Smithbridge). Tim did well to cover ten design issues, supported by a well-researched literature review. Alan covered various DC projects carried out by Smithbridge.

Two further presentations are planned for year 2002. They have been scheduled for 20 Nov (Ground Anchors – Construction Techniques Group) and 4 Dec (Report on International Conference on Geosynthetics and a conference paper). The Northern Area Student Prize may take place on 11 Dec, pending interest from the academic faculties of Auckland and Hamilton.

The following is envisaged for Year 2003:
- February – To be jointly advertised by NZGS and NZSOLD – talk by Peter Riley "Big Dams in South America – triumphs and near tragedies", experienced gained during the ICOLD executive meeting in Foz Do Iguassu Sept 2002
- March – Court legal procedures for claims, legal risks of the engineer & typical mistakes – Paddy Luxford & lawyers
- April – Visiting Speaker – Professor Ishihara (?)
- May – Overseas Speaker – Richard Bathurst – Recent advances on reinforced earth walls
- June – selected major projects

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Waikato/Bay of Plenty Branch Activity Report

Unfortunately there have been no meetings in Tauranga over the last 6 months. We almost had one speaker ready to present, but work commitments soon provided an overburden and thus no excitement for us BOP members. Please feel free to offer your services at any time, a presentation, discussion or simply a gathering of minds. Suitable refreshment sponsorship is available.

I am hoping to have at least 2 meetings in the run-up to the Symposium in 2003, just to get everyone in the mood. Don't forget to book your spot early for, "Geotechnics on the Volcanic Edge". Details are to be found in this publication.

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Wellington Branch Activity Report

We have had three talks this year, which coincidentally is the size of the audience at our last meeting. This size of turnout is certainly depressing for the organiser and not particularly flattering to the speakers. Recent talks and a summary of the topic are presented below:

On 25 June John Turner an Erskine Fellow at the University of Canterbury spoke on the use of piles and anchors to stabilise large landslides in Wyoming and piled foundations for an 8 m deep excavation in Washing DC adjacent to a 10 storey building. For the building, 750 mm diameter bored piles were installed as tangent piles, followed by installation of a single row of tieback anchors. After construction of the basement portion of the new building frame, the tieback anchors were cut and bored piles were used as part of the permanent foundation system. Measured movements of the adjacent building showed that this system was very effective in controlling vertical and horizontal deformations. John's talk was attended by 10 to 12 people

On 24 September Rosslyn Bailey from Opus Central Laboratories and Dev Affleck from Pattle Delamore presented their papers from the recent Young Geotechnical Professionals Conference in Rotorua.

Rosslyn spoke on research to determine the structural number of pavements on volcanic subgrades. Pavements constructed on volcanic ash behave differently to non-volcanic soils and have higher deflections when dynamically loaded. Past relationships between CBR and modulus therefore may not be applicable. In situ-testing of the volcanic subgrades has been conducted using the Falling Weight Deflectometer (FWD) test and in-situ CBR, together with other standard tests. From the in-situ testing, three correlations were identified for volcanic soils. Factors were presented to enable the Structural Number of pavements on volcanic soils to be determined based on the identified relationships, and a procedure suggested for determining the Structural Number of pavement from the FWD modulus.

Dev spoke on a three-dimensional gravity survey of the pre-volcanic topography in Epsom, Auckland. Auckland is a major city built on an active volcanic field. Some of the permeable volcanic deposits constitute a substantial aquifer system within the Auckland isthmus and overlie relatively impermeable Waitemata sediments. A total of 157 gravity stations were established in the Epsom area with the objective of determining the thickness of the tuff and basalt overlying the Waitemata sediments. This information was then used to define the palaetopography underneath the volcanic deposits, which play a controlling part in the complex and divergent groundwater flow regime in the area.

I have organised three more talks for the rest of the year. This hits the goal of six talks a year.

- Alexei Murastev will talk about geotextiles on 22 October. His talk is a summary of recent research carried out by Becas on behalf of Transit.
- Ian Brown will give a talk about monitoring ground and ground movements in the Athens Metro. Ian's company landed this contract from worldwide competition and his talk should be an interesting one. Ian's talk is on 12 November.
- Maurie Mcsaveney will talk on catastrophic landslides on 17 December. The abstract of his talk is as follows:

"The puzzle of understanding the unexpectedly long runout of large rock avalanches has been "solved" many times since Albert Heim first drew attention to it in 1882. Dynamic fragmentation is one of the latest solutions – borrowed from petroleum engineering and astrogeology. Static fragmentation arises at low strain rates by gradual crack initiation and growth, and is dominated by the growth of a single, weakest flaw. This is the regime leading to the initial failure of many landslides. The static strength is largely independent of the loading rate. The dynamic regime is entered when the growth of a few flaws does not relieve the applied elastic strain, and stresses rise in the material adjacent to the flaws, forcing new ones to nucleate and grow. The tensile strength of a dynamically fragmented material increases with approximately the 4th root of the strain rate. The elastic strain energy, W, released at failure (per unit volume of rock) is $W=Q^2/(2E)$, where Q is the tensile strength of the rock and E is the elastic modulus. It is released explosively as kinetic energy as an internal isotropic dispersive stress. Dynamic fragmentation acts as a rocket fuel to propel large rock avalanches, such as the December 1991 collapse of Mt Cook, further than they might have travelled if they had just collapsed to joint-bounded clasts. He may also tell how this and other ideas fared at the NATO Advanced Research Workshop on "Massive rock slope failure: new models for hazard assessment" in Italy, 16–21 June 2002."

We still haven't got a confirmed Wellington Branch coordinator for next year and do not have any talkers lined up. The good new is we have lots of beer still so it is free for the next three meetings!!

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Wellington Branch Coordinator
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Canterbury Branch Activity Report

The Canterbury branch attempts to hold regular meetings with a presentation every 4–6 weeks. These are usually held on a Tuesday night in the School Engineering at the University of Canterbury. The format begins with social drinks and chips at 5.30 pm in the Staff Common Room followed by the presentation in a nearby lecture theatre between 6.00 and 7.00 pm. This is a good time to meet fellow geotechnical practitioners, students and academics. Time at the end of each meeting is allowed for questions and discussion.

Maccaferri New Zealand Limited have been kind enough to offer sponsorship in the form of drinks and chips before each meeting. The contact for Maccaferri in Christchurch is Adrian Gardner (349 5600).

Branch activities have been quiet in the second half of 2002 with several planned presentations cancelled for various reasons. Upcoming events include the Southern Student Prize presentations, to be held on Tuesday 26 November at the University of Canterbury. See the NZGS Web page for further information. Meetings will be advertised to members in advance by email or post. For up-to-date information on Canterbury Branch Activities, see the NZGS web page or contact the coordinator Brian Adams. (brian_adams@urscorp.com, 374 8500).

If you or someone you know has been working on a geotechnical engineering project that would make an interesting branch presentation, please contact the branch coordinator.

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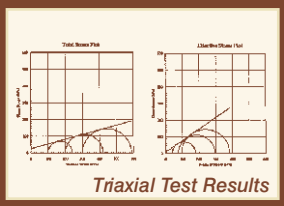
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CONFERENCE REPORTS

Geotechnical Engineering of Embankment Dams

1 Week Specialist Course, University of New South Wales, Sydney, May 2002

Reported by: Don Tate
Riley Consultants Ltd

Over a 1 week period in May an intensive course on the topic of geotechnical engineering of embankment dams was held at University of New South Wales. Participants in the course included consultants, owners representatives and masters students. New Zealand was well represented with 6 people. The level of experience & background of the participants varied widely, from those working in the field to those with limited knowledge. This did not present a major problem though.

The presenters were all eminent experts. Professor Robin Fell is well known for his research on filters and risk assessments in particular, and he presented most aspects. Mark Foster has completed a PhD on piping failure and filters. Dick Davidson is well known in NZ, and he presented some fascinating case studies mainly from the US. Geology was not forgotten, and Patrick Macgregor gave some interesting insights in this key area within dam engineering.

The course was quite outstanding on the breadth and depth of the topics covered. These ranged from dam zoning concepts to specialist areas such as liquefaction and stability analysis. Particularly illuminating was some of the recent research and methods on filters, protection against piping failure and methods to assess the probability of piping failure. The comments on dam zoning as related to hazard rating were also useful. The course and discussions also reinforced for me the feeling that some key areas in the USBR Design of Small Dams (for many the bible on dam design) are by present design criteria outdated. This is particularly the case for filter design and for seepage protection associated with culverts. I would recommend that Robin Fells textbook should be compulsory reading (the new version may be published in the near future).

By about the forth day a significant wilting was apparent from the participants; probably due to a particularly demanding session on liquefaction (or was it something to do with the previous nights' entertainment at a local restaurant?). On the last day Robin Fell handed out an assignment. This was compulsory for the students but not the rest of us. Anyway as a practising consultant I happily volunteered for the trickiest of the 3 options (the main part of the assignment was designing and detailing a dam cross section based on a particular set of founding conditions and materials available). The foundation would have done a NZ site proud, with a fault, permeable zones, and sheared zones of low strength.

Overall the course was extremely good value for money, and I am already making extensive use of the course notes on the job.

7th International Conference on Geosynthetics

Nice, France, 22–27th September 2002

Reported by: Gordon Stevens
Technical Manager, Maccaferri, New Zealand Ltd

It has been 25 years since the first International Conference on geotextiles held in Paris, France. In true fashion the French Chapter of the International Geosynthetics Society chose the exquisite location of Nice, the capital of the French Riviera for the 7th International Conference. Located in the heart of the old town, the Conference Centre was within walking distance of the beach promenade allowing all participants to experience the French culture and enjoy a memorable event.

The Conference was attended by over 1300 exhibitors and delegates from around the world. Approximately 9 members of the recently formed Australia & New Zealand Geosynthetics Chapter attended representing almost 30% of this young Chapter.

The theme of the Conference was "State of the Art Recent Developments" which also had a strong focus on encouraging young and up coming authors to present their latest research work and field experiments. This resulted in over 375 technical papers being presented at the Conference in four parallel sessions. In parallel to the

technical presentations there was an exhibition of geosynthetic products, technologies and services from over 100 companies and organisations.

The Conference began on the Sunday with the JP Giroud lecture presented by Dr Kerry Rowe on the subject of "Geosynthetic Reinforced Embankments over Soft Soils". This is an area of Geosynthetics which has seen continual growth due to the greater infrastructure demands over areas of land generally unsuitable for normal building activities. The authors presented their findings from both field observations and finite element analysis. Some of the key findings were:

- Partial consolidation provided by PVD's and the tension mobilized in reinforcement can substantially increase embankment stability.
- Creep in geosynthetics can decrease the embankment failure height.
- Mobilisation of reinforcement during and after embankment construction can vary significantly depending on soil and reinforcement characteristics.

The Monday Keynote lecture on "Geosynthetics in Waste Containment Facilities: Recent Advances" was co-authored and co-presented by J.G Zornbery (US), D. Adam (Austria) and Malek Bouazza from Monash University, Australia, the current president of the Australasian Geosynthetic Society Chapter. The presentation gave a very good overview of the practices in waste containment carried out over the past 25 years, some of which would have resulted in major litigation of the operator if adopted within the current regulation framework. The advances in materials, installation and testing techniques as well as design practices are now making our waste containment secure and monitoring of groundwater and leachate collection has supported these new practices. Obliviously there are still failures and one of the areas highlighted in this keynote lecture was soil veneers where sliding of the landfill cover occurs over the geosynthetic interface.

The four parallel sessions were broadly categorised into the following categories:

- Geotechnical and Reinforced Soil Structures
- Environmental Engineering
- Transport and hydraulic engineering
- Material testing and properties of Geosynthetics

Choosing one of the four parallel technical sessions to attend was always going to be difficult however the seismic stability of Reinforced Soil Walls had a lot of relevance to New Zealand applications. The papers presented were dominated by shaking table testing carried out by the Japanese researchers. This testing was carried out to measure the horizontal and vertical deformations occurring in Reinforced Soil walls under peak horizontal ground accelerations as high as 0.8 g. In addition to the testing, the performance of reinforced soil walls after the recent large earthquakes in Taiwan was reviewed by Huang and his colleagues at the Taiwanese University. The results of the research allows designers a better understanding the mode and cause of these failures as well as learn from those structures that performed satisfactorily.

The Tuesday morning keynote lecture was a marvel in co-operation and modern technology with the two authors coming from totally different parts of the world. Professor Chew is based in Singapore close to the equator and A Watn based in Norway close to the North Pole. Without email and video conferencing this co-operation would not have been possible. The subject they dealt with was geosynthetic damage from laboratory to field. This was a hard look at the type of damage the geosynthetic undergoes. A number of slides were presented highlighting the fact that damage can occur across the full range of geosynthetics. Specific examples of testing and evaluation of geosynthetic damage were presented which concentrated in the areas of separation and filtration. This included geogrids and geotextiles used in roads, hydraulic barriers and reinforced soil applications to geocomposites used in drainage. The main focus was in the road and coastal revetment areas where installation damage is at its highest. In addition to the keynote lecture there were some interesting presentations in the reinforced soil wall and slope highlighting current design software used with a strong focus on both finite element and finite displacement methods. There were some good predications in the modeling of stress/strain behavior of reinforcement from programs such as FLAC^{3D} v2.0 which closely matched that from observations carried out and measured in the field. There were also some interesting papers covering the advancements in the fields of creep and durability of geosynthetics.

The keynote lecture on Filtration on the Wednesday was unfortunately missed after spending an enjoyable evening savoring the wonderful French hospitality in a 12 century village located 30 km north of Nice. However the mid morning sessions attended proved to be very interesting with a number of reinforced soil wall and slope case histories presented. Although this information did not offer any new advances the installation issues and performance of these structures was very useful. One of the papers presented on field experiments using reinforced soil was extremely interesting from a very practical point of view. The authors of this paper came from the Tokyo Institute of Technology, Kobe University and other research organisations. This presentation focused on soil reinforcement interaction and the experiments pushed this concept to the maximum and beyond from 1.5 m high geogrid reinforced embankments to bridge over 10 m gap to 5 m high reinforced soil slopes with a 30° negative batter (i.e. cantilever wall !!!)

The afternoon was reserved for the exhibitors. This allowed participants to visit the various exhibitors to view

the most recent advanced in product development, testing and installation. Obviously this also allowed manufacturers to view what their competitors were up to as well. On a whole the majority of products on display were very similar to product introduced into the market over the past 30 years. The welded geogrids from two manufacturers and some of the coating technologies were the most recent advances displayed. The increase in product manufactured out of the Asian countries was very evident. With the conference being held in Europe the main focus amongst the European manufactures is the new CE standard. This is an independent review of the manufacturers ISO system and testing and is designed to ensure that the manufacturers produce product in a consistent manner that offer very little variation from the manufactures specification sheet. In the past test data was not audited by an independent oraganisation. From November this year product sold in Europe will have to be supplied from manufacturers who have been awarded the CE Certification.

The last keynote lecture dealt exclusively with the modeling of reinforced soil in finite element methods. This highlighted the growing use of researchers and practitioners in trying to better understand the stress/strain development in the soil and tensile elements during the construction and post construction phases. The remaining presentations were interesting from a long term performance view point. A number of papers showing the performance of geosynthetic reinforced structures on piles and over voids were presented as well as an interesting project in Australia on the performance of non woven geotextile reinforced soil walls built in 1988. Visual observations of the facing showed no major deformations confirming that the post construction creep in these structures to be well within the design limits.

This four-yearly conference is very important as a showcase of the industry providing both practitioners and manufacturer the opportunity to learn and advance the use of Geosynthetics. In addition it also allows users to make contact with the leading researchers and developers of design methods incorporating Geosynthetics. It is always amazing when coming from New Zealand to see the large amounts of money spent on research and testing around the world. With our local environmental and design standards gradually being brought in line with International standards there is now a stronger need for local research to ensure that design objectives can be met within our environmental constraints.

9th IAEG Congress

Durban, 16–20 September, 2002

Reported by: Bruce Riddolls
Golder & Associates

The key event of the congress was without doubt the inaugural Hans Cloos lecture by Sir John Knill, entitled "Core Values". Sir John's lecture was a timely review of the development, function and status of engineering geology. In terms of professional recognition he noted how "engineering geology can be perceived to fall into a second class role. Engineering geologists are regarded, in industry, as the junior members of the geotechnical engineering team. Although the subject is accepted in civil engineering, because it is recognised that good engineering geological advice is essential, it is the exception rather than the generality for engineering geologists to be seen as strictly equal to engineers." Further, he identified the increasing threat of "replacement of the engineering geology function at all levels by engineers".

On the positive side, Sir John also noted how "engineering geology is concerned with the resolution of geological uncertainty". In the ensuing discussion, it was this element which was widely agreed to be the key factor for improved professional recognition, (especially being a function which cannot sensibly be undertaken by engineers).

This will require the professional ability to assess and express levels of geological uncertainty very effectively, often in a team situation, in the context of technical, financial, safety and environmental risk management and decision making. Clearly, educators and professional bodies will need to be made fully aware of their responsibilities to improve delivery on this crucial issue.

The scientific programme of the congress provided something to interest everyone. The increased use of computer technology was to the fore, particularly GIS, notably in the synthesis of previously acquired information, and risk management.

Of the keynote lectures, two stood out for their general appeal:

- "*Geological maps: their new importance in a user-driven digital age*" by Martin Culshaw and Richard Ellison, British Geological Survey, Nottingham.
- "*Information technology applied to engineering geology*" by Niek Rengers, Robert Hack, Mario Hausmann, Siefko Slob, and Walter Zigterman, ITC, Netherlands.

All the congress papers are on CD-ROM and I will be happy to send this to any member.

Bored Piles in Bad Ground

Short Course – University of Canterbury, May 2002

Reported by: Ian McPherson
Connell Wagner Ltd

I attended the "Bored Piles in Bad Ground Seminar" run by the University of Canterbury in May 2002. There was a good turn out of about 25 people ranging from graduate engineers to well-experienced engineers plus a number of contractors. The course was delivered by Kevin McManus of Canterbury University, John Turner from the University of Wyoming and Alan McNabb a contractor from Washington State in the USA.

The first day and a half of the course covered the various aspects of pile investigation, design and construction. Topics covered included:

- A brief history of how and where bored piles were developed.
- Options to support pile excavations. In New Zealand full or partial casing is commonly used but in North America slurry supported excavations are more common.
- Quality assurance of pile construction. This is very important as it is easy to have defects in concrete if construction is not carefully carried out.
- Methods of pile construction. In New Zealand a clam shell or rotating bucket is probably the most common method of excavating bored piles. However in North America auger drilled piles appear to be more common as they are much faster.
- Design of concrete mix and reinforcement.
- Method of investigations including CPT, SPT, and seismic cone. As it is difficult to "prove" a large bored pile, investigation and design is very important. It should be noted that SPT is commonly used in gravelly soils but results in gravel can be uncertain using SPT.
- Design principals were briefly covered including load factors that could be used in New Zealand. Specific design methods were also set out. One interesting point is that the FHWA bored pile manual (FHWA-IF-99-025) limits ultimate bearing capacity to 3.8 MPa in cohesive soils and 2.9 MPa in granular soils as no pile load test results in their database exceed these values. This is much less than a rough of thumb of an ultimate capacity of 400 N for driven piles and 400 N/3 for bored piles.
- Two case histories using bored piles in Christchurch were presented. In the first bored piles were used to control settlement under shallow spread footings and in the second case bored piles were used to carry seismic loads only.
- Non destructive testing of bored piles was reviewed including cross and single hole seismic logging, cross hole tomographic imaging, and gamma-nuclear density logging. Cross hole logging is preferred with a number of steel pipes cast into each pile around the circumference at about 600 mm centres. The use of multiple pipes for testing allows the size and location of any defect in the concrete to be assessed.
- Testing piles using the Osterberg cell. The cell is effectively a flat jack cast into the bottom of a pile and inflated once the pile concrete has set. It works by pushing downwards, so that bearing is measured, and upwards against the pile, so that skin friction is also measured. The test is complete when the pile fails in either skin friction or bearing. The test can be used for virtually any sized piles and several cells can be cast into one pile if necessary. Tests in piles 80 metres or longer have been completed.

In the afternoon of the second day we travelled to site to inspect a demonstration of pile. The pile had been bored before we got there and the concreting was almost ready to go. However, there were significant problems with placing the concrete and in the end the pile concreting on that day was abandoned. I understand that it took in total three attempts to finally concrete the pile.

The good bits from the course were:

- A good list of references.
- A copy of the ADSC's "Drilled Shaft Inspector's Manual" and the ADSC's Standards and Specifications for Bored Piles. There is now no reason not to properly monitor construction of bored piles.
- Information on testing bored piles with the Osterberg cells. Testing of bored piles has always been problematical and now there is a reliable method of assessing both skin friction and bearing. As always, the problem will be getting the client to pay for the cost of this testing.
- Talking with other people involved in bored pile design and construction.

The bad bits, none really. The problems with the test pile were disappointing in some ways but it was a salutary lesson to the problems that can occur with bored piles, or for that matter any other form of construction.

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NEW ZEALAND GEOTECHNICAL SOCIETY
SYMPOSIUM 2003

GEOTECHNICS ON THE VOLCANIC EDGE

28–30 March 2003
27 March Pre-Symposium Workshops
Baycourt Conference Centre, Tauranga

This symposium is intended to provide a forum for practitioners to meet and exchange ideas on a wide range of geotechnical engineering and engineering geological issues. Set on the sunny coastal edge of the Central Volcanic Plateau, Tauranga offers an opportunity to focus on the geotechnics of a wide range of materials and landforms set within an active volcanic seismic zone.

The symposium will extend over two days at the Baycourt Conference Centre, with an option for undertaking a field trip on Sunday 30th March. Pre-Symposium workshops are available on Thursday 27th March 2003.

Professor Kenji Ishihara will present the keynote address on Liquefaction Effects, a technical field in which he is widely regarded as a world leader. Prof. Ishihara is a past president of ISSMGE (Int. Soc. Soil Mech. & Geotech Engr)

The list of symposium topics includes the following:

• Liquefaction • Properties & Behaviour of Volcanic Soils
• Engineering Geology of Volcanic Environments
• Foundation Engineering • Seismic Risk & Embankment Engineering
• Slope Stability, Failures and Hazard Management
• Roading Geotechnics/Case Studies • Legal Implications of Risk • Geosynthetics / Anchors

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SYMPOSIUM/WORKSHOP FEES (INCL. GST)

A: Symposium Registration

2-Day Registration $395 (non-members NZGS $440)
Includes teas, lunches, dinner, conference papers/ materials, Field Trip not included (see below).

Day Registration $198 (non-members NZGS $220)
as above, excluding dinner.

Student Registration $150 (non-members NZGS $190)
2-day registration as above but excluding dinner.

B: Pre-Symposium Workshops: Thurs 27 March

i. Serviceability Limit State Design of Foundations
All day (9am-5pm) $115 (non-members NZGS $140)
Following on from the earlier workshops on Ultimate Limit State Design this will concentrate on the serviceability condition, that is the estimation of foundation displacements under working loads, including:

- Methods that enable prediction of foundation movements under vertical load, horizontal shear and moment loading
- Shallow foundation and pile foundation design
- Emphasis on methods that enable simple calculation
- Estimation of soil stiffness will be discussed

>> Includes teas, lunch and bound workshop notes <<

ii. Engineering Geological Practice
9am to 1pm $60 (non-members NZGS $80)*
A field based half-day workshop examining current engineering geological practice in NZ and the issues of registration and review. Key themes are:

- Mapping, sketching and logging – the total integrated picture from engineering geological mapping
- Promoting the engineering geological "brand name"
- The key role of the engineering geologist in decision-making
- Professional registration of engineering geologists

A meeting of members of the IAEG will be held following the conclusion of the workshop. Fee includes field notes, morning tea and bus transport to selected sites for field mapping*.

iii. Soil and Rock Description
2pm to 4pm $25 (non-members NZGS $35)*
In 2003 the Society will publish a revision to the 1988 Guidelines for the Field Description of Soils and Rocks in Engineering Use. This workshop will introduce the revised Guidelines, and provide hands-on experience and tuition in using the new procedures. Fee includes guidelines*.

>>* Thursday Lunch (optional) $10 <<

C: Field Trip $35 (non-members NZGS $45)
>> Optional extra for all categories of registrant <<
The field trip will depart from Baycourt, Tauranga at 9am on Sunday and will return at about 2pm. Participants will get the opportunity to view a recent major local expressways project (Routes PJK), the sensitive Minden area and some of the more interesting parts of Waihi (gold mining town).

>> Includes morning tea <<

D: Symposium Dinner – Friday 28 March $75
Available to day / student registrants or guest / partner of 2-day registrant. Note: 2-day registration includes one dinner.

NOTE: Late fee of $35 applies for registrations received after 10 March 2003.

ACCOMMODATION

The following are suggested options – all within walking distance of both the conference centre and downtown Tauranga. The booking of rooms at any of the following is the responsibility of registrants. We recommend that you book early to avoid disappointment during the busy season.

Hotels / Motels:
Hotel Armitage: Double/Twin $99 per night.
Durham Motor Inn: Queen studio $98 Suite $110 per night.
Harbour City Motor Inn: Queen studio $105.

Backpackers:
Tauranga Central Backpackers: Single $30, Dorm $18 pn
Just the Ducks Nuts Backpackers: Dble $40, Dorm $20 pn
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WEBSITES

Symposium: www.cce.auckland.ac.nz/geotech2003
NZ Geotechnical Society: www.nzgeotechsoc.org.nz

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Fees: All figures include GST		NZGS Members	Non Members☆
A:	Symposium Registration:		
	☐ 2-Day (includes dinner)	$395	$440
	☐ Day (28th/29th – delete one)	$198	$220
	☐ Student (2-Day)	$150	$190
B:	Workshops Registration:		
	☐ Serviceability Limit State	$115	$140
	☐ Engr Geological Practice	$60*	$80*
	☐ Soil & Rock Description	$25*	$35*
	☐ * Lunch (optional)	$10	$10
C:	☐ Field Trip	$35	$45
D:	☐ Dinner (Fri 28 March 2003) (Guest/Partner or non-full registrant) No. _____ @ $75 each		$_____
	☐ **Late fee (payable after 10 March 2002)**		**$35**

TOTAL ENCLOSED $_____

☆ See www.nzgeotechsoc.org.nz/Membership.htm for details

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New Zealand Geotechnical Society Symposium 2003
GEOTECHNICS ON THE VOLCANIC EDGE – Programme

FRIDAY 28th March 2003		
08.30	Registration: Baycourt Conference Centre, cnr Durham/Wharf Streets, Tauranga	
09.00 (Sharp)	WELCOME: Her Worship Jan Beange, Mayor of Tauranga	
SESSION 1: LIQUEFACTION & FOUNDATIONS (Sponsored by Earthquake Commission (EQC))		
09.10	KEYNOTE SPEAKER: Prof. Kenji Ishihara	
	Effects of Earthquake-Induced Liquefaction on Soil-Structure Interaction	
10.00	*Questions*	
10.10	THEME SPEAKER: Dr Kevin J McManus	
	Earthquake Resistant Foundation Design	
10.35	*Questions*	
10.40	*MORNING TEA (20 mins)*	
SESSION 2: ENGINEERING GEOLOGY OF VOLCANIC ENVIRONMENTS (Sponsored by Beca Carter Hollings & Ferner Ltd)		
11.00	Dr W Prebble	Ignimbrite, Andesite, Landslides and Dam Sites: Engineering Geological Models for Volcanic Terrain
11.15	BD Hegan	Kaimai Tunnel: A Geological Section Through an Ancient Volcano
11.30	DA Burns	Engineering Geological Aspects of the Ruahihi Power Scheme
11.45	AL Williams, CM Wright, A Linzey, G McKean & L Chick	Contingency Plan: Auckland Volcanic Field
12.00	GE Winkler	Geomorphology: Simple and Essential for Site Engineering
12.15	J Hoverd	Tephrostratigraphy of Onepoto Maar Crater: Implications for Ashfall Hazard Assessment in the Auckland Region
12.30	*Questions*	
12.40	*LUNCH (50 mins)*	
SESSION 3: LIQUEFACTION, FOUNDATIONS & RISK (Sponsored by Tonkin & Taylor Ltd)		
13.30	GD Dellow, PR Barker, RD Beetham, L Brown, JV Hengesh, D Heron & AG Hull A Deterministic Methodology for Assessing Regional Liquefaction Susceptibility in New Zealand	
13.45	GJ Saul & DN Jennings	Foundations and Ground Replacement for Taranaki Combined Cycle Power Station, New Zealand
14.00	Dr KC Cheung & D Peters	The Design and Construction of a Bridge with MSE Abutments on Seismically Liquefiable Ground
14.15	ME Jacka	Delayed Failure Due to Liquefaction – A Case Study
14.30	C Bauld	Health on the Volcano's Edge
14.45	A Green	The Legal Implications of Risk
15.00	*Questions*	
15.10	*AFTERNOON TEA (20 mins)*	
SESSION 4: SEISMIC RISK & EMBANKMENT ENGINEERING (Sponsored by Riley Consultants Ltd)		
15.30	TJE Sinclair	Embankments at Hazardous Extremes
15.45	DR Tate	Piping Failure of the Poihipi Reservoir
16.00	AJ Wallis & Dr DV Toan	Design and Construction Monitoring of a Landfill Containment Bund on Soft Marine Sediments
16.15	C Lawson	Performance of Reinforced Fill Slopes in Seismic Environments
16.30	M Aravind	Mount Gordon Tailings Dam
16.45	W Okada	Seismic Lateral Earth Pressure in a Stiff Cohesive Soil
17.00	*Questions (10 minutes)*	
SYMPOSIUM DINNER: Bella Vista Lodge, 1000 Ohauiti Road 7.30pm		
(Drinks sponsored by Tonkin & Taylor Ltd & Beca Carter Hollings & Ferner Ltd)		

SATURDAY 29th March 2003

SESSION 5: PROPERTIES AND BEHAVIOUR OF VOLCANIC SOILS (Sponsored by Geotech Systems Ltd)

09.00	THEME SPEAKER: Dr Laurie Wesley	Geotechnical Properties of Two Volcanic Materials
09.30	SJ Palmer	Consolidation Parameters for Volcanic Ash
09.45	Prof. MJ Pender,	Compressibility of Residual Soil from Constant Rate of
	Dr LD Wesley & B Ni	Strain Ko Loadingin a Modified Triaxial Cell.
10.00	S Terzaghi	Numerical Modelling in Auckland Soils
10.15	Dr VG Moon	Early Stages of Basalt Weathering and Implications
	& MPJ Jayawardane	for Geomechanical Properties
10.30	*Questions*	
10.40	*MORNING TEA (20 mins)*	

SESSION 6: VOLCANIC FOUNDATION MATERIALS & ENVIRONMENTS (Sponsored by Meritec Ltd)

11.00	P Amos, Dr S Read & Dr LR Richards	Geotechnical Properties of Ignimbrite Rocks at Arapuni Dam
11.15	SAL Read, PR Barker & A Reyes	Consolidation Properties of Huka Falls Formation & Linkages to Subsidence at Ohaaki and Wairakei
11.30	GRW East & A George	The Construction of the New Auckland Central Remand Prison on the Mt Eden Basalt Flow
11.45	MJ McSaveney & PJ Glassey	GEONET Landslide Response: Fatal Cleft Peak Debris Flow of 3 January 2002, Upper Rees Valley, West Otago
12.00	J Rae	Land Development of the Central Coastal Bay of Plenty Region: An Integrated Study
12.15	T Adhikary	Engineering Geology Along the Proposed Favona Decline and Estimation of Rock Mass Strength
12.30	*Questions*	
12.40	*LUNCH (50mins)*	

SESSION 7: ROADING GEOTECHNICS & CASE STUDIES (Sponsored by Fulton Hogan Ltd)

13.30	Dr TJ Larkin, B Ni & Prof. MJ Pender	Roading Geotechnics in Soft Soils: Correlation of Laboratory and Field Performance
13.45	GB Farquhar & DA Burns	Engineering Geological Influences on the Mt Roskill SH20 Extension
14.00	D Dennison & DN Jennings	Design of a Large Cut Slope in Sensitive Fine Grained Volcanic Soils
14.15	AJ Cowbourne	Geotechnical Aspects of the PJK Expressways Project, Tauranga
14.30	Dr N Mackenzie & GJ Alexander	Delaney Slag Dump – Design and Construction
14.45	MA Fraser	Planar Landslide Mechanisms in Waitemata Group Materials in the Auckland Region
15.00	*Questions*	
15.10	*AFTERNOON TEA (20 mins)*	

SESSION 8: GEOSYNTHETICS, ANCHORS & CASE STUDIES (Sponsored by Geotech Systems Ltd)

15.30	KC Hudson	Filtration and Slit Film Geotextiles
15.45	T Jewett	Impact Driven Plate Anchors for Retaining Walls and Other Applications
16.00	P Wymer, R Robinson & D Sharp	Review of Ground Anchorage Practice in NZ – A Contractor's Perspective of Applications, Design and Execution
16.15	Dr CY Chin, T McGuigan & Dr DV Toan	Piezometric Response in a Semi-Confined Aquifer to Pile Construction
16.30	M Aravind	Meghnaghat Cooling Water Intake Structure and Demineralised Water Tank
16.45	EL Giles	Geotechnical Design of a Deep slot Excavation for the Waihi Mine Crusher
17.00	*Questions*	
17.10	Closing of Technical Sessions	

SUNDAY 30th March, 8.30am – 1.00pm

FIELD TRIP (Optional) to: Roading project "PJK Expressway" and Waihi mines

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- learning from earthquakes
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- insurance issues

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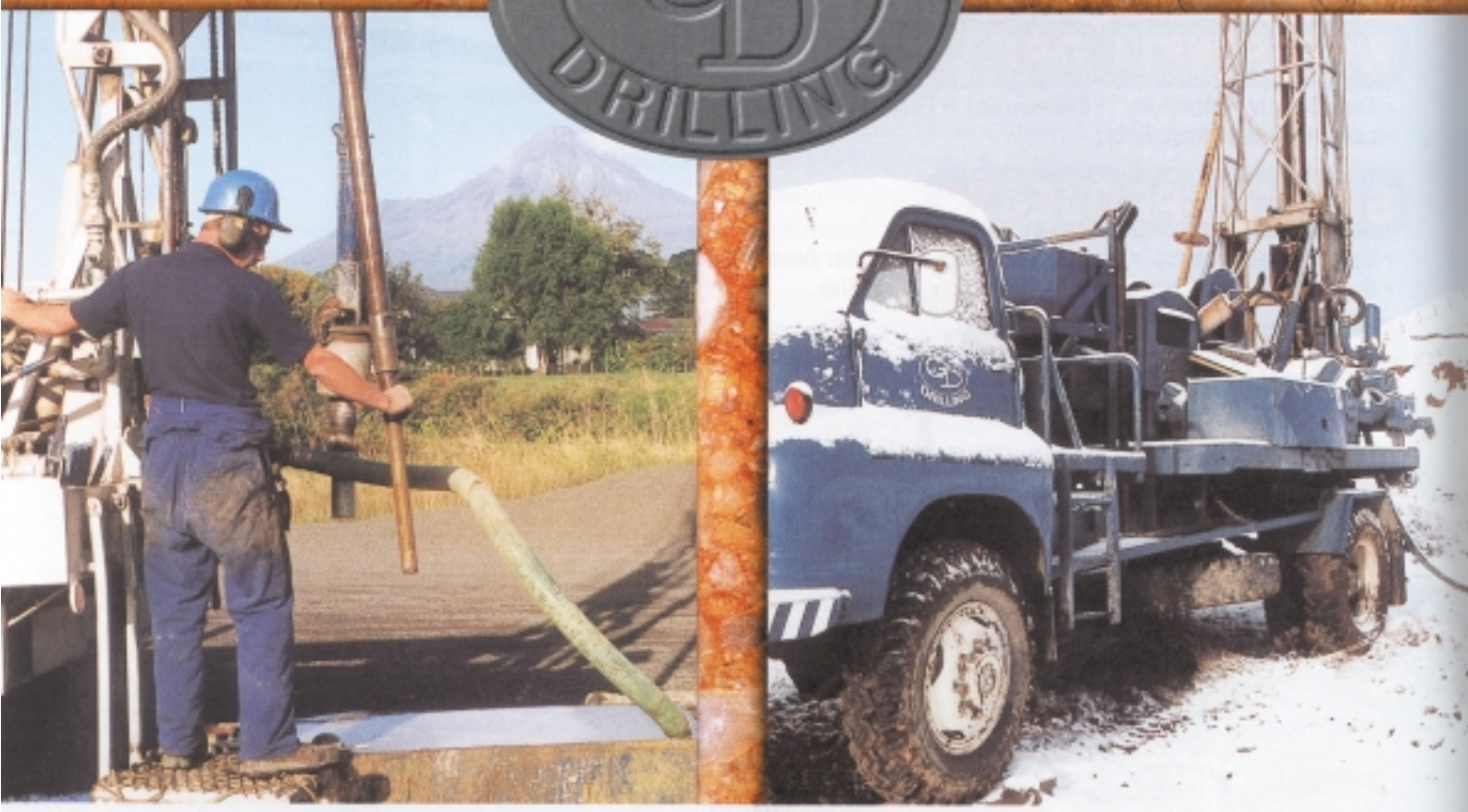
- Shallow and deep large span excavations, civil excavations, caverns etc.
- Rock mass classification revisted – success stories, weaknesses, applications, developments
- Probability and risk
- Petroleum rock engineering
- Dams, foundations, rock as a construction material
- Fragmentaion by blasting
- Tunnels
- Fundamental developments in rock engineering
- Rock engineering education

For more information about the Congress see their website: www.isrm2003.co.za



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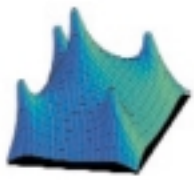

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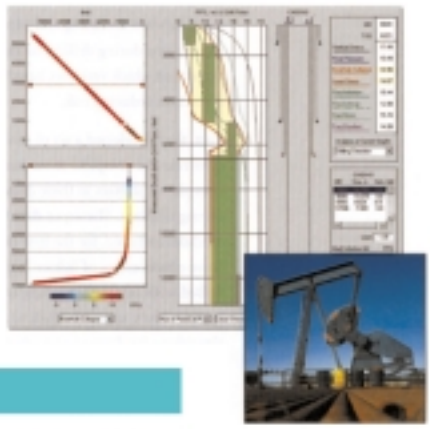

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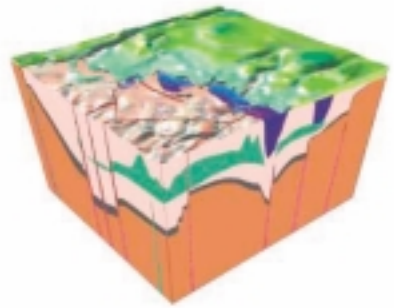

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STANDARDS, LAW & INDUSTRY NEWS

Chartered Professional Engineers of New Zealand Act 2002

In May 2002, the Chartered Professional Engineers Act completed its Third Reading and it is now enacted. The benefits of the new Act to the IPENZ membership have been well documented. Below is the press release that followed the legislation enactment, issued by Dr Andrew Cleland of IPENZ. The press statement is aimed at highlighting the benefits of the Act to the wider community.

Press Release

Subject: Chartered Professional Engineers of New Zealand Act 2002

Date: 30 May 2002

The completion of the Third Reading of the Chartered Professional Engineers of New Zealand Act 2002 last night establishes a new standard of competence in a profession intimately concerned with maintaining public safety.

The Act replaces the 1924 Engineers Registration Act, and allows professional engineers who meet modern engineering competence standards to be registered as Chartered Professional Engineers. Chief Executive of the Institution of Professional Engineers New Zealand (IPENZ), Dr Andrew Cleland is confident that the public will soon see benefits.

"Whereas under the old Act there was no requirement for engineers to demonstrate their retention of competence the public can be assured that every engineer we register has demonstrated recently to their peers in the profession that they have the necessary skills and knowledge to perform competently. We will also be operating complaints procedures to assist purchasers of professional engineering services who feel that they did not receive work of good standard" he said.

The new Act largely aligns the statutory registration system with the systems already put into place voluntarily by IPENZ for designating its own competence-based membership classes. This is pleasing.

The standards against which engineers will have their competence assessed will be benchmarked to international best-practice in engineering, and a Chartered Professional Engineers Council is created to provide auditing of the registration system. A purchaser of professional engineering services will be able to expect consistently high quality advice. The general public, as users of a wide variety of services for which reliability is essential, can be confident that the issue of protection of people has been well considered.

"As the long-standing professional body for engineers in New Zealand we are pleased to accept the responsibility for ensuring high standards are maintained by the profession", Dr Cleland said.

Professional Engineers may start applying for registration in January 2003. At the end of December 2003 the old registration system created under the 1924 Act will be totally closed.

Dr Cleland said "At that time all regulatory authorities seeking to identify people with the skills and knowledge who can perform high quality engineering work or certification reliably will be able to turn to Chartered Professional Engineers".

It is expected that several thousand experienced engineers will seek to register within the first year, with others registering in future years as they meet the competence standards for the first time.

For further information, contact Dr Andrew Cleland, CEO, IPENZ – Engineers New Zealand, on 025 274 3555 or Jeff Wastney, Professional Practice Manager, IPENZ – Engineers New Zealand, on (04) 474 8983.

New Zealand Geotechnical Society Symposium 2003 Engineering Geological Workshop

A field based half-day workshop examining current engineering geological practice in New Zealand and the issues of registration and review. Key themes will be:

- Sound engineering geological practice
- Promoting the engineering geological "brand name"
- Professional registration

A meeting of members of the IAEG will be held following the conclusion of the workshop.

BOOK REVIEWS

Coastal Geotechnical Engineering in Practice

The symposium addresses geotechnical issues associated with soft deposits in marine areas. It dose not cover coastal erosion processes or protection design. The symposium was divided into four themes:

- Exploration of soft ground and determination of soil parameters
- Prediction and performance of earth structures on soft ground
- Engineering geo-materials made from solid wastes with /without chemical treatment.
- Improvement of soft ground by consolidation and compaction techniques

The proceedings include 131 papers covering the four main topics. The papers provide information on a range of routine and leading edge technologies including:

- Lightweight soils made with air foamed cement and dredge slurry, expanded glass, and tire shreds.
- Ground improvement and liquefaction mitigation by mixing, soil with sand, fly ash, cement and gypsum with sand and other soils to form a "soilcrete", sand with oyster shells, electro osmosis, stone columns and chemical grouting.
- Soil strength and consolidation parameter correlation with testing and exploration results
- Liquefaction criteria for non-plastic silts, and cyclic strength testing of marine clays
- Prediction and performance of embankments on soft foundations, soil nails in clay, seawalls construction.
- Consolidation and compaction of soils with sand drains, preformed vertical drains (fibre and plastic board drains), sand compaction piles, vacuum preloading.

This is not a book that would be used for "day to day" reference but provides excellent information on leading edge and innovative methods of managing the geotechnical issues associated with coastal soils.

Reviewed By: Greg Saul, Senior Geotechnical Engineer, Opus International Consultants Ltd

Coastal Geotechnical Engineering in Practice
– Proceedings of the International Symposium Yokohama 2000

Editors:	Akio Nakase & Takashi Tsuchida
Publisher:	A.A.Balkema
Date published:	2000
Page extent:	787 pages
ISBN:	Volume 1: 90 5809 152 X Volume 2: 90 5809 153 8
Web shopping on:	http://www.balkema.jcn.nl/ima/balkema/index.html
Price:	US $173

PROJECT NEWS

GeoNet

By Hugh Cowan for the GeoNet Team

Islands at the Edge

In New Zealand, historical evidence and scientific research convincingly demonstrate that risk to the population and economy from geological hazards is significantly greater than the experience of the last 50 years would indicate (Figures 1 and 2). The temporal and spatial pattern of large earthquakes illustrates the potentially misleading impression of seismic hazard given by the past 50 years of seismic quiescence. The 1987 Edgecumbe earthquake and cities greater than approximately 120,000 inhabitants are indicated (Figure 2).

Monitoring the Earth's Pulse

Currently, most geological hazard monitoring and a substantial amount of geological hazard research in New Zealand is undertaken by the Institute of Geological and Nuclear Sciences (GNS), a wholly Government-owned Crown Research Institute. GNS, and its predecessor the Department of Scientific and Industrial Research (DSIR), has operated seismic networks for more than 40 years. During that time the networks have grown steadily in size to approximately 85 seismographs and 300 accelerographs.

In 1999 the national seismograph network consisted of 34 digital recorders (23 three-axis and 11 one-axis), two regional networks (20 one-axis instruments) and four volcano monitoring networks (30 one-axis instruments in total). At this time all but four of the instruments were obsolete and only six were able to provide real-time continuous data. The strong-motion (accelerograph) network contained 140 "stand-alone" ground sites, i.e. ground recording sites that were not part of arrays. Most were instrumented with obsolete analogue and early digital accelerographs. A further 24 sites were equipped with obsolete scratch-plate acceleroscopes, and there were 110 mostly obsolete instruments in structural and subsurface arrays.

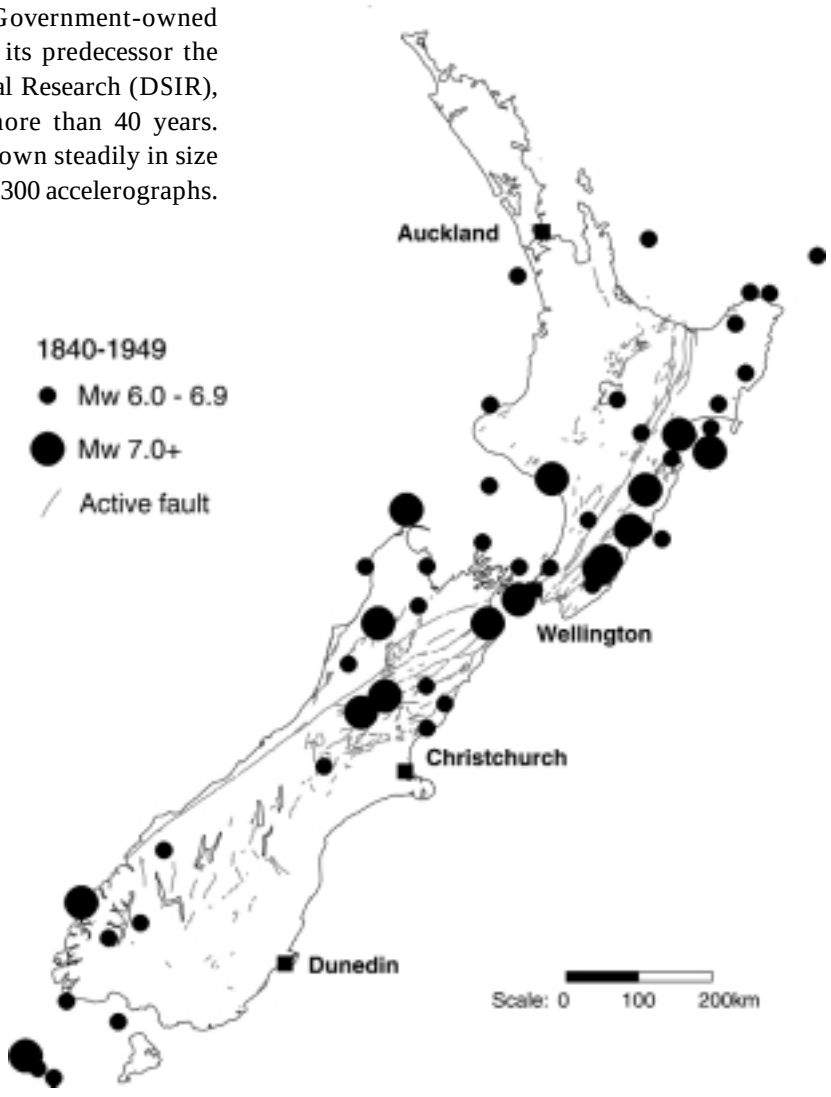


Figure 1: Distribution of earthquakes greater than magnitude 6 in New Zealand: 1840–1949

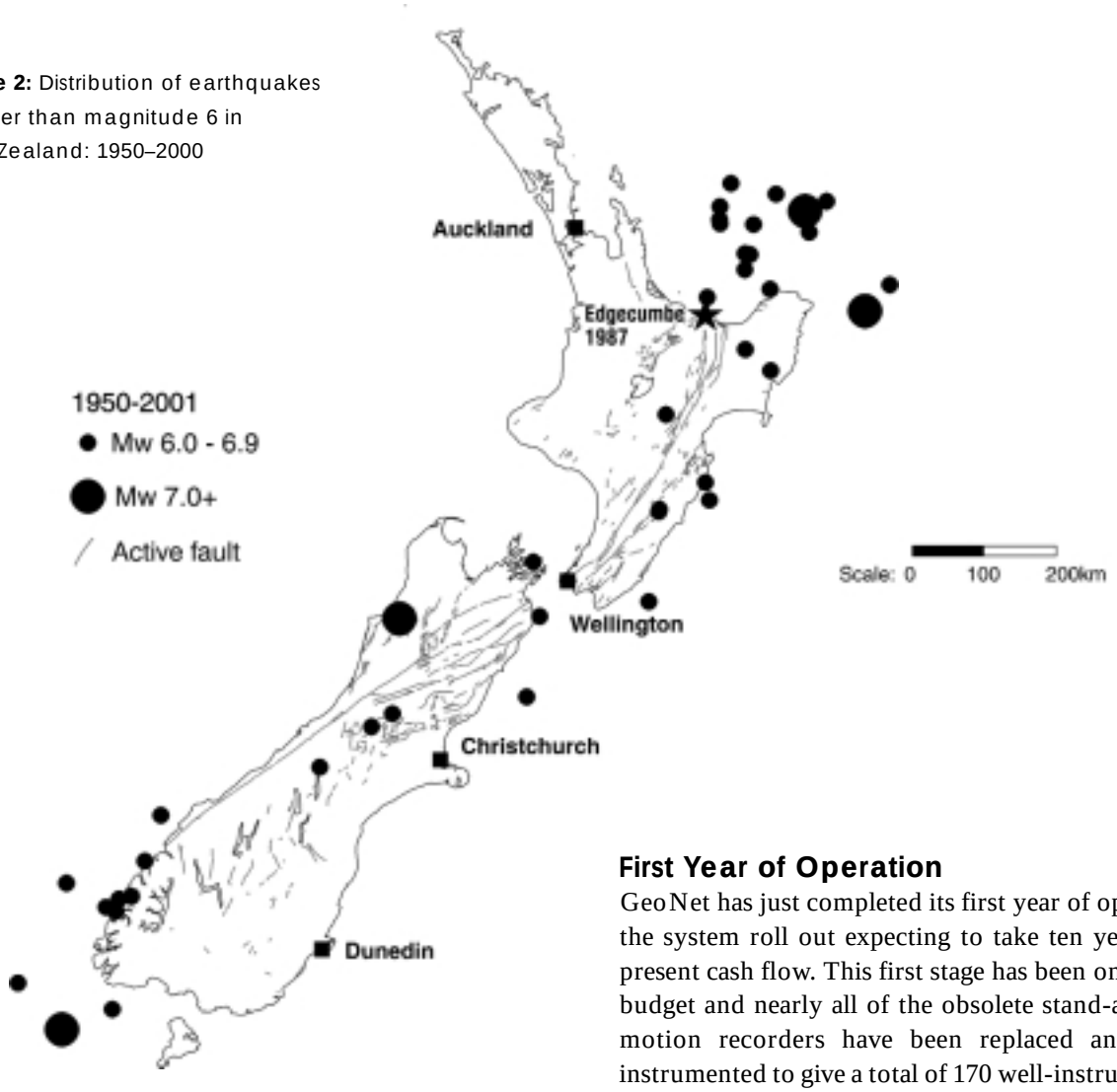


Figure 2: Distribution of earthquakes greater than magnitude 6 in New Zealand: 1950–2000

Strong motion networks in New Zealand have been operated for the purpose of research into near-fault ground motions, regional attenuation, urban microzoning and the response of built structures. Trials of modern instruments and an extensive review of geological hazard monitoring requirements were carried out in New Zealand from 1999 to 2001, culminating in the launch of the GeoNet Project, to build a modern network designed to monitor seismicity, volcanic unrest, land deformation and detect tsunamis.

The project has substantial, long-term public funding ($5 M a year) provided by the Earthquake Commission (EQC) – a government agency responsible for providing residential property insurance and facilitating research and education related to natural disaster reduction. GeoNet is being developed and operated by GNS and phased in over several years. Further information can be obtained from the project web site www.geonet.org.nz.

First Year of Operation

GeoNet has just completed its first year of operation with the system roll out expecting to take ten years based on present cash flow. This first stage has been on time and on budget and nearly all of the obsolete stand-alone strong-motion recorders have been replaced and new sites instrumented to give a total of 170 well-instrumented sites. Future work will see the upgrading of structural and subsurface arrays and the instrumentation of lower-priority ground locations.

Upgrading of the national seismograph network is occurring over a period of about three years, with nine of a planned total of 40 sites now completed. Upgrading of volcano-monitoring and regional networks is proceeding in parallel with the installation of a new network of continuous GPS receivers for monitoring ground deformation in the areas of highest seismic and volcanic risk.

Strong-motion stations are equipped with Kinemetrics "Etna" recorders and FBA accelerometers. Instrument specifications are as follows: accelerometer, triaxial force-balance, range ±2 g, 18-bit resolution, on-site storage capacity 48 minutes, and threshold triggering. GPS timing is provided at all stations, and data transmission is by cellphone.

The National Network seismographs are 6-component stations equipped with either Guralp CMG-40T or 3ESP sensors, and Kinemetrics Episensor accelerometers. A small number of sites will employ Streckheisen STS2

Figure 3: Seismic networks in New Zealand

very-long-period sensors for detection of potential slow, tsunamigenic earthquakes, occurring off the coast of New Zealand. The data logger is a Quanterra Q4126 and continuous data transmission is provided via VSAT (Very Small Aperture Terminal) satellite links operated by Telstra Corporation, Australia.

Locations of the instruments are shown in Figure 3. The strong-motion recorders (labelled "Etna") are mostly deployed near active faults and in significant populated areas. Most are sited on alluvial materials, although in areas like Wellington, where much of the housing is on weak rock, some of the accelerographs are sited on weak rock. The national network seismographs (labelled "VSAT") are generally sited on competent rock some distance from urban areas.

For many years GNS has maintained arrays of accelerographs on several hydro dams and power stations in New Zealand. Many records have been obtained from the arrays but only one set of records, from Matahina earth dam during the magnitude 6.5 Edgecumbe Earthquake of 2 March 1987, was from strong shaking. The Matahina dam suffered significant damage during the earthquake and was later extensively reconstructed.

The accelerographs on the dams belong to the power companies who own the dams. Over recent years most of the companies have been gradually replacing obsolete accelerographs with modern equipment. Meridian Energy with several major hydro dams in the South Island of New Zealand has installed single Etna accelerographs at five of its sites. The accelerographs are connected to the SCADA communication system and activate alarms at a central control centre when the shaking exceeds specified levels. The accelerographs are also linked to GNS's data communication system so that any earthquake records from them are merged with records from GeoNet. In this way the accelerographs provide Meridian Energy with immediate notification of shaking affecting their remote facilities and also contribute valuable records to the New Zealand pool of strong-motion data.

High Quality Research and Emergency Response

An advanced data management system is being implemented at GNS with all GeoNet data to be made freely available to the global research community. The system is distributed across several computers and operating systems, each with particular strengths associated with its role, and data are interchanged freely between them using standard protocols. The hardware runs on a mixture of operating systems: Unix, Linux, VMS and Windows 2000. Standardisation is not possible as software applications are written for specific operating systems, however all communicate with each other using the UDP/IP or TCP/IP protocols.

In order to provide an emergency backup in the event of a damaging earthquake (or some other catastrophe), the GeoNet data management system is duplicated at two geographically separate sites, currently near the capital Wellington and in the central North Island near Taupo. Seismographs send data continuously to both sites, where they are received by computers whose function is to accumulate the data streams for later archiving, and to monitor the data for any ground motion that is distinct from the normal background activity (such as that caused by weather and oceans).

Data analysis computers store and associate the detected earthquakes and generate automatic locations, which are then passed to other computers for broadcast. Large amplitudes trigger quick alert notifications to pagers and email, and the earthquakes are routinely located by duty officers; revised locations are then broadcast. Isoseismal maps showing expected levels of shaking are also provided to some agencies and in the future estimates of losses and casualties may be added to the automatic reports.

Behind the data reception and management system are automated processes that constantly monitor the performance of computer hardware, communications software, vital system processes, free disk space and timeliness of real-time data. Alerts are broadcast via pager or e-mail whenever an exception condition occurs. These processes are also used to log faults and assign tasks to GeoNet staff and to record all correspondence and remedial action. Specific monitoring tools have been developed for volcanology, displaying tremor spectra and seismic traces in addition to the usual visual monitoring. Internal procedure manuals and documentation are also being migrated to an internal web site to make them available to operations staff at any time.

The strong-motion data are archived and also merged with data from the national network seismographs. Because the accelerographs have GPS timing, the strong-motion data can be used for other seismological research purposes and are a valuable addition to the data from weak-motion seismograph networks. Conversely, the weaker-motion seismological data are valuable for a range of strong-motion modelling.

Critical information about earthquakes, i.e. magnitude, location and depth, is automatically forwarded to emergency management authorities and other responding agencies. Currently strong-motion data from the New Zealand network are available from the COSMOS website www.cosmos-eq.org. Within 12 months all seismological, geodetic and other GeoNet data will be readily available via automatic data retrieval and request. Information on the GeoNet project, recent earthquakes in New Zealand, and volcanic activity is available from websites www.geonet.org.nz and www.gns.cri.nz.

The GeoNet Landslide Response

Grant Dellow for the Geonet Team

What is GeoNet?

GeoNet is the name given to a modern New Zealand wide network of instruments being deployed to monitor earthquakes, volcanic unrest, land deformation, land instability, and tsunamis (see GeoNet article). GeoNet, which will be phased in gradually over several years, is core funded by the Earthquake Commission (EQC). It is being designed, installed and operated by the Institute of Geological & Nuclear Sciences Limited (GNS) on behalf of EQC and the New Zealand community.

Introduction

New Zealand is exposed to a wide range of geological hazards (earthquakes, volcanoes, tsunamis, landslides and geothermal activity) that have the potential to cause extensive damage with more severe social and economic consequences than the experience of the last 50 years would indicate. Accurate and timely data about geological hazards will guide the future response during any emergency, and help reduce community vulnerability through better understanding, planning and mitigation of geological hazard and risk.

GeoNet will collect data on landslides and landslide occurrence and make it publicly available. Methods for making this information available include the landslides newsletter, published annually and future plans for a web-based database interface. The landslide component of the GeoNet project is intended to:

- Provide an appropriate level of response to unusually large or complicated landslide events;
- Compile a database of landslide locations and attributes; and
- Publish a yearly catalogue of landslide occurrence.

The Register

GNS is now operating a landslide rapid response register. The register currently has 17 people on board. New applicants are welcome. Registrants are called upon to respond to landslide events that meet the criteria listed below, or at the request of Urban Search and Rescue (USAR).

The criteria GNS uses for activating a rapid response are landslides that cause (or have the potential to cause) any of the following:

- Death or serious injury (requiring at least hospitalisation);
- Subsequent catastrophic events (for example breaching of a landslide dam);
- Direct damage to the value of one million dollars or greater;
- Indirect costs (economic losses) of greater than ten million dollars;
- Threats to public health (e.g. water supply contaminated, sewage discharge);
- Significant research interest.

The USAR Connection

The Ministry of Civil Defence and Emergency Management has initiated the development of Urban Search and Rescue Teams based in three regional centres in New Zealand (Auckland, Palmerston North and Christchurch). We will be encouraging members of the landslide rapid response register to undertake an appropriate level of USAR training. Currently there are a number of levels of USAR training running from basic awareness through to accredited engineers. Although at this stage the accredited engineers are structural engineers we will be working with USAR and the Geotechnical Society to develop training programs for accrediting geotechnical engineers and engineering geologists.

Responses to Date

Since inception, the Geonet Landslide response criteria have been met on three occasions. The first activation was in response to a debris flow in the upper Rees River area of west Otago on 3 January 2002 that killed a tramper. The second occasion was a fatality on a construction site in Auckland, caused by the collapse of a retaining wall (see last issue 63 June 2002). A landslide response was not activated on this occasion as enquiries established that OSH was legally required to investigate this incident and had already commissioned a geotechnical report. The third occasion when the criteria were met was in August 2002 when a high intensity rainstorm event struck an area of about 500 km^2 south and west of Gisborne. Losses during this storm event from floods and landslides are currently estimated at around $10 million. Brief summaries of two responses carried out to date are included below.

Geonet Landslide Response: The fatal Cleft Peak debris flow of 3 January 2002, Upper Rees Valley, West Otago.

On 3 January 2002, Robin Allan Buxton was killed by a debris flow while attempting to cross a headwater tributary of the Rees River, west Otago. The event occurred during heavy rain. The high-intensity rain triggered many shallow landslides in the thin layer of loose, weathered rock debris (regolith) overlying the steeply dipping schist bedrock in many of the tributary

headwaters in the area. These, in turn initiated debris flows in many streams. Mr Buxton and Bevan Thrower had the misfortune to be in a stream channel and about to cross one of these streams at the time a debris flow approached them at high speed. Mr Thrower heard it approaching and escaped by the narrowest of margins.

Geonet Landslide Response: The high intensity rainstorm event of 6–7 August 2002, Gisborne District.

A high intensity significant rainfall event occurred near Gisborne over a period of 2–3 days from 6 August 2002 and caused widespread flooding and landslides. Damage from flooding and landslides occurred to farms and horticultural operations, forests, the railway line, the local road network and State Highway 2 as far south as White Pine Bush, near Tutira. Media reports indicate that about 150 claims for government assistance have been lodged (c.f. 1765 for Cyclone Bola). Most of the damage is related to loss of pasture through landslides and siltation, damage to fences from landslides and alluvial fan aggradation, flooding of buildings, blockage of roads and tracks. Local people in the worst affected area consider the damage from this event to be worse than Cyclone Bola, with the silt level left by the floods comparable to the 1938 storm event. It is the most significant rainfall event in the Gisborne District since the Cyclone Bola storm in March 1988, although the area severely affected by this event is considerably smaller.

Gisborne District Council (GDC) have flown over the site and taken oblique photos and delineated the main damage areas. A complete coverage with vertical photos at a scale 1:16000 is being planned. Mike Crozier (Victoria University) and a team from Landcare lead by Nick Preston also responded to this event and spent a week investigating the damage. The Landcare-Victoria University response was primarily directed at shallow soil failures and their influence on landuse.

Rainfall data has yet to be collated by GDC. The heaviest rainfall occurred on Tuesday 6 August, with anecdotal records of up to 400 mm in a 24-hour period. The rainstorm event appears concentrated in an area between Ngatapa in the north and south at least as far as the Wharerata hills, generally along a coastal strip up to 10 km inland. The greatest damage and presumably the heaviest rainfall appeared to be concentrated in the Muriwai area.

The geology of the affected hill country consists of Miocene mudstone and sandstone/ mudstone units that dip typically between 10–20 degrees. Soil development on these units is generally thin, typically 2 m or less. Most of the landslides are shallow soil flows that have occurred on slopes of moderate steepness (i.e. 20–45 degrees). The Landcare and Victoria University teams are compiling a systematic inventory of these landslides. The landslide sources areas are mostly 1–2 metres deep and 10–20 m wide. The run-out distance and debris dispersal area is much larger i.e. tens to 100 m long of soil material forming a thin veneer. The frequency of failure appears to be strongly linked to landuse. Pastoral land is the most damaged. Neighbouring pine plantations were also damaged but to a lesser extent, while the bush reserve at Waingake is virtually undamaged.

A small landslide was reported on Hospital Hill at the rear of a property in Diana Drive. The failure was an earth flow on a moderately steep slope that is the headscarp of a pre-existing large landslide. The failure is about 10 m wide. On failure, the slipped material has completely fluidised and spread thinly over the property below. This failure is quite different in style from the two large pre-existing landslides that flank the southern and western sides of Hospital Hill. The western landslide headscarp occurs at the rear of the property in question.

Waingake Landslide

A large landslide was reported in Waingake Stream on Ranganui Station, managed by Mr Selwyn Scudder. The landslide has completely destroyed the access road of the farm over a distance of 50 m. Further downstream, the track has also been blocked by a small slip while the approach to a concrete bridge has been washed out.

The geology in the landslide area consists of Miocene mudstone with well-developed dip-slopes, dipping to the west at about 12 degrees. Vertical aerial photographs, (1102/57-59) taken in the 1940's, show a pre-existing landslide covering an area of 39 hectares. The scarp slope of a ridge of more resistant sandstone/mudstone immediately to the west of the landslide forms the western lateral margin of the landslide. The pre-existing landslide moved sub-parallel to the strike of bedding in a northward direction on a 10-degree slope. About 5–6 days after the intense rainstorm, the lower 24 hectares of the landslide was reactivated, damming the Waingake Stream and creating a small lake about 10 m deep.

The landslide has been triggered by highly saturated ground conditions associated with the rainstorm aided by undercutting of the toe by the Waingake Stream. The delay between the rainstorm and the failure may be related to the speed of infiltration of water into the body of the landslide and the failure plane. The removal of the trees would not have helped matters in terms of limiting infiltration. The failure plane is probably over 10 m below the surface in its deepest position and significantly deeper than the rootmass of the pine trees.

Web addresses of interest

http://groups.yahoo.com/group/Landslides_NZ
http://www.usar.org.nz
http://www.gns.cri.nz/hazardwatch/latest/index.html
http://www.geonet.org.nz/

SPECIAL INTERESTS

Numerical Analysis in Geotechnical Engineering, Part 5

Sergei Terzaghi, Sinclair Knight Merz

To re-cap what we have covered to date:

Part 1: was an introduction and included a look at the behaviour of an embankment on soft soil using a variety of different models.
Part 2: We looked at some of the elements of pore pressure generation in a qualitative sense.
Part 3: We looked at the differences between increases in mean stress compared to deviatoric stress.
Part 4: We looked at stress paths with a further look at stress paths under neath the same embankment as Part 1.

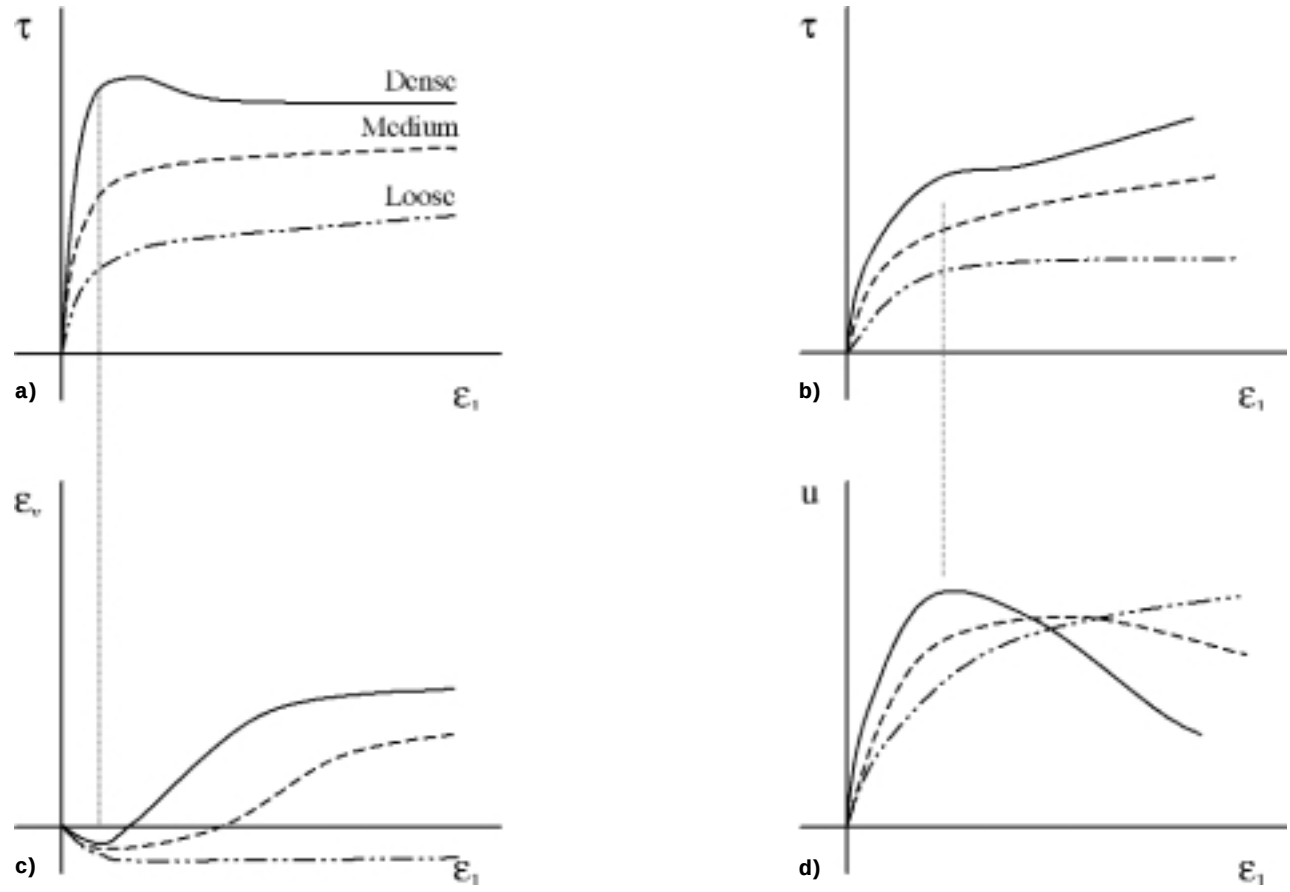
Along the way I have promised to look at the plasticity issues associated with the stress increments involved in the different soils. So this article we will start to look at this, and also look at the issues of dilation as this leads to volumetric behaviour under shear.

Part V: Plasticity and stress

If we consider a single stage of a conventional tri-axial test (drained and undrained), on a sand, then we expect the stress-strain curves and volumetric/pore pressure curves exhibited qualitatively in Figure 1. Under drained conditions, a dense sand will contract pseudo-elastically until failure, and will then start expanding until the developed shear band develops constant void ratio conditions. Similarly, a medium dense sand will expand a comparatively small amount until it reaches a similar state. In contrast a loose sand will contract initially (not always, though), and then either remain in a constant volumetric condition, or, if very loose will continue to contract. This later condition is a particular problem with cemented sands.

In undrained conditions, because of the imposed condition of no volumetric strain, though shear strains may

Figure 1: Conventional Stress Strain Curves. a) drained stress strain, b) undrained stress strain, c) corresponding volumetric stress strain to a), d) corresponding excess pore pressure to b). Note that coding remains the same for all charts.



develop, we generate excess pore pressures instead. During the initial contracting stage, we will develop a positive excess pore pressure. For dense sand, instead of dilating, it will generate negative pore pressures, thereby increasing the strength of the sample. A medium dense sand will generate a small amount of negative pore pressure, with a consequent proportional benefit to strength. Again in contrast a loose sample will either remain constant, or will generate extra excess pore pressure. A point worth noting is that all of these effects will start happening as soon as we exceed the threshold strain.

The undrained strength for a given cell pressure is reduced compared to that of drained loading, at least for a medium dense and loose sands. This is simply because the confining pressure is essentially constant at the initial cell pressure. However, for a dense sand the situation is somewhat different, in that the generated negative pore pressures hold the sample together and increase the strength somewhat as additional strain is imposed.

Conceptually, a similar pattern is exhibited for clays, except that, it is extremely rare to see any sort of dilative response. At best one might see a response akin to the medium dense sand, and more often, a response more like the loose to extremely loose sand. One other caveat worth noting is that these curves and ideas have developed from years of testing of different hard mineral sands, ie essentially isotropic, incompressible materials.

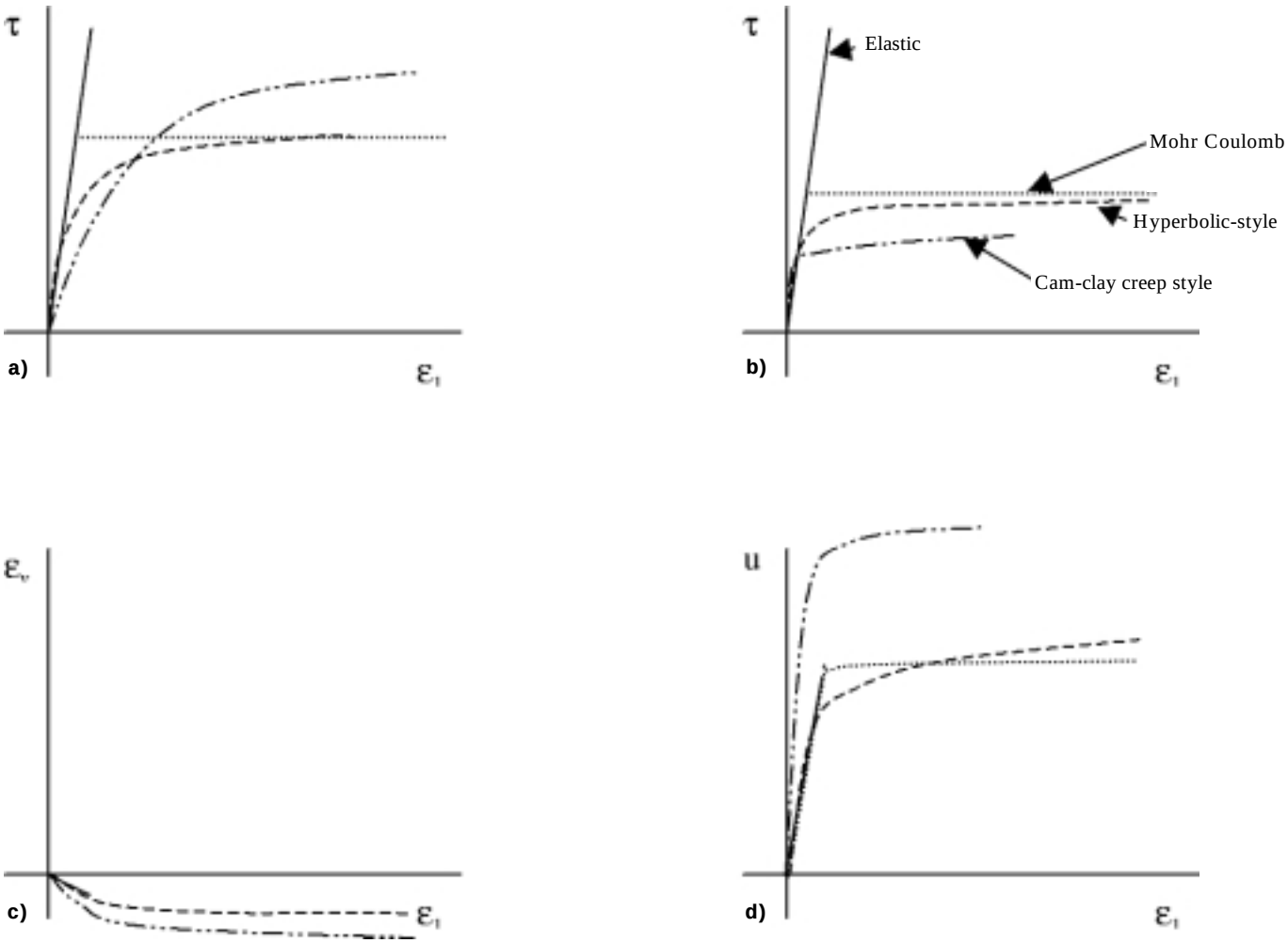
Let us see now how the four models that we have used to date compare to the above concepts as shown in Figure 2.

As can be expected, since we are modelling a soft clay, the general shape is similar to a loose soil, and there is no dilation. However, each of the models has its own interpretation.

The elastic model obviously only applies to the pre-failure portion of shearing, with the volumetric/pore pressure effects calculated directly from Hooks law.

Mohr-Coulomb is similar to the Elastic behaviour, but transitions over to failure with no further increment in

Figure 2 : Soil Models used in embankment study to date. a) Drained stress strain, b) undrained stress strain, c) volumetric strain during drained shearing, d) excess pore pressure during undrained loading Note: material codes remain the same for all charts. Elastic curves for charts c) and d) obscured by initial portion of Mohr coulomb material.



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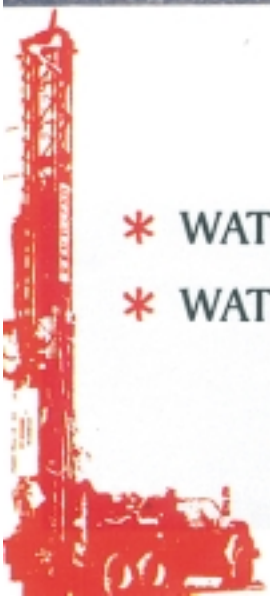

* WATER BORES
* WATER WELLS

shear stress. This illustrates very nicely the concept of perfectly elastic –perfectly plastic, as the lines show either one or the other.

The hyperbolic style model is more interesting. It mimics the shape of the 'real' failure curve relatively well in the stress-strain curves. The volumetric curve (chart c) very closely mimics the Mohr-coulomb volume curve for this material, though there may be some difference to mohr-coulomb round the point of failure. However, the excess pore pressure plot is significantly different. It develops more pore pressure than the mohr-coulomb, and the pore pressure evolves in a slightly different fashion. This is primarily a response to the development of plasticity throughout the shearing phase, and to the change in plastic potential flow.

The cam-clay creep model is even more interesting. In drained loading it exhibits a greater total strength, though higher strains are required to mobilise that strength, whereas in undrained loading it exhibits significantly lower strength. In drained loading, it exhibits a similar mobilised strength/strain as the hyperbolic model at failure. Interestingly, the volumetric strain is very high for the cam-clay style model. Review of the stiffness in shear during the initial portion indicates that the initial stiffness is compatible with the other models. This high volumetric strain suggests that the excess pore pressure that would be generated during undrained shearing will also be high, which proves to be the case. This provides a direct explanation for the reduced strength.

Review of these models indicates the need to carefully consider the characteristics of the problem that one is analyzing and select an appropriate model. In some cases, the problem may need to be analyzed using more than one model in order to catch different aspects of the problem.

COMPANY PROFILES

Rock & Roll Engineering

Rock & Roll Engineering is a specialist engineering geology consultancy that was established in 1991 and is based in Upper Hutt. The consultancy has almost exclusively serviced one client – the Institute of Geological and Nuclear Sciences Ltd and its predecessors, although over the years other clients have included Solid Energy, Tonkin and Taylor, Golders and Opus. The consultancy is run by Grant Dellow.

The consultancy has provided engineering geological services to GNS in three fields. The first of these is foundation investigations and repairs for hydropower structures and includes major work at Matahina, Arapuni, Whakamaru, Clyde, Waitaki, Aviemore, Benmore and Ohau C. The most interesting aspect of this work has been the searching of design and construction drawings and reports to enable the piecing together of the foundation geology for these structures. It has also involved the logging of stored drillholes, drives and rock exposures around these structures.

A second area of work has been in the earthquake hazards field producing susceptibility models for ground shaking amplification, liquefaction and slope stability. The models are composed of a number of data sets (e.g geology, geotechnical, historical and topographic) and can be improved by improving each of the contributing data sets. The realisation that the models produced are dynamic and change as the amount and quality of information available increases means that this work is an ongoing task.

The third area of work and now the most time consuming has been the study of landslides. This work started with the systematic compilation of an inventory of large landslides in New Zealand for GNS and is still ongoing. Since 1996 landslides have been catalogued for GNS using news media accounts and response missions. The landslide catalogue has allowed a more accurate quantification of the hazard and associated risk New Zealanders are exposed to from landslides. Catalogue data shows 4 people have been killed by landslides (and several injured), landslide dams occur at the rate of one per annum, and large landslides (those with a debris volume in excess of one million cubic metres and excluding earthquake generated landslides) have a frequency of one per annum.

The key to doing good work is the acquisition of good quality data. The continual striving for better quality data is the most rewarding and fruitful aspect of the work the consultancy does. (It is not <u>just</u> stamp collecting!)

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URS New Zealand

The geotechnical and geological team at engineering and environmental management consultancy, URS, is among its most vibrant and growing hubs of expertise. Based in Auckland and Christchurch, the 16 strong team works closely alongside other disciplines, as well as with counterparts from URS through Asia Pacific and other parts of the globe. Key services include geotechnical investigations, dam design, construction and rehabilitation, slope stability studies, foundation, geologic and seismic hazard investigations and geotechnical modelling. Expertise is applied to private and public sector clients across a broad range of projects including water and wastewater, bridges and roading, tunnels, dams, energy developments and landfill engineering.

The team's most recent major projects include the design of the second tailrace tunnel at Meridian Energy's Manapouri Power Station in Fiordland, New Zealand's largest ever energy efficiency project; and the detailed risk assessment and options study followed by the design upgrade and overseeing of remedial works at Cosseys Dam, for Auckland region bulk water supplier, Watercare Services.

URS New Zealand is a multidisciplinary team of engineers, scientists, planners, project managers and risk management specialists, based in Auckland, Wellington and Christchurch. It is part of the URS global network of 26,000 professionals in 300 offices and 30 countries. URS's core values are professional excellence, integrity and environmental and social responsibility. With these as a base, teams and individuals have a proven dedication to delivering client-focused solutions.

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National Network of Technological Societies (NNTS)

NNTS exists for the following purposes:

- Facilitating the presentation of the informed views of New Zealand's technological 'community of expertise' on issues of the day (by creating mechanisms for endorsement of non-aligned and learned contributions on technological issues affecting the wider community when they are presented to Government, the media, community leaders and the general public).
- Development of wide-ranging expertise listings as a resource for those in the community seeking informed comment on technological issues.
- Sharing of best practice and cooperation amongst Chief Executives/Executive Officers of member organisations e.g. development and operation of codes of ethics, shared publishing possibilities, wider advertising of meetings/seminars/conferences etc.
- Possibly developing a national Technology Events calendar, sharing administrative service experiences e.g. database developments.

NZGS is now a member – so check out the website
www.nnts.org.nz

MEMBER PROFILES

Steven Anderson

Occupation
Laboratory Manager, Geotechnics Ltd

Career Path
My mother's habit of filling the car with different stones on holidays probably got me interested in geology at a young age. School geography and a careers visit to Waikato University set me up for an Earth Science degree (BSc), which I completed in 1981.

I responded to an advert for a job position as a laboratory technician in a place called Ruakaka. The company, Geotechnics Ltd was looking for a technician to work in a concrete laboratory at Marsden Point Oil Refinery. The refinery expansion project was one of the last "Think Big" projects. After the interview on a Friday I started work the following Monday.

After the project I moved to the Auckland office and have been there ever since, with the exception of the odd project job. I started as a technician and have through promotion moved to the position of laboratory manager.

While working for Geotechnics I have seen the company change from a laboratory servicing it's parent company Tonkin and Taylor Ltd, to an independent business comprising a sales division, two commercial laboratories and numerous project laboratories.

Typical Week
When I first joined Geotechnics my typical week consisted mainly of performing laboratory and field testing, but with my current managerial responsibilities I spend most of my time at a desk. A lot of my time is spent balancing the demands of a business involved in a technical service environment. This involves working directly with clients to establish their requirements, organise the work, encourage the team and provide reliable result on time. This is all done under the umbrella quality system of an IANZ accredited laboratory.

A large part of my day is spent dealing with client queries. These range from providing free advice and information to helping them with their projects, or working with them to get the best solution to their testing requirement. Often when quoting work or writing proposals, a lot of time is spent on defining the purpose of the requested test and any over-riding specifications or contractual obligations. Lastly I check the final reports to make sure the information is clear and unambiguous and complies with our IANZ accreditation.

Highs and Lows
The high points have been when I have worked on major projects, such as The Marsden Point Refinery expansion, Kinleith Pulp and Paper Mill Upgrade, Matahina Dam Strengthening, Manapouri Second Tail Race Tunnel and Seremban Roading Project in Malaysia. The demands of a new project and being involved in the setting up of a testing facility or service, are a great challenge and very rewarding. Working on a major project requires more focus as opposed to the varied small projects of a commercial laboratory. The low points are the regular mundane administrative tasks.

Ambitions
- To keep learning and discovering new ideas and technologies in the geotechnical testing discipline.
- To see Geotechnics Ltd as the prominent geotechnical testing services provider and instrumentation company in New Zealand.
- To spend a fortnight hunting on Stewart Island, if I can get away from the office.

Advice
- Make your client look good.
- Improve your technical competency, but also learn about business management.
- Get organised and do the hard jobs first (get a palm pilot).
- Have an excellent records and filing system.
- Enjoy your job and have fun at work.

Mauri McSaveney

Age

A vintage with potential to mature, currently appreciating in value at 1.74% per year.

Occupation

Senior Engineering Geomorphologist, Institute of Geological & Nuclear Sciences Ltd, Lower Hutt.

Route to the Job

My high-school geography teacher, Phil May, of West Coast Gold Rushes fame kindled an interest in geomorphology that no one has been able to kill. At Canterbury University, Max Gage added glacial geology and glaciers. Graduate School at the Ohio State University, Columbus, Ohio, USA, greatly expanded my knowledge horizon in a stimulating, and broad-based academic research environment. I ostensibly trained in glaciology, but if earth-surface processes research had been invented then, that is what I picked up there.

After the PhD, bro' engineer sent two ads from NZ. The Water and Soil Division of the Ministry of Works and Development (MWD)was setting up a research arm and wanted people to lead research in Alpine Hydrology and in Erosion Processes, out of a base at Lincoln University, near Christchurch. I became Leader, Alpine Hydrology in Water & Soil (W&S), MWD, Christchurch. When Mr Erosion Processes went on study leave, my section became Alpine Hydrology and Erosion Processes, which shortened to Alpine Processes. W&S Scientists were not to be hijacked into MWD projects, but there were still a few gems of Engineering Geomorphology research to be picked up.

MWD never did get to Lincoln. An era of ideologically based management experiments began. MWD vanished in a puff of ink. We W&S research babies went with our bathwater to DSIR. When the plug was pulled on W&S Division, DSIR, a few of us were flushed into the NZ Geological Survey. The reorganisation plague came with us, and NZGS became DSIR-Geology & Geophysics, then the Institute of Geological & Nuclear Sciences Ltd (GNS). I am now in Lower Hutt. I still have the wooden, left-handed desk I inherited in W&S, MWD. I still do Earth-Surface-Processes Research and Engineering Geomorphology. I get to Lincoln University quite often.

Typical Work Day/Week/Year

I solve problems by assimilating all the available data, winnowing out the usual chaff, and sleeping on what is left. If all goes well, the answer is there in the morning to package in plain English and mail to the client. It may take a day, a week, a month or a year or so, but the process and routine are the same. The key thing to judge at the start is whether the task is a sprint, middle distance or marathon. Research is demanding of mental energy, and I have learned from experience that I can not mentally sprint a marathon task (and the occasional 100-metre task at marathon speed is quite therapeutic).

Highs/Lows

I get a lot of job satisfaction out of solving seemingly insoluble engineering geomorphology problems. Landslides, the larger the better; debris flows; alluvial fans; flood plains; erosion; tsunami; "geomorphic" and geological hazards; the next great West Coast earthquake – they are my "bread-and-butter", and "dessert" too. There are a lot of earthworks now around the village at Mount Cook, and people there are a little safer than they used to be. The Otira Viaduct is a work of engineering beauty, and SH73 is a little more secure than it used to be. My advice (with others) started these works.

Lows are few and far between. The closure of the GNS Christchurch office struck pretty low, but I've never regretted the shift to Lower Hutt, and it led to an enduring, productive research partnership with Tim Davies, Professor of Engineering Geomorphology at Lincoln University, that might never have started had I remained in Christchurch.

Ambitions

They say that good mathematicians pass their peak at 18, but good geologists peak at the other end of their career. Having proved I'm no good mathematician, I live in hope that I can be a good geologist.

Advice

- If a site modification will be irreversible, think twice about recommending it, then don't.
- Modify the structure according to the site, and never the reverse.
- The mistake is usually at square one, where few people go back to look.
- Never loose sight of the objective among all the detail. If it doesn't contribute to the objective, it is irrelevant.
- The provision of timely, correct advice is highly laudable; but when compromise is necessary, the engineer requires only that it be timely.
- There are at least four sides to every coin.

NZ Geotechnical Society 2003 Photo Competition

The year 2003 theme is: *"Habits of the species geotechnicalus"*

Show us the things that geotechnical engineers, engineering geologists, and technicans in the profession get up to!!. Photos of you or your colleagues doing what they do best... working hard!!

WIN $200

A perfect chance to win some drinks money for the office.

The winning photo will be printed in colour in the June 2003 issue of the *NZ Geomechanics News* and put onto the Society Web Page.

Send your entry to:

- Management Secretary, NZ Geotechnical Society, 6 Sylvan Valley Ave, Titirangi, Auckland by 20 April 2003
- *OR* email to: dfellows@xtra.co.nz (send as jpgs)
- Clearly mark your entry with your name and provide a caption for your photo

Conditions of Entry:

1. Only amateur photographers may enter.
2. Photos must be taken by the entrant.
3. No computer generated pictures.
4. Any photographs received may be published in subsequent Society publications.
5. Winning entries will be final and no correspondence will be entered into.
6. NZ Geotechnical Society members only may enter.

THE BOB WALLACE COLUMN

When is a conflict of interest, not a conflict of interest? Unfortunately, confusion on this issue is only being complicated by the activity of some clients.

There is a growing trend in our industry towards forms of contract that are supposed to be non-adversarial. In this valiant attempt to save money by avoiding confrontation and conflict there has been a blurring of boundaries between parties to a construction contract. I believe the activity of a professional engineer and his role has to be looked at very carefully.

Let me explain by way of a hypothetical example. A consulting engineer has been appointed by a client to investigate options for a large infrastructure scheme. The investigations include a review of the geotechnical issues and the conceptual development of options. A preferred scheme is identified and the consultant completes a more thorough assessment including preliminary design and budget costs. At this point in the project life cycle the client or project sponsor has three options:

- A conventional Engineer's Detail Design with a competitively tendered Measure and Value Contract.
- A Design and Construct Contract.
- A Turnkey Contract.

With each of these options there is a decreasing amount of potential work and fee income for the professional engineer acting for the project sponsor. In Option 1 there is the detail design and tender documentation fee followed by the tender review and award. Then there will be fees for construction supervision, measurement and certification. A very lucrative package and the means by which consulting engineers have been making money since the very beginnings of our profession.

As a consulting engineer, Option 2 provides less of an opportunity for making a buck. There is still a role for the Client's Engineer but there is no detail design, although there can be some income for reviewing the submitted tender designs. There is less of a demand for construction supervision and measurement since the client is only interested in fitness for purpose and doesn't care what problems the contractor faces on the site or what resources he uses to overcome them.

In Option 3, the Client's Engineer role is virtually non-existent. The Client puts all his faith in the Turnkey Contractor providing the facility asked for within a certain time frame and budget. How this is achieved is entirely at the contractor's discretion and he is expected to self certify the adequacy and appropriateness of the works.

The reasons for this move away from Option 1 could be debated at length. There are those that would say that this traditional approach was too adversarial and inefficient. The effort involved in recovering costs through the inevitable claims process was wasteful and that Option's 2 & 3 offer significant savings in time, money, risk and emotional investment. Call me an old fashioned cynic or a conspiracy theorist with a colourful imagination but I strongly suspect that the wolf has been wearing sheep's clothing and has successfully managed to pull the wool over everyone's eyes. Nothing was ever changed for purely altruistic means. There has to be some payback and that usually means increased profitability and turnover for less effort, at someone else's expense.

So let us go back to my original example. Assume the project sponsor has fallen for the populist argument that Option 2 or 3 is the way to proceed. What options does the consultant have who had been acting as the client's engineer through the preliminary studies and concept designs?

If I had asked that question twenty years ago I am sure I would have been given the answer that the consultant only has one option. He must continue to work and act in the best interests of his client by providing professional advice and support throughout the implementation of the contract albeit for a reduced fee and with less control of the project direction.

Asking the question today I fear that there is another alternative answer that has also gained popular acceptance in the profession. When the decision is made on the form of contract or contract delivery mechanism, the consultant can withdraw his services from the client and offer them instead to the potential bidders for a D&C or Turnkey Contract. I believe the argument used is that the client's best interests are being served since the consultant's background and experience on the project is invaluable. The "logic" suggests that there will be cost benefits and savings to the client if the consultant has continuous intimate involvement in the detailed design and construction.

The argument has a ring of truth to it and can probably be delivered in a very plausible manner. Does that make it any more acceptable? Or does it sound like someone who is desperately trying to justify a sordid attempt to make more money? In any event, it happens and although it opens up a can of worms in regard to the fairness of any subsequent tendering process when I opened the column I suggested that the theme would be related to conflicts of interest. Are these issues related?

Consider further the development of my hypothetical scenario. Our consultant has jumped fences and is now being paid and directed by the contractor. What happens when circumstances revealed during detail design or construction result in additional expenditure for the contractor that he believes is a legitimate claim on the project sponsor due to some inadequacy in the preliminary work or planning? Any client who believes that D&C or Turnkey forms of contract protect them

from such claims has been sadly misled. It can happen, so what role does the consultant take?

The consultants can find themselves in the situation where they are supporting a claim by their current client against a former client who will sue them for negligence if the claim is successful. A significant conflict of interest I would imagine.

Alternatively, the consultant maybe asked by the contractor to consider design changes that offer substantial savings on the original concept schemes and feasibility studies. Can the consultant sit across the table from their former client and have any credibility when trying to justify such design changes at the expense of admitting the inadequacy of their preliminary work? This would be another, entirely foreseeable, conflict of interest.

I don't know the answer to this problem, which I believe goes beyond our local interests. I don't even know if it has been recognised as a potential problem in the profession anywhere in the world. It just doesn't feel right to me and I feel even more uncomfortable when I'm told there can be no conflict when all parties have disclosed their previous interests. I think it is a short and slippery slope to collusion, price fixing and cronyism. Perhaps we are already at the bottom.

EQUIPMENT • INSTRUMENTATION • TESTING • MONITORING

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www.geosales.co.nz

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EVENTS DIARY

2003

FEBRUARY 13–15 2003, Christchurch, New Zealand

NZ Society for Earthquake Engineering – 2003 Pacific Conference on Earthquake Engineering

Session topics:

– Structures
– Foundations and geotechnique
– Seismology and Microzoning
– Lifelines systems
– Emergency management planning
– Learning from earthquakes
– Social and economic issues
– Insurance Issues

http://www.nzsee.org.nz/pcee

MARCH 28–30 2003, Tauranga, New Zealand

NZ Geotechnical Society Symposium – Geotechnics on the Volcanic Edge

Session topics:

– Slope stability and land development
– Properties and behaviour of Volcanic Soils
– Engineering Geology of Volcanic Environments
– Seismic Risk and Dam Engineering
– Foundation Engineering
– Roading Geotechnics and Highway Engineering
– Liquefaction
– Geosynthetics
– Expert Evidence/Legal Implication/Legislation

Abstracts due 31 August 2002
Full papers due 15 December 2002
http://www.cce.auckland.ac.nz/geotech2003

MAY 11–16 2003, Sorrento, Italy

International Conference:
Fast slope movements prediction and prevention for risk mitigation.
and International Workshop:
Occurrence and mechanisms of flows in natural slopes and earthfills.

Session topics:

– Risk Assessment from theory to practice
– Risk Mitigation
– Criteria for land management

Abstracts due 31 July 2002
http://www.unina2.it/fsm2003.for.conference
http://www.unina2.it/flows2003.for.workshop

JUNE 22–26 2003, Cambridge, USA

12th Pan American Conference on Soil Mechanics and Geotechnical Engineering

Conference themes:

– Ground Characterisation and exploration
– Geo-materials and mechanics
– Geo-construction
– lessons learned from failures
– Future challenges
– Fluids in the subsurface environment.

http://www.soilrock.mit.edu

JULY 28–30 2003, Nottingham, UK,

Problematic Soils

Session themes:

– Peat and organic soils
– Volcanic Soils
– Expansive soils
– Collapsible soils
– Decomposed Soils
– Contaminated Soils
– Fills
– Unsaturated soils

Abstracts due 1 November 2002

For more information contact:

The Conference Director
Ci Premier Pte Ltd
150 Orchard Road #07-14
Orchard Plaza
Singapore 238841
Tel 065 6733 2922
Fax 065 6235 3530
Email:-CIPREMIERE@SINGNET.COM.SG
Web: www.cipremier.com

AUGUST 11–12, 2003, Malaysia

Geo-Environmental Engineering

For more information contact:

The Conference Director
Ci Premier Pte Ltd
150 Orchard Road #07-14
Orchard Plaza
Singapore 238841
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Fax 065 6235 3530
Email: CIPREMIERE@SINGNET.COM.SG
Web: www.cipremier.com

AUGUST 25–28 2003,
Prague, The Czech Republic
13th European Conference on Soil Mechanics and Geotechnical Engineering
– Geotechnical Problems with man-made and man influenced grounds.
Conference themes:
– Man made deposits – recent and ancient
– Contaminated ground – remediation and preparation for new construction
– Construction on man made and remediated brownfield sites
– Foundations in urban areas
– Networking of Geo-Engineers between East and West Europe
http://www.escmge2003.cz

SEPTEMBER 17–18 2003,
Saint Petersburg, Russia
Intenational Geotechnical Conference – 'Reconstruction of Historical Cities and Geotechnical Engineering'
Conference themes:
– Reconstruction of historical cities.
– Geotechnical calculations in reconstruction
Papers due: March 1, 2003.
Contact:
Mikhail Lisyuk
Tel. +(7) (812) 251 04 62
Tel./Fax. +(7) (812) 316 61 18
e-mail: mail@georec.spb.ru.
Mailing address:
198005, Saint Petersburg, Izmaylovsky prosp., 4, office 411
Georeconstruction Engineering Co

SEPTEMBER 8–12, 2003, Gauteng, South Africa
10th ISRM International Congress
http://www.isrm2003.co.za

SEPTEMBER 15–18 2003, Istanbul, Turkey
International Symposium on Industrial Minerals and Building Stones

SEPTEMBER 22–24 2003, Lyon, France
3rd International Symposium on Deformation Characteristics of Geomaterials
Conference themes:
– Soils and soft rock
– Experimental investigations into deformation properties from very small strains to beyond failure
– Time effects (ageing and viscous effects)
– The interpretation of laboratory, in situ and field observations of deformation behaviour
– Characterizing and modelling behaviour
– Case studies.
Abstracts due 1st January 2003
http://islyon03.entpe.fr

SEPTEMBER 22–26 2003, Bled, Slovenia
1st International Conference on Groundwater in Geological Engineering
Themes:
– Groundwater as a risk factor and/or a technical constraint
– Groundwater as an environmental constraint
– Groundwater as a socio-economic constraint
Deadline for submission of abstracts 1st December 2002
http://www.pivo-union.si/ICGGE-2003/
http://www.drustvo-skiah.si
http://www.iah.org/
http://www.bled.si/

OCTOBER 13–15, 2003, Stockholm, Sweden
GeoProc 2003 – International Conference on Coupled T-H-M-C Processes in Geosystems
Conference themes:
– Fundamentals
– Modelling
– Experiments
– Applications
http://www.geoproc.org

2004

FEBRUARY 9–11 2004, Auckland, New Zealand
To the eNZ of the Earth –
9th ANZ Conference on Geomechanics
Topics Include:-
– Slope instability
– Foundations
– Piles
– Anchors/reinforcement
– Dams
– Roading
– Environmental Geotechnics
– Seismic Engineering
– Rock Mechanics
– Engineering Geology
– Expansive Soils
– Testing
Call for Abstracts and Papers: See Dec 2002 issue of *NZ Geomechanics News* for call for abstracts and papers

APRIL 13–17 2004, New York, USA
5th International Conference on Case Histories in Geotechnical Engineering
Topics Include:
– Slope instability
– Foundations
– Dams
– Geotechnical earthquake engineering
– Piles
http://www.umr.edu/~eqconf/5thCHConf

NEW ZEALAND GEOTECHNICAL SOCIETY INC.

Management Committee Address List 2002

NAME	POSITION	ADDRESS, EMAIL	PHONE, FAX
Crawford, SA (Steve)*	Chairman	Tonkin & Taylor PO Box 317 Tauranga Scrawford@tonkin.co.nz	07 571 3570 Work 07 571 5508 Fax 021 675 468 Mobile
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Haberfield, CM (Chris)	ISRM Australasian Vice President	Golder Associates Pty Ltd P O Box 6079 Hawthorn West VIC 3122, Australia chaberfield@golder.com.au	+61 3 8862 3500 Work +61 3 8862 3501 Fax +61 3 9754 5452 Home

* Elected members of committee

+ Appointed position

NEW ZEALAND GEOTECHNICAL SOCIETY INC.

Objectives

a) To advance the study and application of soil mechanics, rock mechanics and engineering geology among engineers and scientists
b) To advance the practice and application of these disciplines in engineering
c) To implement the statutes of the respective international societies in so far as they are applicable in New Zealand.

Membership

Engineers, scientists, technicians, contractors, students and others who are interested in the practice and application of soil mechanics, rock mechanics and engineering geology.

Members are required to affiliate to at least one of the International Societies.
Students are encouraged to affiliate to at least one of the International Societies.

Annual Subscription

Subscriptions are paid on an annual basis with the start of the Society's financial year being 1st October. A 50% discount is offered to members joining the Society for the first time. This offer excludes the IAEG bulletin option and student membership. No reduction of the first year's subscription is made for joining the Society part way through the financial year.

A $30 per year service centre will apply to all non IPENZ members.

Basic membership subscriptions (inclusive of GST)

which include the magazine *NZ Geomechanics News*, are:

Members	$67.50
Students	$28.10

Affiliation fees for International Societies

are in addition to the basic membership fee:

International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE)	$24.00
International Society for Rock Mechanics (ISRM)	$33.00
International Association of Engineering Geology & the Environment (IAEG)	$21.00
(with bulletin)	$70.00

All correspondence should be addressed to the Secretary. The postal address is:
NZ Geotechnical Society Inc.
P O Box 12 241
WELLINGTON

The Secretary
NZ Geotechnical Society Inc.
The Institution of Professional Engineers New Zealand (Inc)
P O Box 12 241
WELLINGTON

NEW ZEALAND GEOTECHNICAL SOCIETY INC.
APPLICATION FOR MEMBERSHIP
(A Technical Group of the Institution of Professional Engineers New Zealand (Inc))

Full Name (Underline Family Name) _____
Postal Address _____
Phone No: _____ Fax No: _____ Email: _____
Date of Birth _____
Academic Qualifications _____
Professional Memberships _____ Year Elected _____
Present Employer _____
Occupation _____
Experience in Geomechanics _____

Student Members:
Tertiary Institution _____
Supervisor _____ Supervisor's signature _____

Note that the Society's rules require that in the case of student members "the application must also be countersigned by the student's Supervisor of Studies who thereby certifies that the applicant is indeed a bona-fide full time student of that Tertiary Institution"; Applications will not be considered without this information.

AFFILIATION TO INTERNATIONAL SOCIETIES:

All full members are required to be affiliated to at least one Society, and student members are encouraged to affiliate to at least one Society. Applicants are to indicate below the Society/ies to which they wish to affiliate.

I wish to affiliate to:

International Society for Soil Mechanics and Geotechnical Engineering	(ISSMGE)	Yes/No
International Society for Rock Mechanics	(ISRM)	Yes/No
International Association of Engineering Geology & the Environment	(IAEG)	Yes/No
	(with Bulletin)	Yes/No

DECLARATION:

If admitted to membership, I agree to abide by the rules of the New Zealand Geotechnical Society Inc.
Signed _____ Date _____

ANNUAL SUBSCRIPTION:

Due on notification of acceptance for membership, thereafter on 1st of October. Please do not send subscriptions with this application form. You will be notified and invoiced on acceptance into the Society.

PRIVACY CONDITIONS:

Under the provisions of the Privacy Act 1993, an applicant's authorisation is required for use of their personal information for Society administrative purposes and membership lists. I agree to the above use of this information:
Signed _____ Date _____

(FOR OFFICE USE ONLY)

Received by the Society _____
Recommended by the Management Committee of the Society _____

NEW ZEALAND GEOTECHNICAL SOCIETY INC. PUBLICATIONS

Publication Name	List Price Members	List Price Non-Members
New Zealand Geomechanics Society Conferences:		
Proceedings of the New Zealand Geotechnical Society Symposium – *Engineering and Development in Hazardous Terrain* Christchurch 2001	$50	$70
Proceedings of the New Zealand Geotechnical Society Symposium – *Roading Geotechnics 98* Auckland 1998	$40	$70
Proceedings of Technical Groups, Vol 22, Issue 1G *Geotechnical Issues in Land Development* Hamilton 1996	$20	$35
Proceedings of the Auckland Symposium - *Groundwater and Seepage* May 1990	$10	$45
Australia – New Zealand Conferences on Geomechanics:		
Proceedings of the 6th Australia – NZ Conference on Geomechanics Christchurch, February 1992	$50	$100
Proceedings of the 3rd Australia – NZ Conference on Geomechanics Wellington, May 1980	$10	$30
Other Publications:		
Proceedings of the 2nd Australia – NZ Young Geotechnical Professionals Conference, Auckland, December 1995	$25	$40
Shear Vane Guidelines	$15	$20
Guidelines for the Field Description of Soils and Rocks in Engineering Use	$10	$13
Stability of House Sites and Foundations – Advice to Prospective House and Section Owners	$1	$1
Back Issues of *NZ Geomechanics News* (depending on availability)	50c	50c

Prices do not include GST or postage & handling

Orders to:

Debbie Fellows
Management Secretary
6 Sylvan Valley Ave
Titirangi, Auckland
Email: dfellows@xtra.co.nz

ADVERTISING

NZ Geomechanics News is published twice a year and distributed to the Society's 500 members throughout New Zealand and overseas.

The magazine is issued to society members who comprise professional geotechnical and civil engineers and engineering geologists from a wide range of consulting, contracting and university organisations, as well as those involved in laboratory and instrumentation services.

Advertisement Location	Single Issue	Advert. Size (mm)
Black & White		
Back Cover	$300	210 wide x 297 high
Inside Cover (Front or Back)	$250	210 wide x 297 high
Full Page Internal	$225	185 wide x 265 high
Half Page Internal	$175	90 wide x 265 high 185 wide x 130 high
Quarter Page Internal	$150	90 wide x 130 high
Colour		
Full Page Internal	$400	210 wide x 297 high
A3 Centrefold	$750	420 wide x 297 high
Inserts Insert to be posted with magazine – $200/flyer Maximum size single A4 page Special price given on request for other types and sizes		
Note 1. All rates exclude GST 2. Space is subject to availability 3. 3 mm bleed 4. Advertiser to provide all flyers		

If you are interested in advertising in the next issue of *NZ Geomechanics News* please contact:

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Titirangi
Auckland
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GEOTECHNICS LTD
ROAD TESTING UNIT

Geotechnics offers a comprehensive road testing service which incorporates a wide range of testing applications from single lane unsealed rural accessways to multi-lane highways and motorways. The Road Testing Unit is purpose built for a range of IANZ registered services including:

DEFLECTION TESTING (BENKLEMAN BEAM)

This service utilises a standard Benkleman Beam where pavement deflections are measured and recorded with preliminary results issued on site, followed up by a formal test report.

DEFLECTION TESTING (GEOBEAM)

Using our patented Geobeam, deflection measurements are made via an electromagnetic proximity transducer located at the point of test. This system provides for both standard deflection information and detailed bowl shape at every test point if required. The information is automatically recorded and stored on a hand held site computer and can be used to determine subgrade moduli and analysis of pavement component performance.
This service has particular application on existing pavements where subsurface information is required for design purposes.

Standard test loads of 7.3 tonnes and 8.2 tonnes are available for deflection testing.

FIELD CBR AND PLATE BEARING TESTING

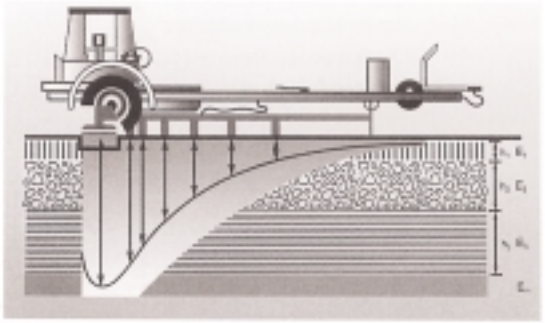
The unit has also been designed to perform Californian Bearing Ratio and Plate Bearing Tests and has built in facilities and equipment for the performance of these tests.

FULL TIME TEAM

The Road Testing Unit is operated by a two man team who are committed full time to its operation and maintenance. We aim to provide a timely, cost competitive service which meets the demands of the civil engineering and construction industries.

THE FALLING WEIGHT DEFLECTOMETER

Using the Falling Weight Deflectometer (FWD) Systems and associated analysis software, it is possible to quickly and accurately determine the structural condition of the pavement system. The required overlay or other rehabilitation alternatives are calculated from analytically based structural design methods, at a cost which is negligible compared to the cost of an incorrect rehabilitation strategy.



GEOTECHNICS LTD
23 MORGAN STREET, NEWMARKET, AUCKLAND
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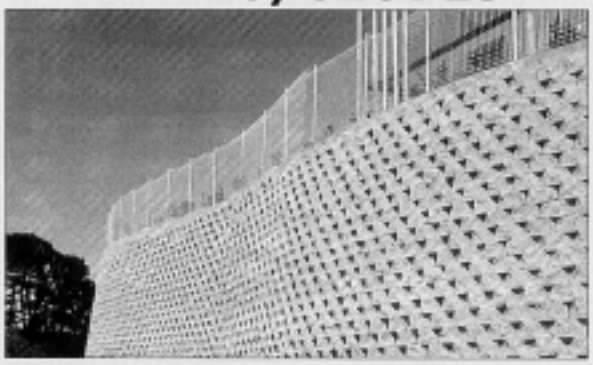
SUPERIOR
REINFORCEMENT
SYSTEMS

For over 20 years we have provided a specialist technical service and a wide variety of superior products to ensure ground stabilisation.

WALLS/SLOPES



When the need is to hold the ground, we have a range of products for every situation from large scale hillside reinforcement to decorative retaining walls

DRAINAGE

We specialise in a broad range of sophisticated drainage products which are economical and easy to install. The emphasis of these products is to be user friendly with features such as minimum excavation and backfill requirements in addition to high flow rates.

EROSION CONTROL

We have numerous products to achieve ground holding and erosion control - from biodegradable protection blankets and permanent grass reinfocement systems, to the rugged, heavy duty gabions.

ROADING

Our roading products are at the forefront of geosynthetic technology. These technically proven products are designed to extend the life of the road and increase the load bearing capacity.

FOR FURTHER INFORMATION CONTACT:

STEVENSON

Building Products

Phone

0800 610 710

6 Branches Auckland wide

'Delivering Value'