

Soil Investigation & Soil-Structure Interaction Modeling for the Kealakaha Stream Bridge

Principal Investigator:

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Project Sponsor:

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Need:

Need to develop soil-structure interaction model based on the types of soil in Hawaii. Soils in Hawaii are different from the soils in the continental U.S. for which the standard soil-structure models were developed.

Objective:

Develop foundation design procedures for large structures constructed on Hawaii's weathered basalt layers. Record and evaluate the structure's response to earthquakes.

Duration:

February 17, 2004 – February 16, 2007

Cost:

\$95,000

Update:

- A three-dimensional non-linear soil-structure interaction model was created for the piled foundations using OPENSEES, an open source non-linear finite element analysis program being developed by the Pacific Earthquake Engineering Research Center (PEER).
- The soil behavior models in OPENSEES were modified to better represent Hawaiian soils, and to correct errors in the current formulations.
- Field investigation will begin when bridge construction starts; will coordinate with contractor to perform borings and soil sample collection from various depths to assess both static and dynamic foundation material properties
- Due to changes in the value engineering change proposal, a new computational model will be generated for the final structure. The changes include a significant reduction in the foundation size, and complete revision of superstructure design, including the use of a base isolation system.