

GSI W-15 Webinar Entitled:

“In-Situ Stabilization of Soil Slopes Using Nailed or Anchored Geosynthetics

Webinar Overview

The sliding of soil slopes in the form of localized landslides represents an annual loss of \$2-5B in America along with an associated 25 to 50 casualties. Theoretically, such failures are readily analyzed; e.g., simplified Bishop for rotational surfaces and Corps of Engineers wedge method for translational surfaces. For existing slopes which cannot be completely reconstructed due to structures at the top or toe of the slope, however, an in-situ remedial method is necessary. This webinar focuses on a geosynthetic placed on the existing soil's surface and then nailed or anchored into the soil beyond the potential failure surface. Originally called “anchored spider-netting”, the method provides several benefits, each of which increases the factor-of-safety, for example,

- increases soil friction
- increases soil cohesion
- nails penetrate the failure plane
- geosynthetic force is added along potential failure plane
- moment due to geosynthetic at ground surface exists

Numeric examples including the above listed benefits are given illustrating the resulting increases in FS-values.

Original field trials in the 1980's are shown using a gathered knit geotextile and hand-driven soil nails. Interestingly all activity then ceased for some twenty-years. Perhaps the 1986 patent on the technique thwarted the method's implementation? Since 2010, however, at least ten manufacturers, contractors or developers have taken up the concept using different soil covering materials as well as various nailing or anchoring systems. Each of these newer methods will be illustrated with a comparison made at the conclusion of the webinar.

Learning Objectives

Participants will become familiar with details of this in-situ soil slope stabilization method. It is indeed a juxtaposition of geosynthetics and ground modification. The factor-of-safety improvements are illustrated by means of theory and examples, as well as description of the commercially available approaches to the technique. This webinar will hopefully lead to mitigating the large number of shallow soil slope failures along our highways as well as on private and public lands.

Webinar Benefits

- (i) Understand the nature and magnitude of soil slope failures
- (ii) Learn about the underlying theory of landslides
- (iii) Learn how the theory is modified using this technique

- (iv) Learn about the initial field trials
- (v) Be exposed to the wide variety of presently available installations
- (vi) Appreciate the differences of the currently available method

Intended Audiences

Owners of sensitive or quasi-stable soil slopes in both the public and private sectors; federal, state and regional geotechnical, transportation, and environmental engineers; engineers from municipal districts and townships; private and municipal land developers, architectural and landscape designers; general civil consulting engineers; testing laboratories servicing these organizations; manufacturers and representatives of geosynthetic materials; ground modification contractors and installers of in-situ soil slope stabilization methods; academic and research groups; and others desiring technically related information on this important aspect of our constructed infrastructure.

Specific Topics Covered

1. Introduction and Theoretical Background
2. Required Theoretical Modifications
3. Soil Nailing and Surface Geosynthetic Effects
4. Implementation of Nailed or Anchored Geosynthetics
5. Current Activity by the Industry
6. Summary and Conclusions

Webinar Instructor

Dr. George R. Koerner is the current director of the Geosynthetic Institute, a position that he has held since 2014. George's interest in geosynthetics spans his entire professional life from undergraduate work in the 1980's to the present. He holds his PH.D. in Civil, Architectural and Environmental Engineering from Drexel University in Philadelphia. George's master thesis was on direct shear testing of geosynthetic interfaces and his doctoral dissertation was on landfill leachate clogging of soil and geosynthetic filters. Both are regularly cited to this day.

Dr. George Koerner is a Professional Engineer in both Pennsylvania and New Jersey, and is an ASQC Quality Auditor. During his 30-years of geosynthetic activities, Dr. Koerner's output has been tremendous and he has to his credit the following publications:

- Books Edited or Co-Edited – 15
- Journal Papers – 18
- Symposium and Conference Publications – 40
- Book Chapters and Published Reports – 4
- Miscellaneous Articles – 30

The Geosynthetic Institute is a nonprofit research and development organization dedicated to the proper use of geosynthetics in its myriad applications. As director of the Geosynthetic Institute, Dr. George Koerner is also in charge of the laboratory accreditation and inspection certification programs.