CE 295 - RESEARCH SEMINARS in STRUCTURAL & GEOTECHNICAL ENGINEERING

Axial and Lateral Pile Behavior in Liquefied Sands From Blast Liquefaction Testing

Date: Thursday, November 21st , 2013
Time: 4:00 – 4:50 pm
Room: EG - 3161

Guest Speaker: Prof. Kyle Rollins, Ph.D., P.E

Photos showing liquefaction induced settlement of 11 inches around the test pile that

Abstract:

To improve our understanding of the axial and lateral load behavior of deep foundations in liquefied soil, BYU has conducted a series of full-scale tests using blast induced liquefaction. Lateral load tests were conducted statically at Treasure Island on piles and drilled shafts. Later, static and dynamic lateral load tests, using a statnamic rocket sled, were conducted in Charleston, South Carolina for the Cooper River Bridge. Based on these tests, p-y curves were developed for liquefied sand which account for both pile diameter and sand density. These p-y curves provide reasonable estimates of pile performance observed in field, centrifuge and large shaking table tests. More recently, blast liquefaction testing has been used to determine the negative skin friction and downdrag on a steel pile in Vancouver, Canada and three CFA piles in Christchurch, New Zealand. In contrast to some theories, measured negative skin friction in the liquefied sand was not zero. As the liquefied sand reconsolidated, the sand exerted negative friction which was about 50% of the positive skin friction before liquefaction. Dr. Rollins will highlight the results from these tests and show videos of the blast liquefaction, sand boil formation, and Statnamic loading.

Bio:

Kyle Rollins received his BS degree from Brigham Young University and his Ph.D. from the University of California at Berkeley. After working as a geotechnical consultant, he joined the Civil Engineering faculty at BYU in 1987 following after his father who was previously a geotechnical professor. His research has involved geotechnical earthquake engineering, deep foundation behavior, bridge abutments, collapsible soils and soil improvement techniques. He has published nearly 150 technical papers and supervised over 100 graduate students. He was recognized as the engineering educator of the year by the Utah State Engineers Council and received the Maeser Research Award at BYU. ASCE recognized his work with the Huber research award and the Wellington prize. In 2009, he was the Cross-Canada Geotechnical lecturer for the Canadian Geotechnical Society.