



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Adam G. Mussell	Project Number J0611
Project Title Liquefaction in Action: A Tale of Two Bays	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this project is to find out which areas in the Monterey and San Francisco Bays are most dangerous during an earthquake (the danger being due to liquefaction, the process by which loose, sandy soils lose their stability and turn to liquid during an earthquake). I inquired as to which soils from Monterey and San Francisco Bays would turn to liquids the easiest, and how do their soil compositions differ. I thought San Francisco would be the most susceptible to liquefaction.</p> <p>Methods/Materials To test my hypothesis, I took a total of 26 samples from both bays, and shook them on a shake table. I used a brick with a ruler to measure the depth that a #building# that size would sink, and used that to gauge the susceptibility (to liquefaction) of the soil. The one with the most sinkage would be the most susceptible. I also subjected my soils to a uniformity test, because fine, uniform soils tend to liquefy more easily.</p> <p>Results Soils in San Francisco Bay consistently caused the brick to sink 4 to 5 cm when water was added to the soil, whereas, in Monterey Bay soils, the sinkage varied from 0 to 5 cm, coming to a lower average than San Francisco Bay soils.</p> <p>Conclusions/Discussion I eventually figured out that my hypothesis was correct: soils from San Francisco Bay, particularly the Marina District, are the most susceptible to liquefaction, and generally fairly uniform. Past incidents have shown ample evidence for the danger of liquefaction, such as the 6 billion dollar property cost of the Loma Prieta quake in 1989, and various collapsing bridges around both bay areas. The data suggests that it is more dangerous to build in San Francisco, primarily in the San Francisco Marina.</p>	
Summary Statement My project compares the soils from San Francisco and Monterey Bays and tests them for liquefaction potential to determine which area is more dangerous during an earthquake.	
Help Received Weber and Associates Engineers company gave vials for uniformity test, Parents helped gather samples, mom helped with shake test data gathering.	