Geotechnical Instrumentation for Field Measurements

Mar. 15-17, 2009
Doubletree Hotel, Cocoa Beach, FL

LECTURERS AND TOPICS

John Dunnicliff, M.S., S.M., P.E.

Course Director, Geotechnical Instrumentation Consultant, Bovey Tracey, Devon, England. Masters degrees from Oxford and Harvard. 50 years experience with geotechnical instrumentation, on numerous and varied projects, with emphasis on obtaining high quality data to help answer specific geotechnical questions. He has taken the lead role in teaching more than 100 continuing education courses in geotechnical instrumentation. He is author of the 1988 and 1993 book *Geotechnical Instrumentation for Monitoring Field Performance*, and co-editor with Don Deere of *Judgment in Geotechnical Engineering: The Professional Legacy of Ralph B. Peck*, published in 1984 and 1991. He is also co-editor with Nancy Young of the 2006 book *Ralph B. Peck, Educator and Engineer – The Essence of the Man*

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Topics:

- Systematic Approach to Planning Monitoring Programs
- Workshop on Planning a Monitoring Program for an Embankment on Soft Ground
- Overview of Hardware for Monitoring Groundwater Pressure, Deformation, Total Stress, and Load and Strain in Structural Members
- Contractual Arrangements for Instrumentation
- Discussion on Inclinometers and TDR

Martin Beth, Geotec Eng, INSA Lyon

Operations Manager for Soldata Group, a company specialising in geotechnical and structural monitoring services, with offices in France, USA, Hong Kong, England, Spain, Hungary, Holland and Russia.

Martin Beth has been Operations Manager for Soldata Group since 1997. Before that, was Project Manager for Jubilee Line 101 Compensation Grouting Site in London. His responsibilities currently include technical support for all Soldata Group sites, project management on a variety of instrumentation sites, and instrumentation systems design. He is also responsible for research and development within Soldata.

Topics:

- Technical Evaluation of Geotechnical Sensors
- Monitoring Deformation in 3D with Robotic Total Stations: The basics, and some case histories.

Marcelo Chaqui, M.Sc.

General Manager for Monir Precision Monitoring Inc., a company specializing in geotechnical and structural monitoring services, located in Toronto, Ontario. Prior to and since completing university he has continually worked in the ground improvement and specialty geotechnical construction fields. The majority of this work was done as a consultant on projects related to grouting, jet grouting, geotechnical monitoring, micropile, anchoring, shoring and related technologies.

Topics:

- Several case histories to follow-up Colin Hope's presentation on manual total station monitoring. These case histories will be of monitoring related to shoring of deep excavations in the Greater Toronto Area. These will be selected specifically to highlight:

    - Use of the observational method for installation of cost effective shoring systems.
    - Combining different instrument types to develop a responsive monitoring program.
    - Correlating data from different instrument types and theoretical modeling to better under the performance of the systems.

Roger Chandler BEng, PhD

He received his degree in Civil Engineering at University of London in 1991 and his PhD in Geotechnical Engineering in 1994. He has been developing commercial geotechnical software for the last 14 years, initially for finite element analysis with SAGE CRISP and for the last 10 years focusing on geotechnical data management at Key Systems Geotechnical and then Keynetix Ltd.

He has served on the Association of Geotechnical and Geoenvironmental Specialist's (AGS) Data Format Committee for the last 12 years and was a co author of "The AGS-M Format for the electronic transfer of monitoring data" published by AGS and CIRIA in 2002. He is also one of the founder members of the DIGGS (Digital Interchange for Geotechnical and Geoenvironmental Specialists) consortium and is the UK representative for the international DIGGS committee. He has written 13 papers on data transfer formats.

He is currently Technical Director of Keynetix Ltd and is project director for the www.monitoringpoint.com website.

Topic:

- Web-based Monitoring Systems
    - Data transfer standards
        - Benefits of non propriety data standards
        - Review of available standards
    - Methods and associated problems of data dissemination
    - Use of web based monitoring systems

Aaron Grosser MSCE, PE

Aaron is a Geotechnical Engineer with 15 years of experience and is with Barr Engineering Company in Minneapolis, Minnesota. He works primarily in the areas of foundation design, slope stabilization, and tailings basin management throughout North America.

Topic:

- The Use of the Fully-grouted Method for Piezometer Installation
  - Description of the method
  - Theoretical background
  - Testing program on various mix designs, with test results for strength and permeability.
  - Case histories outlining the use of the method, and success in previous applications.

Colin Hope L.S. (Land Surveyor)

Survey Manager for Monir Precision Monitoring for the past 3 years with 27 years experience in mining, engineering, archeological (The Rock of Cashel) and land surveying. He has worked on three continents, primarily in Australia, Ireland and Canada. His experience includes a wide variety of projects, including working as the Survey Manager on Intel's Fabrication Plant 24 in Dublin, monitoring pit walls in open-cut mines, designing blast patterns & calculating explosives needed, and conducting volume surveys deep underground.

Topics:

- Using manual total stations for monitoring
- Sources of errors and error management
- Variables that impact on data quality
- The importance of strong control and baseline readings
- Presentation, distribution and storage of data

Daniele Inaudi, Ph.D.

Daniele Inaudi obtained his Ph.D. in civil engineering at the Laboratory of Stress Analysis (IMAC) of the Swiss Federal Institute of Technology in Lausanne for his work on the development of a fiber optic deformation sensing system for civil engineering structural monitoring. In 2005 he obtained an Executive Master in Business Administration from the Technical University of Southern Switzerland.

He is a member of the organizing committee of the annual “International conference on Optical Fiber Sensors”. Daniele Inaudi is author of more that 200 papers, three book chapters and editor of a book on Optical Nondestructive Testing. He is also co-author of the book “Fiber Optic Methods for Structural Health Monitoring”, published by Wiley.

Daniele Inaudi is co-founder and CTO of SMARTEC SA and is Chief Technical Officer of Roctest.

Topic:

- Overview of Fiber Optic Sensing in Civil Engineering
    - Fiber optic sensing basics
    - Fiber optic sensing technologies
    - Applications in civil and geotechnical engineering

Allen Marr PE, PhD

Allen is founder and President of Geocomp Corporation, a company that designs, installs and operates Web-based, real-time monitoring systems for excavations, tunnels, dams, bridges and buildings. He is a licensed Professional Engineer who has been involved in the monitoring systems for major projects around the world, including Central Artery Tunnel Project in Boston; Eastside Access project in New York City; Woodrow Wilson Bridge in Washington, DC; Northshore Connector Tunnel in Pittsburg; and the new Science Center at Harvard University in Cambridge, MA.

Topic:

- Why Monitor Performance?
    - Engineering reasons to monitor performance
    - Business reasons to monitor performance
    - Why monitoring of important structures needs to be real-time

Kevin O'Connor, Ph.D., P.E.

President of GeoTDR, a subsidiary of Geotechnical Consultants Inc., located in Westerville, Ohio. Kevin is a member of the TRB Committee on Soil and Rock Instrumentation (AFS20). He has over 25 years experience with design, installation, and monitoring of TDR-based systems for diverse geotechnical applications. He is co-author with Charles H. Dowding, Ph.D., P.E., of *GeoMeasurements by Pulsing TDR Cables and Probes*, published in 1999.

Topic:

- Time Domain Reflectometry (TDR)
  - TDR basics
  - TDR sensors
  - Installation techniques
  - TDR-based alarm systems
  - Typical costs
  - Discussion on inclinometers and TDR

David Rutledge B.Sc.

David Rutledge is the Director for Infrastructure Monitoring at Leica Geosystems in the Americas. He has been involved in the GPS industry since 1995, and has overseen the installation of numerous GPS networks around the world. He is the author of numerous papers on real-time GPS monitoring and GPS accuracy.

Topic:

- Performance monitoring with GPS
  - GPS and GNSS overview
  - Schematic of a typical GPS system
  - Formal evaluation of GPS accuracy and repeatability
  - Case histories: Monitoring a block cave mine, monitoring a bridge overpass, monitoring a landslide

Tony Simmonds, B.Sc.

Received his degree in Engineering Geology and Geotechnics in England in 1979. Presently he is the International Projects Manager for Geokon, Inc, Lebanon, NH, USA, a manufacturer of geotechnical instrumentation, where he has been for over 25 years. He is an active member of the Transportation Research Board, Deep Foundations Institute and ASCE and has broad experience of instrumentation systems in a variety of projects including tunnels, dams, foundations and mines, both for the supply of the instruments themselves and for the fieldwork associated with installation and data collection.

Topics:

- Vibrating wire instruments, an overview, illustrated with case histories.
- Micro-Electro-Mechanical Systems (MEMS). Basics, tiltmeters, probe inclinometers, and in-place inclinometers.

Robert M. Taylor, B.A.Sc., P.Eng.

President, RST Instruments, Coquitlam, B.C. Canada. Has been involved in geotechnical instrumentation for more than 30 years. Projects have included design, development, and operation of numerous instruments including piezometers, tiltmeters, extensometers, level sensors, and associated data acquisition equipment.

Topic:

- Automatic Data Acquisition Systems and Databases
    - ADAS basics
    - Communications and networking
    - Real-time monitoring
    - Data archiving and reporting
    - Alarms
    - Lightning protection
    - Practical details

L. Randall "Randy" Welch, B.S., P.E.

Technical Specialist, Structural Behavior and Instrumentation, U.S. Bureau of Reclamation, Denver, CO. His 32 years of experience with dams includes designing large earth and rock fill embankments, layout and selection of performance measuring systems for embankment and concrete dams and dam safety inspections. He has been a Senior Engineer responsible for assessing potential failure modes and risk at high hazard dams and has been involved with many comprehensive facility reviews for dam safety and field explorations where the assessment and/or use of geotechnical instruments are key elements. He has extensive experience with evaluating measured and observed dam performance, providing related training to several developing nations and is a chapter leader and contributing author for the ASCE publication, *Guidelines for Instrumentation and Measurements for Monitoring Dam Performance.* Presently he is the instrumentation engineer for Reclamation's Ridges Basin Dam, now undergoing first filling, and a contributing author to "Seepage Monitoring of Embankment Dams" a technical document sponsored by FEMA (Federal Emergency Management Agency) and ICODS (Interagency Committee on Dam Safety) .

Topic:

- Instrumentation for Dam Safety Monitoring
    - Developing performance monitoring programs for dams
    - Commonly used instruments