The Geo-Institute Sustainability in Geotechnical Engineering Technical Committee will live-stream the session **"Recent Advances in Shallow Foundations"** on Friday, December 6, at 2 PM EST. The topics include:

"Design of Stiffened Slabs on Grad" **Jean-Louis Briaud**

When a light building is to be founded on a shrink swell soil where the water table is at some depth, the soil layer between the foundation level and the water table can shrink and swell during the seasons. This induces a soil movement under the foundation which is larger at the edges than at the center of the foundation; this distorts and potentially cracks a brittle structure. The role of the foundation is to be stiff enough to minimize that distortion to an acceptable level. Stiffened slabs on grade sometimes called waffle slabs consist of deep beams in both directions covered by a thin slab on grade. Limiting the deflection at the edges of the slab is the basis for the design of such foundation which are common for one to three stories light buildings such as houses and warehouses. The presentation describes a method which has been developed over years of research to calculate the required depth of the beams. Given the load on the slab, the method called TAMU-Slab allows the engineer to calculate the bending moment, the shear force, and the deflection in the beam. Given the distortion criterion, it iterates on beam depth until the criterion is satisfied. The parameters involved in the calculations include the depth of the active zone, the change in water content or water tension in the soil, the beam spacing, the structural load, and the distortion criterion. The output is the beam depth. Two case histories are presented to illustrate the design.

"Levee Foundation and Seepage Investigation Using Electrical Resistivity Imaging" **Hossain, J**

A levee may be composed of multiple features acting as a physical barrier to prevent water from entering the leveed area. It is important to identify the lateral and vertical extent of seepage water to properly design these levee features. The current industry practice involves performing geotechnical drilling on the levee to assist in the design of such features. However, geotechnical drilling provides information only at one point and interpolation and engineering judgement is required to establish the possible subsurface condition between the boreholes. The current case study focuses on the use of geophysical methods in addition to geotechnical drilling to establish a continuous image of subsurface condition for the Evaluation of the Levee Seepage and Stability at both embankment and foundation soil. Multichannel Electrical Resistivity Imaging (ERI) was used for enhanced mapping of lateral and vertical variations in subsurface and extent of the seepage zone at the Levee and Foundation Soil. Based on the ERI results, soil test borings were performed within and outside of the seepage zone to obtain physical properties of the subsurface soil strata. Seepage analyses were performed in GEOSLOPE which matched the observed phenomena in the field. The benefit of the current approach to designing different levee features is discussed.

"Mapping Voids under the Existing Foundations using a combination of Ground Penetration Radar and Electrical Resistivity Imaging Methods" **Khan, S**

Voids can undermine soil and foundation stability, leading to sudden collapses or gradual settlement. In transportation infrastructure, unnoticed voids can cause road subsidence, bridge failures, or tunnel collapses, resulting in disruptions and significant safety concerns. This study explores the effectiveness of combining Electrical Resistivity Imaging (ERI) and Ground Penetrating Radar (GPR) for detecting and characterizing subsurface voids at shallower depths at a construction site. Using a comprehensive approach, the research conducted surveys in both longitudinal and horizontal directions. The results revealed strong correlations between ERI and GPR data, effectively identifying voids at various depths and detecting extensions of void influences beyond initial areas. The integration of ERI and GPR proved highly effective in distinguishing between void and non-void areas, offering a more reliable and detailed subsurface assessment than either method alone. This study advances geotechnical engineering by demonstrating that combining ERI and GPR enhances project safety, reduces unexpected costs, and improves infrastructure sustainability. The integrated approach facilitates early detection and characterization of subsurface voids, providing a robust method for mitigating risks associated with underground anomalies in construction and transportation projects.