May 2020 DVGI Dinner Meeting

SPEAKER: Willie NeSmith—Berkel

TOPIC: DFI Traveling Lecture—Drilled Displacement Pile Performance at a Site with Coastal Plain Overlying Residual Soil

DATE: Tuesday, May 19, 2020

LOCATION: Webinar Format

Meeting Abstract

The DFI Traveling Lecturer is a prominent industry expert selected annually to travel and present a series of lectures to university students, professional groups and industry associations. The program promotes the field of geotechnical engineering and deep foundation construction by encouraging students to explore a career in the deep foundations industry, providing information on topics of interest to members of the industry, and raising awareness of how DFI and its activities support the industry.

This lecture is a case history of a project in Aiken, South Carolina, where both Coastal Plain soils and residual soils were encountered within the pile depths. Because of the difference in working grade across the site, the length of pile in each of the formations varied. After an extensive testing program, the installation process was modified to accommodate the variable response to displacement of the Coastal Plain and residual soils.

Web registration at www.DVGI.org using the instructions in the announcement email is preferable, or you may register for the webinar by faxing or emailing Jim Beideman at 610-594-2743 or jbeideman@kleinfelder.com (Voice: 610-594-1444 x109) before Thursday, May 14, 2020. A link to access the webinar will be provided to all prior to the meeting date.

We anticipate One PDH will be awarded for attendance.
March 2020 DVGI Dinner Meeting—Student Night

DVGI Student Night was again hosted by Villanova University. This year’s event included a keynote address by past DVGI chair and indie-rock band Civil Discord’s guitarist Jay McKelvey, P.E., D.GE – Director of Geotechnical Design, Earth Engineering Inc. Following the keynote address there were three student presentations and the DVGI Scholarship award presentation. Our student presenters were:

- **Zhuang Zhuo** from Rowan University: “A Methodology for Back-Calculating the Thermal Properties and Design of Thermally Insulated Flexible Pavement Structures”
- **Ali Al Saadi** from the University of Delaware: “Performance of a Geosynthetic-Encased Stone Column Bearing on a Non-Rigid Layer: Numerical Study”
- **Rui Liu** from Rowan University: “Experimental Characterization of Frozen Soil through Electrical Resistivity Measurement”

There were 19 applicants for scholarships, 9 winners, $7,500 in funds dispersed from corporate sponsorships, the golf outing, and Huesker seminar.
Upcoming Dates for 2020 Dinner Meetings and events are as follows:

- **May 19, 2020, Webinar:** Willie NeSmith, Berkel—DFI Traveling Lecture
- **June 2020 (TBD):** Golf Outing—postponed—to be rescheduled in Fall
- **September 2020 Dinner Meeting:** Zia Zafir, Kleinfelder – 2018 IBC/ASCE 7-16 Seismic Code Updates
- **October 2020 Dinner Meeting:** Michael Senior, Schnabel Engineering – Boundary Hydroelectric Dam Rock Stabilization

*One PDH will be awarded for most dinner meetings that you attend.*

If you are interested in presenting at one of our monthly meetings or have ideas about potential speakers, please get in touch with a DVGI board member.

**DVGI PROJECT OF THE YEAR**

2nd Annual DVGI Geotechnical Project of the Year Competition

Submissions accepted now through April 1, 2021

Project of the Year to be selected in May 2021

Projects to be featured in DVGI Newsletters

Visit dvgi.org to apply now!

Submit Applications to Theresa Loux at tloux@aeroaggregates.com
ANNOUNCEMENTS

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ANNNOUNCEMENTS

Upcoming GSI Webinars for 2020
(1.5 PDH each / upon completion of exam)

11:30 AM—1:00 PM (Eastern Time)

Topics, Dates and Registration at www.geosynthetic-institute.org/webinar.htm

Cost: GSI Members $200; Nonmembers $250

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<td>May 20</td>
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HAVE DVGI PUBLISH YOUR ARTICLE, ADVERTISEMENT, OR JOB POSTING

- 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?
- Would you like to get the word out about a job opening, new venture, etc. to our membership via the newsletter?

Please submit your articles or news items for consideration in the next edition of the newsletter or get in touch about our reasonably priced advertising by contacting Jeremy Brown (jbrown@schnabel-eng.com).

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

Theresa Andrejack Loux, Ph.D., P.E.  
Aero Aggregates / DVGI Board Member

Theresa Loux is the Technical Director for Aero Aggregates of North America, headquartered in Eddystone, PA. Theresa has over ten years of combined industry and academic experience in civil and geotechnical engineering. At Aero, Theresa’s primary responsibilities include overseeing the company’s research and development activities, technical documentation, engineering support, quality control program, and education and outreach efforts. In the past, she has been involved in and managed a variety of civil, geotechnical, and geoenvironmental consulting and construction projects in the Mid-Atlantic region. Originally from Central Pennsylvania, Theresa earned her undergraduate and graduate degrees from Drexel University and is a licensed professional engineer in the State of Delaware. She has been fortunate to have the opportunity to be an adjunct professor at several local universities and is currently teaching at Rowan University in Glassboro, NJ.

Theresa lives in Lower Bucks County with her husband Kerry (also a Drexel Dragon!) and their three daughters. In her spare time, she enjoys visiting with family and friends, cooking, quilting, gardening, reading, volunteering in the community, and spending time outside.

Q & A with Theresa:

Q: What got you first interested in the geo-world?
A: Even as a kid, I’ve always liked being outside and building things. However, I can definitely trace my interest in geotechnical engineering to my advisor at Drexel, Joe Wartman. Dr. Wartman took me on as an undergraduate research student when I was a sophomore, and we completed a project looking at scale effects on the bearing capacity of small-scale footings on sand.

Q: What is your favorite thing about your Alma Mater?
A: For me, the initial draw of Drexel was the co-op program and the urban campus. I still think these are awesome features of the university, but in hindsight, my favorite thing about Drexel is all the people that I met while a student. This includes many great professors, staff, and fellow students, many of whom are friends and colleagues today.

Q: What is something about yourself that would surprise us?
A: I learned how to drive on a stick-shift Izuzu pickup truck, and I have my motorcycle license.

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We will continue to feature DVGI members in upcoming issues of the Newsletter. Please feel free to contact any of the board members with any general comments or member spotlight suggestions. Board member email addresses can be found on Page 5.
Q: What advice would you give to students studying a geo-profession?
A: My first bit of advice to students is to develop critical thinking skills as much as you can in college. A lot of students get held up on a specific subject or class, but I think what is really important is knowing enough to ask the right questions and knowing where to go to find information to support your answers. This is a skill that will serve you in any career. Also, I suggest starting to build your network as early as possible. This includes attending professional events (like DVGI meetings!), being active in your student ASCE section, and using LinkedIn as a tool to document your experience and skills and stay connected with others in the industry.

Q: What are three career lessons you’ve learned thus far?
A: 1) People matter most. A good group of coworkers can make a terrible job or task manageable, or even enjoyable, 2) Find a mentor or boss who you can learn from. There is so much to gain by listening to their experience and advice, and 3) Be able to laugh at yourself. We all make mistakes or say the wrong thing sometimes.

Q: What are your hopes for our industry?
A: I hope that our industry continues to grow and attract a motivated, engaged, and diverse membership who will be leaders on infrastructure, resiliency, remediation, and development projects.

Q: What is your favorite thing to do in Philadelphia?
A: My favorite thing to do in the City is to visit my sister-in-law who lives in Queen Village. It’s likely that a visit will include some delicious food—maybe some pho on Washington Avenue?

Q: What aspect of your job do you enjoy the most?
A: I most enjoy diving into the details of a specific project and brainstorming on ways to address an engineering or construction challenge.

Q: What is the most challenging aspect of your job?
A: Time management and work-life balance. I find myself rearranging my priorities on a daily (hourly?) basis.

Q: What do you like most about Aero Aggregates?
A: I work with a wonderful group of people. This includes everyone from our management team to the
Theresa Andrejack Loux, Ph.D., P.E.
Aero Aggregates

folks that work on the plant floor. It’s a very collaborative and team environment, and I feel very supported.

Q: What has been your favorite project that you have been a part of?
A: We have been involved on some of the work along the I-95 corridor in the City. It’s rewarding to see foamed glass aggregate used as a tool to address design challenges on all of our projects, but especially on a highway that I drive every day on my way to work!
Project of the Year Submission

Project: Yeager Airport Runway 5 Safety Area
Client: Central West Virginia Regional Airport Authority (CWVRAA)
Contractors: Orders Construction
Engineers: Schnabel Engineering, ADCI, S&S Engineers, Burns
Submitted By: Allen Cadden, PE, Johanna Simon, PE, and Phil Shull, PE, Schnabel Engineering

Project Description: Built in 1947, Yeager Airport covers 767 acres, has a single asphalt runway, and hosts McLaughlin Air National Guard Base. Today, it is West Virginia’s largest airport and has commendably earned the title “West Virginia’s Gateway.”

However, in March 2015, catastrophic failure of the 240-foot-high reinforced fill emergency overrun structure occurred upon which an engineered materials arresting system (EMAS) sat.

The resulting failure swallowed buildings and caused major flood damage to upstream structures by blocking a portion of Elk Two Mile Creek. The collapse also destabilized the surrounding area and left a 140-foot-high vertical face of partially reinforced fill looming over a massive debris field which obliterated Keystone Drive.

The Central West Virginia Regional Airport Authority (CWVRAA) enlisted Schnabel to develop an emergency mitigation plan to stabilize the vertical face and remove 540,000 cubic yards of debris to allow normal operations to resume as quickly as possible. Schnabel served as the lead designer responsible for remedial cleanup and design of a new retaining wall system to restore the surface area needed to install a new EMAS.

Once successfully completed, the project supported the airport’s status as a vital component to the state’s transportation system and a key asset to the existing and future development of the area. For area residents, it eliminated the fear of a future collapse, and for air travelers, the full restoration of the Runway 5 safety area and its surroundings means increased safety during takeoff and landing.

Geotechnical Challenges

Planning, implementing and executing the deconstruction of such a massive debris field and site preparation for retaining wall design were an enormous task completed in three phases over 22 months. The retaining wall was designed with two distinct sections. The bottom-up construction of the lower wall presented design and construction challenges not typically encountered.

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encountered with traditional top-down soldier pile wall construction. The geofoam backfill of the upper wall allowed the ground surface to reach the necessary elevation while maintaining low enough lateral pressures on the wall to have a constructible structure.

Risk assessments, including a formal risk register, were used throughout this project. Engagement of all stakeholders was critical to its success and encompassed airport management, operations, maintenance, contractors; government agencies; and material suppliers.
PROJECT OF THE YEAR SUBMISSION Continued

Figure 4—Wall Construction

Figure 5—Complete Aerial
PROJECT OF THE YEAR SUBMISSION

Project: I-95 Section BR2 Test Embankment
Client: Pennsylvania Department of Transportation (PennDOT)
Contractors: James Anderson Construction
Engineers: Sarah McInnes, PE (PennDOT), Geoff Stryker, PE (STV Incorporated), Seth Mascho, PG (Susquehanna Civil, Inc.), Jason Taylor, PE, PG (Susquehanna Civil, Inc.), Michael Yang, PG (Michael Baker International)
Submitted By: Geoff Stryker, PE (STV)

Project Description: PennDOT is presently reconstructing the I-95 Betsy Ross Bridge Interchange in the Bridesburg section of Northeast Philadelphia. This $880 million reconstruction includes replacement of the existing mainline, roadway and ramps. An innovative measure was undertaken to eliminate structures at several ramps and replace them with roadway on fill. Staged construction, settlement considerations and existing deep foundations complicate the design. The benefits of replacing these structures with roadway on fill include considerable savings of construction costs and future maintenance efforts. Additionally, the use of on-site regulated fill from the project in the embankments will eliminate the cost of regulated fill disposal.

Evaluation of the elastic settlement from the proposed embankment and retaining walls over the in-situ sandy and non-plastic silty soil is a key factor to determine whether ground improvement measures will be needed. Significantly different elastic modulus values can be obtained using typical estimation methods based on Standard Penetration Test (SPT) N-values, Cone Penetration Testing (CPT) or relative density. To accurately assess the site-specific settlement, an instrumented, ±30-foot high test embankment was constructed near a proposed I-95 ramp embankment. Instrumentation includes settlement plates, inclinometers, extensometers and piezometers. Vertical settlement at the ground surface of the test embankment at selected locations inside and outside the embankment is being monitored with settlement plates and settlement profiles. Inclinometers and extensometers were installed at different locations to identify the vertical and horizontal deflections at different depths.

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During the installation of test embankment, the field-observed settlement data was compared with the theoretical settlement values, which are calculated using soil moduli estimated from both the SPT and CPT results. Based on the comparison, the estimated soil moduli that yield theoretical settlement results closest to the field data were used at other ramp locations under similar subsurface conditions within the same project corridor.

**Geotechnical Challenges:** Based on results of the testing program, the subsurface conditions were found to be generally consistent. The soils are stratified with loose fill near the surface that is underlain by medium dense to very dense alluvium, an approximately 10-foot thick over-consolidated stiff alluvial lean clay, and very dense residuum and saprolite. Bedrock was encountered approximately 70 feet below the existing ground surface. PennDOT practice considers allowable total settlement for retaining wall and bridge structures as limited to one inch. Due to the relatively large loads associated with the embankments and retaining walls, preliminary settlement computations indicated settlements larger than one inch would occur during construction. Total anticipated settlements larger than one inch might be permitted if settlement mitigation solutions are implemented. Current PennDOT practice requires soil improvement or column supported embankments if the anticipated total settlement is greater than three inches. A test embankment was constructed to determine if the actual settlements would align with the preliminary computations.
The data obtained from the instrumented test embankment was used with modeling software to accurately define the elastic modulus and Poisson’s ratio values used in common settlement equations. The results indicated that initial settlement was much larger than what will occur during construction.

Figure 4—Comparison of Observed and Predicted Settlement at Center of Test Embankment

Figure 5—Summary of Subsurface Conditions and Modulus Values from Different Approaches
You are invited to participate in RamJack’s L&L seminar. The presentation includes discussion of principles and the underlying assumptions, and explanations of the theories behind geotechnical analyses of helical (Screw) piles/anchors. References to sources of uncertainties in geotechnical analyses will be made to avoid a false sense of accuracy. The application of engineering principles to practical problems will be illustrated using Case Histories. The presentation touches on the use of computer software.

For more information, please contact Taylor Rizzotte – taylor@ramjacktri.com or Cindy MacKay – cindy@ramjacktri.com to schedule your L&L seminar.
North America Keller companies Bencor, Case Atlantic, Case Foundation, Hayward Baker, HJ Foundation, Keller Canada, McKinney Drilling and Moretrench have joined together and rebranded to Keller.

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