GSI W-16 Webinar Entitled:

"Sand Drains-to-Wick Drains-to-Sand Columns"

Webinar Overview

This webinar begins with Terzaghi's consolidation work (extended by Barron) leading directly to consolidation of saturated soils using the technique of sand drains. It then describes a case history failure resulting in a $6M judgement against the design consultant. This project (and greater economic efficiency) led directly to the use of wick drains; also called prefabricated vertical drains or simply PVD's. They are described and illustrated along with concerns of kinking and smear. The requisite research design is numerically illustrated to arrive at a satisfactory factor-of-safety flow value.

This body of work on drainage, however, has a direct relationship on stability of soft soils using the technique of stone columns. Now using columns of sand encased in a geotextile we have a method to both simultaneously drain soft saturated soils and stabilize the site against shear failure as occurred in the case history cited previously. The technology, including its installation, has indeed come full-circle.

Learning Objectives

Participants will learn one-dimensional vertical consolidation (K. Terzaghi) and its extension to radial flow (R. Barron) of soft saturated soils. The classical method of draining, such soils by sand drains is illustrated by a case history. Unfortunately, the site failed resulting in major litigation which was ugly to say the least. However, the introduction and use of wick drains (aka, PVDs) has completely taken over this application. Issues of kinking and smear will be addressed along with FS-design for flow rate and dewatering. These soft soil sites are indeed sensitive to shear failures and by using the classical sand drain installation method now with a geotextile encased sand column we have both drainage and stability.

Webinar Benefits

1. Review vertical and radial consolidation
2. Learn how to design with sand drains
3. Learn about a major field failure
4. Understand the transition to wick drains
5. Learn about wick drain design
6. Understand the similarities between sand drains and sand columns for stabilization

Intended Audiences

Public and private owners of transportation, geotechnical, hydraulic and environmental facilities; consultants and designers in the private sector; regulators and agency personnel at the federal, state and local levels; geosynthetic manufacturers and their representatives; geotechnical and geosynthetic testing organization personnel; contractors and installers of geosynthetic systems; academic and research groups; and others desiring technically related information on this important aspect of our constructed environment.

Specific Topics Covered

1. Terzaghi/Barron Consolidation Theory
2. Sand Drains to Shorten "H"
3. Case History of a Major Sand Drain Failure
4. Wick Drains (aka, PVDs) Take Over
5. Sand Columns for Stability Reappear
6. Summary and Conclusions

Webinar Instructor

Dr. Robert M. Koerner's (Professor Emeritus of Civil Engineering at Drexel University and Director Emeritus of the Geosynthetic Institute) interest in geosynthetics spans over thirty years of teaching, research, writing and advising. He holds his Ph.D. in Geotechnical Engineering from Duke University. He is a registered Professional Engineer in Pennsylvania, a Distinguished Member of ASCE, a Diplomate of the GeoInstitute and a member of the National Academy of Engineering. Bob has authored and co-authored about 700 papers on geosynthetics and geotechnical topics in journals and at national and international conferences. His most widely used publication is the sixth edition of the textbook entitled *"Designing with Geosynthetics"*. He is the founding director of the Geosynthetic Institute which is a nonprofit research and development organization dedicated to the proper use of geosynthetics in its myriad applications. The institute also provides laboratory accreditation and inspection certification programs.