Presentation:

Construction Over Subsidence-prone Karst Terrain

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Karst terrain is present in the vast majority of the states in the U.S. Most of these areas are due to the presence of underlying limestone (or carbonate) bedrock that have voids or cavities, which at some point can get filled or partially filled with overlying soil overburden, or can occasionally collapse. When this occurs, the soil and bedrock above it is drawn downward. The resulting subsidence would be in the form of surface sags or sinkholes and occasionally can be catastrophic. This phenomenon has occurred over geologic time, but can occur in present time mainly when exacerbated by changes from area development and site construction.

When dealing with construction over karst terrain, the assessment of subsidence risk and potential damage becomes very important. There is a wide range of alternatives in the treatment of karst conditions, with associated costs ranging into the millions of dollars for commercial buildings. Therefore, the engineer's recommended treatment can result in a viable project or one that is cost prohibitive.

The presentation will discuss the various aspects of area development, site construction, and subsurface conditions which play key roles in subsidence type, breadth, magnitude, and occurrence frequency. Of equal or possibly greater importance, is how the expected subsidence will be related to the potential damage. Also, various mitigation techniques and the use of a subsidence detection system with their relative costs will be discussed.

Biography:

Abdolreza (Reza) Osouli, Ph.D., P.E. is the executive director of MEA. He started working at MEA in 2008 when he was at the University of Illinois Urbana Champaign working on his PhD degree in geotechnical engineering. With MEA, Dr. Osouli over the years has graduated from a Staff Engineer, a Geotechnical Engineer, a Project Engineer, a Senior Geotechnical Engineering Consultant to the Executive Director. Dr. Osouli also has been active in research and has published over 70 peer-reviewed journal and conference papers related to deep excavations, pier group foundations, geotechnical numerical analyses, geo-construction, slope stability, subsidence engineering, mine stability, rock mechanics, surface erosion levees, scours in riverbeds, base and subbase aggregate quality control for pavements, seismic performance of retaining walls, and liquefaction. Dr. Osouli also has co-authored many technical reports for various projects related to subsidence engineering and forensic engineering. Dr. Osouli has supervised engineers and technician in conducting subsurface investigation involving field and laboratory testing on soils and rocks, grouting operation of underground mine voids, seepage and stability of levees and slopes, design and analyses of underground coal mines as practicing engineer and researcher. Dr. Osouli has been member of ASCE G-I Embankments, Dams and Slopes Committee and Geotechnics of Soil Erosion for a number of years.