February 2011 Dinner Meeting - DVGI Annual Student Night 2011

KEYNOTE SPEAKER: Dr. Chad Freed
Widener University

TOPIC: The Most Challenging Aspect of Education—Instilling Perspective in Students

DATE: Tuesday, February 22, 2011
LOCATION: Villanova University, Connelly Center
TIME: Social Hour: 5:30 PM; Dinner: 6:30 PM; Presentations: 7:15 PM

The February 2011 DVGI Annual Student Night will feature Chad H. Freed, Ph.D. as the keynote speaker. The title of Dr. Freed’s talk will be The Most Challenging Aspect of Education—Instilling Perspective in Students. The talk will discuss the difficulty and potential methods to instill perspective in young civil engineering students during their formal engineering education who have little to no industrial experience.

Dr. Freed is an Associate Professor in the Environmental Science Department at Widener University. He obtained his B.S. in Civil Engineering from Drexel University, his M.S. in Civil Engineering from Drexel University, his M.S. in Engineering Geology from Drexel University, and his PhD. in Earth and Environmental Science from the University of Pennsylvania. Dr. Freed currently teaches undergraduate-level courses in engineering geology and geographic information systems at Widener University, and graduate-level courses in hydrology, hydrogeology, and site characterization at the University of Pennsylvania. Dr. Freed’s recent research projects have included the mathematical modeling of magnetic fields to detect buried steel drums and multiple projects using geographic information systems in science and engineering. Dr. Freed is also a consultant with the Washington Division of URS Corporation, where he assists in geotechnical engineering site characterizations and designs for geotechnical engineering structures.

In addition to a keynote speaker, graduate students attending local universities will make presentations relative to their current research activities. If you would like to become a Corporate Sponsor of Student Night, please contact Mr. Bob Sabanas, P.E., Voice: 610-524-2300 or Email: rsabanas@nthconsultants.com. The cost for sponsorship is $125 and entitles the sponsor to a display area.
The Francis E. Walter Dam operated by the Philadelphia District, United States Army Corps of Engineers (USACE) is a compacted earthfill dam located at the confluence of the Lehigh River and Bear Creek approximately 5 miles north of White Haven, Pennsylvania. The dam, 86 miles north of Philadelphia, has been in operation as a flood damage reduction structure since its completion in late 1960. However, it is also used for recreation and drought emergency water storage. The overburden at the embankment site consists predominantly of numerous small to large boulders in a matrix of silty sandy gravel. The general geology of the Lehigh River Basin in which F.E. Walter Dam is located lies entirely within the Pocono Plateau which is a small, southeast trending lobe of the Appalachian Plateau physiographic province. Bedrock consists of hard siliceous gray sandstone, siltstone and conglomerate of the Mississippian Pocono Formation, with thin discontinuous beds of gray to black shale.

At various times during its operation, the dam impounds water levels from approximately 70 to 100 feet above the normal pool elevations for extended periods. When such reservoir levels have been maintained, seepage along the downstream toe of the right abutment has been observed. This seepage and its effects upon the integrity of the embankment and its foundation during these pool periods has been a concern since it was first observed in 1966. Consequently, the dam has been classified as a Dam Safety Action Classification (DSAC) III structure. Dams in this class are considered to have a moderate to high risk associated with the combination of life or economic consequences and a moderate to high probability of failure, and require high priority attention to dam safety issues.

The purpose of the project was to perform a remediation program to repair possible flaws which may have arisen from construction defects or natural permeability deficiencies. These flaws are typically repaired by grouting the foundation rock to reduce permeability and seepage through rock fractures.

The remediation consisted of a 600 linear foot double row grout curtain with primary through tertiary grout holes installed utilizing a split – space technique. The construction included drilling of 123 inclined holes on the order of 15 degrees from vertical through the overburden embankment materials utilizing sonic drilling techniques. Overburden drilling ranging from approximately 70 to 230 feet was required before advancing the holes 40 additional feet into the underlying foundation rock. State of the art grouting operations comprised of water pressure testing and pressure grouting using automated, real-time computer monitoring performed to facilitate the grouting operations.

The overall cost of the project was approximately $4 million dollars and was funded through the American Reinvestment and Recovery Act of 2009.

Earl M. Fisher, PE is a licensed Professional Engineer in Pennsylvania, New Jersey and Delaware. Mr. Fisher graduated from Rutgers University and has practiced geotechnical engineering in the private sector in the tri-state area for nearly 22 years before joining the Philadelphia District of the USACE in 2009. Earl did a fantastic job presenting to a very well-attended meeting. Thanks very much Earl!
Implementing a Low Level Monitoring Plan to Determine the Quality of Performance of Stormwater Control Measures

Kathryn Greising, Villanova University  Advisor: Andrea L. Welker, PhD, P.E.

Stormwater Control Measures (SCMs) have been and are being implemented around the world to control peak flows and stormwater runoff in areas with large amounts of impervious surfaces. Some examples of SCMs include rain gardens, green roofs and constructed wetlands. Although there has been an increase in the use of these structures, little is being done to monitor SCMs after they have been constructed. To gain a clear understanding of the performance of these structures, a methodology has been developed to determine whether an SCM is working at the lowest level of compliance. The methodology largely relies on visual inspection to determine whether the SCM is meeting its basic goals. This monitoring plan provides an easy-to-use, cost effective way to monitor SCMs and to determine potential needs for renovation.

This low level monitoring plan is being applied to a number of sites in the Philadelphia area. The sites consist of different types of SCMs, including green roofs, wetlands, rain gardens, seepage pits and pervious pavements. These systems also vary in age, location, and the type of monitoring that already exists. The sites are closely monitored during storm events to see how well the sites are performing with a steady inflow of water. Additional inspections are being performed to accumulate information on the status of the vegetation as well as the soil properties at the sites. A low level monitoring plan like this can provide a basic understanding of the performance of stormwater control measures. It provides a cost effective approach to help identify problems in the systems that may require repairs or reconstruction.

Regional Hazard Assessment of Earthquake-Triggered Landslides using GIS

Farshid Vahedifard, P.E., MCE, Univ. of Delaware  Advisor: Christopher L. Meehan, Ph.D.

Earthquake-triggered landslides can pose a significant threat to both the population and a wide range of natural and man-made structures in earthquake-prone areas. In many moderate to strong earthquake events, earthquake-triggered landslides account for a significant proportion of the total earthquake damage that is observed, and in some cases damage from earthquake-triggered landslides has exceeded the damage that is directly related to strong shaking and fault rupture. Regional landslide hazard mapping systems can be a useful tool for predicting possible landslides in earthquake-prone areas. As a common practice in quantitative landslide hazard assessment, simplified predictive displacement models are usually incorporated in a GIS-based framework in conjunction with topographical, geological, and seismological data. The overall goal of this project is to develop a GIS-based framework in order to locate areas with higher risk of earthquake-triggered landslides due to probable earthquakes. For demonstration purposes, the behavior of earthquake-triggered landslides in the Oat Mountain quadrangle in California will be simulated for the 1994 Northridge earthquake shaking event. To develop the landslide hazard mapping framework, a 10-m digital elevation model (DEM), a geology map, other geotechnical parameters of interest, and the ShakeMap were collected from readily available sources and the associated data were processed and analyzed to predict earthquake-induced landslide displacements in the study area. The predicted landslide-displacement categories were determined based on the landslide hazard criteria proposed by the California Geological Survey (CGS) for very low (<5 cm), low (5-15 cm), moderate (15-30 cm), and high (>30 cm) hazard levels.
Mechanical Properties and Moisture Susceptibility of a Porous Plastic-Based Cementitious Material
Jabber Al-Bihani and Chibuikem Okoro, Temple University

This study evaluated the mechanical properties and moisture susceptibility of a porous plastic-based cementitious (P-PBC) material. P-PBC was produced by simultaneously heating and mixing plastic waste with soils and aggregates at a specified temperature so that a uniform mix was attained. P-PBC specimens with different plastic to soil ratios (PSR, by mass) and plastic to aggregate ratios (PAR, by mass) were prepared, cured and then tested for indirect tensile strength (ITS) and moisture susceptibility. Results showed that ITS decreased with PSR. Specimens prepared with a PSR of 10 had an average ITS value of 114 kPa compared to 745 kPa for specimens with a PSR of 1. It was also found that ITS increased approximately 60% as PAR increased from 0.1 to 0.2. Results from the moisture susceptibility tests showed that all P-PBC mixtures were resistant to moisture induced damage. The findings indicated that P-PBC: 1) provides a structural pavement suitable for pedestrian and vehicular loadings; 2) offers an effective technique for reducing storm water runoff, and improving water quality; 3) diverts a large amount of plastic waste from landfills and incinerators.

A Look at Geo-Competition 2011 Design”
Bonnie Zwissler, Gordy Salisbury, Kevin Martin, and Ryan Miller
Widener University
Advisor: Craig Calabria

Widener undergraduate students investigate the load-deformation mechanisms mobilized in their submitted MSE wall design for Geo-competition 2011. The study looks into wall deformation and stress transfer at various stages of the construction.
The following abstract was accepted by Geo-Frontiers 2011. Congratulations to Bashar!

**Dynamic Soil-Structure Interaction of High-G Centrifuge Foundation**

Bashar S. Qubain, PhD., P.E., GeoStructures, Inc.

Centrifuge devices create bi-directional acceleration forces, resulting in rotational radial thrust, overturning moment and torsion which must be safely resisted by the foundation and surrounding earth materials. In addition, the vibration levels should not harm the machine operation, nor adversely affect adjacent sensitive equipment. To achieve these objectives, detailed subsurface characterization together with 3-D dynamic soil-structure interaction using ABAQUS finite element program is implemented. The entire building which houses the centrifuge and surrounding area including them acine pit and foundation are incorporated into the analysis. The subsurface profile is discretized as having a clay overburden overlying shale bedrock. The dynamic soil/rock properties are obtained from field shear wave velocity measurements and laboratory testing. Model extraction techniques are used to establish the system frequencies of vibration. Modal extraction techniques are used to establish the system frequencies of vibration. The lowest two frequencies are then used to calculate the Rayleigh damping coefficients. In order to determine the vibration levels in other part of the building, history nodes are incorporated into the model at key locations to save computer time and at the same time provide sufficient detail of the overall foundation response.

This paper introduces a practical approach to providing geotechnical engineering services for transmission line projects throughout the foundation life cycle that will yield significant cost and schedule reductions (during subsurface investigation and construction) and mitigate project risk by increasing the reliability and efficiency of the foundation designs and foundation construction process. This is accomplished via timely collaboration during:

- Project Planning;
- Subsurface Investigation & Design; and
- Foundation Construction.

Geological and geotechnical factors can play an important role during project planning. Foundation type is a significant consideration in developing project schedules and budgets. Timely desktop evaluations provide valuable information for preliminary foundation type selection as well as future field investigation planning. The subsurface investigation should provide sufficient information upon which foundation designs are based without being overly conservative in the design approach and without causing excessive delays during construction due to engineering re-designs. To help meet this challenge, a design approach that utilizes nomographs is explored. Nomographs are either graphs or tables that display required drilled pier sizes for various structure types and subsurface profiles based on the collected information along the project alignment. Utilizing nomographs during foundation installation enables onsite geo-professional observers to evaluate the subsurface conditions at each foundation and evaluate the appropriate drilled pier length “on the spot.” This process reduces over-drilling from conservative design assumptions and mitigates the risk of an undersized foundation at locations where a subsurface investigation has not been performed.
MEMBER IN THE NEWS:

John J. Peirce, P.E.
Diplomate, Geotechnical Engineer (D.GE)
Academy of Geo-Professionals Board of Trustees

John J. Peirce, PE, PLS, D.GE, M.ASCE, co-founder and principal of Peirce Engineering, Inc. since 1992, was recently named as a Diplomate, Geotechnical Engineering by the Academy of Geo-Professionals. John has over 40 years of design and construction experience in heavy, highway, and building construction during his career with The Conduit & Foundation Corporation, Schnabel Foundation Company, and Peirce Engineering, Inc. In 1973, John graduated from Drexel University with a Bachelor of Science in Civil Engineering in Geotechnical Engineering and Construction Management. In 1978, he obtained a Master of Science from Drexel University in Geotechnical Engineering. John is a member of the American Society of Civil Engineers and the Delaware Valley Section of ASCE’s Geo-Institute. In 2002, John was named the Philadelphia ASCE Section's Engineer of the Year. He is also a past president and board member of the Delaware Valley Section of the American Society of Highway Engineers (ASHE). Additionally, John is a member of ADSC: The International Association of Foundation Drilling (ADSC), the Deep Foundation Institute (DFI), the Pile Driving Contractors Association (PDCA), and is a member of The Moles, a prestigious association of individuals involved in heavy and underground construction. John has extensive design–build experience in the areas of temporary and permanent excavation support, underpinning, ground anchors, soil nailing, micropiles, sheet pile cofferdams, waterfront bulkheads, and other areas of civil and construction engineering. Some of his notable projects include the Girard Avenue Schuylkill River Bridge, Six Flags Great Adventure Theme Park, the Philadelphia Market East Rail Station, the I-95 Penn’s Landing Tunnel, the World Trade Center Ground Zero Recovery access bridges, PennDOT’s Route 202 reconstruction in King of Prussia, and numerous projects at universities and hospitals such as Penn, Drexel, Villanova, Temple, Jefferson, CHOP, Harvard, MIT, Princeton, and Lehigh.

Congratulations John!
In the News

Restoration of Our Nation’s Historic Memorial

The Secretary of the Interior, Ken Salazar, recently visited with engineers from our local member firm Schnabel Engineering at the Jefferson Memorial Seawall Restoration Project to learn more about the engineering and construction effort at this historically sensitive site. The Secretary also held a press conference on the steps of the Memorial to launch the National Mall Master Plan. Schnabel Engineering from West Chester, PA, was retained by the National Park Service to provide design and construction support services for this important project in the capital.

After touring the site with Darrell Wilder, PE, and Helen Robinson, PE of Schnabel’s Geotechnical Group, the Secretary expressed his deepest appreciation for the effort that Schnabel has put forward in maintaining the legacy of the Jefferson Memorial. To read the Washington Post Article visit the link below.

Since the construction of the Memorial, the North Plaza and adjacent seawall have been subject to continued settlement. Schnabel provided an investigation of the area surrounding the Memorial, which included an extensive instrumentation program. Schnabel concluded that the settlements observed are likely due mainly to a drop of the piezometric head deep at the rock interface. Based on alternatives and recommendations developed by Schnabel, the National Park Service selected a movement mitigation scheme that includes demolition and reconstruction of the seawall on caissons and pipe piles. The scheme will provide resistance to both future vertical and lateral movement of the North Plaza and new seawall. Repair to the seawall and plaza began in December 2009, with a majority of the work expected to be completed by May 2011.

To learn about this and other exciting geostructural projects, please visit the link below:

<http://www.washingtonpost.com/wp-dyn/content/article/2010/11/12/AR2010111201988.html>

HAVE DVGI PUBLISH YOUR ARTICLE

Do you have an interesting article on a project or individual in your organization that you would like to have published in the DVGI newsletter? Please submit your articles for consideration in an upcoming edition to Bill Rinker at brinker@kleinfelder.com.
Schnabel Engineering is pleased to bring you the fifth lecture of this series, and we are happy to announce that the distinguished Lecturer for the 2010 Schnabel Lecture is Mr. Douglas Boyer. Mr. Boyer is a civil engineer and engineering geologist with 25 years of experience in dam engineering and dam safety.

Dam engineering has evolved substantially over the past 30 years since the failure of Teton Dam and other dams in the mid to late 1970s. The recent failures of levee embankments and systems as part of Hurricane Katrina and other large storms have focused concerns on the nation’s levee systems and how government and industry has approached and communicated flood risks to the public.

The approach and techniques we have used in the past to analyze these structures and to understand, manage, and communicate the risks these structures pose are not sufficient. Within the US, we have shifted our focus from the design and construction of new structures to arguably a more difficult task, to rehabilitate and fortify our aging infrastructure systems. Our engineering and analysis tools continue to improve our ability to evaluate complex scenarios and problems; however, those tools are of little value if we do not use critical thinking and apply sound engineering judgment to develop new and innovative solutions.

Risk-informed approaches and methodologies have gained wider use and acceptance within the profession to help focus and prioritize limited human and economic resources for the many projects that require attention. This presentation will focus on the lessons we have learned over the past 30 years and the future direction of dam and levee engineering and safety.

Mr. Boyer currently serves as the Western Division Chief for the US Army Corps of Engineers Risk Management Center in Denver, Colorado. Prior to joining the Corps he was the Supervisor, Dam Safety Engineering with the Federal Energy Regulatory Commission (FERC) in Portland, Oregon. Previous employment positions include Principal Designer/Team Leader; Chief, Dam Safety Branch, Colorado Division of Water Resources; and Manager, Engineering Geology Group, all with the US Bureau of Reclamation in Denver, Colorado. While at the Bureau, Mr. Boyer was the co-principal designer for Ridges Basin Dam, a recently constructed 275-ft high dam located in southwestern Colorado. Prior to his federal employment, Mr. Boyer has 15 years of consulting experience. Mr. Boyer received his B.S. in Geological Sciences from Penn State and M.S. in Civil Engineering from South Dakota Schools of Mines & Technology. He is a former Board of Director and Vice President of the US Society on Dams, and former Board of Director and Publications Director for the Association of Environmental and Engineering Geologists.

We are honored that Mr. Boyer joins our past Lecturers Dr. Donald Bruce, Mr. Jerry DiMaggio, Mr. Scot Litke, and Mr. James Morrison.

THURSDAY, APRIL 7, 2011, 5:30 PM
VILLANOVA UNIVERSITY CEER 001
RECEPTION TO FOLLOW
Earn PDHs at 2011-2012 DVGI Events

Upcoming Dates for 2011-2012 Dinner Meetings are as follows:

♦ February 22, 2011: Student Night at Villanova
♦ March 22, 2011: Ground Improvement Short Course by Menard/Nicholson (4 PDHs) and Dinner Presentation by Ed O’Malley of GeoStructures on Rapid Impact Compaction (1 PDH)
♦ April 19, 2011
♦ May 17, 2001

One PDH will be awarded for most dinner meetings that you attend. Those interested in the PDHs can obtain supporting documentation at the sign-in desk prior to each event.

Looking for a Geotechnical Career Opportunity?

Have you considered a student internship or a co-op position? It’s a great way to “get your foot in the door” while gaining practical professional experience. Check the new geotechnical co-op and internship links on the G-I Student page at: http://content.geoinstitute.org/student.html.

G-I Chapters and Local Geotechnical Groups

As a 21st Century professional organization, the G-I aims to collaborate with local, national, and international geo-professional organizations. To meet that goal, the G-I has developed a strategic plan for outreach to local geotechnical groups to assist them in becoming a Geo-Institute Chapter. Check out this great link to other G-I Chapters and local Geotech Groups across the country: http://content.geoinstitute.org/groups/index.html.

G-I Twitter Brings You Quick News Updates

Twitter is a social networking tool for posting very brief updates, or “tweets.” The G-I launched its Twitter feed in April 2009 to announce updates to its website and other relevant news items. Since then, over 150 updates have been posted and more than 144 persons have become registered G-I followers. Visit our Twitter feed at http://twitter.com/GeoInstitute. You can check for updates or “follow” us using a Twitter account, an RSS reader, or one of the many other web applications that work with Twitter. Spread the word. Also check out the DVGI link at www.linkedin.com. Set up an account and keep up to date with business associates.

ASCE/G-I Members:
Read past and present issues of Geo-Strata magazine online at www.geoinstitute.org

DVGI Merchandise Available for Purchase
1 GB memory sticks ($12); coffee mugs ($8); and lapel pins with the DVGI logo ($5) are available for purchase. See Ara Mouradian if you are interested in purchasing any of these items.

www.DVGI.org
Check out our new website under construction!
Upcoming Conferences: Save the Dates:

March 30—April 1, 2011
25TH CENTRAL PENNSYLVANIA GEOTECHNICAL CONFERENCE
Hershey, Pennsylvania
Sponsored by: ASCE, Central PA Section

To register, exhibit and obtain further information, visit our website at:
http://www.central-pa-asce-geotech.org/

Advances in Geotechnical Engineering

Registration is now open!
The objective of Geo-Frontiers 2011 is to share new developments in geotechnical engineering technologies. Attendees will be exposed to the latest state of the art and practice as applied to geotechnical engineering. As an engineer, environmental specialist, water or transportation regulator, you will have an extensive menu of technical programs, workshops and short courses to select from. You’ll walk away with up to 32 pdhs, hundreds of new ideas—from design and engineering strategies to cost-saving geotechnical solutions and new industry contacts.

TradeShow
If your market is geotechnical products and services you should exhibit at the largest geotechnical trade event in North America... Geo-Frontiers 2011.
♦ Exhibitors include manufacturers and service providers showcasing geotechnical solutions and technologies and innovations
♦ Exhibits will include the latest products, technologies, services and equipment for the geosynthetics industry.
For more information and to register online, please go to www.geofrontiers.org

DVGi Board Member Nominations

The DVGI is seeking nominations to fill one At-large Board member position for the 2011-2012 period, starting this summer. If you are interested, please contact a Board member for more information.

Nominations for Philadelphia-Area Geotechnical Engineer of the Year

The DVGI is seeking nominations for Geotechnical Engineer of the Year. Please speak with a Board Member to nominate an individual.
Job Postings:

NJ-PA PE Licensed Geotechnical Engineer for small to large scale projects, both buildings and civil structures. Subsurface exploration, soil classification, analysis and foundation recommendations. Prepare proposals and reports, supervise technicians and develop business. Minimum 8 to 10 years experience.

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