



**CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY**

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| Name(s) Benjamin A. Panasyuk | Project Number J0322 |
| Project Title Is Earth-Friendly Concrete Stronger than Traditional Portland Concrete? | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of my project was to determine the strength between traditional Portland Concrete and Earth Friendly Concrete.</p> <p>Methods/Materials The experiments involved making and testing three different mixes: Earth- Friendly, Portland, and Half-and-Half. Earth-Friendly Concrete was created by combining eggshell powder, wood ash, fire clay, gravel, sand, and liquid eggs, and traditional mix was made using store bought Portland cement, gravel, sand, and water. Equal amounts of Portland and Earth-Friendly mixes were combined to create Half-and-Half concrete. The mixes cured for 14 days. On the 15th day, the break strength was tested in a compression testing machine. The constants of the experiments were proportions of the mix design, mold sizes, curing time, and same curing temperature for each set of molds to be compared. Measurements were made by cups for mix design, a fahrenheit thermometer for curing temperature, and a compression machine for testing strength to compare psi readings.</p> <p>Results The result of my experiment showed Earth-Friendly Concrete to be much weaker than Portland Concrete with low psi readings of 101, 109, and 116 of Earth-Friendly mix molds compared to high psi reading of 3514, 3543, and 3981 of Portland mix molds. Half-and-Half mix results were between Portland and Earth-Friendly mixes and still much weaker than Portland concrete with psi readings of 219, 221, and 254.</p> <p>Conclusions/Discussion The results of the test showed that Portland concrete molds were about 34 times stronger than earth-friendly concrete molds. Half-and-half concrete appeared to be only 2 times stronger than earth-friendly concrete and about 16 times weaker than Portland concrete. I believe that I got these results possibly because of the incorrect proportions of the aggregates when designing the recipe of the earth-friendly mix or because one of the aggregates used could have made the concrete weaker. It also is possible that, if I let the molds cure for a much longer time, the results of the break strength test might have been different.</p> | |
| Summary Statement I created my own Earth Friendly Concrete. | |
| Help Received My mother helped me find research online and she guided me through the whole process, my father assisted me in buying materials, mixing concrete, and making molds. | |