6th Annual Web Conferences 2020
Technical Committees

Live Streaming Daily – Technical Case Studies

December 6 – 10, 2021

The Geo-Institute Embankments Dams and Slopes Technical Committee will live-stream the session "*Extreme Events on Civil Infrastructures*" on Monday, December 6 at 11 AM EST. The topics include:

"Drilled quicklime to stop landslides in soils containing expansive clay," **Richards L Handy**, Ph.D., P.E., M.ASCE

Drilled quicklime was first used and reported in Civil Engineering in 1965. This is the first published account of what has been learned. The process involves filling boreholes made on a grid pattern and extending down to the base of an active landslide, and has saved over 100 houses in several states. The following reactions have been identified: (1) Only the active part of a landslide requires treatment; (2) hydration of lime takes water from the soil so sliding stops; (3) expansion distributes hydrated lime out into cracks in the soil, where it (4) increases the soil plastic limit so it exceeds the moisture content, and (recently discovered) (5) slowly destroys the expansive clay so components engage in pozzolanic cementation reactions that render the soil almost rock-hard and are permanent.

"*Mobilized Shear Strength of a Compacted Fill Slope,*" **Lucia Moya**, S.M.ASCE., **Jiale Lin**, S.M.ACE, and **Timothy D. Stark**, Ph.D., P.E., D.GE., F.ASCE

Water infiltration can cause softening of compacted fill and a reduction of the shear strength from peak to the fully softened strength and an accompanying reduction in factor of safety (FOS). This presentation will describe a case study of a compacted fill slope failure that occurred six years after its construction due to raising of the phreatic surface from irrigation and a leaking connection between the main and lateral water supply pipes. The compacted fill material primarily consists of high plasticity clayey soil. The FOS was 2.25 at the end of construction using the peak compacted shear strength parameters. The FOS was found to be close to unity (1) when the FSS was assigned to the compacted fill material with an appropriate phreatic surface, which means the compacted fill softened within six years mobilizing a slide mass with a maximum depth of about 4 m.

"*Ohio DOT Design of Drilled Shaft Landslide Stabilization*," **Alexander B.C. Dettloff**, P.E., M.ASCE

In the last two decades, drilled shafts have become the most commonly used and economical solution for stabilizing landslides occurring along the transportation system in the state of Ohio. This presentation will detail how the Ohio Department of Transportation has taken the results of research studies performed from 2000 to 2016, and developed an optimized design methodology for these drilled shaft systems, which is described in Ohio Department of Transportation Geotechnical Bulletin #7 titled: Drilled Shaft Landslide Stabilization Design.

"*Infrastructure System Performance during Hurricane Ida*," **Adda Athanasopolous-Zekkos**, Ph.D., M.ASCE and **Navid H. Jafari**, Ph.D., M.ASCE

This presentation will discuss the findings from the GEER and NEER reconnaissance and analysis of Hurricane Ida on the coastal infrastructure systems. Hurricane Ida made landfall on 29 August 2021 – the same day as Hurricane Katrina 16 years ago. The Louisiana coast experienced a combined peak storm surge and waves of 13 ft, which caused localized floodside erosion of levees, shoreline erosion and dune overwash, and significant damage to the electrical power grid and telecommunications. The lessons learned from this case study will be compared to performance of coastal infrastructure with historical hurricanes, such as Hurricanes Katrina in 2005, Gustav in 2008, Ike in 2012, and Zeta in 2020.