CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

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Project Number

33269

Project Title

Earthquake Proof?

Abstract

Objectives/Goals

Does the height of two different buildings affect it#s stability in an Earthquake?

Methods/Materials

Place dowel on surface with different heights at 3 inches, 6 inches, 9 inches, 12 inches, and 15 inches. Drilled a hole so the dowel can snugly fit in the hole. Drill into the middle of the golf ball one inch, then #screw# it into the top of the dowel. Shake the 2 X 4 on each marker for 5 seconds, and measure how long the dowel shakes for. Record how long it shakes each time, and then average the times. Find which length shook the dowel the longest; this is the frequency. Repeat steps 1-8, but now with a new dowel height (35-65 cm). Use the frequency for each of the two lengths of the dowels for next section of the experiment. *There will be two different frequencies for the pairs except for the pair of 25 cm dowels. Drill a hole 2 inches away from the original, and then a half inch away from that hole. Place dowels next to each other in sets of 2 (25 cm x 25 cm, 25 cm X 35 cm, etc).
*When you do the set of 25,25, that is the only time you need to use the farthest hole from the original (step #10). Repeat shaking for each set at the 2 different frequencies found from step #6. Average the number of hits for each frequency (step #9).

Results

Our building heights showed us that the more change, the more movement occurred after finding the frequencies. There were some high frequencies and low frequencies. Both the 45cm dowels and the 65 cm dowels had a frequency of six, which was the lowest frequency we had. The 25cm dowel and the 35cm dowel both had frequencies of 12, which was the middle number for our frequencies. The final dowel, which was our 55cm dowel, had the highest frequency, which was 15.

Conclusions/Discussion

During an earthquake it is better to have buildings that are similar in height so they do not hit each other. When we change the difference between the heights by 10 cm, there was more destruction than having buildings be the same height. Our hypothesis was supported because our data shows that when we increased the 25 cm dowel and 25 cm dowel to the 25 cm dowel and 35 cm dowel, the hits increased by 0.8. A more intense example is when we experimented with the 25 cm dowel and the 65 cm dowel, the 65 cm dowel snapped right off. This example is proof that different height buildings are not a good idea when they are next to each other in an earthquake.

Summary Statement

When buildings are at different heights, and when an earthquake occurs, the smaller building will hit the taller building making the taller building collapse.

Help Received

Dads helping us drill. Coach helping us with board layout.

Preliminary