CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)

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Project Number

35042

Project Title

Stop Drop and Quake

Abstract

Objectives/Goals

Our goal was to design and test the best way to retrofit a two story house to make it earthquake safe.

Methods/Materials

-Foam Board
-Duck Tape
-Bungee Chords
-Tape
-Tennis Balls
-Bean Bags

Results

Our hypothesis was accurate that one of the retrofitted houses will survive the best. During the process we thought the "X" and pole bracing would survive the best but it ended up surviving the second best. The rubber band bracing was an idea that our expert recommended. We were given blueprints of a building being retro fitted. The design on the prints was an old building that was having steel rods placed below the floors to hold the was together. The designs were all successful. We tested them all on the same shake table at a 7.0 magnitude and as it progressed all the earthquake retrofitted houses survived better. We learned that concrete rebar would help it survive because it still might move even if there is no damage. The basic house survived for the shortest time period at the same 7.0 magnitude. The best design was the elastic bracing. The design lasted 41 seconds at a 7.0 magnitude.

After analyzing our results we found that using a stretchable material will hold a building together. When the building was placed on the table it held together. The data shows that if a house was to be retrofitted adding steel rods would hold the walls and the building together. In most buildings the weight of the roof is rested on the walls, so when the walls buckle the roof comes down. With the rubber bands the walls are much stronger.

Summary Statement

How can We retrofit a house to make it earthquake safe?

Help Received

Jessie Lizama (Disaster Kleenup Specialists) and Art Werner (Structural Engineer)