6th Annual Web Conferences 2020
Technical Committees

Live Streaming Daily – Technical Case Studies

December 6 – 10, 2021

The Geo-Institute Earth Retaining Structures Technical Committee will live-stream on Friday, December 10 at 2 PM EST. The topics include:

"*Choreographing Deconstruction of Existing Basement Structure and Construction of SOE system*", **Meeok Kim**, Ph.D., P.E.

An earth retention system (ERS), whether it is a temporary or permanent, has become a main engineering item in urban setting. The system typically is engineered to enable a below grade excavation but not for an existing basement structure's demolition. The demolition of One James River Plaza (OJRP), a 21 story high building was proposed and planned by an implosion method. However, the basement of the building had to be mechanically demolished before the implosion. The basement of the OJRP building was 260 feet by 330 feet wide and 35 feet deep at deepest and constructed about 50 years ago. It is abutting main streets of the downtown of Richmond, Virginia. To safeguard the streets and protect adjacent properties, the mechanical demolition of the basement structure had to be planned with an installation of new support of excavation (SOE) system within the building's property line. Because, the property is bound by streets and high rise buildings across, it is almost impossible to install the SOE system without the demolition of the basement. To resolve this dilemma, the demolition of basement structure, wall and slab, were analyzed in a sequence with tieback installation of the new SOE system to prevent an excessive movement of retained soil and as well as sudden collapse of basement wall or slab. The structural demands on partially demolished basement wall and slabs were evaluated per demolition and tieback installation sequences to prevent a sudden collapse of the basement wall or slab before the completion of proper bracing mechanism of the new SOE system. Depends on the evaluation outcome, the tieback elevation and deconstruction sequencing were adjusted. Presenter will talk about the challenges of deconstruction of this deep basement wall in urban setting and discuss about engineering methodology adapted to engineer the sequences between the demolition of basement structure and the new SOE system.

"Deflection-Based Design for the Capitol Crossing Excavation Support System", **Harald P. Ludwig**, Ph.D., P.E., and **Harry W. Schnabel**, P.E., M.ASCE

The support of excavation (SOE) system for the Capitol Crossing project in Washington, DC consisted of a combination of soldier piles, lagging, tiebacks, braces, underpinning, single auger soil mixed (SASM) walls, micropiles, and a tiedback slurry wall. Over 130,000 square feet of SOE was installed with more than 1,300 tiebacks providing lateral support for excavation depths of up to 72 feet. Several existing structures that were close to the site were supported by a combination of conventional hand dug underpinning pits, bracket piles, and stiff SASM walls.

This paper will focus on the design and performance of the SOE adjacent to two of the existing structures, the Holy Rosary Church and the Bell Tower. Deflection-based design was used to estimate the movements these structures so that any potential damage could be avoided. An extensive monitoring program was used to provide real time movement data. The results of this monitoring program will be discussed in terms of estimated movements versus actual movements.

"*Multi-Purpose Cofferdam for Lake Manatee Dam Phase II Repairs*", **Ahmed Mahgoub**, Ph.D., P.Eng., M.ASCE and **Glen R. Andersen**, Ph.D., P.E., M.ASCE

An innovative cofferdam system has been designed for the Phase II Repairs on the Lake Manatee Dam in Manatee County, Florida. The Service Spillway is being retrofit with a new seepage control system. A portion of this work involves the use of a cofferdam composed of internally-braced sheetpile sections and combi-wall sections to span across the intake channel and to retain a portion of the embankment. The embedded portion of the cofferdam surrounding the spillway approach walls will remain in place as a part of a new seepage control system. Initial design calculations indicated some locations with complex soil-structure interactions that could not be adequately modeled with standard approaches. Accordingly, finite element modeling techniques were employed to verify the initial calculations and to identify critical design elements required for stability. This presentation focuses on the design process for the cofferdam and on the usefulness of the finite element method in identifying and addressing key aspects of the

complex soil-structure interactions that will be present both during the dewatering process and the subsequent long-term performance of the new seepage control system.

"Accommodation Variable Subsurface Conditions for Major League Soccer Stadium Excavation Support", **Gregory A. Terri,** P.E., M.ASCE

Approximately 1,400 wall feet of temporary earth retention was required to allow for excavations as deep as 40 feet below street level as part of the below grade construction of the new Major League Stadium in Saint Louis.

The subsurface conditions and highly variable rock elevations resulted in selection of a drilled and rock-socket soldier beam and lagging system, tied-back with high-capacity strand anchors into rock. Rock bolting was also required to allow for excavations below existing drilled piers supporting a bridge. The discussion will focus on the design, sequencing, monitoring and performance of the system.