Vancouver Geotechnical Society
A Local Section of the Canadian Geotechnical Society

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NOTICE OF UPCOMING AGM & TECHNICAL PRESENTATION

Wednesday, September 14, 2016

SUBJECT: **Ground Improvement and Liquefaction Mitigation using Driven Timber Piles**

SPEAKER: **Armin W. Stuedlein, Associate Professor –** *Oregon State University*

Armin is an Associate Professor in the School of Civil and Construction Engineering at Oregon State University. Armin received his doctorate at the University of Washington in 2008. He joined the faculty at OSU in 2009 after five years of geotechnical consulting at Seattle-based firms, where he specialized in port and harbor engineering with an emphasis on foundation and earthquake engineering. His research focuses on ground improvement, reinforced soils, foundations, and the characterization and incorporation of inherent soil variability and model transformation errors, with methodologies that range from full-scale testing, element-level laboratory work, and numerical and statistical simulations. Presently, his research is funded by the Oregon Department of Transportation, the National Science Foundation, and the National Academy of Science, with projects concerning the understanding of the axial, lateral, and torsional load transfer of drilled shaft foundations, tall MSE walls with closely-spaced reinforcements, and drained timber pile ground improvement for liquefaction mitigation. Among other honors, Armin received the 2013 Deep Foundations Institute Young Professor Paper Award and the 2015 Associate Editor of the Year Award for the Journal of Geotechnical and Geoenvironmental Engineering.

CONTENT: Conventional driven timber pile ground improvement can provide a cost-effective liquefaction mitigation method, as it provides densification and reinforcement to an improved subgrade. The potential for drained timber piles to improve densification and potentially reduce in-earthquake pore pressures could allow densification, reinforcement, and drainage in one mitigation method. However, the soil densification possible with timber pile ground improvement is rarely incorporated into stability analyses of supported geostructures because of the current lack of understanding of the amount of densification possible. This study focuses on a field trial of driven conventional and drained timber piles to investigate the effect of pile spacing, time-since-installation, and drainage on the amount of soil densification. The test site consisted of clean to silty sands with a relative density ranging from 40 to 50 percent prior to installation. Following installation of the timber piles spaced at two, three, four, and five pile diameters, cone penetration tests were conducted to evaluate the degree of densification. These tests were performed at approximately 10, 50, 120, and 250 days following installation to evaluate the effect of time and to understand the role of fines content on the degree of densification. In general, the relative density of the soils improved to approximately 60 to 100 percent depending on the pile spacing and the presence of drainage elements. A controlled blasting test plan was also conducted at an un-improved control zone and in the improved timber pile test area to evaluate the effectiveness of this ground improvement alternative to reduce the excess pore-water pressures and mitigate liquefaction. The treated zones were shown to mitigate liquefaction by reducing the peak residual ru values 10 to 25 percent and lowering the soil settlements by approximately 75 percent compared to the un-improved zone.

DETAILS: **Location:** Executive Inn, 4201 Lougheed Highway, Burnaby, BC V5C 3Y6
Social Hour: 5:30 to 6:30 pm (drinks available at the hotel bar)
Annual General Meeting: 6:30 to 7:00 pm
- Report from Previous Year
- Executive Committee Elections

Technical Presentation: 7:00 to 8:00 pm (No need to RSVP)
Dinner: 8:00 pm ($30 will be charged for dinner)

If you would like to stay for dinner, please RSVP to Shane Magnusson via email or at the door shane.magnusson@amecfw.com