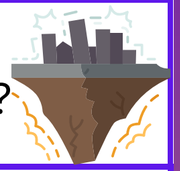
Earthquake Science

Would a System Stop an Earthquake?



Statement of the Problem

In many places, earthquakes happens, destroying thousands of buildings and loosing millions of dollars, but with just putting structures underground, it will greatly decrease the amount of damage and money loss.
This project will focus on structures that help buildings in earthquakes, to be specific this project will focus on:

1. What's the best way a structure survives an earthquake?
2. How much shaking will the cones reduce?
3. Will less water spill with the cones?

Background Research

In the first place, the impact of earthquakes to the world is structural damage. www.BC.Campus and www.GDI.Engineering.com Accorded," earthquakes can lead to the destruction of buildings, bridges and roads"."Investing in resilient design can significantly reduce disaster cost, saving money in the long run by minimizing damage and recover quickly after disaster". This means, earthquakes destroys buildings leading to loss of money and lives of people, but with the system, it will make it safer. As a result, this will lead to a money loss, structural damage, and more deaths, but with the idea this will significantly reduce damages.

In addition, this idea is important because it will reduce the damage. WWW.Test-books and Nearby-enginners.com said "They anchor the building stopping it from tilting due to forces like wind, earthquakes or different movement". The other website said"below-grade system must support loads and environmental conditions, requiring careful design and construction". This means, this system will protect the building from falling into debris, mostly working all of the time. In conclusion, my project is the key to maintain buildings safely.
Furthermore, we used to have this kind of ideas since the past. WWW.wikipedia.com stated,"Ancient architecture aimed to build structures that could stand seismic activity, modern earthquake design has become critical". In other words, this idea was passed through generations, but just by improving them, it can stand a chance against the earthquakes. in conclusion, we used to put these buildings in our structures, making them more safe in natural disasters.

Hypothesis

If a model building is supported by structural sticks placed in the corners, then a cup of water on top will spill less during shaking compared to a model without sticks, because the added supports will reduce movement and absorb vibrations—similar to how reinforced structures can reduce damage during an earthquake.

Variables

Independent
Cones

→

Dependent
stability of the building

Constant
Amount of water, intensity and boxes

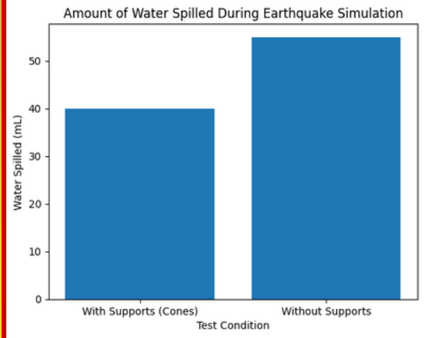
Materials

This project will need 2 boxes, 1 cup of water, 4 cones and glue. Our objective is with the cones the water MUST spill less water than the one without the

Procedures

1.First, get 2 tissue boxes.
2. Second, carve 4 holes in the corners in both boxes.
3. Then get 4 plastic cones, put it in the holes,
4.Next, get a cup of water.
5. Later on, put the water on top of the superior box, place the box on top of the other one with the cones.
6.Then after that, i would start to shake the box below, simulating an earthquake,
7. After that, i would measure the amount of water that spilled.
8.Later, i would do the same but without the cones.

Results



The water with the supports helped spill a little less water compared to the one without supports.

photos

before

after

Discussion

In the experiment, the cones/supports helped the water to stay a little bit more stable, meaning the cones didn't really helped that much. But it would depend on how strong is the earthquake and what materials is the supports made of.

Conclusion

In conclusion, I can say that the experiment was correct, yes, though it only reduces a bit of the impact, in case of a real one, the support could help maintain the building in a stable way. In this case, the supports would need to be made of strong and special materials, meaning the results can improve.

Sources

- **BC Campus. (n.d.). Earthquakes and structural damage. https://www.bccampus.ca**
- **GDI Engineering. (n.d.). Earthquake-resistant structures. https://www.gdiengineering.com**
- **Nearby Engineers. (n.d.). How engineers design for earthquakes. https://nearbyengineers.com**
- **Wikipedia. (2024). Earthquake engineering.**