

# **ASCE Geo-Institute (G-I) Underground Engineering and Construction (UEC) Committee**

**Lectures on Offer from the UEC Committee (2018-2019)**  
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## **Case Histories in Underground Engineering**

**Speaker varies by location (Brian Fulcher – McMillen Jacobs Associates, Brian Zelenko and Bill Hansmire - WSP, Anil Parikh - AECOM, Brett Zernich – Traylor Brothers, Jim Nickerson – Kenny Construction, Ted Dowey – NYC DEP)**

These talks will discuss recent case histories in major tunnel and underground engineering projects. Actual case histories will vary by speaker and will include the Second Avenue Subway in New York, DC Water Clean Rivers Program, Lake Mead Intake No. 3 in Nevada, the Regional Connector Project in Los Angeles, or other significant tunnel projects. Lectures will discuss key design challenges with a focus on geotechnical aspects of design and construction as well as lessons learned.

## **Geological and Geotechnical Site Investigations for Tunnel Projects**

**Speaker varies by locations (Greg Raines - Stantec, Red Robinson – Shannon & Wilson, Chris Snee – Snee Geoconsult)**

Site investigations are typically performed to evaluate subsurface conditions that affect project safety, cost effectiveness, and design and construction. For tunnel projects, where the geotechnical risk is often very high and the selected construction methods are integral to the project success, the importance of a thorough and well-planned site investigation program is critical. This lecture will discuss the importance of geological and geotechnical conditions on tunnel design and construction, and will provide guidelines for appropriate methods and techniques for investigating these conditions for the purposes of tunnel design and construction.

## **Soft Ground Tunnel Construction by Tunnel Boring Machine (TBM)**

**Jack Brockaway - Herrenknecht**

There are a wide variety of techniques for tunnel construction in soft ground. The best fit is often determined by ground conditions, budget, and surrounding structures. In order to select the most appropriate method for a particular tunnel, several factors need to be taken into consideration, including the characteristics of the ground to be encountered, TBM operational limitations, tolerance of adjacent structures to ground movement, and the amount of risk that is acceptable to project stakeholders. This lecture will discuss the latest advancements in soft ground tunnel construction and key tunnel design and construction selection criteria, including the appropriateness of TBMs and their operational limitations.

## **Use of Sequential Excavation Method (SEM) in Tunnel Construction**

**Vojtech Gall – GZ Consultants, Paul Madsen - Kiewit**

SEM, also known as the New Austrian Tunneling Method (NATM), is a tunnel construction approach that utilizes the self-supporting capacity of the ground to achieve economy in ground

support for underground excavations. Its application is highly specialized, relying heavily on prediction of anticipated ground behavior, prior experience, and the inherent ability to adapt excavation based on detailed mapping and observations from instrumentation monitoring data. This lecture will focus on key design concepts and principles of SEM, including both structural and geotechnical aspects, and will include a discussion of case histories of recently completed SEM tunnel projects.

### **Groundwater Control and Ground Improvement for Tunneling Projects**

**Paul Schmall - Moretrench, Paul Madsen - Kiewit Infrastructure**

Ground improvement is an essential component of many construction projects that involve underground work. By improving the characteristics of soils and rock, ground improvement provides a wide range of solutions to address underground challenges. This lecture will focus on the advantages and disadvantages of various ground improvement techniques for tunneling projects, including dewatering, soil mixing, ground freezing, and grouting. Specific project application and case histories of ground improvement work completed on recent tunnel projects will also be discussed.

### **Instrumentation and Monitoring of Existing Structures during Underground Construction (Speaker varies by location)**

This lecture will introduce basic concepts of instrumentation and monitoring of existing structures as it relates to tunnel construction, including details of instrumentation programs and recent state-of-the-art approaches to real time instrumentation monitoring and data acquisition and reporting techniques. This lecture will also discuss strategies for overcoming logistical and engineering challenges of implementing modern instrumentation and monitoring systems for underground projects. The benefits and limitations of various instrumentation methods will also be discussed.

### **Seismic Design of Tunnels**

**(Speaker varies by location)**

Tunnel response to seismic ground motions is fundamentally different than aboveground structures and the traditional approach to evaluating the effects these motions have on structure response. Underground structures are often confined by the surrounding soil and cannot experience free vibrations as is the case for aboveground structures. This response necessitates an alternate approach to design, one that accounts for various modes of ground deformations and their engineering implications for tunnel design. This lecture will present an overview of current seismic design methodology for tunnels and will include case histories and project examples to demonstrate the applicability of various analysis methods.

### **A Day in the Workplace – A Young Tunnel Engineer’s Perspective**

**(Speaker varies by location)**

Ever wondered what it’s like to be a tunnel engineer? This “lecture” offers a unique perspective of tunnel engineering in the workplace by presenting actual experiences of a young tunnel engineer. Speakers will candidly discuss their experience in the underground industry, from a typical work day in the “office,” to the challenges of being a young engineer in a demanding, yet rewarding, profession. Speakers will also answer questions and offer advice for those considering a career in underground engineering.