

## **Final Report**

### **Intro**

For our building, we made a base isolation system, bracing, and made sure everything was flexible and stable. The base isolation system will help make the shaking not as bad. The bracing is what the walls would be and it is what keeps the whole building together. The frame of our building uses bracing to make it more stable and able to handle the energy from the earthquake.

### **Over All Design**

Over all, our building looks like a giant three layer cake. We chose this design because we think that tall buildings are stronger when layered because the bottom layer is large and can handle weight and the top layers are smaller and lighter so it will not be top heavy. We have tested it and it works. The materials we used for our building are popsicle sticks, hot glue, string, and tape. Everything on the building was reinforced with tape. The building is made of wood, which is sturdy but flexible. The hot glue keeps everything together. The string will help keep the bracing stable.

### **Base Isolation System**

Our base isolation system is made of several layers of foamy mesh, tape, and hot glue. It is meant to make the shaking more bouncy and absorb some of the movement. To secure the base isolation system to the base, we taped it first then hot glued it because we found that hot glue doesn't stick well to foamy mesh by itself. This base isolation system will help because it is like a cushion, so the shaking will not be as bad because it will help keep the building stable and prevent damage to the building.

## **Bracing**

Our bracing is made of popsicle sticks, string, and hot glue. The popsicle sticks are made into x's. We chose x's because we found online and Sadie's dad said that x's that are made up of 4 triangles are stronger. The x's have gaps in between to connect more x's. In the center of each x, string is wrapped around it to keep it stable. When you put together the x's, they look like a large box. There are three boxes and each one is smaller than the other and stacked on top of each other. We did this so that our building would not be top heavy. The top box has a different, stronger design so it can hold the brick. It has x's and over the xs are other popsicle sticks. The top is popsicle sticks layered on top. There is also a stick in the middle of the top box to make sure it can hold the brick.

## **Simulation**

Our building withstood both the vibration table and manual shake table. The base isolation system did its job and helped a lot. The bracing helped and made sure

everything stayed together. All three floors of our building did not take any damage. Our design worked very well and did not take any damage at all. No damage occurred on the bus either. Our design was also pretty realistic and would most likely stay together in real life in my opinion. I think our building was great, and I don't think I would want to do anything differently except take away the tape to make it more flexible.