CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)
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Project Number
35539

Project Title
Studying Earthquake Intensity on Soils with Varying Moisture Levels

Abstract

Objectives/Goals
The purpose of this experiment is to study and analyze the impact that soils with varying moisture levels have on the intensity of an earthquake. It was hypothesized that when various soils, each with different moisture levels are placed on a shake table, the dry soil will have the most intense earthquake because when there is less weight on the fault, the area becomes susceptible to a more intense earthquake. I compared the readings obtained to the historical data to see if earthquakes and droughts have a relation.

Methods/Materials
Three different soil types were obtained (clay, gravel and sand). Each soil type had three different moisture levels flooded, normal, and dry. I made buildings of different sizes using small cubed wooden blocks and placed them on the shake table. I made a shake table with a large wooden block. I stapled a lid to the bottom of the block where the marbles were placed. The soil would be placed on the wooden block, then I would place a ruler at the side and shake side to side for p-waves. I would repeat this with a different size of marbles. To test for s-wave, I shook up and down instead of side to side testing with large and small marbles. I would repeat everything with different soils, and see how intense the earthquake was. I repeated the experiment three times.

Results
Dry soils are impacted more compared to normal or flooded soils if the soil is low in density.

Conclusions/Discussion
Dryness only makes a difference in a few soils such as sand and gravel. A drought leads to a more intense earthquake if the soil is less dense. Soils with high density such as clay are not as greatly impacted by an earthquake. When the soil is less dense, the lighter the soil is, as density and mass are directly proportional. Lighter weight on a fault is more susceptible to a more intense earthquake. Therefore, my hypothesis was partially supported by my experiment since dryness only makes a difference in a few soils not all.

Summary Statement
In this experiment, I tested to see if there is a relation between moisture levels and earthquake intensity.

Help Received
Mom helped buy materials.