Comprehensive Investigation of Nonlinear Site Response: Collaborative Research with UC San Diego and UC Davis

Annual Project Summary
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Non-technical Summary

The objective of this research is to conduct highly accurate and highly instrumented, physical model tests to study the nonlinear behavior of stiff soil sites during earthquakes. Results of this testing program will establish guidelines as to when nonlinear site response analyses are called for, and when linear or equivalent-linear analyses can predict near-surface accelerations with sufficient accuracy. For this purpose, the centrifuge testing technique is employed to thoroughly document the seismic response of a dense compacted sand stratum. The wealth of documented accelerations (surface and downhole) are utilized within a system identification framework in order to fully characterize the damping and stiffness characteristics of stiff soil sites. Appropriate computational models for prediction of seismic site response will be proposed and calibrated, along with the identified dynamic soil properties.