



香港岩土及岩土環境工程專業協會

ASSOCIATION OF GEOTECHNICAL & GEOENVIRONMENTAL SPECIALISTS (HONG KONG)

AGS (HK) NEWSLETTER

Editorial

The first issue of the AGS(HK) newsletter published in September 2003 received wide distribution amongst the Hong Kong Geotechnical and Geo-environmental community. We've received many positive comments and we hope to make this publication a regular and sought after source of HK Geo-news. Our intention is to keep the profession aware of current and future AGS(HK) activities and we hope this next edition of the newsletter will do just that!

This issue includes reports on recent successful AGS(HK) forums, a brief description of what our Geo-environmental Working Group is up to and a few words from the next generation of geotechnical and geo-environmental engineers.

We also recommend that you pay regular visits to our website at www.ags-hk.org which we always keep up to date with latest events, news and downloads. If your company would like to become a member of the AGS(HK) and contribute towards this dynamic and exciting organization, please send your enquiry to membership@ags-hk.org or download the forms from our website.

Comments

Please feel free to send any comments on the content or design of this newsletter to :

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Newsbites

Ground Investigation Guidelines (GIGs)

In line with AGS(HK) objectives and as part of the AGS(HK) 18 month plan developed during a brainstorming session held in April 2003, it was pledged to produce documents on site investigation providing guidance to young engineers and

geologists involved with the planning, specification, design and supervision of site investigations. In September 2003, AGS(HK) published and distributed to the geotechnical community the following.



GIG01 *Contract Documentation;*

GIG02 *Planning & Programming Considerations; and*

GIG03 *Procurement*

The fourth GIG which has just recently been published is

GIG04 *Design Guidelines*

Feedback from the profession on the GIGs are encouraged and welcomed via gig@ags-hk.org.

Annual General Meeting 2003 & Forum on GI Problems Revisited & AGS(HK) Promoting Best Practice

The Annual General Meeting was held on 17 December 2003 at Hong Kong Polytechnic University. Our chairman, Mr Michael Lacy, provided a brief report of AGS(HK) activities and achievements over the 2002/2003 session. A detailed copy of Michael's chairmans report can be downloaded at www.ags-hk.org.

After the AGM was successfully closed, the audience were treated to brief introductions of the recently published GIGs by each of the GIG authors / compilers. Professor Chris Fletcher then provided a presentation on his much anticipated and soon to be published descriptive guide on "The geology of Site Investigation Boreholes from Hong Kong". This guide has been produced with the support of the Applied Geoscience Centre (AGC) and sponsorship from the AGS(HK) and SICC, and follows on from the very successful AGC logging course held last year, which was also strongly supported by the AGS(HK) and the SICC. Many thanks to Prof Fletcher and the GIG authors / compilers for their insightful presentations.

Visit by Professor Peter Fookes

Professor Peter Fookes F.R.Eng, known as the “doyen of engineering geology” and “father of engineering geomorphology” in the U.K visited Hong Kong at the end of November 2003. The visit was jointly sponsored by AGS(HK), IMMM(HK), GSHK, HKCA(SICC) and HKRGGSL. Peter gave two lectures and a technical meeting during his stay and can be seen below (right) together with Dick Martin (left) from IMMM (co-ordinator of the event).



On 27th November 2003 Peter gave an updated version of his 1997 Glossop Lecture, ‘*Geology for Engineers : the Geological Model, Prediction and Performance*’ held at the Hong Kong Convention & Exhibition Centre in Wanchai and attended by about 300 members of the geotechnical profession. Peter also gave an introductory lecture at a technical meeting ‘*Ground Investigation and Modelling for Engineering in Saprolite and Weathered Rock*’ which was held at HKUST on 29th November 2003. On 2nd December 2003, Peter presented an updated version of his GeoEng Melbourne 2000 lecture, ‘*Total Geological History : a model approach to the anticipation, observation and understanding of site conditions for engineers*’ held at HKU.

The general consensus from all those who attended was that the lectures were entertaining and of significant interest. The positive response should undoubtedly lead to similar events in the future.

AGS(HK) representation on the GEO Working Group for Guidance Document on Engineering Geological Practice in Hong Kong

The Geotechnical Engineering Office (GEO) have awarded to Maunsell Geotechnical Services Ltd the contract to prepare a *Guidance Document on Engineering Geological Practice in Hong Kong – Feasibility Study*. In recognition of the AGS(HK) as a well respected and knowledgeable organization



with a unique perspective within the geotechnical community, GEO has invited the AGS(HK) to provide representation on the Working Group overseeing the preparation of the document. Membership of the Working Group includes representatives of learned societies related to geotechnical practice including AGS(HK), HKIE, IMMM(HK), IoQ(HK), GSHK and HKRGGSL. Our Mr Graeme Jardine has expended considerable efforts towards conveying AGS(HK) comments to the Working Group and providing regular reports and updates to the committee on the progress. AGS members are welcome to contact Graeme for further information at geoenvir@ags-hk.org.

Joint Meeting between SSTRB and Professional Bodies

Following an invitation from GEO, AGS(HK) took part in a Joint Meeting on the 3rd December 2003 between the Slope Safety Technical Review Board (SSTRB) and the various professional bodies associated with geotechnics in Hong Kong which included HKRGGSL, HKIE(GD) and IMMM(HK).

Mr Michael Lacy (Chairman) and Mr Joseph Lo (Chairman-elect) represented AGS(HK) at this meeting. A presentation was made to Professors N R Morgenstern, M D Bolton and S J Wang who are members of the review board. The presentation explained the history of the AGS in Hong Kong and discussed the current activities of AGS(HK).



Book Prize

Students, graduates and other young attendants of the ground forums are encouraged to submit written records of the presentations and dialogue that take place at the forums. The AGS(HK) offers a book prize to the value of HK\$500 for the most concise and well-written record for each of the ground forums held. Suitable records may be sent to Dr Cyril Chan at:

e-mail: hfcchan@fugro.com.hk

postal: c/o Fugro Geotechnical Services (HK) Ltd
Units 8-11, 10th Floor
Worldwide Industrial Centre
43-47 Shan Mei Street
Fo Tan, Shatin, N.T.

Geoenvironmental Working Group

The Geoenvironmental Working Group of the AGS(HK) was established in November 2003 to provide an "industry" based authoritative voice on the investigation, remediation and associated design approaches to contaminated land and landfills, as well as highlight their potential legal implications.

The redevelopment of former industrial sites including power and petrol stations, incinerators, tank farms, factories, vehicle maintenance areas, ship yards and landfills has been increasing in the last 15 years with notable examples of remediated sites in Penny's Bay, Kai Tak Airport and Tsing Yi. With public pressure on the reduction of reclamation and with the high cost of developing steep slope areas, further development of potentially contaminated sites are seen as target areas for the Government and private developers alike. However, before these sites can be reused they must be firstly investigated properly, assessed correctly, remediated successfully with an equitable economic and/or legal agreement made between the owner or leasee.

Of the 16 designated landfills in Hong Kong, currently only two (WENT & SENT) are still receiving low level contaminated material and refuse. Recycling



of potential waste is of paramount importance to ease the pressure on these landfills and to limit (if required) the development of new landfill sites or incineration plants, as well as the practical, safe and environmentally friendly management and redevelopment of these existing facilities.



Maintenance dredging or the development of contaminated marine mud locations does and will produce large volumes of polluted materials. Like reclamation, mud disposal is an emotive subject for the Government, the public and concerned groups as it may have significant environmental impacts at the source or at the disposal site. The existing open sea

disposal areas and the contaminated disposal sites at East Sha Chau will be filled in the foreseeable future at present rates. What are the feasible "in situ" alternatives, taking into consideration geotechnical, cost and programme requirements?



The recent Penny's Bay shipyard episode highlighted the limited scope of Hong Kong legislation dealing with contamination by landowners of the land they occupy. Unlike in other jurisdictions, Hong Kong does not have comprehensive legislation to support the so called "polluter pays" principle. Instead, the Hong Kong Government has sought to pursue that principle by contractual means, however this practice is not universally applied. Moreover, it has only been adopted relatively recently. It seems likely that there are many potential development sites where the old lease contained no provisions obliging the lessee to pay for the clean up of contamination on the site concerned. Even if there were, there may be problems with the enforceability of such provisions, given potential time-bars for bringing legal proceedings and also cessations of business operations. New grants of potentially contaminated land are likely to involve obligations on the purchaser to clean up the potential contamination (obligations by way of lease conditions, environmental permits or planning permission). Therefore, purchases of potentially contaminated sites, either by way of assignment from the existing lessee or new grant from Government, pose significant risks for developers in the form of substantial liability in relation to any pre-existing contamination. This liability could include major clean up costs, claims by construction workers, claims by future site users and claims by neighbouring landowners. In turn, the developer's potential liability brings risks for the construction consultants and contractors involved who might in some way assume part of the developer's liability themselves.

The Working Group members have a diverse experience covering both geotechnical, geoenvironmental and environmental engineering, as well as a qualified legal professional. They come from small and large multi-disciplinary engineering consultancies, contractors and a well known legal practice and offer a unique Hong Kong source of experience in geoenvironmental aspects of the industry gained here in the territory and internationally. The aims of the



Working Group are to improve the awareness, understanding, and implications of contaminated land (including marine) and landfills to the industry and society, and to offer practical solutions to what we believe is an area of great concern to all parties. This is hoped to be achieved by the following means :-

- Provide good practice guidelines on the investigation, assessment and remediation of contaminated land;
- Provide a forum for exchange of information and experience, and promote best ethical (including legal aspects), professional and social practices;
- Provide formal responses and position papers on Government or related documentation, or comment on current issues; and
- Organise Ground Forums and CPD courses covering issues of concern.

As a first step to increasing the awareness, understanding and implications of geoenvironmental issues the Working Group's first CPD course will be held in June 2004. This full day CPD course will provide an overview of contaminated sites in Hong Kong, the present investigation (field and laboratory) and assessment of these areas, as well as the present legal framework in operation, and offer pointers towards improvement in these areas based on international experience. The course is aimed at all levels from students to senior professionals, legal representatives and developers. Future CPD courses or Ground Forums envisaged for this year include landfill design and maintenance, the effectiveness of remediation processes in Hong Kong and viable international alternatives, and Made Ground/Fill geoenvironmental logging description. It is also hoped that by the end of 2004 up to two Ground Investigation Guidelines (GIG) will be produced for investigation and associated laboratory testing of contaminated land.

By Graeme Jardine

Ground Forum on Bored Pile Interfaces

An AGS(HK) ground forum on bored pile interfaces was held on 16th September 2003 at the Joint Professional Centre. The ground forum consisted of several short presentations given by Dr Jack Pappin, Mr Arthur So, and Dr Andy Pickles which were followed by an open forum for discussion amongst the participants. The discussions raised by this provocative topic were valued by all despite the fact many were left standing due to the high attendance!

The AGS(HK) offers a book prize valued at HK\$500 from Swindon Bookshop for best ground forum notes. The award for a report on this forum was won by Ms Jeannie Leung of the Geotechnical Engineering Office. Jeannie's report is reproduced below.



In Hong Kong, bored piles are frequently adopted as the foundation for high-rise buildings and other major structures. Post-construction drilling is required to prove that the concrete/rock interface of the bored piles is acceptable in accordance with the recommendations given in PNAP No. 66. However, problems such as unbound aggregates or core loss are often identified during the proof drilling, requiring assessment of the effects on the pile performance and any necessary remedial measures to rectify the defects. There arises a need to review the incidence at the pile toe interface and assess the pile behaviour to better facilitate bored pile construction.

Case History Review (by Dr Jack Pappin)

In the first presentation, Dr Jack Pappin reviewed the findings of a case history review on 5 projects involving interface (proof) coring for 263 nos. of piles. About 40% of all the piles were found to have problems such as unbound concrete aggregate and soil inclusions. As part of the study, oedometer tests were carried out at normal stresses up to 15MPa for typical soil inclusion materials including decomposed granite and volcanics and 10mm unbound concrete aggregates to portray their stress-strain behaviour. Finite element modelling of pile toes having interface soil inclusions were also conducted. The findings of the study indicated that a material thickness of 100mm at the interface can generally be tolerated to control the differential settlement to within 1/500. Also, if the soil inclusion thickness is not uniform, as long as 1/25 of the pile area is in direct contact with rock and the inclusion material is only up to 300mm thick, the pile behaviour is acceptable. In other words, when soil inclusion is identified in the interface core, if another drilled core has an intact interface, the pile does not require any remedial actions.

Bored Pile Interface - A Contractor's Viewpoint (by Mr Arthur So)

In the second presentation, Mr Arthur So presented his viewpoint on practical construction techniques to minimize the occurrence of problems at the bored pile interface and some enhancement methods and recommendations for further improvement of interface quality. Firstly, he discussed some possible causes for the occurrence of unbound aggregates and soil inclusion at the pile interface. Then, he went on to discuss some typical treatment methods, including sinking investigation holes to locate the extent of the defects and afterwards cleaning with water and filling with grout. Verification holes were sunk thereafter to prove the effectiveness of the treatment method. This approach is technically feasible, but it is also very time-consuming and costly. The above treatment procedures conducted on a 60m long bored pile in one of Mr So's projects required an additional 128 days and one million dollars on the investigation holes only. Therefore, Mr So made some queries on the current practice and provided suggestions for improvement. He also proposed the use of additional grout tubes to serve as a reserve for any future investigation or verification cores in order to save time and cost.

Pile Interface Coring - An Alternative View (by Dr Andy Pickles)

Dr Andy Pickles provided an alternative view on pile interface coring by introducing potential problems with the interpretation of interface drilling results and also discussed the design issues of end-bearing bored piles. To illustrate a potential problem in the interpretation of interface cores, Dr Pickles conducted an experiment in which an interface core using a double barrel (with water) and another one using a triple barrel (with polymer) were sunk in the same bored pile. The inferred inclusion material is completely decomposed granite and highly decomposed granite respectively. Therefore, the experiment indicated that the quality of rock core retrieved is highly dependent on the drilling method. On this basis, Dr Pickles urged practitioners to employ a high quality of drilling to avoid problems arising from the interpretation of badly retrieved cores.

Dr Pickles then went on to discuss the over-conservative design approach commonly adopted in the determination of bearing capacity of end-bearing piles. He also mentioned that the assumption of horizontal jointing is not realistic. Instead, inclined jointing are always observed in the ground and contributes to a sloping rockhead across the diameter of a pile. Finally, Dr Pickles gave a verdict that the use of interface core as post-construction proof drilling is not giving us value-for-money as a large proportion of the interface

cores are non-compliant and incur additional cost and time. He proposed to either minimize the requirement on proof drilling and maintain the 5MPa bearing capacity, or alternatively, keep the 100% interface coring but double the bearing capacity to 10MPa.

Conclusion



In this ground forum, valuable experience from the speakers were shared with the audience, ranging from case histories to the design and construction aspects of interface problems in bored pile construction. A question and answer session was followed by the presentations. A question was addressed to the speakers as to whether we should abandon the proof coring requirement altogether as the interpretation results of the cores do not seem reliable according to the presentations. The speakers responded that the quality of interface cores should be assured by minimizing the sample disturbance with the use of high-quality drilling methods as appropriate, such as triple barrel with polymer. Otherwise, poor-quality cores from which no reliable interpretation can be obtained would be completely meaningless and a waste of money. Many other questions addressing the interpretation of interface cores and possible improvements for the poor interfaces were also raised and discussed.

In conclusion, this ground forum served as a good chance for both the experienced and young engineers to better understand these recurrent problems and discuss constructive improvements for bored pile construction in the future.

By Ms Jeannie Leung

AGS(HK) - Fostering our Future Generation

Many of you may be unaware that AGS(HK) provides funding of HK\$10K each towards scholarships at the universities of HKU, HKPolyU and HKUST. The scholarships are awarded each year to MSc(Eng) students studying in the Geotechnical or Geoenvironmental field who have demonstrated

considerable potential achieving outstanding results and high merit. AGS(HK) hopes such contributions will encourage talented young minds into the geotechnical and geoenvironmental profession and ensure the high caliber of our future generation of geo-professionals. We've asked last years AGS winners to provide us with some feedback ...

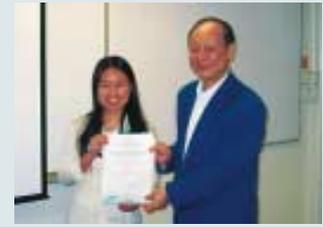
I am very pleased and honoured to have received the AGS(HK) Scholarship 2002-2003 for my MSc postgraduate study at HKU. The award gives testimony to my achievement in postgraduate study and undoubtedly gives me a boost and encouragement towards my future geotechnical practice in Hong Kong. Being a young engineer, I very much appreciate this award and hope to achieve the aims of the AGS(HK). I aspire to contribute to the geotechnical community and promote, enhance and maintain the quality of professional practice in geotechnical engineering.



WAN Siu Pong

AGS(HK) Scholarship Recipient (2002-2003)
(University of Hong Kong)

After gaining my bachelor degree, I came to HKUST. I am very interested to pursue geotechnical study although my knowledge is quite



limited so far. I find it particularly interesting because soil is a natural element of the earth and different from man-made materials we usually deal with and I wish to discover more about the behaviour and attributes of soil. As a beginner in the geotechnical research field, I appreciate the scholarship that AGS(HK) gave to me as it is really a big encouragement for me.

Li Xia

AGS(HK) Scholarship Recipient (2003-2004)
(Hong Kong University of Science and Technology)

Letters - Opinions

The AGS(HK) encourages discussion on issues affecting the Association and the industry and the editor will be happy to publish letters from readers on relevant topics. Letters may be sent by e-mail or postal mail to David Sein (contact details refer front page). Authors should indicate their intention for their letter to be published.

Diary Dates

(note: please check our website at www.ags-hk.org for updated information on upcoming events)

Event	Date	Time	Venue	Contact/Registration
Ground Forum on Pipe Jacking and Micro-Tunnelling	April 2004 (tentative)	18:00-20:00	(to be confirmed)	Leslie Swann lhs@babtie.com.hk
CPD Course on Contaminated Land and its Legal Implications	June 2004 (tentative)	09:00-17:00	(to be confirmed)	Graeme Jardine gaj@mottconnell.com.hk
CPD Course on Insurance Risk in Geotechnical Engineering	25 September 2004 (tentative)	09:00-13:00	(to be confirmed)	Cyril Chan hfcchan@fugro.com.hk
Ground Forum on Geotechnical Risk	(to be confirmed)	18:00-20:00	(to be confirmed)	Michael Lacy michael.lacy@benaimgroup.com
AGM & Ground Forum	2 December 2004 (tentative)	18:00-20:00	(to be confirmed)	Michael Lacy michael.lacy@benaimgroup.com

Disclaimer Although every effort has been made to check the accuracy of the information provided in this newsletter, the Association of Geotechnical & Geoenvironmental Specialists (Hong Kong) does not accept any responsibility for mis-statements contained herein or misunderstanding arising herefrom.