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# Geotechnical Instrumentation and Monitoring

## Field monitoring as a tool for economic and reliable geotechnical solutions

Wednesday 31st March 2010 • America Square Conference Centre, London EC3



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Learn lessons from case study examples, including:

- **Monitoring unstable sea cliffs in Scarborough**  
Julian Maund, Technical Director – Ground Engineering, Mouchel
- **Displacement of cast iron tunnels arising from One New Change excavation**  
Mike Devriendt, Associate, Arup
- **Long-term monitoring of an active slope at Godstone**  
Dr Andrew Ridley, Managing Director, Geotechnical Observations

**PLUS** Get more from your conference experience by attending our Pre-Conference Workshop

### The Fundamentals of Instrumentation and Monitoring

in association with

Soil Instruments Ltd



Tuesday 30th March 2010, London

- Explore the role of different types of instrumentation in various project situations
- Study the benefits of different monitoring processes and the relevance of the data produced

Register your place now at:  
[www.gemonitoring.com](http://www.gemonitoring.com)



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# Geotechnical Instrumentation and Field monitoring as a tool for economic and reliable geotechnical

Now, more than ever, there is a demand for increasingly reliable and easily accessible data to quantify the monitoring parameters and determine changes at all stages of the project.

Geotechnical engineers need to get to grips with new monitoring technologies and how best to deploy them.

The **Ground Engineering** and **New Civil Engineer** conference on **Geotechnical Instrumentation and Monitoring** brings you an exclusive opportunity to hear from experts on the technologies and techniques available today.

Learn the lessons from past experiences. This important event features **case studies on slope and tunnel stability** as well as the **effect of excavations on adjacent structures**.

Attend to:

- Identify **why and when** monitoring equipment should be installed
- Hear about new, as well as tried and tested, **monitoring equipment**
- Gain insights into how best to **set up and operate** monitoring schemes
- Understand **how much data** to collect and at what frequency
- **Avoid the pitfalls** encountered on previous projects

**PLUS** get interactive in the “**Five minutes of fame**” session.

**Don't be left behind, get the updates you need to stay ahead of the game.**

**Praise from delegates at previous GE events:**

**“Good balance of technical information and case studies”**

P McCracken, Robert West Consulting

**“Interesting and good networking contacts”**

J Dixon, Tensar

**Who will you meet?**

**Geotechnical engineers, Geoenvironmental engineers, Consultants, Contractors, Clients, Project managers, Academics, Instrumentation manufacturers and suppliers**

**Want to increase your marketing exposure?**

We can create tailored sponsorship, exhibition and networking packages to help you reach your target markets.

Contact **Roland Maybank** for further details -  
Tel: **020 7728 5851** or  
Email: **roland.maybank@emap.com**

## Pre-Conference Workshop

### The Fundamentals of Instrumentation and Monitoring

in association with **Soil Instruments Ltd**



**Tuesday 30th March 2010, London**

This half-day workshop considers the instrumentation that is used for different monitoring processes. It looks at the most up to date equipment and how to ensure its fitness for purpose. Consideration is given to the sort of data that is produced and how best to use this data, as well as to the frequency of data monitoring required to obtain an appropriate volume of data.

The sessions will all be interactive with opportunities for questions and discussion. Soil Instruments Ltd will be on hand throughout the day to give demonstrations of the instrumentation that is being discussed.

**12:50 Registration and refreshments**

**13:20 Opening address from the facilitator**

**Jonathan Scott**, Managing Director, ITM-Soil Group

**13:30 Monitoring Groundwater**

**Dr. Gary Holmes**, Technical Director, **WJ Groundwater Ltd.**

- Descriptions of the instruments and applications - including observation wells, open standpipe piezometers, vibrating wire piezometers, flushable piezometers for measuring negative pore water pressures and fully-grouted piezometers
- Collecting and interpreting data
- Questions and discussion

**13:50 Monitoring Displacements**

**Richard Marshall**, Sales Manager, **Soil Instruments Ltd.**  
**Angela van Rietschoten**, Managing Director, **Profound BV**

- Descriptions of the instruments and applications - including tiltmeters, extensometers, inclinometers, liquid level gauges and wireless sensing systems
- Using the technologies for controlling compensation grouting
- Collecting and interpreting data
- Questions and discussion

**14:30 Monitoring Load and Strain**

**Bob Allen**, Associate, **London Bridge Associates**

- Descriptions of the instruments and applications - including load cells, strain gauges and stress cells
- Collecting and interpreting data
- Questions and discussion

**14:50 Afternoon refreshments**

**15:20 Using Geographic Information Systems (GIS) with Data Management Systems**

**Raphael Siebenmann**, Project Scientist, **Geosyntec Consultants, USA**

**Dr Hai-Tien Yu**, Chief Technology Officer, **ITM-Soil Group**

- Introducing GIS technology, terminology, and capabilities
- Visualising geotechnical data
- Construction-control instrumentation guidelines for development and maintenance of project-specific GIS
- Considering the application of GIS systems to transportation and infrastructure projects
- Avoiding the potential pitfalls and maximising the benefits of the technologies

**15:45 Recent Advances in Fibre Optic Sensing**

**Olivier Georis**, CEO, **FOS&S, Belgium**

- Introducing advanced fibre-optic technology - Draw Tower Gratings (DTG)
- Considering the advantages of fibre-optic technology for geotechnical and structure monitoring
- Learning from cases histories for geotechnical monitoring and structure monitoring
- Questions and discussion

**16:00 Addressing the role of instrumentation in different geotechnical situations**

**Dr Richard Bassett**, Emeritus Reader in Geotechnics, **University College London**

- Looking at excavations, embankments, slopes, landslides, tunnels, piles and shafts

**16:45 Closing remarks from the facilitator and end of workshop**

To register visit [www.gemonitoring.com](http://www.gemonitoring.com) call **0845 0**

## Programme

**08:30** Registration and refreshments

**09:10** Opening address from the Chair

**Jonathan Gammon**, Divisional Director, **Jacobs**

**09:20** Keynote address – why monitor performance?

- Summarising the principle technical reasons for monitoring and considering its use for safeguarding your neighbours' assets
- Use of risk analysis and decision theory to quantify benefits of geotechnical monitoring
- Getting value from monitoring - comparing costs / benefits
- Using geotechnical instrumentation to reduce risks and decrease litigation
- Drawing on examples from the Boston Central Artery Tunnel Project

**Allen Marr**, CEO, **Geocomp Corporation**

**10:15** Key issues for performance monitoring – making the best use of available technologies

- Summarising the systematic planning process, to ensure that performance monitoring achieves its purpose
- An overview of monitoring techniques in current use and new or emerging technologies
- Who should be responsible for the instrumentation and monitoring during construction? The pros and cons of letting the contract to the client or to the main contractor

**John Dunicliff**, Geotechnical Instrumentation Consultant

**11:00** Question and answer session

**11:15** Morning refreshments

**11:40** Monitoring during construction and beyond – the feedback loop between design and site control

- Capitalising on the data received – the loop of data gathering, understanding and application back to project and other jobs
- Using the observational method – how monitoring data can feed back into the geotechnical analysis
- Getting better data for design leading to better data for value engineering
- Determining response values for action from the initial monitoring data

**Dr Jamie Standing**, Senior Lecturer in Soil Mechanics, **Imperial College London**

**12:25** ONE NEW CHANGE – displacement of cast iron tunnels arising from a deep basement excavation in central London

- A summary of the instrumentation used on the project – what has been installed and how has it worked?
- Displacements of London Underground Central Line tunnels arising from changes in ground loading
- Determination of contingencies in the event of trigger levels of movements being exceeded
- Comparison of measured displacements and tunnel deformation calculations
- The importance of monitoring and the lessons learned

**Mike Devriendt**, Associate, **Arup**

**12:45** Question and answer session

**13:00** Networking lunch

**14:00** M25 GODSTONE – long-term monitoring of an active slope

- Explaining the historical context of the project
- Selecting appropriate technology for long-term slope monitoring
- Using climate records to schedule monitoring frequency
- Identifying the trigger values
- Monitoring of implemented control measures

**Dr Andrew Ridley**, Managing Director, **Geotechnical Observations**

**14:20** SCARBOROUGH – monitoring of unstable sea cliffs in response to wet weather events

- Understanding the need for monitoring the sea cliffs
- Considering the triggers for monitoring and the procedures to determine when more data is required
- Summarising the instrumentation used and data obtained to date. How has the use of a GIS system aided the interpretation process?
- Identifying problems with the instrumentation and how these have been overcome
- Looking at the lessons learned from the project

**Julian Maund**, Technical Director – Ground Engineering, **Mouchel**

**14:40** Question and answer session

**14:55** Five minutes of fame

Your chance to present the results from your projects and share the lessons learned... but after 5 mins, the whistle blows and you must stop. In this fast-paced session, you will see numerous examples of the varied work the industry is involved in.

*Email [ge-fame@emap.com](mailto:ge-fame@emap.com) with a 200 word summary of the project details in order to register your interest in participating in this session. If selected, you will be asked to produce a 2500 word paper to accompany your presentation, which will be downloadable to conference delegates after the event.*

**15:25** Afternoon refreshments

**15:50** BLACKFRIARS STATION RE-DEVELOPMENT – instrumentation and monitoring to protect and assure

- An overview of the project, affected assets and the design development process
- A summary of the instrumentation systems in place and the setting of movement limits
- Considering the effective use of data
- Discussing the system maintenance
- Looking at the current status and lessons learnt to date.

**Carlton Hall**, Technical Director – Ground Engineering, **Jacobs**

**16:10** Question and answer session

**16:20** BIRMINGHAM – monitoring of Network Rail tunnels during redevelopment of the Bull Ring Centre

- Detailing the instrumentation and vibration monitoring system which was installed
- Analysing the results in comparison with the FE analysis
- Understanding the differences between the theoretical and measured results
- Discussing the interpretation of the instrument data – ensuring maximum safety using a considered approach to 'real-world' conditions within the tunnel
- Learning the lessons about the response of tunnels to both construction and non-construction related influences

**Dr Richard Bassett**, Senior Consultant, **ITM-Soil**

**16:40** CASE STUDY – tunnel monitoring

- Explaining the main reasons for monitoring on the project
- A summary of the instrumentation and interpretation methods used – what was installed and has it worked?
- Examples of the theoretical results and predictions, comparing the real trends with theoretical expectations
- What problems were encountered through the monitoring process? Determining threshold limits for action levels
- Evaluating the actions that were taken and the impact of these actions on further monitoring

**Rory O'Rourke**, Managing Director, **Datum**

**17:00** Question and answer session

**17:15** Closing remarks from the Chair and end of conference

