CEE 595 – Geotechnical Engineering Seminar

Wednesday, May 2, 2018 – 11:00AM, Newmark Lab 2310

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"Trust but verify"
A Case History of MSE Wall Failure: Finite Element Modeling and Evaluation

Abstract: This paper presents a case history of a mechanically stabilized earth (MSE) wall failure along with the results of finite element modeling and evaluation of the failure mechanism. The 11.5-meter high wall is comprised of steel reinforcing strips embedded in compacted backfill and connected to reinforced concrete facing panels. Some of the facing panels were installed atop abandoned drilled caissons that were originally constructed for an adjacent building. At ten of the caisson locations, the reinforcing strips sheared at the connection with the wall panels, and the panels fell off the wall. Results of the finite element analyses indicate that failure occurred due to excessive tensile stresses in the reinforcing strips as a result of differential settlement between the panels and the strips. Parametric analyses were performed for the present and final loading conditions to help devise corrective measures to prevent any future failure of the MSE wall.

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"There are no good sites left"
A Case History of 3400 Overton Office Building/Parking Deck

Abstract: The plan for initial site development of a seven-story office building and 6 level pre-cast parking deck was to excavate the site to the finish subgrade elevations for the building and parking deck and support them on auger-cast piles. However, the locations of these structures required extensive retaining walls around them to accommodate grade changes and access. A steep slope of uncontrolled boulder laden fill located on the north side of the building was analyzed and determined to be unstable such that failure could undermine the building. After analyses of various retaining wall configurations, the owners decided to move the loading dock to the northwest side of the building and design/construct a reinforced geogrid retaining wall on this slope by first excavating to an elevation that would protect the foundation if slope failure occurred. Detailed air track holes, soil test borings and test explorations to define subsurface conditions revealed that the uncontrolled fill slope also included a large volume of massive rock boulders which would prevent the installation of deep foundations.

Consequently, the contractor over excavated the building site to near elevation 925 to remove the boulder and fill. Any further excavation to remove the boulders would be isolated to a trench along the two interior column lines, with individual cap excavations for perimeter columns; both would be backfilled with a compacted soil/rock mix or flowable fill. The contractor and owner decided to crush the rock on site to a 4" size, mix it with the stockpiled soil, and re-fill the building pad to final subgrade near elevation 942. The reinforced earth walls were constructed for the building parking decks and roads. Installation of deep foundations then proceeded without incident.

Speaker Bio:

James L. Willmer, known by his colleagues and friends as "Jim", reflects a passionate and focused career that exemplifies service to the public, his clients, the engineering community, his colleagues, friends and family. Jim's passion for geotechnical engineering is demonstrated by his master's degree in geotechnical and structural engineering from the University of Illinois in Champaign-Urbana and a lifetime of project work in these disciplines; as well as embracing the challenge of applying his geotechnical knowledge in solving environmental engineering and construction materials testing challenges throughout his 45 years of engineering in Atlanta, the Southeast, and 32 states across the U.S. and the Caribbean islands. Jim was recently selected as the 2018 Engineer of the Year in Georgia by the Georgia Society of Professional Engineers.