CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY

Name(s)

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Project Number

J0905

Project Title

Mitigating Liquefaction

Abstract

Objectives/Goals

My goal is to find the best way to alleviate liquefaction. Liquefaction is a property of soil where when it's saturated with water and it comes under stress, such as an earthquake, it behaves like a liquid. I want to alleviate liquefaction by adding things to or changing the soil in some way.

Methods/Materials

There were four repetitions each, where the soil was mixed with sand, mixed with gravel, packed down, and with plain, loose soil (control) completed. I shook a tub with the soil or soil mixture on a track. I put a weighted plastic container as a structure on the soil and a ping-pong ball, representing a sewer, in the soil.

Results

Of the three mitigations, packing the soil down had the best results. I found that the structure on top of the soil sank the least, which was an average of 2.4 cm, and the ping-pong ball within the soil rose the least, which was an average of 2.5 cm. The control structure sank an average of 4.5 cm and the ping-pong ball rose an average of 3.9 cm.

Conclusions/Discussion

From this I can conclude that people in a high-risk liquefaction zone should build their structures and utilities on or in packed soil instead of loose soil, gravel-, or sand-rich soil.

Summary Statement

Finding the best way to reduce the effects of liquefaction by testing different modifications to the soil.

Help Received

My mother helped me type my report and supervised the tests, purchased any materials necessary, and taught me about liquefaction.