5th Annual Web Conferences 2020

Technical Committees

December 7 – 11, 2020

Live Streaming Daily – Technical Case Studies

The Geo-Institute Technical Committees will be live streaming the Earth Retaining Structures Technical Committee Thursday, December 10 at 11 AM EST. The topics include:

"UNDERPINNING METHODS AND INNOVATIONS," **Matthew J. Niermann**, PE, M. ASCE

Underpinning is the act of extending a foundation to a suitable bearing stratum. There are many methods to accomplish this. Selection of the appropriate method depends on technical factors such as the condition of the structure to be underpinned, the type of foundation to be underpinned, the depth of underpinning, the magnitude of loads on the foundation, and the subsurface conditions at the site. However, even more importantly, selection of the appropriate method must consider worker safety. This presentation will describe several common underpinning techniques used today. In addition, a new method of underpinning that improves worker safety will be introduced.

"CASE STUDIES OF EXCAVATION-INDUCED SETTLEMENTS", **Wystan Carswell**, PhD, PE, M.ASCE

For deep excavations in soft cohesive soils, the evaluation of factor of safety against basal heave is important not only for the stability of the excavation, but also as an indicator of how adjacent structures may be affected. Deep excavations with low factors of safety against basal heave may lead to ground movements that reach well beyond typically assumed "zones of influence" of the excavation (e.g., 1 horizontal to 1 vertical from the bottom of the excavation). This presentation will focus on the performance data from four deep excavations (approximately 40 ft deep) in the Greater Boston area, looking particularly at the relationship between site plan area and excavation-related movements. Topics of discussion will include the formation of expectations and communication of risk with project stakeholders, recommendations for future project planning, how to assess excavation support systems and building monitoring data during construction, and potential mitigation strategies to ensure successful project delivery.

"DIAPHRAGM WALL WITH POST-TENSIONED ANCHORS IN NON-CONTROLLED FILL MATERIALS," **Rozbeh B. Moghaddam**, PhD, PE, M.ASCE

Deep excavations associated with the construction of underground parking garages for major corporate buildings create significant challenges for geotechnical engineers, especially when the subsurface material consist of non-controlled fill. This paper provides a detailed description of a project located in Santa Fe, Mexico City, Mexico, where two corporate towers with 26 and 12 stories and 8 basement levels were built on a 1970s landfill site. Based on the maximum depth of excavation and local restrictions on deformations for major road arteries located in close proximity to the project site, the retaining system selected for the project consisted of a diaphragm wall reinforced with post-tension anchors. In addition to geotechnical drilling and sampling, results of three full scale pull-out test completed at the north end of the project site are discussed. From the load tests, cable elongations were recorded to be less than 1% of the bonded length of the anchors.

"PORTLAND CSO BASIN: DIAPHRAGM WALL ENGINEERING OUTSIDE THE BOX," **Brian Barkauskas**, PE, M.ASCE and **Lola Moussey**, EI

The Louisville and Jefferson County Metropolitan Sewer District are well underway through a $1.15-billion dollar program, Project WIN, designed to meet a federal consent decree required to reduce and mitigate the effects of Combined Sewer Overflows (CSO) and to eliminate Sanitary Sewer Overflows (SSO) and any other unauthorized

discharges. As part of the overall program, a large underground storage basin was required to be constructed that would offer protection to the Ohio River from CSO's. Challenging site and soil conditions drove the support of excavation designer and installer, Nicholson Construction, to think well outside the box to create a solution to supporting an approximate 250-foot diameter excavation. This case study will walk through the aspects of the project from planning to construction.