



**CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY**

Name(s) Eric K. Gediman	Project Number J0313
Project Title How Does the Design of a Building Change the Effect Inertia Has on It during an Earthquake?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this project was to test out the base isolator, a device that keeps the building detached from the ground, and see how the usage of it changes the effect of inertia.</p> <p>Methods/Materials Fusion 360 3D modeler, laser cutter to cut out the parts, arduino code and diagram for parts available here: https://drive.google.com/file/d/1HJvE0uji0FFx-wkrk3xvGMi94fuNJ6b8/view?usp=sharing. I created the design for the base isolator, hexagons, and table, but I recieved help with the hexagons and table at the Hexlab, and I designed and wrote the code for the original circuitry, but my design was refined at a place called the Hexlab. I gued the parts together and set up the table and performed the experiment with 3 different building designs and adding different amount of weight it the form of coins, the weight added being constant for each design. I measured the time until the initial collapse, and the layer that originally collapsed, layers being the 12 hexagons I stacked to create the building.</p> <p>Results The more weight that was added while the building was on the base isolator the longer until initial collapse, and the layer of collapse had no discernable difference. The more weight that was added to the top of the building while not on the base isolator the longer it took until initial collapse, and the lower the layer of collapse was. When the weight was placed on a piece of wood that the building was on that was on the shake table there was no real difference.</p> <p>Conclusions/Discussion These results show that the best way to build you building is to use a base isolator, and add as much weight as possible to it, since the more weight that is added the better the chance of the building surviving the earthquake. The results also show that adding weight to the top of the building as dense material isn't a good idea, since that lowers the center of gravity, and more of the building will fall at once, creating a bigger hazard than just having no protection at all.</p>	
Summary Statement I tested how buildings react under an earthquake with a base isolator and differing amounts of inertia, to see how much weight you should have on a building depending on the design of the building.	
Help Received I designed the base isolator myself, and I got access to a laser cutter and help in refining my designs and code at a place called the Hexlab.	