

DRISI

CALTRANS DIVISION OF RESEARCH,
INNOVATION AND SYSTEM INFORMATION

Research Notes

Geotechnical/
Structures

DECEMBER 2023

Project Title:
Consequences-Based Analysis of
Undrained Shear Behavior of Soils
and Liquefaction Hazards, Phase 1:
Filling the Data Gaps

Task Number: 3946

Start Date: September 2021

Completion Date: September 2025

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Consequences-Based Analysis of Undrained Shear Behavior of Soils and Liquefaction Hazards, Phase 1: Filling the Data Gaps

The objective of this Phase 1 study is to fill critical data gaps to document the undrained shear behavior of sands, silts, and clays for both static and dynamic loadings, and to provide a preliminary set of predictive models for the undrained shear response of soils.

WHAT IS THE NEED?

The overall objective of this multi-year, multi-phase effort is to create a true performance-based model to evaluate the consequences of undrained response in all soils, including consequences resulting from earthquake-induced liquefaction and cyclic softening. Through this overall project, a more robust method for estimating field performance of soils during undrained events (including earthquakes) will be developed and tested.

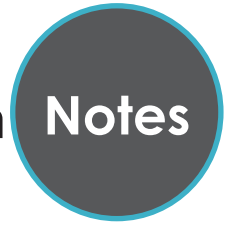
WHAT ARE WE DOING?

Funded tasks for this study include the following:

- (1) Perform a literature review of related studies.
- (2) Conduct a field sampling program for transitional soils at sites in several states.
- (3) Perform laboratory tests.
- (4) Compile a database of soil in-situ resistance and corresponding undrained shear strength and strains from across the United States.
- (5) As part of the Next Generation Liquefaction (NGL) Project modeling effort, develop and deliver a preliminary set of predictive models based on available field-case-history data for the monotonic and cyclic undrained shear response of soils.



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knowledge that improves
California's transportation system



WHAT IS OUR GOAL?

The objective of this Phase 1 study is to fill critical data gaps to document the undrained shear behavior of sands, silts, and clays for both static and dynamic loadings, and to provide a preliminary set of predictive models for the undrained shear response of soils.

WHAT IS THE BENEFIT?

The overall objective of this multi-year, multi-phase effort is to create a true performance-based model to evaluate the consequences of undrained response in all soils, including consequences resulting from earthquake-induced liquefaction and cyclic softening. Through this overall project, a more robust method for estimating field performance of soils during undrained events (including earthquakes) will be developed and tested.

WHAT IS THE PROGRESS TO DATE?

Prime consultant not yet finalized for contract. UDOT intends to hire a firm or university as the prime consultant through qualifications-based selection.