



## Vancouver Geotechnical Society

A Local Section of the Canadian Geotechnical Society

[www.v-g-s.ca](http://www.v-g-s.ca)

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## NOTICE OF UPCOMING TECHNICAL PRESENTATION

Thursday, 23 February 2023

**TOPIC:** Field Trials of Microbially Induced Desaturation for Earthquake Liquefaction Mitigation in Portland, Oregon

**SPEAKER:** Diane Moug, Ph.D. – Assistant Professor, Portland State University.

Diane Moug is an Assistant Professor in the Civil and Environmental Engineering department at Portland State University. Her research aims to reduce geotechnical earthquake hazards through improved hazard characterization in poorly-understood soils and innovative mitigation. She is particularly focused on the earthquake hazards of the Pacific Northwest's fine-grained silty soils and at the Critical Energy Infrastructure hub in Portland, Oregon. She also investigates liquefaction mitigation through microbially induced desaturation. Diane teaches courses on introductory and advanced soil mechanics, computational geomechanics, and geotechnical site investigation. She earned a Masters and PhD in Civil Engineering at the University of California, Davis, and a Bachelor's of Applied Science in Geological Engineering at the University of British Columbia. She worked as an engineering consultant at Robertson GeoConsultants Inc. from 2010 to 2012.

**CONTENT:** Earthquake liquefaction hazards in silty soils are a critical problem in Portland, Oregon and other areas around the world. This is a particular problem for existing facilities founded upon silty liquefiable soil, for which there exists no cost-effective mitigation solution at the present time. Recent studies suggest that liquefaction mitigation using microbially-induced desaturation (MID) may provide the capability to do this. MID treatment can be performed by injecting a treatment solution into liquefaction-prone soils. The treatment solution stimulates growth of native bacteria that produce nitrogen gas as a byproduct. The objective of MID is to reduce earthquake-induced excess pore water pressure generation compared to saturated soil, and thereby reduce the potential for triggering liquefaction. This presentation will describe two field trials of MID for liquefaction mitigation performed in Portland, OR in summer 2019. Low-plasticity, liquefiable silts were treated with MID by injecting a treatment solution to stimulate native bacteria for a duration of four weeks. Migration of the treatment solution and saturation ratios were monitored with a range of methods, including: crosshole pressure-wave velocity measurements, a vertical array of embedded sensors that measure water content and bulk electrical conductivity, pre- and post-treatment seismic cone penetration tests, and direct soil sampling of the treated soils. Monitoring at both sites indicated that liquefiable silts were successfully desaturated and that desaturation has sustained for over 3 years.

**DETAILS:** **Location:** Centennial Room, Executive Hotel, 4201 Lougheed Highway, Burnaby, BC V5C 3Y6  
**Social Hour:** 5:30 to 6:30 pm (drinks available at the hotel bar)  
**Technical Presentation:** 6:30 to 7:30 pm (No need to RSVP)  
**Dinner:** 8:00 pm (\$20 will be charged for dinner). If you would like to stay for dinner, please RSVP to Ali Jahanfar via email ([ali.jahanfar@stantec.com](mailto:ali.jahanfar@stantec.com)) or at the door.