

Geotechnical Courses

Soil Description Workshop

~~26th January 2017~~ - **SOLD OUT**

1st March 2017

Rock Description Workshop

2nd March 2017

10th May 2017



Health & Safety Courses

IOSH Safe Supervision (3 Day)

~~11th - 13th Jan 2017~~ **SOLD OUT**

IOSH Avoiding Danger (1 Day)

~~20th Jan 2017~~ **SOLD OUT**

IOSH Working Safely (1 Day)

23rd February 2017



Geotechnical Courses

Geo Foundation Design

2nd February 2017

Geotech' Lab Testing Awareness

9th February 2017

In Situ Testing

8th February 2017



Other Events

Geotechnica 2017

12th & 13th July 2017

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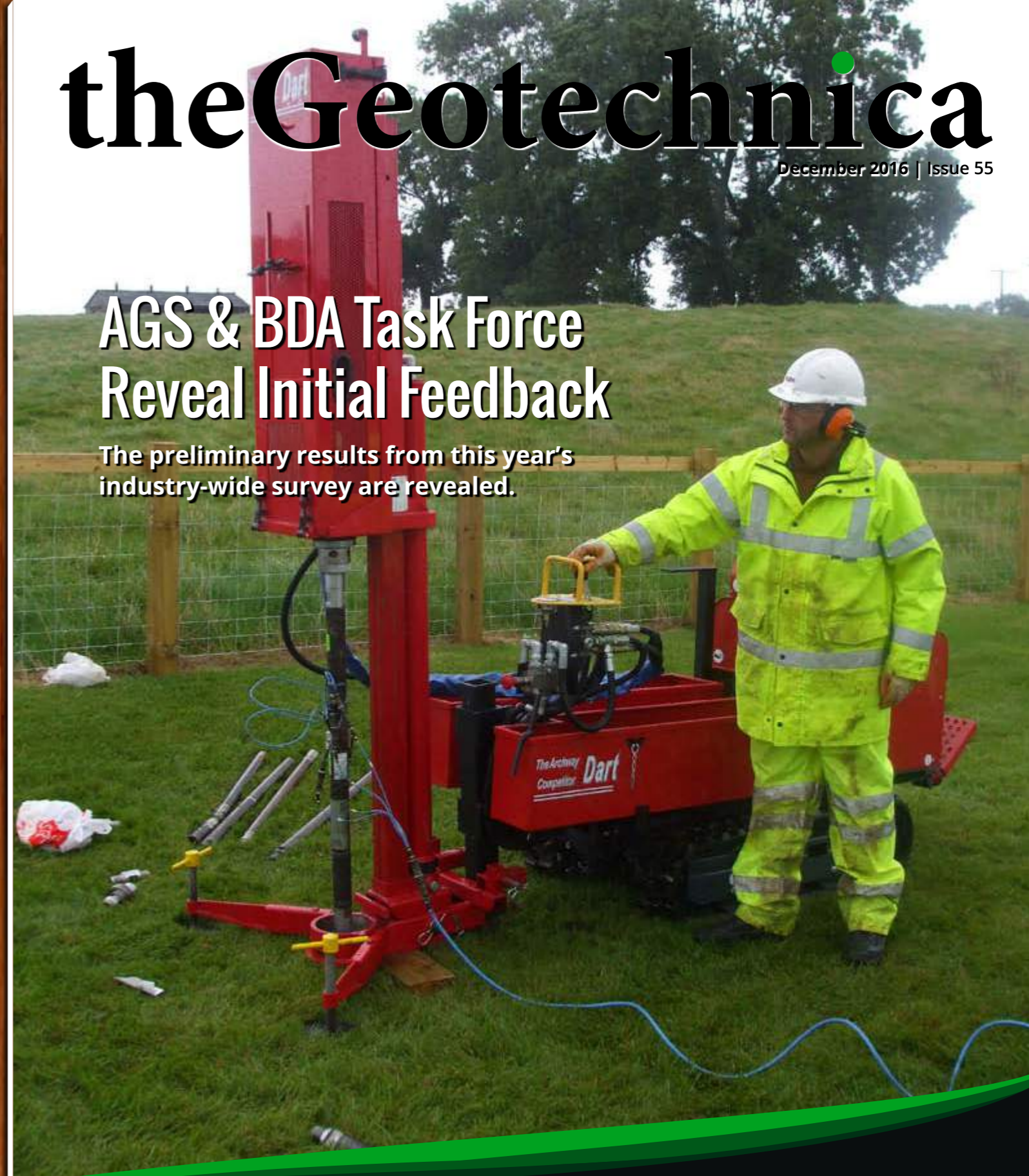


theGeotechnica

December 2016 | Issue 55

AGS & BDA Task Force Reveal Initial Feedback

The preliminary results from this year's industry-wide survey are revealed.



Debris Flows and Shallow Landslides

The flexible solutions that are available to help prevent them

Piling into Biomass Plants

Yallem Ltd discuss their latest project situated in Dorset

Tentatively Identified Compounds (TICs)

TerraTek explain what TICs are and why you should be asking for them

GEOTECHNICAL COURSES

SOIL DESCRIPTION WORKSHOP - £275 + VAT

@Equipe Offices, Banbury

~~26th January 2017~~ **SOLD OUT** EXTRA DATE TBC

1st March 2017

6th April 2017

ROCK DESCRIPTION WORKSHOP - £275 + VAT

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2nd March 2017

10th May 2017

27th July 2017

GEOTECHNICAL FOUNDATION DESIGN - £225 + VAT

@Equipe Offices, Banbury

2nd February 2017

6th April 2017

GEOTECHNICAL LABORATORY
TESTING AWARENESS - £225 + VAT

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9th February 2017

9th June 2017

IN SITU TESTING - £225 + VAT

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25th May 2017

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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: ~~11 - 13 January 2017~~ **SOLD OUT**
15 - 17 February 2017

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: ~~20th January 2017~~ **SOLD OUT**
24th February 2017

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: 23rd February 2017
4th May 2017



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Welcome

Welcome to the 55th Edition of **theGeotechnica** - the UK's fastest growing online geotechnically focussed e-magazine.

Providing this month's first article is Tony Bailey, Project Manager at Geobrugg AG. In this excellent case study, Tony discusses flexible solutions for one of the most common issues raised due to increasingly poor weather conditions in the winter months in the UK - debris flows and shallow landslides.

A survey of the UK ground investigation industry was conducted in July and August 2016. The results are being assessed by the joint AGS and BDA Task Force, and will be published over the next few months. Opportunities for comment and further discussion will be provided subsequently. The second entry into this month's issue of **theGeotechnica** is also our cover article, and it is a notice which provides initial feedback on the Survey.

The third entry into this month's issue comes courtesy of first-time contributors Yallem. In their debut article, Yallem reveal details of their latest piling project at a Dorset-based Biomass Plant, featuring spacial challenges and variable ground conditions.

Providing the final article for Issue 55 of **theGeotechnica** is David Bowen of Terra Tek. David is a Senior Chemistry Supervisor at Terra Tek's Birmingham Laboratory. In this in-depth article David focuses on Tentatively Identified Compounds, explaining exactly what they are, how you test for them and what happens if you find them.

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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Soil Description Workshop - £275 + VAT per person

This one day geotechnical training course is delivered by the UK's leading Soil and Rock Description expert, Professor David Norbury, and will bring delegates up to speed on the changes within the Standards and provide a detailed approach to soil description practices and techniques. The British Standards (Codes) under which investigations in the UK have been carried out continue to incorporate and mirror the European Standards. UK practice has changed to meet these new requirements and practitioners will learn about them and how to follow compliant soil logging techniques within this course.



Rock Description Workshop - £275 + VAT per person

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 - £225 + VAT per person

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.



A collaboration between



Geotechnical Foundation Design - £225 + VAT per person

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) - £175 + VAT per person

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 - £150 + VAT per person

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 - £450 + VAT per person

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. This 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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**GET IN TOUCH
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A VX debris flow barrier protecting a culvert.



Filled SL150 Shallow Landslide barrier having successfully stopped a landslide.



FLEXIBLE SOLUTIONS FOR DEBRIS FLOWS AND SHALLOW LANDSLIDES

Providing this month's first article for the *Geotechnica* is Tony Bailey, Project Manager at [Geobrugg AG](#). In this excellent case study, Tony discusses flexible solutions for debris flows and shallow landslides.

Recent years have seen both an increase in the number and severity of winter storms, last year saw 11 named storms hit the UK. This trend is forecast to continue, leading to increasingly wetter winters. There are two main natural hazards that are closely associated with heavy rain from storms: Debris flows and shallow landslides.

Debris flows are channelised flows with a relatively high velocity up to 10 m/s and the potential to carry huge volumes of debris down the channel, dependant on the size of the catchment area. After periods of rainfall the ground is saturated, depending on the drainage capacity of the ground a debris flow can occur within a very short period of

“Recent winters have led many asset owners to re-evaluate the capacity of their culverts.”

time following the start of rainfall. For debris flows the intensity and duration of the rainfall are key indicators of the likely severity of the event, the higher the volume of water the more debris can be carried

down slope. This is important for understanding the process and for the design of protection measures.

Due to their channelised nature debris flows usually occur within known stream valleys. These streams are traditionally routed under infrastructure via culverts. The storms of recent winters have however led many asset owners to re-evaluate the capacity of their culverts, many of which were put in place several decades ago based on rainfall averages that do not take into account the volume and intensity of rainfall from recent storms.

There are two major hazards to be considered when evaluating

“...high velocity flows carry large volumes of material and have a highly erosive effect on the channel banks.”

existing culverts. The first is that high velocity flows carry large volumes of material and have a highly erosive effect on the channel banks. This can lead to bank erosion above and below the asset. Erosion from above adds more debris to the flow, however more significantly bank erosion can lead to a change in location of the channel directing the flow away from the existing culvert.

Erosion of the channel below the asset can have serious consequences if the erosion leads to the undermining of the asset.

With normal stream flows or in light rain water easily passes through the culvert, however in a large storm if the stream becomes a debris flow which carries large volumes of soil, rocks and vegetation down the channel, these quickly block the culvert and lead to an over spilling of the debris on to the asset. In the case of a rail line or road this leads to a closure until the debris can be cleared and the culvert can be unblocked. The short intervals between storms last winter, six in November

SL150 Shallow Landslide barrier deployed to protect the railway from further landslides.



and December, made the task of safely emptying before the next event very difficult.

While a stream will need to be routed under an asset, there is a solution that will protect the culvert from being blocked by debris. Flexible debris flow barriers installed upstream of the barrier allow water to pass unobstructed through the barrier but hold back the debris therefore protecting the culvert and the infrastructure. Once debris has accumulated in the barrier, the debris acts as an energy absorber slowing the water and therefore helping to reduce bank erosion below the barrier.

Every channel is unique in cross section, geology, volume capacity and potential for debris accumulation. It is

for this reason that every barrier can be considered a bespoke solution. Engineers of Switzerland based safety experts from Geobrugg are on hand to offer advice on the best type, arrangement and specification of the barrier. Because a one size fits all approach is not suitable.

“Ring nets provide the optimum combination of stability and flexibility.”

The Geobrugg range of debris flow barriers are constructed using ROCCO ring nets, made from high-tensile steel wire. The ring nets provide the optimum combination

of stability to stop a flow and the flexibility to enable the continued flow of water. Energy is dissipated through the use of brake rings. These are anchored using spiral rope anchors designed to bend to a certain degree without reduction of load capacity.

All barriers are fully customisable with options available for differently shaped valleys, different barrier heights and different expected loads. Geobrugg high-tensile steel wire nets gives high strength with low weight. This makes the barriers both easy to transport and very quick and easy to install, even in the toughest of terrain.

Barriers from Geobrugg have been field tested in real world conditions with external

supervision. Those protection systems can be designed for high volumes to accommodate multiple filling events, minimizing the number of times it needs to be emptied over the winter. Or if space is limited can be stacked with multiple barriers in a valley providing extra capacity. Following a filling event the barrier can be quickly assessed for remaining capacity or damage. As the parts are standard across all barriers replacements can be quickly sourced and mobilised to site.

Shallow landslides are typically near surface slides occurring where an impermeable soil, in the UK typically boulder clay, sits atop an impermeable rock. These are far harder

“Shallow Landslides are far harder to forecast.”

to forecast as the path and volume of materials involved are very dependent on the slope conditions and the underlying geology. The typical mechanism involves water reaching the interface between the soil and rock, lubricating the sliding plane, leading to a shallow landslide.

Where a shallow landslide impacts on infrastructure significant damage is done, often requiring an extended closure to repair the damage. Traditional protection measures have included driven

steel pile walls to hold back the landslide, piled solutions hold back both the soil and water so need to be designed for very high impact loads. The major disadvantage is that installation is costly and time-consuming, especially as landslides occur on steep slopes often away from easy access.

An often deployed temporary solution is gabion baskets, these have the benefit of allowing some dissipation of water. However they are still a static structure and are not strong enough to reliably withstand the dynamic forces of a shallow landslide impact.

A solution combining most advantages are the Geobrugg flexible landslide barriers: ►►

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A VX barrier (bottom) and UX barrier (above) deployed to provide maximum capacity within a narrowing channel.



“Their construction from high-tensile steel wire mesh gives the flexibility for rapid dissipation of the initial impact energy...”

Their construction from high-tensile steel wire mesh gives the flexibility for rapid

dissipation of the initial impact energy while providing maximum strength to hold the high static loads after the event. The open mesh allows for rapid dissipation of water but retains all of the coarse material.

The system is easily adaptable at design stage and can be customised to suit the terrain along the slope. The Swiss safety experts are able to produce different height systems. In addition Geobrugg

engineers are available to assist with the design and to find the best solution for the situation on site. As with the debris flow solutions, the landslide barrier is easy to assess for remaining capacity and any damage caused by a filling event. The components are designed to be lightweight and easy to transport and install.

Geobrugg barriers have been field tested in 1:1 conditions and are the only barriers to hold the CE marking for landslide

barriers. They have also been tested for rock fall impacts with a minimum energy absorption capacity of 500 kJ, as the two hazards are often closely associated. The shallow landslide protection system has been proven to be effective in the UK: In December 2015 a barrier on the A83 in Scotland successfully caught and held back a large landslide during storm Desmond, the road stayed open and sustained no damage. ■

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AGS & BDA TASK FORCE PROVIDE INITIAL SURVEY FEEDBACK

A survey of the UK ground investigation industry was conducted in July and August 2016.

The results are being assessed by the joint [AGS](#) and [BDA](#) Task Force, and will be published over the next few months. Opportunities for comment and further discussion will be provided subsequently.

This notice gives initial feedback on the Survey.

The Survey attracted 585 responses from across the industry, which is very encouraging for such an exercise. There was considerable diversity within the population. Interestingly, fewer than half the respondents were members of either Association.

In addition to answering

the quantitative questions, respondents were very generous with their comments and suggestions on how the industry could be improved.

- 60% of respondents reported that they had a good working knowledge of the relevant Technical Standards for the industry (EC7). This implies that 40%

“The Survey attracted 585 responses from across the industry, which is very encouraging for such an exercise.”

do not!

- 70% of respondents reported that they always or usually applied the Technical Standards in their work (and had the authority to do so). This implies that 30% do not!



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A Driller's Focus on Health & Safety

Jon Christie – Chairman, BDA Safety Committee

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Mike Massey – Clear Solutions Ltd

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Peter Redford, Past BDA Chairman

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“80% of respondents thought that procurement decisions based on cost discouraged adherence to the Technical Standards.”

- 75% of respondents had a good working knowledge of the relevant Health and Safety legislation for the industry (and had the authority to apply it). This implies that 25% do not!
- 80% of respondents thought that procurement decisions

- based on cost discouraged adherence to the Technical Standards.
- 55% of respondents thought that Technical Standards are not rigorously enforced, and that people are not honest/open about how much they adhere to the Standards.
- 50% of respondents thought that there was a skills shortage in the industry.
- 35% of respondents thought that some practices in the UK ground investigation industry were no longer ‘fit for purpose’. Only 20% disagreed; the remainder were neutral. Particular practices were clearly targeted ahead of others.

- Respondents thought that the 5 most important challenges facing the industry were:
 - o Availability of suitably qualified people
 - o Raising the understanding of those involved in the procurement process
 - o Attracting young recruits to the industry
 - o Improving the image of the industry
 - o Encouraging innovation

There is a lot more detail to analyse. Further results will be revealed and discussed in depth in early 2017. ■

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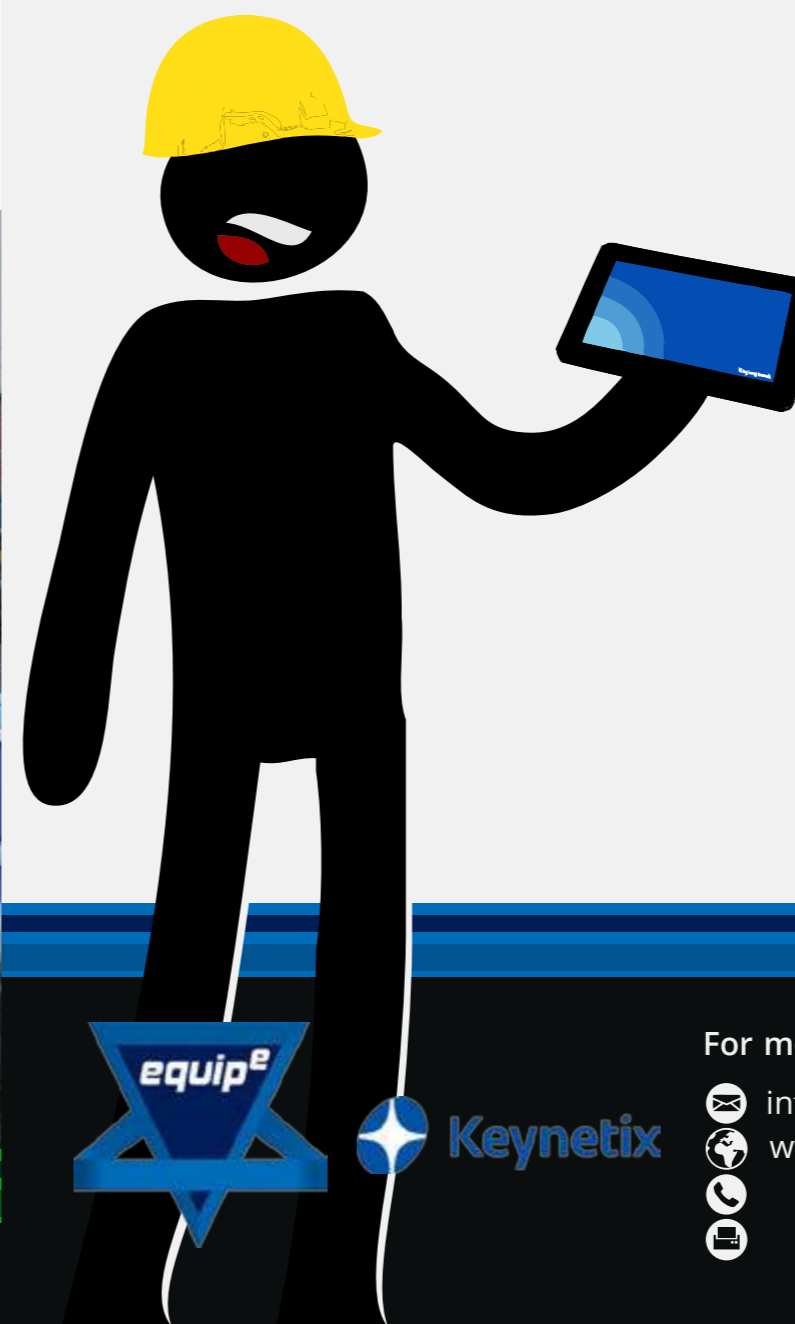
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YALLEM PILES INTO DORSET BIOMASS PLANT



“This project is not without its challenges, as the trench has to be dug within the confines of an existing building, through variable ground, with restricted headroom and accessibility.”

comprising 82 x 450mm SFA piles, using their MC5D SFA piling rig.

This project is not without its challenges, as the trench has to be dug within the confines of an existing building, through variable ground, with restricted headroom and accessibility.

Speaking about the project Rob Mellay, Managing Director of Yallem, commented: “The challenging site conditions, coupled with tight project timescales, will further demonstrate Yallem’s technical competency in the piling sector, the project is not without its difficulties. We are delighted to be expanding our portfolio of UK-based projects in the renewable energy sector and our involvement in this project further demonstrates our CFA and SFA capabilities within the UK piling sector”. ■

Providing the third entry into this month’s issue of the *Geotechnica* are first-time contributors [Yallem](#). In their debut article, Yallem reveal details of their latest piling project at a Dorset-based Biomass Plant, featuring spacial challenges and variable ground conditions.

Yallem, one of the UK’s fastest growing piling and geotechnical services contractors, has been awarded piling works as part

of the development of a waste management and recycling plant in Parley, Dorset, working with main contractor Eco Sustainable Solutions Ltd.

Yallem’s scope of works form part of a much larger project – the development of

a biomass Combined Heat and Power Plant, which once commissioned will be capable of processing 10,000 tonnes of compost woody oversize and waste wood fuel a year, generating power for the whole site and sending some to the

national grid.

Yallem began work mid-September, with completion of piling works scheduled for mid-October. During this time Yallem will install a contiguous retained pile wall, for the Biomass ORC Unit trench,

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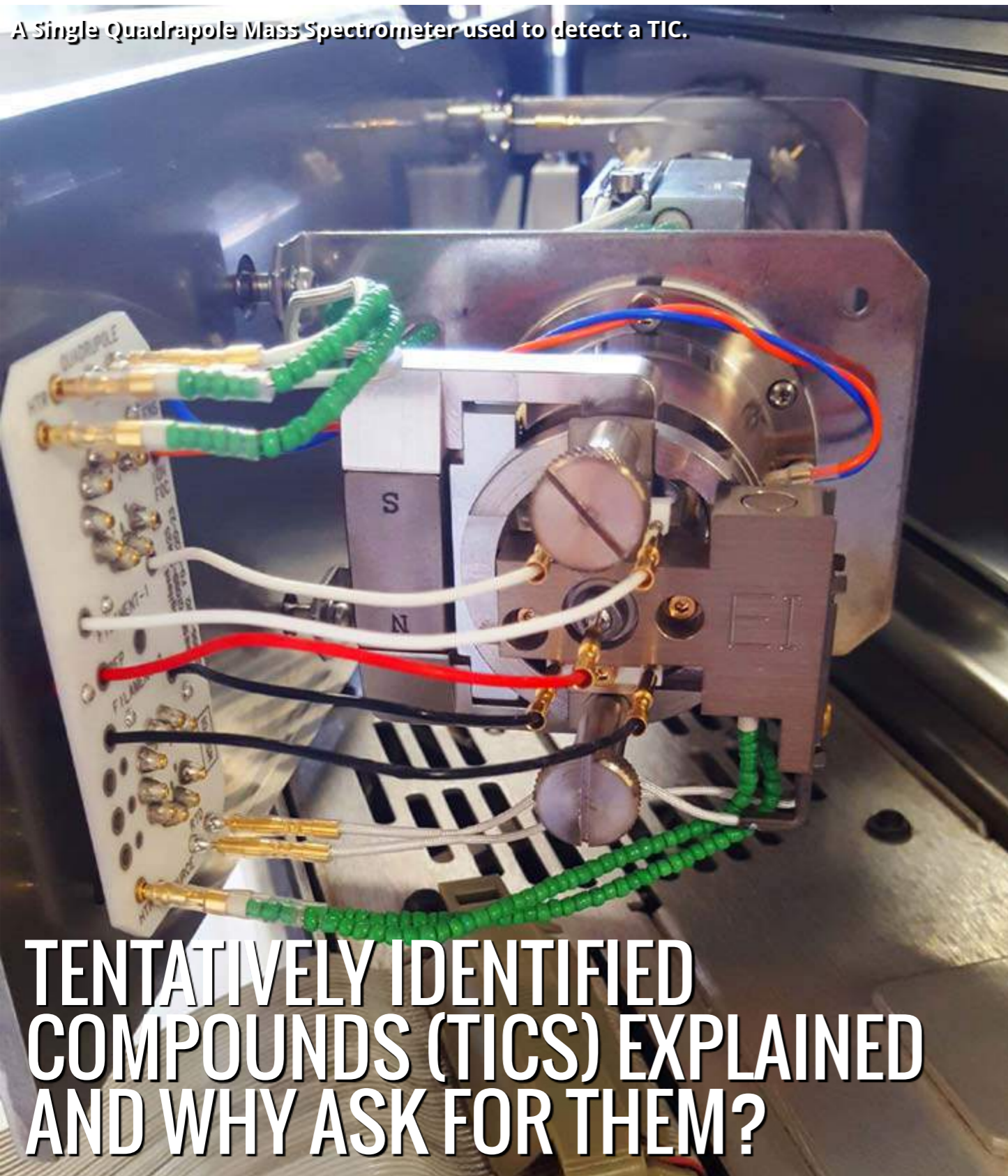
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A Single Quadrupole Mass Spectrometer used to detect a TIC.



TENTATIVELY IDENTIFIED COMPOUNDS (TICS) EXPLAINED AND WHY ASK FOR THEM?

Providing the final article for Issue 55 of the Geotechnica is David Bowen of Terra Tek. David is a Senior Chemistry Supervisor at Terra Tek's Birmingham Laboratory. In this in-depth article David focuses on Tentatively Identified Compounds, explaining exactly what they are, how you test for them and what happens if you find them.

Most routine analytical testing target list of compounds for suites have a well established analysis. Some suites however,

such as the UKWIR suite for laying pipe work in Brownfield sites, also require non-target Tentatively Identified Compounds (TICs) as standard.

So, what is a TIC? How are they detected? Why can this test be useful? And what does it mean if you find some?

Non Target Peak Search Report

TIC Library : C:\Database\NIST05.L
TIC Integration Parameters: events.e

Peak Number 1 Fluoranthene, 2-methyl- Concentration Rank 1

R.I.	Est Conc	Area	Relative to ISID	R.I.
11.709	0.58 µg/ml	7935390	Chrysene-D12	12.724

Hit# of 5	Tentative ID	MW	MolForm	CAS#	Qual
1	Fluoranthene, 2-methyl-	216	C17H12	033543-31-6	94
2	1H-Benzo[a]fluorene	216	C17H12	000238-84-6	92
3	7H-Benzo[c]fluorene	216	C17H12	000205-12-9	87
4	Pyrene, 1-methyl-	216	C17H12	002301-21-7	87
5	1H-Benzo[a]fluorene	216	C17H12	000238-84-6	87

Tentatively Identified Compound

% Likelihood of this compound

Possible Compounds present

An example TIC report.

“A TIC is usually an optional extra when requesting an analysis for Volatile Organic Compounds and /or Semi-Volatile Organic Compounds.”

A TIC is usually an optional extra when requesting an analysis for Volatile Organic Compounds (VOCs) and / or Semi-Volatile Organic Compounds (SVOCs). These tests are performed by GC/MS, and can cover up to and beyond two hundred target analytes. Target analytes are quantified and identified against a certified standard.

When combining these methods, any compound which by nature is either volatile or semi-volatile and can be extracted, will be introduced to the GC and subsequent MS detector. So, from a single

analytical injection a whole world of information beyond the confines of the target list of analytes could be available to exploit.

Therefore, if a non-target compound is present, we can search the NIST library to find a highly likely, positive match – tentatively identified, and give a semi-quantitative estimated concentration, calculated against its response and the most comparable internal standard.

“There are many advantageous reasons for requesting a TIC in addition to the standard screening tests of VOCs and SVOCs.”

There are many advantageous reasons for requesting a TIC in addition to the standard

“If some of these contaminants are likely to be unconventional and outside of the scope of a target analysis suite, TIC’s could be used to detect them...”

screening tests of VOCs and SVOCs. Examples include, and are not limited to the following:

When conducting bench studies as part of a preliminary risk assessment, the historical use of the site and associated potential sources of contamination should be assessed and identified. If some of these contaminants are likely to be unconventional and outside of the scope of a target analysis suite, TIC’s could be used to detect them and hence, assist in characterising the site.



A site to be investigated which may contain unconventional contaminants. Image courtesy of James Brown, DTS Raeburn.

Alternatively, should the history of the site be unclear, and the source of the potential contaminant unknown, incorporating TICs here would also be highly recommended.

“Even sites which have a well-known history with obvious contaminants suspected, can sometimes present surprises.”

Even sites which have a well-known history with obvious contaminants suspected, can sometimes present surprises. An example could be a strange unknown odour emitting from

a sample taken from an area of the site. A TIC coupled to a VOC test would help to identify what this anomaly is.

Outside of the Environmental sector, Chemists undertaking experiments may wish to identify gases emitted or intermediate compounds produced during or after chemical reaction processes. Capturing these gases or liquids, and analysing them with the aid of TICs can assist in understanding the reaction mechanism of the experiment and in evaluating findings.

So, for site investigation purposes, if a TIC was discovered, what would this mean?

Using literature searches of the tentatively identified compounds found is a

“Some compounds found by TICs are naturally occurring in the environment rather than anthropogenic.”

useful starting point to help understand why they have been discovered. Some compounds found by TICs are naturally occurring in the environment rather than anthropogenic. Other compounds are by-products of the analytical extraction process, which should be recognised and removed by the qualified analytical chemist before reporting.

Compounds of interest and/or of significance to an ►►

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Underground storage tanks found at a site with limited historical information. Image courtesy of James Brown, DTS Raeburn.

“Compounds of interest and/or of significance to an environmental assessment study, which are identified as a TIC and have been assigned an estimated concentration, could be added to the target list of compounds for that particular site.”

environmental assessment study, which are identified as a TIC and have been assigned an

estimated concentration, could be added to the target list of compounds for that particular site. In doing so, certified standards of the compound would need to be sort, and the original analysis re-quantified against this, to give a calculated concentration to be reported.

In some cases, just the identity of any unknowns or unexpected substances found on the site is of use, and the need to accurately determine the concentration may not be a requirement.

Taking these examples into consideration, one should never underestimate the usefulness of scheduling a TIC coupled with a VOC and SVOC analysis suite when undertaking environmental assessment

investigations. The analytical screening power which this provides, by identifying and quantifying target compounds and tentatively identifying non-target compounds in a single sample, is an exceptional analytical tool, which is not always taken advantage of. Conventional and unconventional contaminants can be analysed for, confidence that no undetected surprises lurk on the site, and bespoke site specific target analysis suites could be developed in response to a positive TIC match for future testing.

TICs can be scheduled as an additional option to Terra Tek's VOC and SVOC suites for soils, waters, and leachates. ■



Unknown contaminants and tanks found on a site. Image courtesy of James Brown, DTS Raeburn.

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