

March 29, 2015

Dear Mr. Vassiliades and Professional Engineers in California Government,

I would like to thank you and the Professional Engineers in California Government for awarding me the James E. Roberts Award for Excellence at the 65th Los Angeles County Science and Engineering Fair on March 28th. Earthquakes have always really fascinated me and I wanted to see how I could help minimize the damage done to structures. I hope to be an engineer one day, so I decided to do a project related to earthquakes in my 8th grade school year.

My name is Andrew Karroum and I am an 8th grader at Nativity Catholic School in Torrance. My favorite subject has always been science, and entering the L.A. County Science and Engineering Fair seemed like a perfect way to express my love for science, more specifically engineering and earthquakes. When I finished this project everyone at my school really liked it a lot. At my school's science fair, my project was featured in the front of the room so whoever walked in would see my project first. I'm happy to say my school awarded me first place.

My project is titled *The Effect of Bracing Type on Structural Integrity*. It is about finding which type of vertical structural bracing is best for an earthquake-resistant design. My hypothesis stated that, if correct, diagonal bracing will work better than no bracing at all, and cross bracing will work better than diagonal bracing alone. I had four variables: bracing type, location of bracing, use of weight, and earthquake intensity. I built a shake table to simulate a minor and major earthquake. Then I tested five different two-story structures under the conditions of my four variables. My data showed that when I used no bracing, lots of damage occurred for every test run. Damage was significantly reduced when diagonal bracing was used and there was no damage when cross bracing was used. In conclusion, both diagonal and cross bracing significantly reduces the amount of damage done to a home, which proves my hypothesis correct.

I had a lot of fun doing this year's project. I am probably going to expand it next year by adding more bracing types, adding an additional floor to my structures, and maybe even simulating more types of earthquakes. For example, the shake table I built simulated a tectonic earthquake, but maybe I can find a way to also simulate a collapse earthquake.

Again, I would like to thank you very much for giving me such a prestigious award. I had a great experience being interviewed by you and the other engineers from your organization. This experience and seeing my name appear on the screen as the recipient for this huge award is something I will always remember. THANK YOU! I also look forward sharing my project at the upcoming presentation of awards event.

Sincerely,

Andrew William Karroum