CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Evelyn Chang

Project Number
J1802

Project Title
Earthquake: Building Destroyer

Abstract

Objectives/Goals
The objective of my project was to see how the different modes of earthquake effect the damage suffered by the building. I predicted that the combination movement will cause the most damage because the building is suffering from two movements at the same time.

Methods/Materials
*Materials:clay,thin cardboard,toothpicks,foam board,6 springs,2 hold-downs,block of wood,2 large cardboard,marbles,100cm wire,6 nails;2 thin,2 thick

*Procedures:For the building,I used the clay as the columns the thin cardboard as the roof and the toothpicks as reinforcement against collapsing. I build the building on a foam board and connected the board to the springs which are then connected to the block of wood.The whole contraption would then be placed on a large cardboard with marbles to prevent friction. During the experiment, I traced the building before I shook it.Then, I pull the board 7 cm back and let go. Finally, I trace the shaken building and record the distance in mm between the original position and the shaken position. For the combination movement, I would remove the building contraption from the large cardboard and place it on 4 springs attached vertically to another cardboard. During this experiment, I would pull the building back 7 cm and push the building down by4 cm and record my results the results as I did for the horizontal movement. For the vertical, I would simply cut off the horizontal springs and press the board down by 4 cm and record my results the way I did for the previous experiments.

Results
In the horizontal movement, I noticed that the building tilted to the side every time. In the vertical movement, the building did not tilt to the side as much as the horizontal movement, but I noticed a 0.5 mm to 2 mm large gap between the column of the building and the roof. In the combination movement, I did not see as much lateral damage as I did in the horizontal movement, but I noticed a 5 - 27 degrees large twist in the building.

Conclusions/Discussion
The data supported as well as opposed my prediction. It supported my prediction by showing a twist in the building, which could cause more damage than a regular horizontal movement earthquake in reality. However, it opposed my prediction because it did not show the most lateral damage. For my data, I was recording and measuring the lateral damage. I conclude that each movement causes their own damage and therefore could not exactly be compared.

Summary Statement
My project is about the different seismic waves and how they effect a building shaken by it.

Help Received
father helped set-up the shake table, mother helped me with my backboard