



Research Project Highlight

Workshop: Liquefaction Susceptibility Modeling

TSRP Topic: G1 - Triggering criteria

Principal Investigator

Armin W. Stuedlein, Professor, Oregon State University, Corvallis, OR

Co-Principal Investigators

- Jonathan P. Stewart, Professor, University of California, Los Angeles, CA
- T. Matthew Evans, Professor, Oregon State University, Corvallis, OR

Start-End Dates:

2/1/2022-1/31/2023

Abstract

The typical progression of engineering analysis of soil liquefaction involves three steps: determination of liquefaction susceptibility, evaluation of liquefaction triggering for one or more earthquake scenarios, and the assessment of the consequences of liquefaction triggering. Although each of these steps is associated with considerable epistemic uncertainties, the basic framework for engineering analyses of liquefaction triggering and the consequent deformations or instability have been established. However, these analyses hinge upon whether a particular stratum is deemed susceptible to liquefaction, with considerable risk or cost associated with incorrectly assessing susceptibility. The goals of this project are to: (1) organize and conduct a two-day workshop fully-aligned with the ongoing efforts of the Next Generation Liquefaction (NGL) team that is focused on developing improved data resources and models related to liquefaction susceptibility and triggering, and (2) prepare a summary report describing the outcomes of the workshop and the specific consensus-based recommendations on the needed elements of a next-generation liquefaction model and the steps needed to produce such models. The proposed workshop will serve as the ideal venue to present to, and inform the technical community of, the ongoing research by NGL and others to develop liquefaction susceptibility models, engage the community for their input, identify research gaps and necessary data resources, and build a consensus on the principal elements (e.g., input variables, output quantities) of NGL susceptibility models, and what work is needed to ultimately develop such models.

Deliverables

A PEER report summarizing the workshop goals and discussions, the state-of-the-practice consensus, identified research gaps and needed data resources, and research funding opportunities will be prepared and will serve as the main deliverable stemming from this project.

Research Impact

This workshop aims to follow in the footsteps of the 1996 NCEER and 1998 NCEER/NSF workshop on liquefaction triggering, and the 2016 NSF-funded US-Japan-NZ workshop on liquefaction effects to provide a set of consensus-based, short- and long-term recommendations for the improved evaluation of

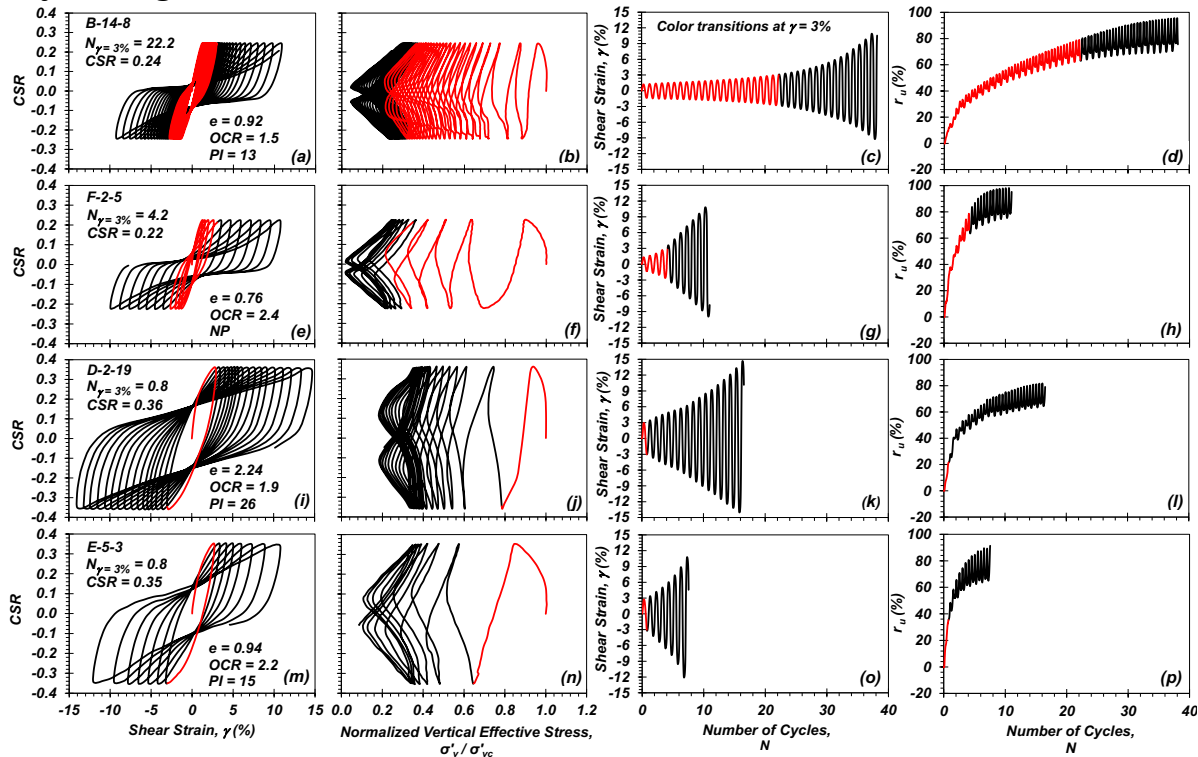


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liquefaction susceptibility and susceptibility modeling. This workshop should produce an immediate impact in the field of geotechnical earthquake engineering through cost- and risk-reduction practices through the adoption of uniform recommendations on liquefaction susceptibility evaluation. Furthermore, this workshop will allow for the improved development of a probabilistic liquefaction susceptibility model that can be seamlessly integrated into a probabilistic liquefaction-triggering model and within a performance- based earthquake engineering (PBEE) methodology.

Project Image



Examples of laboratory element test results on low plasticity silts demonstrating the range in sand-like and clay-like cyclic behavior for soils with varying and similar index properties and stress histories.