



CALIFORNIA STATE SCIENCE FAIR 2012 PROJECT SUMMARY

Name(s) Christopher D. Isozaki	Project Number J0311
Project Title Building an Earthquake Safety Desk	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My goal was to design a desk that would protect a person during an earthquake. Based on my research, the greatest risk of serious injury or death during an earthquake was because of collapsing buildings. I decided that a good goal would be if the desk could survive a 3000 pound object falling from a height of at least 10 feet.</p> <p>Methods/Materials The first test was to help decide on the shape of the frame. I created 5 inch wire models of 3 desks: 4-legged, triangular, and arched. I placed a plastic bucket on the models and added water until they either collapsed or were significantly deformed. The second test showed how the impact would distribute the force to different parts of the desk. I used 3 support legs and the 4th leg had a scale. I took weights and placed them on different parts of the desk and recorded the results from the scale. The third test was meant to confirm that the desk met the overall goal. A metal salvage company used a crane to drop a 3000 pound car on the desk from higher than 10 feet. I made the desk using the following materials: wood (tabletop), steel tubes (structure), thin sheet steel(skin), clay and EMT (crumple zone), rebar and cement (distribution layer), and steel bolts for connecting the parts. I used many tools to make the desk including hand grinders for cutting, drills, a vise, pipe wrench, screwdrivers, wrenches, hammers, etc.</p> <p>Results The first test showed the arch shape was the strongest but only a little stronger than the triangle. I also used the arch shape because it is able to withstand more impact from different angles. The second test showed the weight was not distributed very well across the board. To distribute the weight better, I decided to use a reinforced concrete layer and thin steel skin. The third test confirmed that the desk could withstand the impact of a 3000 pound object falling from a height of greater than 10 feet.</p> <p>Conclusions/Discussion The testing confirmed the desk was able to survive a large impact. In my research none of the other earthquake desks used an arch shape. I believe desk designers should consider the arch shape and the crumple zone design if they are trying to be earthquake safe.</p>	
Summary Statement My project was to design, build and test a desk to keep a person safe during an earthquake.	
Help Received Father and brothers helped with dangerous or too difficult manufacturing and testing tasks, Carson Auto Recyclers dropped the car, various members of the community offered advice on manufacturing, materials and sources of information, vendors donated tools and materials.	