

ANNUNCIO SEMINARIO

**Downdrag and Dragload Behavior of Piles from Blast Induced Liquefaction Testing**

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Abstract

Frequently, deep foundations extend through liquefiable sand layers and bear on more competent layers at depth. When liquefaction occurs, the skin friction in the liquefied layer would be expected to decrease to near zero; however, as pore pressure dissipates and the liquefiable layer settles, negative skin friction could potentially develop around the pile in this layer. To investigate this phenomenon, axial load tests were performed on instrumented full-scale driven piles, augercast piles, and micropiles before and after blast-induced liquefaction. Tests were performed at sites in Canada, New Zealand and Italy. Typically, following liquefaction, the ground around the pile settled significantly (75 to 270 mm). Skin friction in the liquefied layer dropped to essentially zero after liquefaction. However, negative skin friction equal to about 50% of the pre-blast positive skin friction developed as the liquefied soil reconsolidated. The neutral plane method provided reasonable estimates of the resulting pile settlement which was often quite small in comparison to the maximum ground settlement. When applied load caused the pile to settle more than the surrounding soil, negative friction changed to positive friction. Videos of the blasting and associated liquefaction will be shown.

Short 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 abutment behavior, collapsible soils and soil improvement techniques. He has published over 180 technical papers and supervised 125 graduate students. ASCE recognized his work with the Huber research award, the Wellington prize, and the Wallace Hayward Baker award. In 2014, he received the JorjOsterberg Award from the Deep

Foundations Institute and in 2009 he was the Cross-Canada Geotechnical lecturer for the Canadian Geotechnical Society.