

## Geotechnical Courses

Soil Description Work-shop

28th October 2015

4th December 2015

Rock Description Work-shop

30th September 2015

27th November 2015



## Health & Safety Courses

IOSH Safe Supervision (3 Day)

7th - 9th October 2015

IOSH Avoiding Danger (1 Day)

16th October 2015



IOSH Working Safely (1 Day)

29th October 2015

## Geotechnical Courses

In Situ Testing

6th October 2015

3rd December 2015

Geotech' Lab Testing Awareness

13th October 2015

1st December 2015



## Technical Seminars

Geophysics in Geotechnical Practice

10th November 2015

CPT in Geotechnical Practice

24th - 25th November 2015



# theGeotechnica

September 2015 | Issue 44

## Geotechnica



# 2015

## Conference Review

Detailed breakdown of every talk from this year's event, including HS2, Network Rail and London Underground, as well as links to all speakers presentations.

### Precast pile solutions for bridges & piers

Piling firm Aarsleff are awarded contract for Mersey Gateway

### Respirable asbestos fibres in soil

DETS discuss their new testing procedure to identify asbestos in soil

### Laboratory Data Management

Geotechnical Engineering discuss their implementation of KeyLAB2



# EQUIPE TRAINING

## Health and Safety Courses

DELIVERED IN PARTNERSHIP WITH: **RPA SAFETY SERVICES LTD**

### IOSH Safe Supervision of Geotechnical Sites

This three day geotechnically focussed health and safety course has been developed by industry specialists and is a unique course for managers and supervisors involved in projects in the drilling and geotechnical industry. The course is certified by IOSH and has been approved by The Environment Agency, Thames Water, AGS and BDA and also meets all of the requirements of the UKCG (formerly the Main Contractor's Group).

**NEXT COURSE DATES:** 7th - 9th October 2015  
11th - 13th November 2015

### IOSH Avoiding Danger from Underground Services

This one day geotechnically focussed health and safety course follows the requirements and guidance set out within HSG47 and includes the four chapters; identifying and managing the dangers; planning the work; detecting, identifying and marking and safe excavation. Important aspects include the use of real examples from the geotechnical industry and delivery by chartered advisors who are from within the industry.

**NEXT COURSE DATES:** 16th October 2015  
20th November 2015

### IOSH Working Safely (on Geotechnical Sites)

This one day geotechnically focussed health and safety course has been developed by industry specialists as a foundation to site safety for all personnel involved in projects in the drilling and geotechnical industry. Its aim is to impart the core safety skills required of those working on geotechnical sites by building on their existing specialist technical skills and making it relevant to their place of work.

**NEXT COURSE DATES:** 29th October 2015



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# GEOTECHNICAL COURSES

## SOIL DESCRIPTION WORKSHOP - £265 + VAT

28th October 2015

4th December 2015

## ROCK DESCRIPTION WORKSHOP - £265 + VAT

30th September 2015

27th November 2015

## GEOTECHNICAL FOUNDATION DESIGN - £225 + VAT

15th October 2015

10th December 2015

## IN SITU TESTING - £225 + VAT

6th October 2015

3rd December 2015

## GEOTECHNICAL LABORATORY TESTING AWARENESS - £225 + VAT

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## UPCOMING COURSES IN 2015

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# Welcome

Welcome to the 44th Edition of **theGeotechnica** - the UK's fastest growing online geotechnically focussed e-magazine.

The opening article of this month's issue comes from Debbie Darling of Jooce Marketing & PR on behalf of Aarsleff. This month Debbie reveals details of Aarsleff's recent success in securing the contract for piling works on the upcoming Mersey Gateway project.

Next up we have one of our highly valued regular contributors, Hazel Davidson of Derwentside Environmental Testing Services. In this excellently informative article, Hazel reveals details of DETS new testing procedure for identifying asbestos in soil.



Following this we have Elizabeth Withington, Senior Geotechnical Engineer and Senior Manager, and Wendy Jones Senior Engineering Geologist and IT Software Manager. In this article Elizabeth and Wendy provide details of

Geotechnical Engineering's recent adoption of laboratory data management system - KeyLAB2.

Finally is our cover article for this month's issue. Providing an in-depth look at the Geotechnical Conference from this year's Geotechnica is Calum Spires of the Equipe Group. Excitingly, this article will also provide links to the PowerPoint presentations from each talk meaning that if you were unfortunate enough to miss out on attending the event live, you can still catch up with all of the content discussed.

As with every new edition of the magazine, the Editorial Team here at **theGeotechnica** will be on the lookout for even more new, original and interesting content from all corners of the sector, and would actively encourage all readers to come forward with any appropriate and relevant content - whether it be a small news item or a detailed case study of works recently completed or being undertaken. If this content is media rich and interactive, then all the better. We are looking to increase the already large readership of the magazine through better social media integration and promotion, as well as improving content month on month.

Finally, for any content that is submitted we will ensure that an advertising space, proportionate to the quality of content provided, is reserved should you wish to place an advert in that single edition of the magazine. We hope you enjoy this month's edition of the magazine and are inspired to contribute your own content for the coming editions of **theGeotechnica**.

**Editorial Team,  
theGeotechnica**

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# AARSLEFF AWARDED MERSEY GATEWAY SECTIONS

## PRECAST SOLUTION FOR BRIDGE ABUTMENTS & PIERS



*Writing for theGeotechnica this month is Debbie Darling of Jooce Marketing & PR on behalf of [Aarsleff](#). This month Debbie reveals details of Aarsleff's recent success in securing the contract for piling works on the upcoming Mersey Gateway project.*

Aarsleff, one of the UK's leading contractors of driven precast concrete piles, has been awarded the contract for piling works on two sections – Ditton Junction Bridge and Widnes Victoria Loops Viaduct – of the major infrastructure Mersey Gateway project. When complete the Mersey Gateway Project will bring much needed traffic relief for the existing Silver Jubilee Bridge, resulting in infrastructure investments necessary to deliver the regeneration of Halton and the North West.

Piling works on the Ditton Junction Bridge and Widnes Victoria Loop Viaduct sections commenced 1 June 2015, although Aarsleff has been involved in the Mersey Gateway project for over 9 months, undertaking an intense programme of test piling (completed Dec 14 / Jan 15) and assisting in a very specific technical design solution – a solution unique within the UK driven market which Aarsleff could provide due to the European group capabilities. The use of 'raked' precast piles for the bridge abutment

structures is also significant and delivers numerous benefits to the project. This type of piled solution is not common within the UK civils market; this is an approach Aarsleff want to challenge on future projects.

**“To satisfy the design specification Aarsleff is using a Centrum cage former, which is used widely on the continent...”**

To satisfy the design specification Aarsleff is using a Centrum cage former, which is used widely on the continent,

but for the first time in the UK, to meet with the unique specification demands set by the designer. With Aarsleff operating in Europe, it has a common operating system within its Centrum pre-cast pile factories, which allows this unique approach to a solution to be adopted across the business. The type of cages being fabricated for use within the 350mm square sections are completely unique and require the Company's 'A Class' mechanical locking joint to ensure a robust quality product is supplied for installation. Additionally, each pile cage has a complex internal cage structure including tightly pitched helical and additional 40mm Rebar

to withstand the forces being applied to the piles from the  
**“All of the pile fabrication solutions were trialled within the Centrum manufacturing plant to ensure compliance...”**

overlying structure. All of the pile fabrication solutions were trialled within the Centrum manufacturing plant to ensure compliance with the spec and a safe and quality product was manufactured. Both Aarsleff and Centrum ensured a transparent approach was adopted from the outset and invited the client to witness the Centrum factory and supported full production surveillance.

Specifically the works will include installing 174-no. 20m long, 350 piles at Ditton, foundations for a bridge and 244-no. 21m long, 350 piles at Victoria, which will form the foundations for the approach viaduct to the new Mersey Bridge. Piling will be carried out using the Company's own Junttan PM20s complete with a high performance 7-tonne and a 5-tonne hammer. Delivery of the program will require accurate and robust planning as logistics are intricate and challenging.

Speaking about the scheme, Stephen Black, Aarsleff's on-site Project Manager for the

Merseylink development said: “This is an exciting infrastructure project and the first major highways project Aarsleff has been involved with and where there has been the provision of a dedicated resident Project Manager in recent years. The use of raked precast engineered piles overcame some of the many variable challenges associated with the project, ranging from space restrictions through to

**“The challenging complexity of the scheme demanded a solutions-based approach...”**

contaminated ground. The challenging complexity of the scheme demanded a solutions-based approach working closely with the client and client's designer. This approach ultimately outlines Aarsleff's commitment to producing a number of innovative elements to accommodate the very technical design specification – Specification for Highway Works.”

The project construction works are being delivered by a construction joint venture between FCC Construction S.A., Samsung C&T ECUK Limited and Kier Infrastructure and Overseas Limited, and is a continuation of works, in which Aarsleff has been involved, with future works expected to follow. ■

# THE GEOTECHNICAL ACADEMY

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## CPD Approved Courses for Geotechnical Academy Alumni

### Specifying Site Investigations

This one day course will look at the various methods available to carry out intrusive and non intrusive investigation. Whilst the course will concentrate on geotechnical methods some geo-environmental methods will be briefly discussed. The course will look at the aims of SI and categorise the various stages in an investigation.

### Soil Description Workshop

From 2007 new European Standards have started replacing the British Standards (Codes) under which investigations in the UK have been carried out. UK working practice will have to change to meet these new requirements but few practitioners are aware of the changes or the timetable. The workshop will comprise a series of lectures on the changes, and lectures on soil description followed by practical sessions describing soil samples.

### Rock Description Workshop

From 2007 new European Standards have started replacing the British Standards (Codes) under which investigations in the UK have been carried out. UK working practice will have to change to meet these new requirements but few practitioners are aware of the changes or the timetable. The workshop will comprise a series of lectures on the changes, and lectures on rock description followed by practical sessions describing rock and compiling mechanical logs of rock core.

### In Situ Testing

The course will cover both the theory and the practice of various In Situ Testing techniques used on typical geotechnical projects. In addition the courses will consider the effect that Eurocodes will have on the UK's current practice. This course provides an overview of in situ tests used in common practice and some of the more specialist tests together with their advantages and limitations.

### Field Instrumentation and Monitoring

The course comprises a comprehensive one day appreciation of the complete process involved in Instrumentation and Monitoring in the geotechnical environment. The course provides an overview of the current guidance documents and their requirements. The course will consider the design of both individual installations and the installation of suites of instruments in the wider site context.

### Geotechnical Foundation Design

This one day course will provide a general overview of foundation design. It will include an assessment of the use and choice of shallow foundations and piles. It will cover the derivation of bearing capacity formula and their use. Exercises will be carried out to calculate the working loads and settlement of simple foundations. The methods used to calculate these will be in accordance with those described in Eurocode.

### IOSH Working Safely (on Geotechnical Sites)

This one day course is developed by industry specialists within RPA Safety Services and Equipe Training as a foundation to site safety. Its aim is to impart the core safety skills required of those working on geotechnical sites by building on their existing specialist technical skills. After attending the course, candidates should be able to identify hazards on site, understand basic safety legislation, participate fully and confidently in site safety consultation and manage priority risks to a sufficient standard.

### IOSH Avoiding Danger from Underground Services

Partnering with RPA Safety Services once again, Equipe provide another IOSH certified health and safety course. This one day course is aimed at anybody involved in specifying, instructing, managing, supervising or actually breaking ground and really addresses the problems and risks related to underground services, which may be encountered during both planning and execution of geotechnical projects.

### IOSH Safe Supervision of Geotechnical Sites

Equipe has partnered with RPA Safety Services, an independent occupational health and safety specialist, to provide a unique IOSH certified course for the Drilling and Geotechnics industry. The three day course is certified by IOSH, is specifically focussed on the geotechnical industry and provides a totally unique and relevant Health and Safety course for managers and supervisors.

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# ASBESTOS IN SOIL - RESPIRABLE FIBRES IN RESPIRABLE DUST

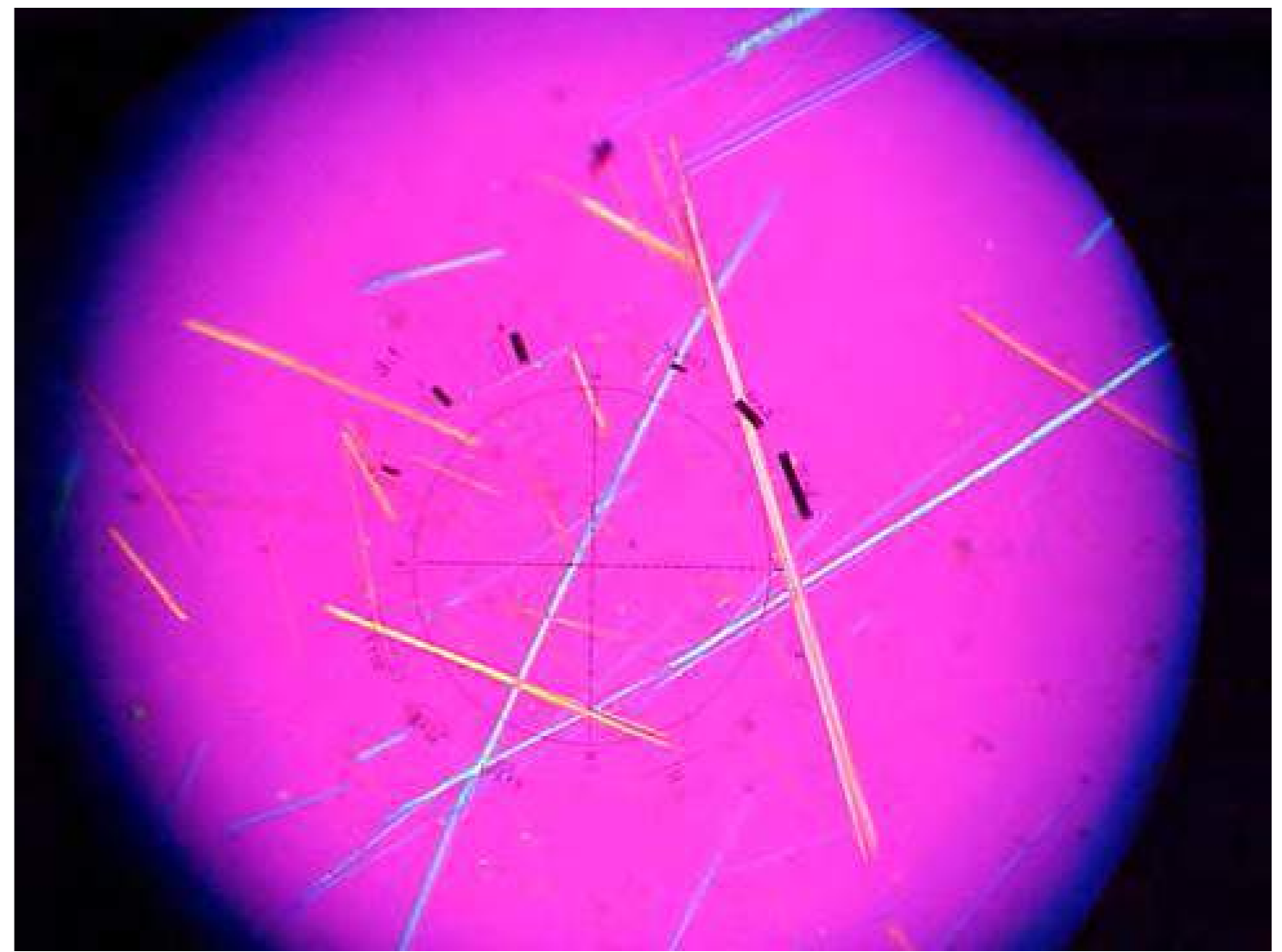
## THE MISSING LINK FOR RISK ASSESSMENT

Writing for the *Geotechnica* this month is Hazel Davidson of [Derwentside Environmental Testing Services](#). In this excellently informative article, Hazel reveals details of DETS new testing procedure for identifying asbestos in soil.

In recent years, the testing of on brownfield sites. The soil for asbestos has become most common analysis for commonplace, often for this purpose is presence and purposes of risk assessment identification of asbestos,

followed by quantification of the percentage mass of asbestos in the soil.

The problem with this approach is that percentage mass of asbestos does not directly relate to the risk posed. As a simple example, 0.1% asbestos bound within an ACM, such



“One proposed solution to this problem (the fibre release test) is to attempt to agitate a dried soil sample, and carry out air tests under controlled conditions to try to estimate what the fibre release rate might be.”

as asbestos cement, presents a much lower immediate risk than 0.1 % of free fibres within

the soil, as the risk to human health comes from airborne, respirable fibres.

One proposed solution to this problem (the fibre release test) is to attempt to agitate a dried soil sample, and carry out air tests under controlled conditions to try to estimate what the fibre release rate might be. There are problems with this approach too, however:

- Collecting the dust as well as the fibres causes issues with identification and counting
- It is difficult to standardise – different soil matrices may require different agitation periods, as do different asbestos types

- Cleaning the equipment between samples is difficult

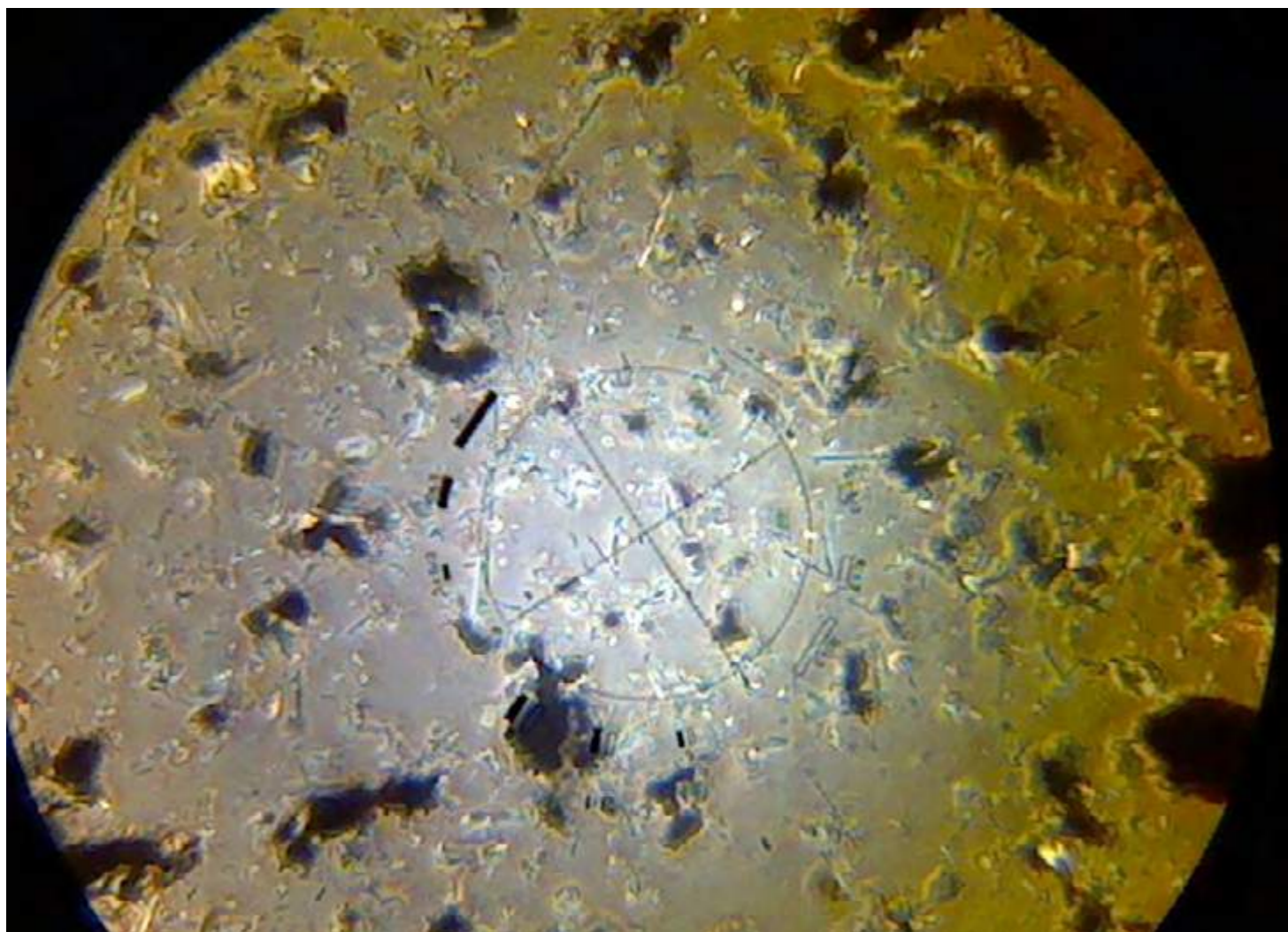
- There are Health and Safety issues in deliberately creating an asbestos dust cloud

- The lengthy duration of the test gives rise to unacceptable costs

- Relating the data to anything meaningful in terms of site risk is difficult, if not impossible

### Alternative methodology

Our solution is the Respirable Fibres in Respirable Dust test. Dust monitoring focuses on PM10 concentrations - that is, the amount of particles with a diameters of less than 10µm. Therefore, ►



a more useful test would be to calculate the possible asbestos concentration in this fraction of the sample, in terms of fibres per mg (f/mg PM10). Effectively, we are able to carry out a test equivalent to the asbestos air test on the respirable portion of the soil. This means that we can provide an estimate of three key indicators of risk that were not possible to calculate before:

1. The fibres per ml of asbestos in air at a given level of dustiness (0.5 mg m<sup>3</sup> for example)

2. The dustiness level on site that would need to be reached before the clearance indicator of 0.01 f/ml would be breached

3. The dustiness level on site that would need to be reached before the control limit of 0.1 f/ml would be breached

We have applied for accreditation to ISO 17025 for this method.

The test is performed by collecting a sample of PM10 material onto a filter and performing a fibre count, using the same fibre counting rules as specified in HSG248 for asbestos air testing. The data from this fibre count can then be used to calculate the fibres / mg of PM10 material, the fibres/ml in air at a dustiness of 0.5mg/m<sup>3</sup> (the OEL for dust), and the dustiness that would be needed to reach the asbestos clearance indicator of

0.01 f/ml and control limit of 0.1 f/ml in air.

#### Advantages of the method

- The results provide a good indication of whether site activities are likely to give rise to airborne fibres, and to what levels

- The results allow a decision to be made about the level of air monitoring that will be required, based on the requirements of the Control of Asbestos Regulations

- The results allow informed decisions about dust suppression to be made

- By removing factors that affect the release of fibres from soil, such as soil type, particle

size and moisture content, the risk can be assessed more accurately

- Once a result has been calculated for the likely fibre content of the respirable dust, the on-site measurements could then focus on the levels of dust being generated on-site, which is much cheaper than asbestos air testing.

- Cost - The test is significantly less expensive than the fibre release test, and can be scheduled as well as, or instead of, quantification. Also, no extra equipment, and only minimal additional training would be required for laboratories already performing quantitative analysis.

- This test eliminates the safety issues associated with deliberately agitating a dry sample that is known to contain asbestos, and with the cleaning of the equipment after each test.

### "The recent SOBRA document on airborne asbestos fibre monitoring is of interest to work with this method"

The recent SOBRA (Society for Brownfield Risk Assessment) document on airborne asbestos fibre monitoring is of interest to work with this method - it discusses asbestos

air testing and dust monitoring, and this test provides the missing link between the two:

<http://www.sobra.org.uk/content/reports/Dust-Monitoring-Protocol-Earthwork-Activities-Brownfield-Sites.pdf>

The test has been validated for a range of asbestos types at a range of concentrations, and has been shown to give consistent results, and has been submitted to UKAS for accreditation to ISO 17025. A small number of field trials demonstrated useful and meaningful data, but this is not yet published data, due to client confidentiality issues, so cannot be included here. ■

## Derwentside Environmental Testing Services

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Email: [info@dets.co.uk](mailto:info@dets.co.uk)

Web: [www.dets.co.uk](http://www.dets.co.uk)



DETS offer a wide range of analytical services for the environmental, construction, waste, fuel and engineering industries, and are accredited to ISO 17025 and MCERTS for soils and waters. Combining a modern, well equipped laboratory, with highly skilled and dedicated staff, we can ensure an excellent and flexible service to meet your requirements.

DETS are recognised as a centre of excellence for the analysis of asbestos in soil, and hold accreditation for:

- Identification of asbestos
- Quantification of asbestos, including free fibres
- Water absorption to determine licensable or non-licensable material
- NEW – respirable fibres in respirable dust (accreditation pending) to aid risk assessment on site

Our staff work closely with our clients to understand their needs in terms of technical and commercial requirements, including reporting deadlines, thus enabling our clients to meet their own obligations confidently.

## DETS – dependable data, dependable delivery



# SAFER | G



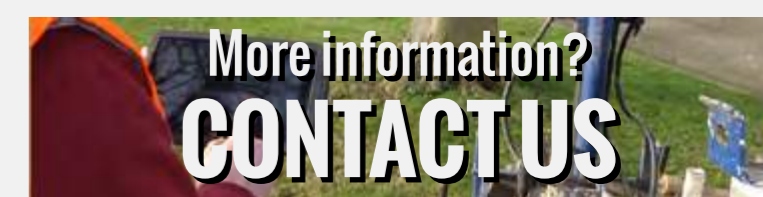
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# IMPROVING GEOTECHNICAL LABORATORY SERVICES

*Elizabeth Withington, Senior Geotechnical Engineer and Senior Manager, and Wendy Jones Senior Engineering Geologist and IT Software Manager provide details of [Geotechnical Engineering's recent adoption of laboratory data management system - KeyLAB2.](#)*

Towards the end of 2014 the Geotechnical Engineering Limited (GEL) recognised the need to improve our service to Clients. Various laboratory data management systems

were investigated and Keynetix Ltd were approached to explore the logistics of using their KeyLAB2 Software. Geotechnical Engineering started to use KeyLAB2 in June 2015.

KeyLAB2 has been designed to provide a complete testing laboratory management system, incorporating sample storage details, schedules and scheduling, data processing and reporting of results through to invoicing, equipment calibration and sample disposal; all in one place! It also houses its own AGS data mapper, quickly creating data which can be used to exchange/send



**“Roger Chandler, Managing Director from Keynetix Ltd and Wendy Jones Technical Support Manager from GEL worked together to integrate the existing GEL testing, technicians spreadsheets and GEL reporting templates, linking them to the KeyLAB2 parameters and mappers.”**

geotechnical information between clients, contractors, laboratories and their various software packages.

Roger Chandler, Managing

Director from Keynetix Ltd and Wendy Jones Technical Support Manager from GEL worked together to integrate the existing GEL testing, technicians spreadsheets and GEL reporting templates, linking them to the KeyLAB2 parameters and mappers.

The KeyLAB2 program's platform is Excel and comes ready to use after a simple installation process. The package includes standard results input, processing and output and reporting spreadsheets for a large number of tests including British Standards, IRSM (International Society for Rock Mechanics) and ASTM (American Society for Testing and Materials) with more available on the Keynetix website. Wendy's brief was to rebuild the report templates that GEL use for presenting results in Excel format to be incorporated into the KeyLAB2 package. As well as complying

with AGS format rules, all sheets and reports have to meet with all BS1377 standards, the new BS EN ISO 17892 standards and GEL's UKAS accreditation requirements.

Phase one, where standard physical laboratory testing such as classification, rock, and compaction related testing is now complete. Wendy is now preparing to work on Phase two, expanding the quota of tests handled by KeyLAB2 over the coming weeks to cover highways specification aggregates and high end effective stress testing.

The AGS import and built in scheduler capability together with the flexibility of KeyLAB2 enables GEL to integrate our own pro forma templates, meaning that sample and testing data is no longer double or even triple handled within the laboratory. Project and all test data is entered just once, in one place. The Excel based



“By combining Excel skills with the integrated GEL spreadsheets, the technicians already know how to input, calculate and process results and so no additional training on that front needed.”

package then stores the data and performs the complex calculations and processes results ready for reporting in one step considerably reducing  
**“This means that it is less time consuming and increases the efficiency of GEL staff with faster reporting to our Clients.”**

processing time. This means that it is less time consuming and increases the efficiency of GEL staff with faster reporting to our Clients. Additionally, because the package is Excel based, transmittal of electronic schedules can be easily and speedily carried out eliminating the need for hard copies, saving time and allowing testing to get underway faster.

Technicians and laboratory management staff were trained by Wendy to handle

the AGS data import and export for KeyLAB2. They were also trained on the basics of using all the KeyLAB2 functions and applications in seminars and presentations designed to introduce them to the software. The seminar used both examples and existing projects to take the staff through the completion of a project step by step using KeyLAB2. The objective was to ensure staff could competently manage a project and produce accurate reports after the very first training session. Future sessions are planned to build on the basics, developing the equipment and administration functions thereby enabling individuals to become powerusers and administrators. They will also be able to create and maintain their own templates and spreadsheets as well as become trainers themselves.

The advantage of using Excel is that it is a familiar program that everybody knows. By combining Excel skills with the

integrated GEL spreadsheets, the technicians already know how to input, calculate and process results and so no additional training on that front needed.

Wendy Jones from GEL commented “KeyLAB2 is a powerful tool which will enable GEL to greatly increase efficiency and quality across the board in an already excellent laboratory. The benefits of using KeyLAB2 will allow us to provide an even greater level of service for our Clients”.

Roger Chandler from Keynetix commented “The implementation at GEL has been text book and it has been a pleasure to work with Wendy and her team. Within just a few weeks of Wendy conducting the training and phase 1 being released all staff, from management to lab technicians, are saving time on the day to day management of the laboratory.” ■

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# GEOPHYSICS IN GEOTECHNICAL PRACTICE



## Seminar Date: 10th November 2015

The seminar will increase the awareness regarding the correct use of geophysics for non-invasive investigations, structural and geological mapping and ground modelling which can provide an in depth and continuous understanding of both surface and subsurface conditions and can also reduce the risk of underground hazards and optimise budgets.

### What delegates will learn

- Have an understanding of the importance of using a geophysics specialist
- Advantages and limitations of land and downhole geophysical techniques
- Have an understanding of how geophysics can be used to reduce risk
- Have an understanding of when geophysics can complement obtrusive investigations
- Have an appreciation of what the results mean and how they are obtained

### Who should attend?

Geophysical Investigation Specifiers, Geophysics Graduates, Geotechnical Engineers, Engineering Geologists, Consulting Engineers, Designers, Developers and Clients.

### Content Covered

- How to choose the best techniques
- Key points when scheduling geophysics
- Using geophysics to manage risk
- Overview of surface techniques
- Overview of down-hole techniques
- Advantages and limitations of techniques
- Data handling
- Advances in geophysics
- Case Studies

In collaboration with



**Speakers:**  
Kim Beesley, *Managing Director, European Geophysical Services Ltd*

Dr Simon Hughes,  
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### Who should attend?

Onshore and offshore specifiers, procurers and users of Cone Penetration Testing. Geotechnical Engineers, Engineering Geologists, Consulting Engineers, Civil Engineers, Designers, Developers and Clients involved in onshore and offshore ground investigations.

### Seminar Programme

#### Day 1

- 08:45 – 09:00 Registration – Tea/Coffee
- 09:00 – 09:15 Introduction
- 09:15 – 10:00 Historic overview, equipment and procedures, data acquisition
- 10:00 – 10:45 Standards and guidelines. Data processing and corrections
- 10:45 – 11:10 Quality control – with examples offshore and onshore
- 11:10 – 11:30 Morning Break
- 11:30 – 12:15 Soil profiling and soil identification
- 12:15 – 13:00 Interpretation in terms of soil parameters in sand
- 13:00 – 14:00 Buffet Lunch
- 13:30 – 14:30 Demonstrations
- 14:30 – 15:15 Interpretation in terms of soil parameters in clay
- 15:15 – 15:30 Afternoon Break
- 15:30 – 16:15 Question and answer session
- 16:15 – 16:30 Summary and Close

#### Day 2

- 08:45 – 09:00 Tea/Coffee
- 09:00 – 09:30 Interpretation in other soil types (silt, chalk, peat --)
- 09:30 – 10:00 Full flow penetrometers in very soft clays
- 10:00 – 10:45 Advantages of other sensors (seismic cone, electrical resistivity, nuclear density etc)
- 10:45 – 11:00 Morning Break
- 11:00 – 11:35 Direct application of CPT data (pile design, compaction control, correlation to SPT)
- 11:35 – 12:10 Sampling with CPT equipment
- 12:10 – 13:00 Case histories onshore and offshore
- 13:00 – 14:00 Buffet Lunch
- 13:30 – 14:30 Demonstrations
- 14:30 – 15:30 Work shop on CPT interpretation
- 15:30 – 15:45 Afternoon Break
- 15:45 – 16:00 Summary and Close

In collaboration with



**Speakers:**  
Dr John Powell,  
*Technical Director, GEOLABS Ltd*

Tom Lunne,  
*Expert Advisor, NGI*

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# GEOTECHNICA 2015 - THE CONFERENCE REVIEW

*Providing an in-depth look at the Geotechnical Conference from this year's Geotechnica is Calum Spire of the [Equipe Group](#). This article will also provide links to the PowerPoint presentations from each talk.*

The line-up for the geotechnical conference portion of Geotechnica 2015 featured perhaps the most stellar group of speakers ever assembled at a UK based geotechnical conference, with speakers from some of the biggest clients in the UK today – Network Rail, London Underground and HS2. The inclusion of speakers from these clients certainly piqued the interest of the geotechnical community, with record numbers of visitors to Geotechnica piling into

the Warwickshire Exhibition Centre's conference suite to hear the talks.

The conference itself was split into four sessions, titled: Session 1 (Supported by Network Rail) - Meeting the challenges and future requirements of geotechnical Clients; Session 2 - Remote monitoring of geotechnical assets; Session 3 (Supported by the British Drilling Association) - Keeping on the right side of Health and Safety legislation; and finally

**“One of the founding principles of Geotechnica is to encourage communication to increase knowledge and understanding across the sector.”**

Session 4 (Supported by the Association of Geotechnical and Geoenvironmental Specialists) - How AGS data makes organisations more efficient.

One of the founding principles of Geotechnica is to encourage

communication to increase knowledge and understanding across the sector. One area that the organisers of Geotechnica were and certainly still are encouraging more communication in is along the geotechnical supply chain, starting with the client's specifications all the way down to the instructions that contractors on site.

Session 1 of the geotechnical conference focused very specifically on what the clients see as their main areas of focus for ground investigation during upcoming projects. The session head headlined by keynote speaker Dr Nader Saffari from London



Underground [\[click here to view Nader's presentation\]](#).

During his introductory talk Nader outlined the history of GI across a number of London Underground projects and referenced the need for quality when carrying out the investigations – all the way from the specification to the equipment and skills of the on-site staff, as well as data collection and management techniques and the effective use of the data obtained. Dr Saffari then specifically pointed to innovation within geotechnics being one of the drivers behind some of the more highly acclaimed projects, with technologies such as LiDAR, UtterBerry and ShapeAccelArray referenced. Nader then summarized by stating that GI plays a key role in the design, construction and management of assets on the London Underground Network, and that more innovative non-intrusive techniques and smart technology such as the ones previously mentioned were required in order to meet the challenges ahead for the largest clients.

**“...more innovative non-intrusive techniques and smart technology such as the ones previously mentioned were required in order to meet the challenges ahead for the largest clients.”**

Following Nader's keynote talk was the most highly anticipated presentation of the two days which saw attendees cramming into the conference suite and queueing out of the door. HS2's Head of Ground Investigations and CH2M Technical Director of Tunneling and Geotechnics Jonathan Gammon delivered a talk on the challenges and requirements of the ground investigation for HS2 Phase One [\[click here to view Jonathan's presentation\]](#). Jonathan outlined the role of the GI for the project,



with a need for unusual/critical design and construction requirements, provision of monitoring data, informing utilities and other early works design, and also to inform both the Invitation to Tender for the main Civils Works Contracts and the Contractors Scheme Design, amongst a number of other things. The scope of the ground investigation was also revealed, with the need for boreholes, CPT, trial pits, surface geophysics, ground penetrating radar, installation and monitoring of instrumentation, on site and laboratory testing and reporting all outlined, all spread across 12,606 GI fieldwork locations. Jonathan also discussed the framework contract basis, as well as GI parcels and work packages. Risks and key health and safety principles and objectives were also discussed, with a large focus being placed on the new Construction and Design Management Regulations which were changed in April

2015. Finally Jonathan talked the attending delegates through the challenges facing the HS2 project that consultants and contractors needed to be made aware of – most notably simply the scale of the project itself. Whereas Nader placed the focus on innovation being a key focus point for London Underground, Jonathan was keen to place a large emphasis on health, safety and welfare being the primary concern for HS2, followed by making data collection paperless (where possible) in order to speed up the process as much as possible. Overall the talk gave an eye-opening look into just how massive HS2's ground investigation is going to be, with contractors likely to be stretched to breaking point to fulfill the workload.

Next to discuss their geotechnical requirements and aims for the future were Network Rail, represented by Senior Engineer Mike Brown [\[click here to view Mike's](#)

[presentation\]](#). Having endured the wettest year and wettest winter on record in the last financial year, the risk of failed earthworks has become increasingly concerning for Network Rail, with the client now aiming to reduce this risks through the application of technology, such as fibre optic acoustic sensing and earthworks remote monitoring.

**“Mike outlined the next steps in implementation of these technologies, discussing how GI contractors will be crucial in the installation of these systems.”**

Mike outlined the next steps in implementation of these technologies, discussing how GI contractors will be crucial in the installation of these

systems.

Finally Professor David Norbury rounded off the morning's session with a look at the new Eurocode – BS5930:2015, and what it means to ground investigation contractors and consultants [\[click here to view David's presentation\]](#). One of the most obvious changes is the change of title from 'site' to 'ground' investigations, but it also includes updates to best practices, cutting of repetition and improvement of workflow. Professor Norbury also discussed the changes to Soil and Rock Description, an area where he is one of the world's leading experts.

The second session of the first day focused on remote monitoring of geotechnical assets and was kicked off and chaired by Professor Neil Dixon of Loughborough University. Professor Dixon delivered an intriguing talk centered on the use of Slope ALARMS (a slope displacement sensor) to aid the early warning of geotechnical limit states [\[click here to view Neil's presentation\]](#). Neil started by outlining details of known geotechnical limit states, including trigger levels and who the data that we currently have is shared with, before discussing how Slope ALARMS use AE stress waves to indicated deformation in slopes. Neil finished by accentuating the benefits of the ALARMS system, emphasizing that the information obtained is instantaneous, continuous and delivered in real-time.

Neil then handed over to Dr David Gunn and Dr Jonathan Chambers of the British Geological Survey who discussed PRIME (Proactive Infrastructure Monitoring and Evaluation). David and Jonathan explained that the PRIME system is based on time-lapse electrical resistivity tomography (ERT), which is a geophysical technique used to generate images of the resistivity distribution in the subsurface. PRIME is designed for remote operation using telemetry, so that ERT images can be captured automatically and streamed in near-real-time via a web interface.

Following on from the BGS speakers was Heba Bevan – the mind behind the UtterBerry technology name-dropped by Nader Saffari in his keynote speech [\[click here to view Heba's presentation\]](#). In her talk Heba explained the value of UtterBerry, as well the technology behind the innovation which measures temperature, humidity and tilt angles, as well as boasting a built-in accelerometer. Heba then continued by offering details and case studies of the successful implementation of the UtterBerry sensors.

Next to present was James Preston of Monitor Optics Systems, a fibre optic monitoring specialist [\[click here to view James' presentation\]](#). James began by talking through the principles behind remote condition monitoring, explaining how by running fibre optic sensing cables

along sections of earthworks, it is possible to sense the direction of any movement or disturbance, allowing instantaneous feedback and automated continuous monitoring. James then provided case studies of fibre optic technology being used in civil engineering projects such as the Bond Street extension (tried to prove sustainability) and also the Holme Tunnel works.

Roger Hazelden of TRW Conekt was next to present, discussing APSCAM – a novel sensing system for monitoring railway earthworks [\[click here to view Roger's presentation\]](#). Roger began by outlining exactly what APSCAM was – an optical sensor system utilising self-powered tilt-sensing cameras to detect subsidence and slippage on railway earthworks. After running through the system configuration of the technology, Roger ran through the benefits of the system, before concluding that a recent study had confirmed the technical feasibility of the concept both from the optical and electronics perspectives – a plan for further development to a field deployment is now being prepared.

The final offering of Session 2 came through Martin Clegg of Geosense who introduced the Wi-SOS 480, a communication gateway for dataloggers and sensors [\[click here to view Martin's presentation\]](#). Martin ran through the components of the system, as well as its long-range capability, ►

configuration and diagnostic features and out-of-the-box abilities.

Following the conclusion of the session, there was opportunity for attendees to discuss the various strengths and weaknesses of the technology on display. What was most notable and obvious was that the innovation that Dr Nader Saffari had asked for in his keynote talk is certainly in the pipeline and starting to be delivered, with a number of exciting new monitoring technologies beginning to enter the fray.

Day two of the geotechnical conference was kicked off by John Underwood of the Health and Safety Executive who gave an insightful run-through of

the recent CDM Regulation updates, as well as raising two topic issues – notably the specification and quality of drill tubes, but also geological (flammable, toxic, asphyxiant) gas under pressure [\[click here to view John's presentation\]](#). After outlining the issue of incorrectly specified and treated drill rods/casing, John delved into the issue of gas release under pressure and asked for input from on-site workers on their experiences of drilling near coal, or if they had experienced issues with the release of gas, either through natural sources or gas leaks. Following this was the examination of the 2015 update to CDM Regulations. John discussed whether the drilling industry had

anything to fear from CDM 2015 before explaining the main changes, specifically the greater responsibility placed on clients, but also the clarification of what constitutes 'competency' for certain jobs. Finally John stressed that the drilling industry must be aware of the role of the 'Principal Contractor' and the need for greater coordination and communication between all parties involved in projects.

Following on from John was Chris Swainston of Geotechnics who delivered an update on the danger of asbestos in soil [\[click here to view Chris' presentation\]](#). First Chris outlined why there is a continued interest in asbestos in soil, before discussing

the uncertainty surrounding development of a regulatory position on asbestos, especially the cost of any potential regulatory development. After running through the options of safe work with asbestos, Chris went on to discuss the current Joint Industry Working Group focused on the matter and what the issues are affecting the development of 'safe' values of asbestos in soil.

Bringing Session 3 to a close was the British Drilling Association's Director, Peter Redford [\[click here to view Peter's presentation\]](#). Peter was tasked with introducing the newly revised version of the

## "Starting by giving a historical overview of the BDA and the Audit itself, Peter discussed the new audit's aims of raising standards..."

BDA Audit. Starting by giving a historical overview of the BDA and the Audit itself, Peter discussed the new audit's aims of raising standards, raising the profile of the scheme, reflecting the recently revised NVQ and to deal with previous criticism. Following discussing what the BDA expect from auditees, themselves and their auditors, Peter also explained the new digitized process of auditing, as well as results from their trial period of auditing



which provided only one first time pass. Peter was also keen to emphasize the fact that the new audit does not ask for anything other than the current standards and legislation which are required by law or industry best practice, and that the scheme will give the industry a way of ensuring and measuring quality, whilst also making sure that smaller companies were given the support and relevant information required to keep up to date with standards and practices by way of a free BDA Health and Safety Manual. Finally Peter looked to the future, with the BDA looking to obtain external certification for the audit, likely to be from UKAS or similar, as well as a pre-audit touch screen technical knowledge test to be introduced in 2016.

The final session of Geotechnica 2015's geotechnical conference was opened and led by Jackie Bland, the chair of the AGS Data Management Working Group. Session 4 was dedicated to AGS data, educating visitors as to its value and how it can be utilised

to make organisations more efficient. Jackie chaired the session and began by advising visitors how they could get the most out of the afternoon.

First to deliver their insight was Dr Helen Reeves of the BGS, who discussed the importance of AGS data to the ASK (Accessing Subsurface Knowledge) network – specifically citing the case study involving the Glasgow City Council [\[click here to view Helen's presentation\]](#). Helen began by outlining the two golden rules of efficiency for AGS digital data – only enter the data once and get someone else to do it (at source!). Also explained was the issue of inaccessible data, with Dr Reeves providing a surprising figure – only 18% of data from recent major infrastructure projects can be used with any high degree of confidence. Data from projects had previously been and is still often provided in formats unsuitable for immediate use and also in multiple formats. The ASK Network was then



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introduced as a knowledge exchange network, where high quality systemic subsurface datasets and models are shared to help better inform decision making and management of urban resources – all done through the use of AGS formatted data. The Glasgow City Council case study (GSPEC – Glasgow SPECification for data Capture) was then examined, which utilized the principles of the ASK Network and specified that all data captured on site for projects was to be done via AGS and collated through an online portal.

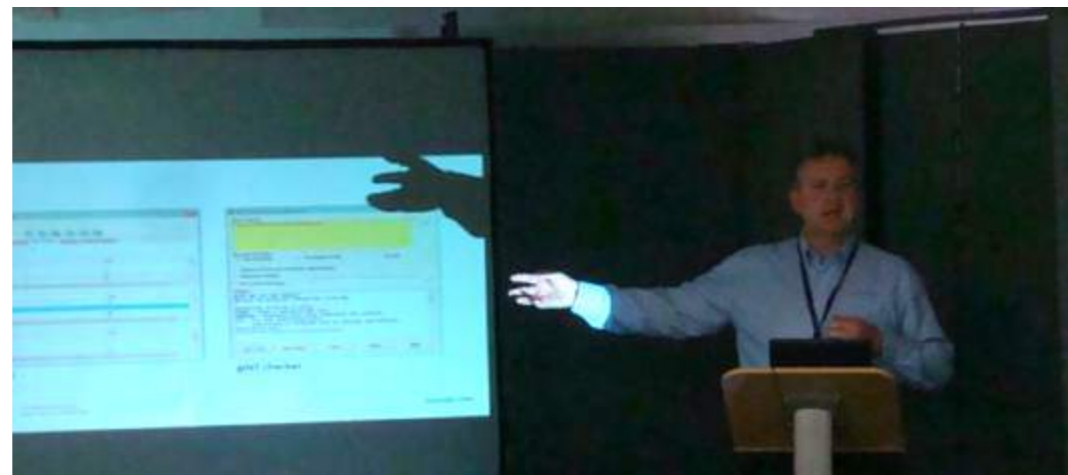
Continuing on the theme of digital data capture direct from site, Ben Armstrong of Ground Technology Services followed Helen by running through the various advantages and disadvantages of on-site digital data capture [\[click here to view Ben's presentation\]](#). Ben was keen to emphasize that the transition from pen and paper data capture to digital tablets being used on site could potentially be a slow and arduous process, with the current workforce sometimes resistant to change. Training and collaboration was

underlined as being a crucial part of this change, with on-site staff being more likely to be embracing of the digitized format if they are trained proficiently and the use of such systems managed

**“Ben also agreed with Helen that the golden rule of AGS data capture input is only doing it once...”**

appropriately. Ben also agreed with Helen that the golden rule of AGS data capture input is only doing it once, and that the cost of digital data entry systems can easily be offset by removing the need for someone else to process the data once the staff on site have sent it to the office on a ragged piece of paper, streamlining the process for efficient transfer of data from site.

Once Ben had outlined how digital AGS data was obtained from site, Greg Adamson of ALcontrol Laboratories then discussed the importance



and usefulness of AGS data to laboratories [\[click here to view Greg's presentation\]](#). Greg first ran through what the current model of data transfer looks like, with clients informing consultants of their requirements, the consultants relaying this to the contractor, who carry out the on-site work before sending the samples and data back to their office for re-typing, only for this to be sent to the laboratory using their own labeling system. This labeling system seldom matches that of the laboratories, so the samples are all relabeled and processed – a needless time-consuming process – all whilst the client is still waiting for the data to be relayed back to them. Greg then explained that AGS data captured digitally on site allows for massive amounts of time to be saved, but also removes any potential transcription errors and maintains a common language that enables integration with other data management systems, all meaning that the project is completed faster and data is obtained by the client in a far more efficient manner.

Next up to talk about the value

of AGS data was Dr Roger Chandler, Managing Director of AGS data management experts – Keynetix [\[click here to view Roger's presentation\]](#). The next step in the process of utilizing AGS data after it has been collected on AGS and processed by laboratories is the delivery back to the client into a data management system for interpretation. Roger offered a step-by-step guide of what should be done with AGS data into best interpret your ground investigation results – beginning with the most important part: checking the data. Once the data has been checked and the client is satisfied that all necessary data and fields have been inputted, it is imported into Microsoft Excel and sorted. Following this it is imported into AGS compatible software (a list of which can be found on the AGS website). Roger also demonstrated the pace at which data can be inputted into various software packages and then utilized in data plots, dashboards, summary views, site plans, human health assessments and sections/3D visualisations.

Following on from Roger's

venture into AGS data being used for 3D modelling, Simon Miles and Jérôme Chamfray then discussed the use of AGS data to assist with the delivery of geotechnical data into the BIM (Building Information Modelling) process [\[click here to view Simon and Jérôme's presentation\]](#). Simon and Jérôme began by explaining exactly what BIM is – the management of information through the project lifecycle, but not just about 3D CAD modelling or technology. Building on this, they then explained that there are a number of links and processes required to produce a BIM model, but that AGS data input is key to it all, as it is used to transmit the land and marine geological data from the field into databases and interpretation tools, and then

**“A case study was then presented of AGS data in a BIM environment – the Silvertown tunnel project...”**

ultimately into Civil3D. A case study was then presented of AGS data in a BIM environment – the Silvertown tunnel project carried out by Atkins. In this case study Simon and Jérôme explained that thanks to the AGS data input from various GI's across the project site including previous boreholes drilled within and close by the river for the London Cable Car project reduced the

requirement for over-water holes to be re-drilled, meaning that the project saved upwards of £100k.

The final talk of the geotechnical conference came from Alex Simantirakis of HS2 Ltd who offered a client's perspective on the usefulness of AGS data, particularly obtaining to use on modern railway projects [\[click here to view Alex's presentation\]](#). Alex began by outlining the plans for HS2 in a similar fashion to Jonathan Gammon on day one, however Alex focused more specifically on the GI aspects – most notably the data management tasks. Alex outlined the main objective of the GI from a data management perspective for HS2 – the provision of quality, factual, comprehensive and accurate geotechnical and geo-environmental data to form the model of the whole of the Phase 1 route. Alongside this was the main risk – ineffective management of that data. Alex continued by encouraging collaboration between all parties involved, before outlining the uses of AGS data from the perspective of HS2 in terms of creating a comprehensive digital platform. Finally Alex outlined HS2's expectations for the GI for the project – excellent quality data with a robust data management plan, the correct use of AGS data, embracement of technologies to capture said data, and also thorough checks that the data inputted is correct before being utilized. ■

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