

2024 Chicago Geotechnical Lecture Series

Lessons in Underground Construction

University of Illinois at Chicago • Student Center East, Illinois Room
750 S. Halsted Street, Chicago, IL 60607 • *Public parking is available onsite.*



Friday, May 3, 2024

Organized by:
Geo-Institute Chapter of the ASCE Illinois Section



PROGRAM

8:00 AM Exhibitor set-up
8:15 – 9:00 AM Breakfast / Registration / Exhibitors

Morning Session

09:00 AM - 09:15 AM Welcome
09:15 AM - 10:15 AM "Confronting complex challenges while introducing electricity into the environment at the Fish Barrier," *Joseph Schulenberg, PhD, PE, USACE/University of Illinois - Chicago*
10:15 AM - 11:00 AM Break / Exhibitors
11:00 AM - 12:00 PM "Supertall and Megatall Towers Surrounding Kuala Lumpur's Central Park", *Seth Martin, PE, BC.GE, Langan*
12:00 PM - 1:00 PM Lunch

Afternoon Session

1:00 - 2:00 PM "History and Overview of Chicago's Intercepting Sewers and Tunnel & Reservoir Plan (TARP)", *Faruk Oksuz, PE, Black & Veatch Corporation, and Patrick Jensen, PE, Metropolitan Water Reclamation District of Greater Chicago*
2:00 - 2:45 PM Break / Exhibitors
2:45 - 3:45 PM "A History of Geotechnical Engineering in Chicago", *Richard J. Finno, PhD, PE, Northwestern University*
3:45 - 4:00 PM Break / Exhibitors
4:00 PM Happy Hour (Location TBD)

REGISTRATION AND EXHIBITORS

Registration: The full registration fee covers lecture attendance, continental breakfast, and lunch*. Firms are invited to exhibit your products, services, or emerging technologies to the engineering community. Exhibitor space consists of a table and electric and includes one general registration to the conference. You may register online using a credit card or check. Registration fees and payment links are as follows:

Registration Type	Early Bird (by April 8, 2024)	April 9 to May 1, 2024	Registration/ Payment Links
General	\$300	\$400	Early / Regular
Educator/Government	\$200	\$300	Early / Regular
Student (with valid ID)	\$50	\$100	Early / Regular
Exhibitor (includes 1 General)	\$600	\$700	Early / Regular

For questions regarding registration or meal requests, contact Jason Buenker (jason.buenker@shanwil.com) and Thierno Kane (tkane@geosyntec.com).

**Vegetarian and other meal options are available upon request. Please contact Jason Buenker with your request.*



2024 Chicago Geotechnical Lecture Series *Lessons in Underground Construction*



CHICAGO GEOTECHNICAL LECTURE SERIES HISTORY

The Chicago Geotechnical Lecture Series (formerly called the Soil Mechanics Lecture Series) was established in 1962 to educate the local engineering community and keep them informed of recent developments in geotechnical and geoenvironmental engineering. Many nationally recognized experts in several areas of geotechnical engineering practice have presented papers in this Lecture Series.

- 1963 Foundation Construction in the Chicago Area (Inaugural Lecture)
- 1964 Design of Structures to Resist Earth Pressure
- 1968 Foundation Engineering
- 1970 Observational Methods in Soil and Rock Engineering
- 1973 Innovations in Foundation Construction
- 1974 Computer Applications in Foundation Engineering and Construction
- 1976 Problems in Soil Mechanics and Foundation Engineering
- 1978 Problems in Construction and Geotechnical Engineering
- 1982 Groundwater Flow and Contamination Control
- 1986 Practice and Innovations in Geotechnical Engineering
- 1988 Soil-Structure Interaction
- 1990 Geosynthetics in Geotechnics: State of the Practice in Geomembranes and Geotextiles
- 1992 Geotechnical Aspects in Transportation
- 1994 Current Topics in Geotechnical and Geoenvironmental Engineering
- 1996 Current Topics in Tunneling
- 1998 Innovations in Earth Retaining Systems
- 2000 Geotechnical Failures and Lessons Learned
- 2003 Geotechnical Performance Monitoring
- 2006 Geotechnical Aspects of Earth Retention and Shoreline Protection
- 2008 Current Topics in Foundation Engineering
- 2010 Case Studies in Geotechnical Engineering
- 2012 Earth Structure – Ground Improvement
- 2014 Geotechnical Earthquake Engineering
- 2017 Innovative Geotechnologies
- 2019 Case Studies and Lessons in Geotechnical Engineering
- 2022 Lectures in Geotechnical Engineering

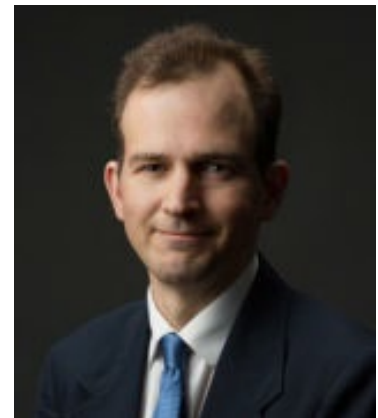


Confronting complex challenges while introducing electricity into the environment at the Fish Barrier

Joseph Schulenberg, PhD, PE, USACE/University of Illinois - Chicago

Abstract: The first Aquatic Dispersal Barrier (Fish Barrier) has been in place since 2002. After that time several other barriers have been added (IIA, IIB, Barrier I). As a result, several complex environmental challenges have been investigated. These challenges include shock hazard due to stray current, railroad interference, corrosion of adjacent infrastructure, maintaining a given gradient at the water surface, and in-water safety. These challenges, while often unique to this application, may present learning opportunities for the geotechnical community. Stray current may be present at numerous projects. Railroad interference may be part of various soil related projects. The process of analyzing railroad interference is similar to analyzing frequency interference due to pile driving or earthquakes. Corrosion investigations can be part of civil works projects. Just like the USACE formerly modeled water flow through dams using an electrical analogy, electricity can be modeled using seepage models well known in the geotechnical community. And, evaluating in-water electrical safety due to pulsed direct current is an area where the USACE should share as much knowledge as possible.

About the Speaker: Joseph W. Schulenberg, P.E., Geotechnical (CELRC). Joseph is a Registered Professional Civil Engineer in the State of Illinois, currently serving as an Assistant Clinical Professor in the Department of Civil, Materials, and Environmental Engineering at the University of Illinois at Chicago. He also works part-time for the Chicago District of the US Army Corps of Engineers. He has over 22 years of geotechnical engineering experience, which includes over 20 years with the US Army Corps of Engineers. Joseph holds both a Bachelor and Master of Science degree in Civil Engineering from Michigan State University and Ph.D. from Northwestern University. He has been a Regional Technical Specialist for the Lakes and Rivers Division (LRD) from 2011 until present, working on a multitude of navigation, dam and levee safety, and flood damage reduction projects within the Corps of Engineers. Since 2009 he has been involved in mapping, modeling, and remediating stray current issues for the Aquatic Invasive Species Dispersal Barrier.



Supertall and Megatall Towers Surrounding Kuala Lumpur's Central Park

Seth Martin, PE, BC.GE, Langan

Abstract: This presentation will provide insights and lessons learned over a decade of deep foundation design and construction for Supertall and Megatall towers surrounding Kuala Lumpur's Central Park. KL's Central Park is home to the 450-meter-tall Petronas Twin Towers, which are founded on some of the world's deepest foundations and most challenging ground conditions.

The subject towers are massive, weighing up to 9,000 Meganewtons and are located in one of the most challenging geological conditions in the world. These towers will be supported by piled raft systems. The reinforced concrete rafts for the subject will encompass fields of large-diameter bored piles up to 2.5 meters in diameter. The piles rank as some of the deepest foundation elements in the world at up to 125 meters deep, and push the limits on the world's most advanced deep foundation drilling technologies. Soil-structure interaction was performed between the structural and geotechnical engineers to model the performance of each tower foundation.

The ground conditions in KL present significant challenges to the foundations for these towers. The underlying soils consist of hard clayey silt (the Kenny Hill formation), then karstic limestone bedrock. The limestone surface can be highly erratic, varying from about 50 to 130+ meters below grade across the park. In the most extreme cases, underground cliffs and rock pinnacles as much as 50 meters tall have been encountered between adjacent piles within a single tower footprint.

The presentation will leave the audience understanding:

- The importance of geological conditions in foundation design of tall towers,
- The basic process of soil-structure interaction analysis, and
- Construction methods and limitations for deep foundations below tall towers in challenging ground conditions.

About the Speaker: Seth Martin is an Associate Principal at Langan, where he has worked for 13 years. Seth is based out of Langan's New York City office where he works on a variety of local and international projects. He received his bachelor's and master's degrees from Virginia Tech.

Seth specializes in geotechnical engineering design, instrumentation and monitoring, and construction oversight of various foundation and support of excavation systems. Seth collaborates with developers, engineers and contractors to deliver innovative and practical solutions to complex excavation support and foundation designs. Seth has established his approach to large-scale complex projects through his work on supertall and megatall towers in Manhattan, Malaysia, Saudi Arabia, India, London, Thailand, and the United Arab Emirates. Seth's work has spanned various development sectors, including: commercial, mixed-use, residential, aviation, infrastructure, healthcare, industrial, education, and more.

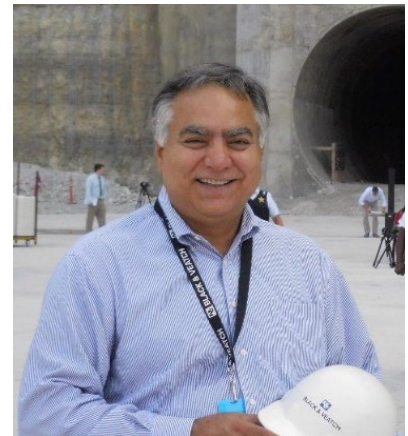


History and Overview of Chicago's Intercepting Sewers and Tunnel & Reservoir Plan (TARP)

Faruk Oksuz, PE, Black & Veatch Corporation
Patrick Jensen, PE, Metropolitan Water Reclamation District of Greater Chicago

Abstract: This presentation is about the Chicago area's intercepting sewers dating back to 1907 to the advancement and commissioning of the massive engineering Tunnel and Reservoir Plan (TARP). Presenters from Metropolitan Water Reclamation District of Greater Chicago (MWRD) and Black & Veatch will share perspectives on how sewer tunnels and TARP played a monumental role for pollution & flood control as well as protection of the area's most valuable resource, Lake Michigan. Presentation will include insights on Chicago's geology and geotechnical considerations for design and construction of over 110 miles of tunnels ranging from 8 to 33-ft in diameter, and two reservoirs that are excavated to an approximately 300-foot deep with storage of more than 17 billion gallons of combined sewer and flood water before they are treated and released back to the Illinois Waterways.

About the Speaker: Faruk Oksuz, P.E., is a vice president and technology and business director with Black & Veatch Governments and Environment Sector. He has over 30 years of experience that covers a wide range of conveyance, storage, flood control, navigation and hydropower infrastructure systems with large tunnels, dams, canals, reservoirs, penstocks, pipelines, pump stations, and gates. He routinely provides strategic direction for projects delivery and risk management. Projects he worked on include Chicago MWRD's Tunnel and Reservoir Plan (TARP) components, U.S. Army Corps of Engineers McCook and Thornton Reservoirs, Singapore's Deep Tunnel Sewerage System (DTSS Phase 2), Indianapolis Deep Tunnels and Dallas Mill Creek Stormwater Tunnels, San Diego's San Vicente Dam Raise, City of Austin's Jollyville Tunnel, Tennessee Valley Authority's (TVA) Boone Dam Remediation, and Cincinnati's Lower Mill Creek and Milwaukee's Northwest Side Relief tunnels. He is also a leader in sustainability and innovation initiatives. He is a registered professional engineer in several states, and a graduate of the Istanbul Technical University and Southern Illinois University, with degrees in Mining and Mechanical Engineering and Energy Processes.



About the Speaker: Mr. Patrick Jensen, P.E., is a Principal Civil Engineer in the Collection Facilities/TARP (Tunnel and Reservoir Plan) Section of the Engineering Department at the Metropolitan Water Reclamation District of Greater Chicago (MWRD) and has been working there 14 years on large infrastructure projects. As a Principal Civil Engineer, Mr. Jensen now serves as a project manager for flood and pollution control projects within its service area, oversees the MWRD's collection systems asset management plan as well as sewer rehabilitation design projects. He has a Bachelor of Science degree in Civil Engineering from Marquette University in Milwaukee, WI.





A History of Geotechnical Engineering in Chicago

Richard J. Finno, PhD, PE, Northwestern University

Abstract: This talk will describe selected developments in geotechnical engineering that had their genesis in Chicago. Topics include shallow foundations, caissons and excavation support.

About the Speaker: Rich Finno is Professor Emeritus of Civil Engineering specializing in geotechnical engineering. After receiving his BSCE from the University of Illinois at Urbana-Champaign in 1975 and MS from Stanford University in 1976, he worked for Sargent & Lundy and Woodward-Clyde Consultants. Upon coming to his senses, he returned to Stanford and somehow convinced the faculty to grant him a PhD. Thereafter, he entered academia and was at Northwestern University from 1986 to his retirement in 2019. He 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, among them the Ralph B. Peck Medal, 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 180 reviewed technical papers. He served as Chair of the Earth Retaining Structures Committee and the and as an Editor of the Journal of Geotechnical and Geoenvironmental Engineering of ASCE. During his time as an academic, he also consulted on projects for many organizations. He is currently enjoying retirement by doting on his grandchildren, traveling, doing a bit of consulting and working on his golf game.