



**CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY**

Name(s) Parisa K. Baher	Project Number 31788
Project Title What's Shakin'? A Study on Finding the Most Earthquake-Resistant Design of Base Isolation During Seismic Activity	
Objectives/Goals Goal of this experiment is to find the most efficient design of base isolated building which will prevent the amount of lives lost and save money that is used for reconstruction by using different shapes of base isolation and dampers. In order to increase movement, I hypothesize that a decrease in friction between the base and the building, with adequate number of dampers and treated contact surface, will result in the least damage to the building. Abstract Goal of this experiment is to find the most efficient design of base isolated building which will prevent the amount of lives lost and save money that is used for reconstruction by using different shapes of base isolation and dampers. In order to increase movement, I hypothesize that a decrease in friction between the base and the building, with adequate number of dampers and treated contact surface, will result in the least damage to the building. Methods/Materials .Plastic Pan, .Wooden Boards, .Square Blocks, .Round Blocks, .Metal Screws, .Gold Foam Board, .Project Bricks, .Tacky Glue, .Elastic Bands, .Rubber Bands, .Knife, .Marbles, .Electric Drill, .Scissors, .Straight Edge. 1)Build the shake table. 2)Build the building base using the base isolators and dampers. 3)Build the building using the foam board and foam blocks. 4)Count the number of blocks that fell, and the building displacement. Build the various base isolation models for the rest of the trials, following similar procedures described above, using various base isolation shapes, number and type of dampers, and types of contact surfaces, and repeat the shake test experiment 15 more times. Results I discovered that the trials with square-on-square isolators with elastic band dampers (A-1 to A-4) had an average displacement and fallen blocks of 0.375# and 46. The same series of tests with round-on-square isolators (B-1 to B-4) produced average displacement and fallen blocks of 0.475# and 50. When I ran the same tests using rubber bands (C-1 to C-4, and D-1 to D-4) the average displacement and fallen blocks were 0.4875# and 67. Conclusions/Discussion My Trial A-4 performed the best among all the other 16 trials. In contrast, the worst performing trial was Trial D-1. My experiment supported my hypothesis, that the base isolation system with adequate number of dampers and proper contact surface did have the best performance in the major seismic event. This was measured through the number of blocks that fell, and amount of building movement for each trial.	
Summary Statement This experiment is focused on discovering which design of base isolation will be most earthquake-resistant during seismic activity, to prevent stuctures from collapsing and minimize the number of injuries and deaths that impact our society.	
Help Received Father helped with measurements before building was built. Father sewed the two ends of the elastic band dampers. Father drilled holes on base isolators.	