



**CALIFORNIA STATE SCIENCE FAIR  
2013 PROJECT SUMMARY**

<b>Name(s)</b> <b>Krista Celo; Francesca Legaspi</b>	<b>Project Number</b> <b>J0308</b>
<b>Project Title</b> <b>Building Stability during Earthquakes</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of our experiment was to test the effect of different building modifications on its performance during a simulated earthquake. Our goal was to determine which building structural modification provides the most stability and earthquake resistance. <b>Methods/Materials</b> With the assistance of a family friend, we built an earthquake simulator made from sheet metal attached to wooden rods which served as rollers. We used a 7-amp, 120 volt electric drill to power and control the speed of the table. Next, four (4) blocks of wood were overlapped nine (9) stories high, and were placed in the center of the earthquake simulator. The machine was left vibrating and timed until the building collapsed. Three (3) trials were done. At the end of each trial, the building was rebuilt. For the next set of three trials each, we modified the building by adding a cross brace made of popsicle sticks, then a base isolator made of cardboard box filled with marbles, then the last set was a combination of both. <b>Results</b> The building with both cross-bracing and a base isolator was the most stable. It was able to withstand the earthquake simulation the longest time than the 3 other building structures. This building's stability increased by 263% than our original control structure. <b>Conclusions/Discussion</b> Before we commenced this project, our hypothesis was that adding both cross-bracing and a base isolator to our control structure will be the most earthquake resistant. Our experiment confirmed that our hypothesis was correct. The combined modification prevented the building blocks from collapsing longer than any of the other tested structures.	
<b>Summary Statement</b> Our project shows that buildings can be more earthquake resistant by making certain structural modifications (such as cross-bracing, base isolation or a combination of both) to make it more stable during an earthquake.	
<b>Help Received</b> Francesca's father and a family friend helped in designing and building the earthquake simulator table.	