ASCE CENTRAL PENNSYLVANIA SECTION

Newsletter

APRIL 29, 2019

VOLUME 49, NUMBER 4

IN THIS ISSUE

SECTION OFFICERS

President's Message

Where does the time go? It's difficult to believe my year as president of the Central PA Section is over. The April dinner meeting began with officer installations for 2019-2020. The experience of serving as president has been very rewarding. I would like to express my thanks and gratitude to the Board for all their hard work this past year. It has been an honor to serve as your president. I would also like to congratulate Brandon Motuk as he assumes the presidency.

I would like to encourage all of you to get involved. We are a volunteer organization and we could not conduct the business of the Section without those individuals who are willing to give of their time to get things done. We have a couple of positions for 2019-2020 to be filled. Those positions are Vice President and Legislative Committee Chair.

The Vice President attends all meetings of the Section Board of Directors and acts in place of the President-Elect when the President-Elect is not available.

The Legislative Committee Chair shall be knowledgeable about relevant legislative issues within the Section and report them at the Section Board of Directors meetings.

If you are interested in any of the available positions, please contact Kerry Henneberger (khenneberger@larsondesigngroup.com) or Brandon Motuk (bmotuk@yahoo.com).

We will be taking a break from dinner meetings over the summer months, however we have several exciting upcoming events in the next few months. The following events have been scheduled:

- May 7th – Environmental and Water Resources Technical Group Lunch Presentation – Edward Muzic, P.E., Section Chief for Chapter 105 Permits and Nathan Phillips, P.E., Section Chief for Section 102 Permits – **Chapter 102 and Chapter 105 Permits in Pennsylvania**
- May 23rd – **3rd Annual Central PA SEI ½ Day Technical Conference** – Four (4) Sessions
- July 27th – **Annual Knoebels Picnic**

You can find more details about upcoming events on the Section website at http://sections.asce.org/central-pennsylvania/events

WELCOME NEW PROFESSIONALS:
Pinlei Chen
John Zendek
Seth Bomgardner
Curt Bradley, P.E.

WELCOME NEW STUDENTS:
Galen Lehman
Ivan Oon
Chase Mader
Maximilian Ororbia
Gage Schatz
Guang Chen
Lhenda Li
Wan
Jiarui Wang

We also post events on our Facebook page and Twitter
https://www.facebook.com/pg/ASCE.CentralPA/events/?ref=page_internal
https://twitter.com/ascecentralpa

I hope to see you at upcoming Section events!

Sincerely,

Kerry E. Henneberger, P. E., M. ASCE
2018-2019 Central PA Section President
khenneberger@larsondesigngroup.com

Transportation Technical Lunch Presentation

Submitted by Michelle Madzelan, PE, Transportation Co-Chair

Over 30 professionals converged on Gannett Fleming to listen to David A. Hamlet, P.E., and Nathaniel S. Kirchner, P.E., both from Gannett Fleming, talk about Diverging Diamond Interchange (DDI) Projects in Pennsylvania. The Technical Lunch presentation was held on March 19, 2019 and offered remote access to other professionals through a live online broadcast of the presentation.

The session was both informative and interesting. All in attendance learned a lot about diverging diamonds from the presentation. They learned about geometric concerns in the DDI layout, pedestrian accommodation considerations, traffic signal design items related to ramp metering of the merge lanes and protected phases, safety features associated with traveling on the opposite side of the roadway, and development of the traffic control during construction. The presentation placed a high importance on pavement markings and signing layout to avoid confusion by the traveling public. The presentation included references to the first DDI constructed in Pennsylvania at I-70 and US 19 in PennDOT District 12-0 along with lessons learned utilized in the development of the I-83 Exit 4 in PennDOT District 8-0.

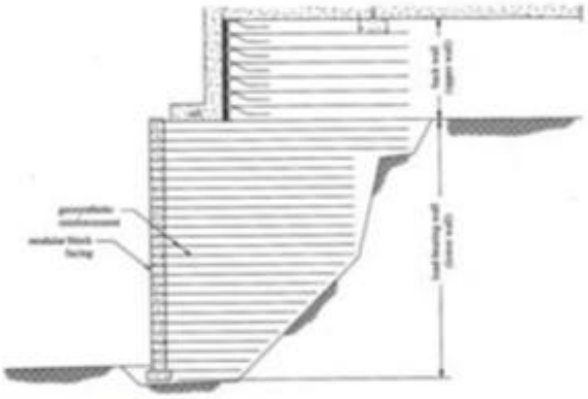
We want to extend appreciation to both David and Nathaniel for sharing their expertise and experiences with the group.

G-I Susquehanna Valley Chapter News

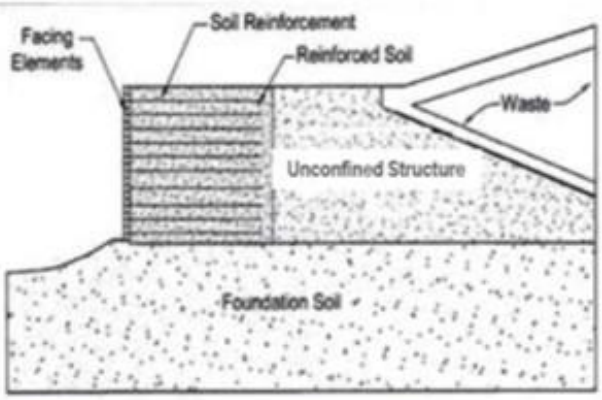
Submitted by: Thomas J. Imholte, P.E., Geotechnical Co-Chair

On February 26, 2019 the G-I Susquehanna Valley Chapter hosted the webinar titled "A Data Base and Recommendations on 320 Failed MSE Walls with Geosynthetic Reinforcement." More than 30 engineers and geologists attended the event that was held at the Gannett Fleming's Camp Hill, PA Office. The presenter was Robert M. Koerner, Ph.D, P.E., NAE, Hon. ASCE, Director Emeritus of the Geosynthetic Institute, Professor Emeritus at Drexel University.

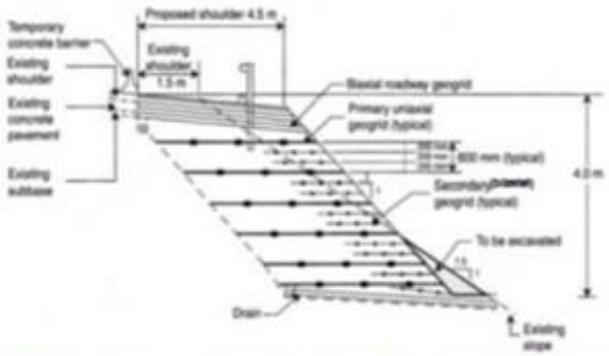
Mr. Koerner's presentation was very informative with extensive references for further study if desired by the attendees. He began with the basics as illustrated below to get everyone off on the right foot.



(a) MSE wall with a bridge abutment surcharge (Figure by Wu, et al. 2006)



(b) MSE berm components in landfill applications (Figure by Luettich, 2010)



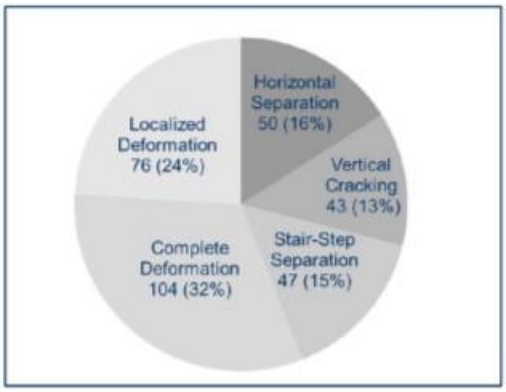
(c) MSE reinforced soil slope for shoulder widening (Figure by Berg, et al., 1990)

Mr. Koerner then explained the two failure classifications used to differentiate the data base. These include excessive deformation and wall collapsed. For the excessive deformation classification, Mr. Koerner noted that question, "what is excessive?" varies based whether you are the Owner, the Contractor or the Design Engineer. He noted that in general, the Owner is less tolerant of deformation and Contractor is more tolerant and the Design Engineer is in-between. Mr. Koerner displayed several slides of photographs depicting examples of excessive deformation which culminated in a pie chart to demonstrate the relative distribution of the various cases.

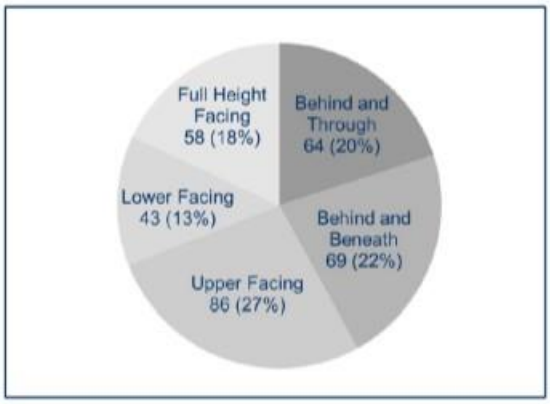
The webinar continued with a discussion on wall collapse. Mr. Koerner noted that similar to excessive deformation, there is much variation in types of wall collapse. Some wall collapses are at the top of the wall,

some at the bottom, some are over a long extent and some are narrow but full height. This culminated with another pie chart demonstrating the relative distribution of the various cases of wall collapse.

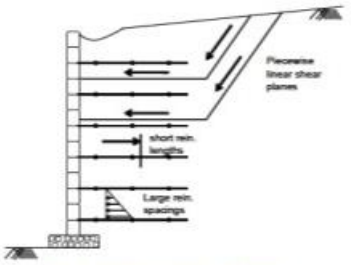
Patterns of Wall Facing Deformations



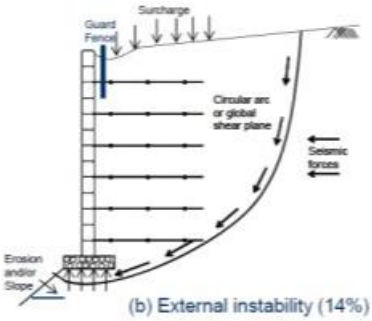
Patterns of Wall Facing Collapse Locations



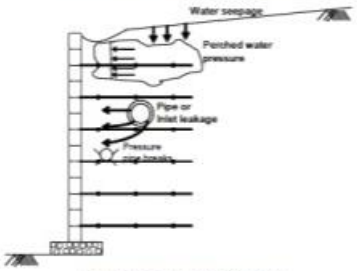
Mr. Koerner then continued by looking at another way of categorizing the failures – varying failure mechanisms.



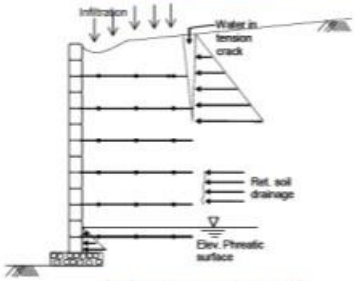
(a) Internal instability (22%)



(b) External instability (14%)



(c) Internal water (37%)



(d) External water (27%)

Mr. Koerner concluded with this summary

- The wall failure situation is of great concern
- It mistakenly looks bad for geosynthetics
- Primary causes are poor design and construction
- Construction-wise it's the use of silt and clay soils and poor placement and compaction
- These and other corrections are well within the state-of-the-practice
- It's up to us (all of us) to fix the situation.

2019 ASCE Legislative Fly-In

Submitted by: Scott Hamilton, PhD, P.E.

York College of Pennsylvania student Josh Sims, civil engineering major Class of 2021 was selected to be part of the Virginia Commonwealth delegation for the 2019 ASCE Legislative Fly-In. On Tuesday March 12th and Wednesday, March 13th, Josh and 257 other ASCE members from 50 states, DC and Puerto Rico, arrived on Capitol Hill to advocate for infrastructure investment and the civil engineering community.

ASCE members met with roughly 330 congressional offices during the Fly-In. Josh and the ASCE members from Virginia met with Sen Mark Warner, Sen Tim Kaine, and Rep. Don Beyer.

Armed with everyday civil engineering experiences, issues briefings from the ASCE Government Relations team, and insight from keynote speakers, Fly-In attendees spent Wednesday afternoon advocating for a 25-cent per gallon motor fuels tax increase to help fix the Highway Trust Fund, fully appropriating key infrastructure programs in FY2020 as well as urging Members of Congress to follow ASCE's Principles for Investment as they draft a bipartisan infrastructure bill.

Prior to educating Capitol Hill on the importance of and urgent need for infrastructure investment, ASCE members received advocacy tips and tools from notable guests. During Tuesday's programs members heard from Brad Fitch, CEO of the Congressional Management Foundation and Senator Tom Carper (D-DE), while Neil Pedersen, Executive Director of the Transportation Research Board shared details from their latest study "Renewing the National Commitment to the Interstate Highway System."

During Wednesday's advocacy session, Representatives Earl Blumenauer (D-OR) and Rodney Davis (R-IL) provided insights on what legislators hope to hear from constituents and the current status of a federal infrastructure package before heading out to make visits to Members of Congress.

Josh is also an active member and officer of the York College Student Chapter of ASCE and frequently attends the monthly dinner meetings of the Section.

October 2018 CSVT River Bridge Tour

Submitted by: Mike McGowan, P.E., SEI Chair

On Monday, October 22nd, 2018, a group of sixteen professionals and four graduate students from the Penn State Structural Engineering Institute (SEI) Graduate Student Chapter participated in a very informative and picture worthy tour of the Central Susquehanna Valley Transportation Project (CSVT) river bridge located just north of the Borough of Selinsgrove.

The tour started on the east side of the river where steel girders were being set on previously constructed concrete piers. The participants were impressed by the magnitude of the structure as they walked around the piers. When completed, the bridge will be 4,545' long, 90' wide, 180' high above the river. The tour then moved to the east abutment where awe-inspiring views of the valley greeted us. After a quick stop at the west abutment, the group moved to the causeway where they experienced close-up views of foundation and pier construction. As the photos show, this structure was truly a sight-to-be seen.

Central PA SEI thanks PennDOT District 3-0 for hosting this event and answering the group's many questions.

April 2019 Penn State New Steam Services Building Tour

Submitted by: Maximilian E. Ororbia

Members of the Penn State Structural Engineering Institute (SEI) Graduate Student Chapter took a quick break from their studies on Monday, April 8, 2019, to enjoy the good weather and a tour of the new Steam Services Building being constructed within the 600-acre site of the existing PSU West Campus Steam Plant. The new three story mixed use office building will serve the Steam Services Group and future tenants.

The Penn State Engineering Institute (SEI) Graduate Student Chapter tour group

The tour started in one of the site's construction trailers where the group was informed on the project.

A walk around the perimeter of New Steam Services Building (right)

A tour of the trailer itself was given since its open floor plan and new technologies led to a collaborative space which aided the construction groups in communicating effectively and efficiently amongst each other. Next the group walked the perimeter of the building where they learned about how weather can affect decisions made on construction schedules and methods. The group then toured the inside of the building where they discussed the importance of communication and collaboration between all parties involved in the construction phase of the building to address the needs of the owner, while maintaining the integrity of the project's design, keeping the established schedule, and enforcing safe construction practices.

An interior tour of the New Steam Services Building

The Penn State SEI Graduate Student Chapter thanks Alexander Building Construction Company and Penn State's Office of Physical Plant for answering all our questions and hosting this event.

April 2019 Dinner Meeting

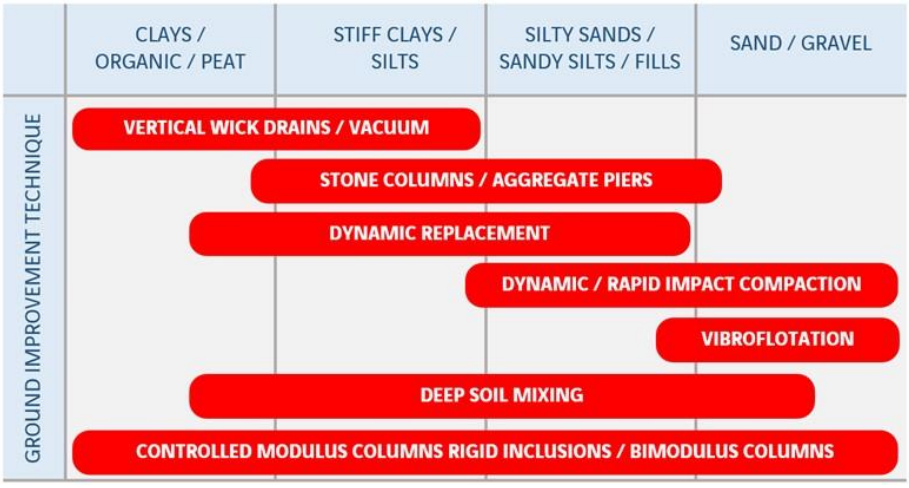
Submitted by: Thomas J. Imholte, P.E., Geotechnical Co-Chair

On April 10, 2019 the G-I Susquehanna Valley Chapter hosted the ASCE Central PA Section Dinner Meeting. The presenter was Brandon Buschmeier, P.E., Director of Engineering and Regional Sales Manager of Menard Group USA. Mr. Buschmeier presented on CMC Rigid Inclusions.

Because this was a Section Dinner Meeting, the attendees varied widely from structural engineers, water resource engineers, highway engineers as well as geo-professionals such as geologists and geotechnical engineers. To get everyone on somewhat equal footing (no pun intended), Mr. Buschmeier started the technical portion of his presentation by defining CMC Rigid Inclusions. CMC stands for Controlled Modulus Column. Mr. Buschmeier explained the following:

CMCs are a ground improvement solution comprised of grouted inclusions which act to reinforce a soil mass for the purpose of settlement control. CMC is a technology using piling equipment to build solutions designed with a ground improvement approach and philosophy. Typically, CMCS are used as an alternate to driven piles, ACIPs, RAPs, WDs and surcharge, PIFs, stone columns, overexcavate and replace.

Mr. Buschmeier demonstrated the versatility of CMC Rigid Inclusions but cautioned that, like any ground improvement technique, they are not a one-size fits all solution.

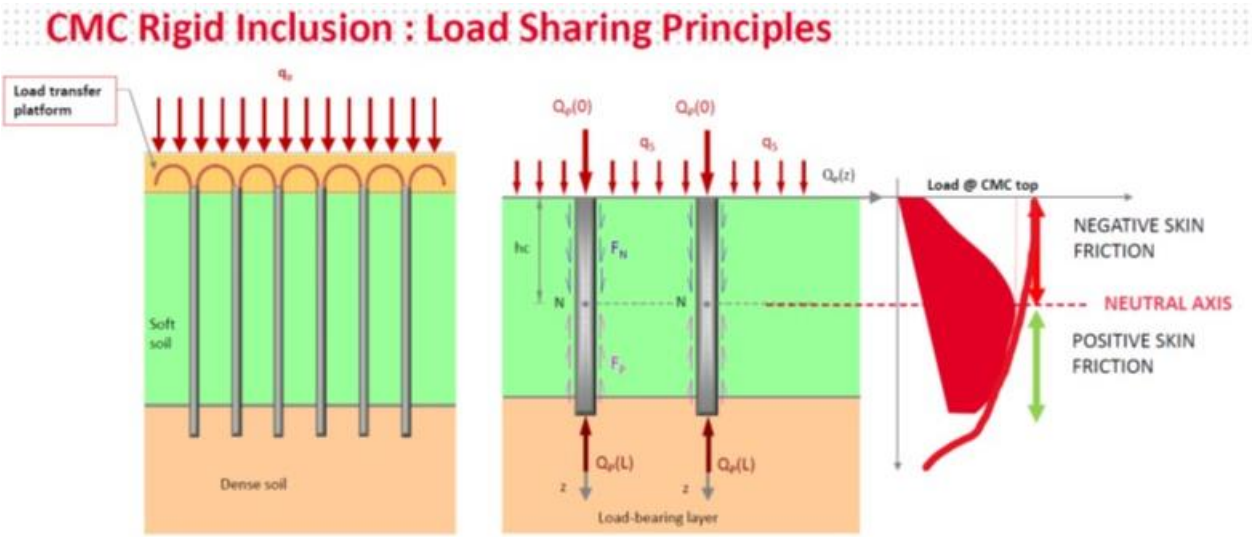


Mr. Buschmeier then went on to discuss the advantages of CMC Rigid Inclusions. He presented four (4) common challenges for any ground improvement solution, namely, depth, load, geotechnical constraints and budget.

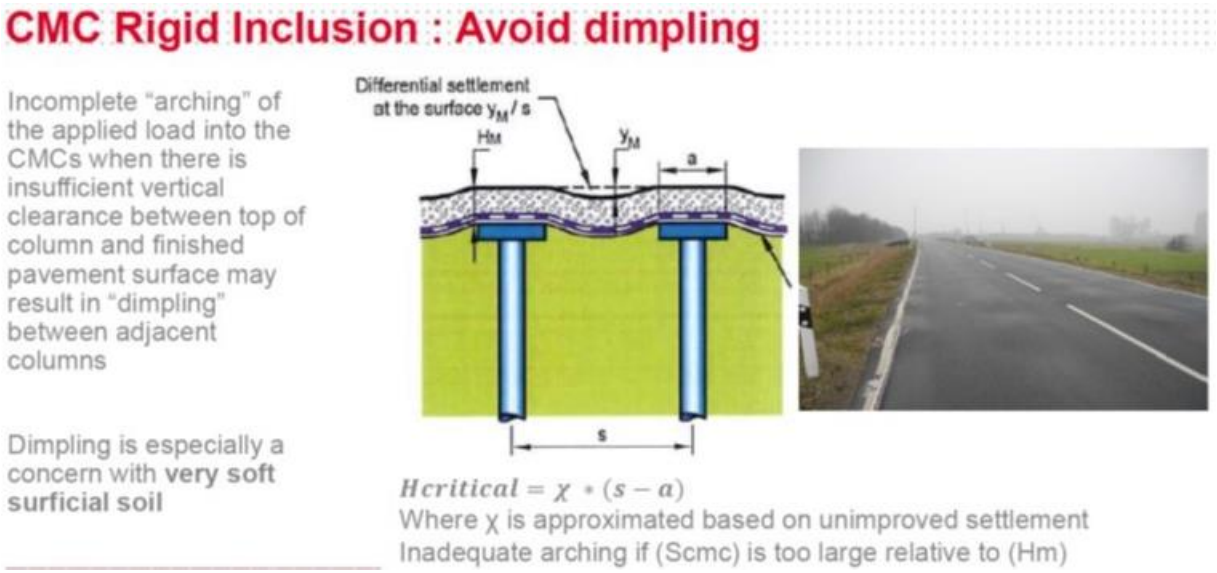
Mr. Buschmeier noted that most ground improvement methods only effective at shallow depths. Menard has overcome this limitation through crawler crane-mounted specialized equipment capable of reaching depths of 150 feet. Regarding the load challenge, Mr. Buschmeier stated that grouted rigid inclusions can support heavy structures (oil tanks, embankments up to 45 feet) and high bearing pressure footings (10 ksf). Mr. Buschmeier reiterated what was stated before - CMC Rigid Inclusions can be used in a wide variety of soils, which is a good response to the geotechnical constraints challenge. With respect to the budget challenge, Mr. Buschmeier stated, "CMC Rigid Inclusions allow construction without use of pile caps and structural slabs – high production means reduced costs."

Mr. Buschmeier transitioned to a deeper discussion on the types of ground improvement techniques and the mechanics regarding their behavior: densify, consolidate or stiffen. Those ground improvements that stiffen

can be further classified as granular and grouted. CMC Rigid Inclusions fall into the grouted category and Mr. Buschmeier began to detail their behavior.



Mr. Buschmeier explained that there are four (4) main components of the CMC Rigid Inclusion System that must be designed to optimally interact - structure/slab being supported, the load transfer platform, CMC Rigid Inclusion and the soil matrix. He further explained that typically the load transfer platform is typically 2-4 feet thick and there is a real concern when the correct thickness cannot be provided because adequate arching within the platform will not occur and dimpling can result as shown in this slide:



Mr. Buschmeier noted that the CMC Rigid Inclusion design is very complex and a 3-D Finite Element (FE) analysis is required for optimization. He stated that Menard uses Plaxis 3-D FE software for their designs. A 3-D FE model is necessary to properly evaluate lateral deformation, capture edge effects and analyze non-uniform loading.

Moving on from design, Mr. Buschmeier finished by discussing the level of quality control Menard employs to ensure that the CMC Rigid Inclusions installed correspond to the design and provide a good solution to

the site-specific foundation challenge. He stated that at Menard Quality Control starts with a CMC installation log that records much key information including downward pressure, rotary pressure and torque, rate of penetration and extraction, grout pressure and a theoretical profile of the inclusion. He said that each inclusion record is like its own boring and can be used to compare to the existing subsurface information, like the soil profile, to verify design parameters.

In addition to the installation logs, Menard performs strength testing of the grout used to make sure the proper strength is being achieved to meet the project requirements. In addition to the components, an individual inclusion can be tested or the full system can be tested. In conclusion, he cautioned that after the CMC Rigid Inclusions have been installed, they cannot be forgotten. The onsite contractor needs to be mindful and respect CMCs when excavating. The construction documents need to restrict site traffic until the specified grout strength is achieved and it is critical that the load transfer platform be properly constructed.

Mr. Buschmeier' s presentation was well received and prompted many thoughtful questions both during the presentation and after. Thank you, Brandon, for an entertaining and enjoyable presentation!

2019 George Winter Award Recipient

Submitted by: Kerry Henneberger, P.E., President

Thomas E. Boothby, Ph.D., P.E., F.ASCE, professor of architectural engineering at Penn State, has been selected by the Structural Engineering Institute of the American Society of Civil Engineers (ASCE) to receive the **2019 George Winter Award.** Dr. Boothby was selected for "his expertise as a structural engineer and his passion for art, history and culture to captivate a widespread professional understanding of the interdependence of engineering and the humanities." The award will be presented during the Society's Structures Congress in Orlando, FL on April 27, 2019. The Central Pennsylvania Section congratulates Dr. Boothby on this significant achievement.

ASCE Penn State University News

Submitted by Nicole Dato

This past weekend the Penn State University Park Concrete Canoe team traveled to the ASCE Mid-Atlantic Regional (MAR) Conference at the University of Pittsburgh - Johnstown. Along with meeting students from across the region, they competed with their concrete canoe. Though it rained for most of the races on Sunday, the team came out with an overall second place finish and numerous second-place finishes in individual categories.

2019 ASCE Distinguished Chapter Award for Region 2

Submitted by Leslie Payne, Director, Student and Younger Member Programs

It is my pleasure to inform you that the Penn State University – University Park ASCE Student Chapter has been awarded the 2019 ASCE Distinguished Chapter Award for Region 2 by the ASCE Committee on Student Members. This award is made annually to the most outstanding Student Organization in your Region.

Your Student Chapter was recommended for these awards by the Committee on Student Members based on activities recorded in the Student Chapter's 2018 Annual Report.

A plaque recognizing the Chapter's achievement will be mailed to you at the address above. If this address is incorrect, please let me know right away. You may want to contact your Region Director or ASCE Section President to arrange for the plaque to be presented to your Student Chapter at a convenient time.

On behalf of the ASCE Committee on Student members, congratulations to the Student Chapter officers and members, to the Practitioner Advisors, and to you as Faculty Advisor. The Society recognizes and sincerely appreciates your personal contribution, enthusiasm, and hard work, which result in outstanding Student Organization programs such as yours.

Sponsors and Press Releases

Gannett Fleming has acquired one of California's most well-respected geotechnical companies, SAGE Engineers. This marks the fourth acquisition for Gannett Fleming in seven months.

"Gannett Fleming's entrepreneurial, innovative spirit is critical to our culture, so we always look for that same characteristic when evaluating other firms – SAGE is the perfect match," said Bob Scaer, PE, chairman and CEO. "We're eager to expand our geoscience, geostructural, power, and dams services in California, but even more excited to welcome SAGE's thought leaders to our team."

On April 4, Larson Design Group's Diversity & Inclusion Committee received an award at the TQI Awards Banquet held in State College. The award recognized LDG for advancing diversity and fostering a culture of inclusion within the workforce, business processes and within the community. The banquet was sponsored by APC, PennDOT and the Pennsylvania Turnpike Commission. Accepting the award on behalf of Larson Design Group and the Committee were Joe Romano, Brenda Nichols and Terry Krezmer.

GPI Services:

- Planning
- Design
- Construction Management
- Coatings Design and Inspection
- Bridges
- Highways
- Transit
- Dams
- Airports
- Buildings
- Ports and Marine Facilities

2018 ENR:

- Bridges #5
- Transportation #14
- Design Firms #56

Pennsylvania Offices

- Scranton
- Mechanicsburg
- Allentown
- Pittsburgh

Events

Event	Date	Location
Annual Legislative Day	April 30, 2019	Harrisburg, PA
Environmental and Water Resources Technical Group Webinar	May 7, 2019	Gannett Fleming West Building, Camp Hill
3rd Annual Central PA SEI ½ Day Technical Conference	May 23, 2019	Gannett Fleming West Building, Camp Hill
Annual Knoebels Picnic	July 27, 2019	Knoebels Amusement Park, Elysburg

The schedule is growing daily, please visit http://sections.asce.org/central-pennsylvania for more information.

Job Postings

C.S. Davidson, Inc – Engineer-In-Training and Designer (Bridge Services)

C.S. Davidson, Inc –Project Designer – Entry-Level Civil Engineer

Gannett Fleming – Senior Highway Engineer, Geotechnical Project Engineer, Water Resources Engineer, Civil Engineer, Entry Level Water Engineer, Transportation Project Manager, Water Engineering Intern, State Traffic Management Center Operator, Highway Project Manager, Civil Engineer

Larson Design Group – Project Manager, Construction Inspection

Susquehanna Civil – Bridge Engineer/Designer

Traffic Planning & Design, Inc (TPD) – Construction Inspection/Manager, Highway Design Specialist, Highway Design Project Manager (public and Private), Municipal Traffic Engineer, Traffic Engineer, Traffic Signal/ITS Engineer, Transportation Planning Specialist, Structural Designer

Jobs postings are included on the Section Website at http://sections.asce.org/central-pennsylvania/node/10

Address Change? Questions About ASCE?

If you are an ASCE member, and wish to update your address information, please visit: www.asce.org/myprofile.

If you are a member of ASCE, and have questions, please email them to: centralpa.asce@gmail.com.

Questions about the ASCE Central PA Section Newsletter? Send an email to Jason Taylor, Newsletter Editor, at jtaylor@sqcivil.com.