Virginia Tech
Center for Geotechnical Practice and Research
Annual Lecture Program

Thursday, March 30, 2017

Alumni Assembly Hall
Inn at Virginia Tech and Skelton Conference Center
Blacksburg, Virginia

8:00-8:45 "Widely Spaced Shear Walls Stabilize Landslide to Protect Trunk Highway"
Rick Deschamps, P.E., Ph.D.

In 2003 a landslide in Crookston MN caused extensive damage to home owners and jeopardized Trunk Highway 2, a main East-West road to Grand Forks ND. A team selected by the MN Department of Transportation stabilized the area using large shear walls installed parallel to the displacement vectors across the site. The shear walls were 100 feet (30 m) in length, 3 feet (1m) in width, and spaced 90 feet apart. The walls were constructed with a cement-bentonite mixture by excavating 65 feet through the lake clays and penetrating 10 ft (3m) into the underlying glacial till. The walls have been in place for approximately a year and a half. The presentation will describe the design, construction and performance of the walls.

9:00-9:45 "Case Study: Displacement Cast-in-Place Piles in Coastal Plain Soils"
James P. Racine, MS. CE, P.E. and Karl A. Higgins, III, P.E., D.GE.

Displacement Cast-in-Place (DCIP) piles are not a common deep foundation type in the DC Metro Area. As a result, less regional data was available for these foundations compared to other more traditional deep foundation types. DCIP piles are formed by pushing a displacing body tipped with a partially-flighted auger bit to depth through the application of force and torque. Twenty static load tests showed that DCIP piles did not consistently achieve higher capacities when installed in over-consolidated clays and dense sands. It is theorized that the much slower penetration rate in the dense bearing stratums actually resulted in reducing the shear strength of the soils to residual values. Achieving consistent tip elevations and embedment into the bearing stratum was a frequent problem for the DCIP piles, necessitating the need for pre-augering, and ultimately a switch to ACIP piles to complete the project.

10:00-10:45 "Nepal Hydro Project Post-Earthquake Evaluation"
Ray E. Martin, Ph.D., P.E., D.GE. and Binod Tiwari, Ph.D., P.E.

The Upper Tamakoshi Hydroelectric Project was under construction in Nepal in 2015 when two large earthquakes occurred. The authors were part of a Panel of Experts assembled with the charge of evaluating: 1) differential settlements and displacements of various monoliths of the concrete dam under construction; 2) remedial measures proposed by project consultants for needed repairs; and 3) other critical issues observed that posed risks to the future completed project. Because of this damage the project construction was suspended and an assessment of the causes of the damage and other potential threats to the project moving forward were conducted. This paper discusses the geology of the region, the impact of regional seismicity, the foundation settlements, concerns about the left abutment, and the risk of rock falls and landslides in the project area.

Keynote Speaker

11:00-12:00 "Design and Construction of Modern Earth and Rockfill Dams"
Joseph Ehasz, P.E.

The lecture discusses the design evolution of embankment dams and illustrates that the final design is not complete until the dam is constructed and the reservoir is full. It outlines the economic factors affected by topography, geology and availability of local materials. It also illustrates that the design must be flexible and conservative with respect to stability and be able to incorporate and adapt to unforeseen conditions during construction, as illustrated by discussion of the construction of two dams, and the performance over the last 12 years of a third - a 200-meter high embankment dam.

12:00 The lecturers, CGPR members, and Virginia Tech faculty and graduate students are invited to join us for lunch in Latham Ballroom