



# CALIFORNIA STATE SCIENCE FAIR

## 2005 PROJECT SUMMARY

Name(s) <b>Omar K. Habbal</b>	Project Number <b>J1806</b>
<b>Project Title</b> <b>Which Earthquake-Resistant Building Technique Works the Best?</b>	
<b>Objectives/Goals</b> The purpose for this project was to find the best way to keep buildings safest during an earthquake. Since a major earthquake is expected in Southern California, we have to prepare for the worst. Building designers already use techniques to help buildings withstand an earthquake, however, they do not know which one will perform the best during an earthquake. This experiment will test three techniques in an earthquake simulator. The first is the rubber foundation technique. The second is the Damper technique, and the third was my own invention, the Ball Bearing technique.	<b>Abstract</b>
<b>Methods/Materials</b> I first constructed the earthquake simulator. To do this, I built a peg board with 4 pegs, each 15 inches apart. I then constructed the three model buildings and applied a technique and weights on each of them. Then, I conducted the experiment. I placed the building inside the earthquake simulator and pulled the rubber band to the 5 cm. line. I pulled the rubber band 1 cm. farther every 5 seconds. I recorded the times they stood standing and how far the rubber band was able to go before the building fell over. I conducted 5 trials.	
<b>Results</b> My results were very surprising. The Rubber Foundation technique stood for an average time of 37 seconds, and the rubber band was able to be pulled to the 13 cm. line. The Damper Technique only stood for an average time of only 29 seconds and the rubber band was able to be pulled to the 11cm. line. My invention, the ball bearing technique, lasted for an average time of 1 minute, 9 seconds and the rubber band was able to be pulled all the way to the 21 cm. line!	
<b>Conclusions/Discussion</b> I have concluded that the Ball Bearing technique was able to withstand an earthquake almost twice as powerful than the Rubber Foundation, or the Damper technique could withstand. Some day in the future, building designers might use my invention to ensure that everyone will remain safe during a major earthquake.	
<b>Summary Statement</b> This project was conducted to find out the best way to make buildings earthquake resistant	
<b>Help Received</b> My dad helped to make the earthquake simulator and purchased the needed materials	