Lessons Learned in Geotechnical Engineering

Williamsburg, Virginia
October 10 to October 12, 2016
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PROGRAM

Monday, October 10, 2016

10:30 AM Golf Outing (Golden Horseshoe Golf Course)
Tee times 10:30 AM until noon

6:00 PM to 9:00 PM Reception (Exhibit Hall Virginia Rooms EF)
Sirloin of Beef Carving Station, Pasta Station, Cupcake Station, Two complimentary drinks.

Tuesday, October 11, 2016

7:00 AM to 8:00 AM Continental Breakfast (Exhibit Hall – Virginia Rooms EF)
Fruits, pastries, muffins, bagels, yogurts, hard boiled eggs, All day juice, coffee, granola bars, trail mix and fruit

Morning Session Location: Virginia Rooms ABCD
Exhibit Hall (Virginia Rooms EF) will be open throughout the conference

7:45 AM Thanks to the Exhibitors
Greg Simmons, MSCE, PE, M ASCE
Exhibitor Chair
Menard USA

7:50 AM Welcome Remarks
Jose N. Gómez S., PE, MSCE, DGE, F ASCE
Conference Chair
ECS Mid-Atlantic, LLC

7:55 AM Geotechnical Investigations for Tunneling and Underground Construction Projects, Recommended Considerations Based on Recent Case Histories
Jamal Rostami
Colorado School of Mines

8:45 AM Use and Misuse of Numerical Modeling in Geotechnical Engineering Applications
Youssef Hashash, PE, PhD,
University of Illinois at Urbana-Champaign

9:35 AM Break (Exhibit Hall – Virginia EF)
Coffee, Juice, Ham & Cheddar Biscuits and snacks
Sponsored by The Reinforced Earth Company

10:00 AM Lessons Learned from Field Performance of Retention Systems
Richard J. Finno, PE, PhD, DGE
Northwestern University
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<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>11:00 AM</td>
<td><strong>The Evolution of Specialty Geotechnical Construction Techniques:</strong></td>
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<td><em>The “Great Leap” Theory</em></td>
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<td>Donald A. Bruce, PhD, CEng., DGE, M ASCE</td>
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<td>Geosystems, L.P.</td>
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<td>12:00 Noon</td>
<td><strong>Luncheon with Exhibitors</strong> (Virginia Lawn – outside Exhibit Hall)</td>
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<td>Southern BBQ with chicken, pulled pork, sides and dessert</td>
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<td><strong>Afternoon Session Location:</strong> Virginia Rooms ABCD</td>
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<td>1:30 PM</td>
<td><strong>Geoinstitute Update</strong></td>
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<td>Kord Wissmann, PhD, PE, DGE</td>
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<td></td>
<td>President, Geoinstitute</td>
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<td>Geopier Foundation Inc.</td>
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<td>1:35 PM</td>
<td><strong>Keynote Speaker:</strong></td>
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<td>Behavior of Two Large Mats under High Loads: Lessons Learned</td>
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<td></td>
<td>Jean Louis Briaud, PhD</td>
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<td>Texas A&amp;M University</td>
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<td>3:05 PM</td>
<td><strong>Break</strong> (Exhibit Hall – Virginia EF)</td>
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<td>Coffee, Juice, Strawberry Fondue and snacks</td>
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<td><strong>Sponsored by GET Solutions</strong></td>
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<td>3:30 PM</td>
<td><strong>Lessons Learned from Ground Improvement Around the World</strong></td>
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<td>Frederic Masse</td>
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<td>Menard Group USA</td>
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<td>4:20 PM</td>
<td>**Lateral and Vertical Pressures on Structures during Artificial</td>
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<td>Ground Freezing: Lessons Learned from First Street Tunnel</td>
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<td>Washington, DC and Access Shaft No. 3, Buenos Aires, Argentina</td>
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<td>Joseph Sopko, PhD, PE</td>
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<td>Moretrench American Corporation</td>
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<td>6:00 PM</td>
<td><strong>Offsite Dinner at Le Yaca Restaurant</strong> (Separate Registration)</td>
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**Wednesday, October 12, 2016**

**Location:** Virginia Rooms ABCD

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<tr>
<th>Time</th>
<th>Event</th>
<th>Presenter(s)</th>
<th>Institution</th>
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<tbody>
<tr>
<td>7:00 AM to 8:00 AM</td>
<td><strong>Continental Breakfast</strong> (Exhibit Hall – Virginia Rooms EF)</td>
<td>Fruits, pastries, muffins, bagels, yogurts, hard boiled eggs, Juice, coffee, granola bars, trail mix and fruit until noon</td>
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<tr>
<td>8:00 AM</td>
<td><strong>Lessons from Operations and Engineering Response to a Crisis:</strong></td>
<td>Allen Cadden, PE, DGE, F ASCE</td>
<td>Schnabel Engineering</td>
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<td>Yeager Airport Runway 5 Slope Failure</td>
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<td>8:50 AM</td>
<td><strong>Displacement Cast-in-Place Piles in Coastal Plain Soils; Lessons</strong></td>
<td>Karl A. Higgins, III, M Eng., PE, DGE</td>
<td>ECS Mid-Atlantic</td>
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<td>Learned at MGM Casino National Harbor Project</td>
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<tr>
<td>9:40 AM</td>
<td><strong>Break</strong> (Exhibit Hall – Virginia Rooms EF)</td>
<td>Coffee, Juice, Ham &amp; Cheddar Biscuits and snacks</td>
<td>Sponsored by JES.</td>
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<tr>
<td>10:05 AM</td>
<td><strong>Trends in the Mechanical and Chemical Behavior of Fly Ash</strong></td>
<td>Susan E. Burns, PhD, PE, F ASCE</td>
<td>Georgia Institute of Technology</td>
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<td>Produced During 130 Years of Power Generation</td>
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<td>10:55 AM</td>
<td><strong>Advances in the Characterization of Gravelly Soil Deposits</strong></td>
<td>Jason T. DeJong, PhD</td>
<td>University of California, Davis</td>
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<td>11:45 AM</td>
<td><strong>Constructing in Congested Areas Without Damaging Existing Structures</strong></td>
<td>Hugh Lacy, PE, F ASCE and Gregg Piazza, PE</td>
<td>Mueser Rutledge Consulting Engineers</td>
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<tr>
<td>12:35 PM</td>
<td><strong>Closing Remarks</strong></td>
<td>Roger Failmezger, PE, DGE, F ASCE</td>
<td>Conference Co-Chair</td>
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<td>In-Situ Soil Testing LC</td>
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## Organizing Committee

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<tr>
<th>Name</th>
<th>Position</th>
<th>Company/Department</th>
<th>Email</th>
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<tr>
<td>Jose N. Gómez, PE, MSCE, DGE, F ASCE</td>
<td>Conference Chair</td>
<td>Senior Principal Geotechnical Engineer</td>
<td><a href="mailto:JGomez@ecslimited.com">JGomez@ecslimited.com</a></td>
</tr>
<tr>
<td>Roger Failmezger, PE, DGE, F ASCE</td>
<td>Conference Co-Chair</td>
<td>President In-situ Soil Testing, LC</td>
<td><a href="mailto:roger@insitusoil.com">roger@insitusoil.com</a></td>
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<td>Jason Dauch, PE</td>
<td>Treasurer</td>
<td>Project Engineer</td>
<td><a href="mailto:jdauch@dea-inc.net">jdauch@dea-inc.net</a></td>
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<tr>
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<td>Speaker Chair</td>
<td>Principal/Senior Vice President</td>
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<tr>
<td>Greg Simmons PE, M ASCE</td>
<td>Exhibits Manager</td>
<td>Business Development Manager</td>
<td><a href="mailto:GSimmons@menardusa.com">GSimmons@menardusa.com</a></td>
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<tr>
<td>Ross Cutts, MSCE, PE</td>
<td>Webmaster</td>
<td>Engineering Geology Field Manager</td>
<td><a href="mailto:rcutts@sha.state.md.us">rcutts@sha.state.md.us</a></td>
</tr>
<tr>
<td>Dana Eddy, MSCE, PE</td>
<td>Golf Outing Chair</td>
<td></td>
<td><a href="mailto:dana.eddy.79@gmail.com">dana.eddy.79@gmail.com</a></td>
</tr>
<tr>
<td>Michael J. Galli, MSCE, PE</td>
<td>Marketing</td>
<td>Geotechnical Department Manager / Senior Geologist</td>
<td><a href="mailto:MGalli@ecslimited.com">MGalli@ecslimited.com</a></td>
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<tr>
<td>Sara B. Philips</td>
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<td><a href="mailto:Sphilips@ecslimited.com">Sphilips@ecslimited.com</a></td>
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ABSTRACTS

Geotechnical Investigations for Tunneling and Underground Construction Projects, Recommended Considerations Based on Recent Case Histories

JAMAL ROSTAMI, PhD, PE
Associate Professor and Hadden /Alacer Gold Endowed Chair at Department of Mining Engineering
Director of the Excavation Engineering and Earth Mechanics Institute (EMI)
Colorado School of Mines

Abstract

Underground construction and tunneling are different from most other construction jobs in that instead of the structure being on the ground, it is entirely below the ground surface, and in fact, the opening made in the ground by excavation is your target structure. This means more vulnerability to changes in the ground conditions and higher impacts on construction schedule and cost. Differing Site Conditions (DSC) claims are a frequent part of tunneling contracts, often attached to a big price tag. This presentation will offer a quick review of the geotechnical investigations including on-site and laboratory testing for tunneling, types of reports and their role in the contractual practices, and a brief discussion of items missed or mis-interpreted in some recent project when summarizing and reporting the ground conditions. A discussion of special tests for soil and rock for tunneling purposes will be offered in addition to typical issues that could ended up in construction problems and claims.

Dr. Jamal Rostami has over 26 years of experience in design, management, research, and teaching in the field of mining, tunneling, and underground construction. Dr. Rostami is a registered Professional Engineering (PE) in Maryland, Pennsylvania, and Virginia. He has published over 50 peer reviewed journal publication and 140 conference papers and many technical reports. He is a member of SME, ASCE, ARMA, ISEE, IRSME, IRRMS, TRB tunneling committee, and Univ. of Tehran alumni association. He was the 2013 chair of the professional engineering exam committee, and a member of the strategic committees of the society of mining engineers (SME). Dr. Rostami was named the recipient of the Pittsburgh Coal Mining Institute of America’s 2014 Stephen McCann Memorial Educational Excellence Award. He is the editor of Tunnelling and Underground Space Technology (Elsevier) and a member of Editorial Board of Mining Engineering (SME) and other tunneling and mining journals. He is also a founding member of Iranian American Academics and Professionals (IAAP) in 2013 and founder of Professors Without Borders Inc.

Dr. Rostami was born in Tehran and graduated first in his class at the University of Tehran (UT) with a degree in Mining Engineering. He graduate with MSc and PhD degrees in mining engineering from the Colorado School of Mines (CSM). He served as a research faculty at CSM before joining UT in 1988. Dr. Rostami worked as a full time consultant with major engineering companies prior to joining Pennsylvania State University in 2007.
Use and Misuse of Numerical Modeling in Geotechnical Engineering Applications

Youssef M.A. Hashash, PhD, PE, FASCE
William J. and Elaine F. Hall Endowed Professor of Civil and Environmental Engineering
University of Illinois at Urbana-Champaign.

Abstract
The use of numerical modeling in Geotechnical Engineering practice encompasses projects of all scales. The availability of user-friendly software and fast computing platforms is enabling the use of ever more sophisticated soil models and the modeling of geotechnical problems in two and three dimensions. These sophisticated models require a significant level of care to generate reliable results and insights into the engineering problem being analyzed. This presentation will present best practices for integrating advanced numerical modeling into an engineering project. The presentation will highlight technical elements as well as the analysis team organization needs to effectively undertake this modeling. Moreover, examples of misapplication of numerical modeling leading to incorrect conclusions will also be discussed.

Youssef Hashash received his undergraduate and graduate degrees from MIT after which he worked in Dallas, Texas and San Francisco, California on a number of underground construction projects in the United States and Canada. Youssef joined the faculty of the Department of Civil and Environmental Engineering at the University of Illinois at Urbana-Champaign in 1998. He taught courses in Geotechnical Engineering, Numerical Modeling in Geomechanics, Geotechnical Earthquake Engineering, Tunneling in Soil and Rock, and Excavation Support Systems. His research focus includes deep excavations in urban areas, earthquake engineering, continuum and discrete element modeling and soil-structure interaction. He also works on geotechnical engineering applications of visualization, augmented reality, imaging, and drone technologies. He has published over 200 articles and is co-inventor on four patents. His research group developed the software program DEEPSOIL that is used worldwide for evaluation of soil response to earthquake shaking.
Lessons Learned from Full Scale Performance of Retention Systems

Richard Finno, PE, PhD, DGE
Professor of Civil Engineering
Northwestern University

Abstract

Unexpected behavior of retention systems is not uncommon. Several examples are presented in this talk that cover both stability and serviceability issues. A large diameter self-sinking caisson encountered difficulties during construction that led to its structural failure. Its performance emphasizes Terzaghi’s admonition “do not design on paper what must be wished into place.” While stability problems are rare, serviceability problems related to deep-supported excavations are not. After reviewing methods to assess damage potential with an eye for setting allowable limits, several cases are presented to illustrate the relation between ground movements and damage to adjacent structures and to identify sources of ground movements arising during construction of deep urban excavations.

Rich Finno is a Professor of Civil Engineering specializing in geotechnical engineering. After receiving his BSCE from the University of Illinois at Urbana-Champaign and MS from Stanford University, he worked for Sargent & Lundy and Woodward-Clyde Consultants. Upon coming to his senses, he returned to Stanford and convinced the faculty to grant him a PhD. Thereafter, he entered academia and has been at Northwestern University since 1986. He has conducted research in the areas of full-scale performance of deep excavations and tunnels, adaptive management methods in geotechnical engineering, numerical analysis, inverse analysis techniques, failure processes in soil, small strain behavior of clays and non-destructive testing of deep foundations. He has received a number of awards from ASCE, including the Karl Terzaghi Award, the Harry Schnabel Jr. Award for Lifetime Achievement in Retaining Structures and the Walter L. Huber Civil Engineering Research Prize. He is the author or co-author of more than 165 reviewed technical papers. He served as Chair of the Earth Retaining Structures Committee and as an Editor of the Journal of Geotechnical and Geoenvironmental Engineering of ASCE. He has consulted on more than 300 projects for many organizations on projects related to retention systems, tunnels, shafts, foundations, and slopes.
The Evolution of Specialty Geotechnical Construction Techniques:
The “Great Leap” Theory

Donald A. Bruce, PhD, C Eng., DGE, M ASCE
President
Geosystems, LP

Abstract
In historic literature, there is the “Great Man” theory, whereby history is reflected in the biographies of preeminent characters. In the more theoretical and academic branches of specialty geotechnical engineering, the theory holds with, of course, Prof. Terzaghi as one of the heroic great men — a researcher, problem solver, and inspiration sans pareil. In contrast, in the branch of specialty geotechnical construction, technological advances occur principally through “Great Leaps” as opposed to steady and progressive evolution.

Six criteria must be satisfied in support of awarding “Great Leap” status, beginning with a project-specific challenge of unprecedented scope or complexity, and ending with a legacy document detailing and codifying the leap. These steps are illustrated by reference to developments in drilling and grouting; cutoffs for dams; Deep Mixing; and micropiles, all techniques in which the author has been intimately involved throughout his professional career as a researcher, contractor, educator and consultant.

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Donald Bruce received his BS (Geology and Mineralogy) and Ph.D (Geotechnical Engineering) from Aberdeen University, Scotland. He thereafter worked in specialty geotechnical construction in various countries and projects throughout the world before becoming Technical Director of Nicholson Construction, Pittsburgh, PA, from 1986-1996. Since then, he has been President of Geosystems, L.P., a consultancy based in Pittsburgh, PA and Scottsdale, AZ, specializing in the application of ground treatment, improvement and retention techniques. As such, he has participated in over 1,000 projects in six continents, principally associated with dams, levees, deep foundations, tunnels and mines.

Dr. Bruce is active in professional and trade associations in North America and Europe, and is a Chartered Civil Engineer and Fellow of the Institute of Civil Engineers (UK), and a Licensed Geologist and Engineering Geologist in the US. He has authored over 300 technical papers and three textbooks, the latest of which are “Dam Foundation Grouting” (Bruce and Weaver) and Specialty Construction Techniques for Dam and Levee Remediation.”
Behavior of Two Large Mats under High Loads

Jean-Louis Briaud, PhD
Distinguished Professor
Texas A&M University
President, FedIGS, the Federation of International Geoengineering Societies

Abstract
The lecture investigates the geotechnical behavior of two large mat foundations over several decades of time. The first case history is the foundation of the Washington Monument in Washington DC completed in 1885 and the second case history is the foundation of the San Jacinto Monument in Houston, Texas completed in 1936. Both mats are about 38 m by 38 m, were heavily loaded compared to current practice, and settlement records are available. Calculations performed with respect to depth of influence, stress increase with depth, consolidation settlement, and ultimate bearing capacity are presented. Additional considerations include the influence of subsidence, soil heterogeneity, and underpinning. Lessons learned from the behavior of these two mats are drawn and recommendations are made for the geotechnical aspect of mat foundations.

Professor Jean-Louis Briaud is a Distinguished Professor and Holder of the Spencer J. Buchanan Chair in the Zachry Department of Civil Engineering at Texas A&M University and a Professional Engineer. He received his Bachelor degree in France in 1972 and his Ph.D. degree from the University of Ottawa in Canada in 1979. His expertise is in foundation engineering and more generally geotechnical engineering. He has served as President of the Association of Geotechnical Engineering Professors in the USA, President of the Geo-Institute of the American Society of Civil Engineers, President of the International Society for Soil Mechanics and Geotechnical Engineering, and is the current President of the Federation of International Geoengineering Societies. Among other awards, he has received the ASCE Ralph Peck Award from the USA, the CGS Geoffrey Meyerhof Foundation Engineering Award from Canada, the Honorable Aitalyev Medal from Kazakhstan, and is a member of the National Academy of Natural Sciences in Russia. Over the last 30 years, Dr. Briaud has conducted about 10 million dollars of research most of which was on foundations and retaining walls. He has supervised 50 PhD students and 90 Master students. He is the author of a new book entitled Geotechnical Engineering and one entitled The Pressuremeter; he has published about 300 articles and reports in geotechnical engineering. He enjoys tennis, soccer, and rugby, and plays jazz piano at the amateur level.
Lessons Learned from Ground Improvement Projects around the World

Frederic Masse
President
Menard Group USA

Abstract
Ground improvement, while getting more and more popular in the USA, has always been on the fringe of the geotechnical world in a niche of its own. From a ground improvement perspective, almost every major jobsite is unique and requires some type of innovation to successfully be designed and built. Through his international experience, the presenter will offer a worldwide perspective on some major achievements in Ground Improvement in the last 40 years with a focus on showing that with innovation and entrepreneurship, ground improvement techniques can be used in the most challenging conditions without requiring the use of deep foundations.

From France with Dynamic Compaction at the Nice Airport, to Korea with Vacuum Consolidation at the Kimhae and Jangyoo Sewage Treatment plants, from Germany with wick drains at the Airbus A380 factory to the USA with CMC Rigid Inclusions at a Fedex facility, a common theme will be developed during the lecture. Every one of these major projects was completed through a combination of inventing a new equipment, adapting an existing technique to local conditions, or developing a new technical approach.

The importance of local conditions as well as geotechnical conditions in the selection of a ground improvement solution will be discussed.

Innovation and entrepreneurship were the cornerstones of every major development in ground improvement in the last four decades. Whether it is a breakthrough or a series of incremental improvements, these examples from around the world will confirm that innovation is the motor of progress in Ground Improvement.

Frederic Masse is the president of Menard Group USA, a ground improvement contractor operating in the USA under two companies: Menard USA and US Wickdrain.

Prior to leading the company, Mr. Masse was the Executive Vice-President in charge of Operations and Engineering. Mr. Masse has been one of the leaders behind the development of CMC Rigid Inclusions in the USA and has been directly responsible for the management of hundreds of designs and projects of CMC Rigid Inclusions. Prior to his tenure in the USA, Mr. Masse spent 8 years in South East Asia and particularly in South Korea where he was leading the South Korean branch of Menard. Mr. Masse was the project manager on three very large vacuum consolidation projects in South Korea and Thailand as well as several deep dynamic compaction and vibro-stone columns in South Korea, Australia, France, and Poland. Mr. Masse graduated with a MS in Civil Engineering from Ecole Centrale Paris.
Lateral and Vertical Pressures on Structures During Artificial Ground Freezing: Lessons Learned from First Street Tunnel, Washington, DC and Access Shaft No. 3, Buenos Aires, Argentina

Joseph A. Sopko, PhD, PE
Director, Ground Freezing
Moretrench American Corporation

Abstract
Ground freezing was used on two separate projects to provide temporary earth support and groundwater control during shaft and tunnel excavation. Expansion of the pore water during freezing creates frost effects that can result in vertical heave or lateral pressures on existing subsurface structures. These frost effects were observed on two separate projects. Methods of determining the potential pressures during the design using laboratory testing and numeric analysis are discussed. Mitigation of these effects in the field using reinforcement, insulation and heating elements are presented.

Dr. Sopko is the Director of Ground freezing for Moretrench American Corporation and has over 35 years’ experience in geotechnical engineering, 30 that have been devoted almost entirely to ground freezing and groundwater control.

He received his BS, MS, and PhD in Civil Engineering from Michigan State University in East Lansing, Michigan. His doctoral research was based on developing new methods for the design of frozen earth structures. Dr. Sopko has been responsible for the design, construction and operation for ground freezing projects worldwide for both the civil construction and mining industry. He is a retired Lt. Col. from the U.S. Air Force where he served as a civil engineering officer in the Air National Guard and was activated for both Operation Desert Shield and Operation Enduring Freedom in Afghanistan. Dr. Sopko is a member of the ASCE, Society of Mining Engineers, Chairman of ASTM Subcommittee D18.19 Testing of Frozen Soils and Rock and the Moles.
Lessons Learned from Operations and Engineering Response to a Crisis: Yeager Airport Runway 5 Slope Failure

Allen Cadden, PE, DGE, F ASCE
Geostructural Practice Leader
Schnabel Engineering

Abstract
On March 12, 2015, the Yeager Airport experienced one of the largest engineering disasters to ever affect a US scheduled service airport when an engineered fill that supported the Runway 5 Engineered Materials Arresting System (EMAS) installation failed. Not only did the slope failure affect the operation of the airport, more critically, it completely demolished a residence and a church building, it covered a state highway, and it created a dam on a local stream that caused major flooding upstream of the slope failure material. Miraculously, there were no lives lost or even injuries associated with the slope failure and the airport was in continuous operation.

In the days, weeks and months that followed the slope failure, the airport and its engineers constantly made decisions that affected property owners near the slope failure, the general public living in the area, and the continued safe operation of the airport. Obviously, the most important issue was to ensure the safety and welfare of those who were directly affected by the slope failure. At the same time, it was necessary to make some difficult decisions as to how the Airport would continue to operate with a severely compromised EMAS installation as its only safety area. Finally, the most difficult decisions were yet to come with determining how to first stabilize the very fragile slope that remained and, eventually, to determine how to repair the slope failures so regain the entire use of the runway.

Allen Cadden has more than 30 years of experience in field, project engineering, and management experience in geotechnical and geostructural projects spanning investigations to design and construction monitoring services. Allen has worked on projects involving shallow and deep foundations, earth retention systems, geosynthetic applications, pavements, and ground improvement. In addition, he has provided analyses and designs for new and existing dams, waterfront structures, excavation bracing, underpinning, micropiles, as well as instrumentation and data acquisition; and has particular depth of experience in grouting technologies and applications. As an active member of Association for Foundation Drilling (ADSC), American Society of Civil Engineers, and Deep Foundations Institute, he maintains awareness of the state of practice in these speciality areas and is a regularly invited speaker to these societies. He is the immediate Past-President of the ASCE Geo-Institute Board of Governors, Chairman of the International Society for Micropiles, Member of the Board of Directors for the International Conference Organization for Grouting (ICOG), and past member of the Board of Directors for ADSC. He serves on the ADSC/DFI Micropile Committee as well as the ASCE GI Grouting Committee.
Displacement Cast-in-Place Piles in Coastal Plain Soils; Lessons learned at MGM Casino National Harbor Project

Karl A. Higgins, III, M Eng., PE, DGE
Chief Engineer
ECS Mid-Atlantic

Abstract

Displacement Cast-in-Place (DCIP) piles are not a common deep foundation type in the DC Metro Area. As a result, limited regional data was available for these foundations compared to other, more traditional, deep foundation systems. DCIP piles differ from traditional Auger Cast-In-Place (ACIP) piles in that the pile annulus is formed by pushing a displacing body tipped with a partially flighted auger bit to depth through the application of force and torque versus just torque, resulting in denser soils around the boring annulus.

A review of data from 20 static load tests and the installation of over 2,600 DCIP and ACIP piles for the $1.3B MGM Casino Project (2014-2015) indicates that DCIP piles did not consistently achieve pile shaft friction and end bearing support values higher than ACIP piles as would be expected from past research; this was particularly true in the case of over-consolidated clays and dense sands. Additionally, the pile support characteristics of DCIP piles appeared to be more consistent with typical capacities obtained from driven displacement piles. Achieving a consistent tip elevation and embedment into the bearing stratum was a frequent problem for DCIP piles, necessitating the need to switch to augering techniques at times during construction.

This presentation will discuss the limitations of DCIP pile installation in Coastal Plain soils and will present the lessons learned during this project. The paper will also compare this pile type to both conventional ACIP and driven displacement piles utilizing site-specific load test and installation data.

Karl Higgins is the Chief Engineer for ECS Mid-Atlantic, the company’s largest subsidiary (about 500 employees). Prior to serving as Chief Engineer, Mr. Higgins was the Assistant Branch Manager for ECS’ DC metro office, which consists of a team of approximately 215 engineers, geologists and technicians working on a variety of building and infrastructure projects in northern Virginia/Washington, D.C. Mr. Higgins is responsible for standard of practice of engineering for ECS Mid-Atlantic and works closely with 15 ECS regional offices in this endeavor. He consults nationwide with other ECS offices and internationally.

Mr. Higgins received his BS Degree in Civil Engineering from Virginia Tech University, and his Masters in Engineering from The University of Missouri at Rolla. Karl is also a Board Certified Geotechnical Engineer from the Academy of GeoProfessionals (AGP).
Evolution of the Engineering Behavior of Fly Ash Produced Over a Century of Power Generation: Lessons Learned

Susan E. Burns, PhD, PE, F ASCE
Georgia Power Distinguished Professor and Associate Chair for Undergraduate Programs
School of Civil and Environmental Engineering
Georgia Institute of Technology

Abstract

The lecture investigates the engineering characteristics of fly ash produced over the last century of power generation, with special attention to the storage, disposal, and reuse of fly ash within a variety of construction applications. Trends in the chemical and mechanical properties of fly ash will be analyzed as a function of source input and pollution controls, with recommendations for reuse applications in the field. Specific analysis will be made of the alteration of fly ash from new fuel sources, such as biomass, with highlights of the lessons learned for long-term storage, for productive reuse, and for application in construction materials.

Susan E. Burns is the Georgia Power Distinguished Professor and Associate Chair for Undergraduate Programs in the School of Civil and Environmental Engineering at the Georgia Institute of Technology. Dr. Burns earned a Bachelor Degree in Civil Engineering BCE (1990), MS Civil Engineering (geotechnical) (1996), MS Environmental Engineering (1996), and PhD in Civil Engineering (1997), all from Georgia Tech.

Dr. Burns' research focuses on applications in geoenvironmental engineering, with particular emphasis on the productive reuse of waste materials including dredged sediments, fly ash, and biomass fly ash, treatment of highway stormwater runoff using engineered materials, erosion control of soils on highway rights-of-way, interfacial behavior of organic- and inorganic-coated soils, the transport and behavior of microbubbles in otherwise saturated porous media, and the hydraulic conductivity and consolidation properties of fine-grained soils using seismic piezocone penetration testing (SPCPT). Support for her research has come from a range of federal, state, and industrial sources, including a National Science Foundation Career Award.

Dr. Burns has served as the president of the United States Universities Council on Geotechnical Education and Research (USUCGER), she is a past member of the National Research Council’s (NRC) Standing Committee on Geological and Geotechnical Engineering, and a past member of the NRC’s Committee on Assessment of the Performance of Engineered Waste Containment Barriers. She was elected Fellow of the American Society of Civil Engineers in 2013.
Recent Advances in the Characterization of Gravelly Soils Deposits

Jason T. DeJong, PhD
Professor, Department of Civil and Environmental Engineering
University of California, Davis

Abstract
Characterizing project sites where gravelly alluvium is present poses particular challenges. Conventional field and laboratory techniques are significantly limited when large gravel particles either prevent their operation or adversely influence their measurements. The deposition of gravelly alluvium often involves complex, energy and sediment load dependent processes that can result in highly spatially variable deposits comprised of gravel to clay-sized particles. This pervasive variability warrants an integrated site characterization approach anchored in an understanding of the geological formation processes and the expected controlling deformation/failure mechanisms, confirmed by the site investigation, simplified as part of site idealization, and verified during construction and long term monitoring. Systematic incorporation and handling of the site variability during the site idealization process is particularly important. Recent work at several gravelly alluvial sites has allowed the development of new approaches and techniques for improved site characterization. In particular, the benefit of continuous sonic sampling is demonstrated and a systematic method for evaluating gravel influence on SPT N values is outlined. Finally, an overview of the instrumented Becker Penetration Test (iBPT), a new closed-ended, large diameter penetrometer with direct energy measurement at the drill string tip is presented.

Jason T. DeJong is a Professor at the University of California, Davis. He received a B.S.C.E. from UC Davis and an M.S.C.E. and Ph.D. at the Georgia Institute of Technology. Through the Soil Interactions Laboratory and the NSF Engineering Research Center for Bio-mediated and Bio-inspired Geotechnics Prof. DeJong directs research in the areas of biogeotechnics, integrated site characterization, behavior of intermediate and gravelly soils (iBPT), earthquake engineering, and deep foundations. His work has been disseminated through more than 125 publications and recognized through the ASTM International Hogentogler Award (2x), the ICE TK Hsieh Prize, the ASCE Huber Research Prize, the ASCE Casagrande Professional Development Award, and the Prakash Research Award, among others. Today he will be presenting recent advances in the characterization of gravelly materials that have been developed and adopted in practice over the past 5 years.
Constructing in Congested Areas without Damaging Existing Structures
By Hugh Lacy and Gregg Piazza

Hugh Lacy, PE, F ASCE
Retired Partner
Mueser Rutledge Consulting Engineers

Gregg V. Piazza, PE
Associate
Mueser Rutledge Consulting Engineers

Abstract
These projects illustrate how soils and rock unique to the eastern US Coastal Plain can heavily influence foundations and protection of adjacent structures. The first case is a slope instability in a gentle slope underlain by hard fissured clay that caused damage to a WMATA rail bridge in SE Washington, DC. A second case is analysis of stresses in an existing rock subway station in Virginia to determine how to build tall buildings above and directly adjacent to the station without damaging or overstressing the lining supporting the station. The third case is the design and construction of a Washington, DC hotel with a 97-ft deep basement immediately adjacent to three existing buildings without damaging the existing structures. The solution was to construct stiff concrete slurry walls prior to excavation and then use a “top down” method of construction to minimize lateral movement of the permanent walls and permit rapid construction of the superstructure while the underground space was being excavated. The fourth case is the DC Convention Center with basement exhibit space as much as 70 ft below the ground surface and covering a 6-block area. Due to the long spans between columns on 90-ft centers, the structural engineers did not want resist horizontal wall loads on the floor that had also to support heavy live loads. Various means were developed to support the walls at different locations.

Hugh Lacy is an expert in tunneling, building, and bridge foundation design, ground freezing technology, protecting existing structures during adjacent construction, evaluating damage to existing structures, and installation of groundwater cut-off walls. In his 52-year career in geotechnical engineering, he has directed projects and supervised staff on a wide variety of structures including high-rise buildings in urban settings, buildings on marginal ground, bridges, transit systems, tunnels, dams, and utilities. He received BS and MS degrees in civil engineering from Cornell University.

Gregg Piazza is a specialist in structural engineering, with an emphasis on marine and waterfront structures. He has over 20 years of experience in the inspection of buildings and waterfront structures and in the engineering analysis and design of deep foundations, marine structures, permanent retaining walls, sheetpile walls, underpinning, support of excavation, and tieback and tiedown anchors. He has performed installation inspections of deep foundations, retaining structures, support of excavation, underpinning, and field investigations for buildings, waterfront structures, and tunnels. He obtained his BS in Applied Mathematics from the University of Vermont and MS in Civil Engineering from the Stevens Institute of Technology.
LIST OF SPEAKERS

Professor Jean-Louis Briaud, Distinguished Professor, Texas A&M University President, FedIGS, the Federation of International Geoengineering Societies

Donald A. Bruce, PhD, CEng., DGE, MASCE, President, Geosystems, LP

Susan E. Burns, PhD, PE, F ASCE, Georgia Power Distinguished Professor and, Associate Chair for Undergraduate Programs, School of Civil and Environmental Engineering, Georgia Institute of Technology

Allen Cadden, PE, DGE, F ASCE, Geostructural Practice Leader, Schnabel Engineering

Jason T. DeJong, PhD, Professor, Department of Civil and Environmental Engineering, University of California, Davis

Richard Finno, PE, PhD, DGE, Professor of Civil Engineering, Northwestern University

Youssef M.A. Hashash, PhD, PE, F ASCE, William J. and Elaine F. Hall Endowed Professor of Civil and Environmental Engineering, University of Illinois at Urbana-Champaign.

Karl A. Higgins, III, M Eng., PE, DGE, Chief Engineer, ECS Mid-Atlantic

Hugh Lacy, PE, F ASCE, Retired Partner, Mueser Rutledge Consulting Engineers

Frederic Masse, President, Menard Group USA

Gregg V. Piazza, PE, Associate, Mueser Rutledge Consulting Engineers

Jamal Rostami, PhD, PE, Associate Professor and Hadden /Alacer Gold Endowed Chair at Department of Mining Engineering, Director of the Excavation Engineering and Earth Mechanics Institute (EMI), Colorado School of Mines

Joseph A. Sopko, PhD, PE, Director, Ground Freezing, Moretrench American Corporation
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DINNER VENUE DIRECTIONS*

Image Source: Google Maps

6:00 PM Tuesday, October 11, 2016
Le Yaca French Restaurant
1430 High Street, Williamsburg, VA 23188
Phone: (757) 220-3616

* Separate Registration Required for Dinner
October 10 to October 12, 2016

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