# CALIFORNIA STATE SCIENCE FAIR
## 2007 PROJECT SUMMARY

**Name(s)**
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**Project Number**
**J0219**

**Project Title**
## Green Concrete

**Abstract**

**Objectives/Goals**
The purpose of this experiment was to determine if adding waste materials to concrete affects its strength. There are two goals to be achieved by adding waste materials to concrete. First, it could be a great way to use materials that clog landfills. Second, the waste materials could make the concrete lighter. Thus, the experiment was to find out if a lightweight concrete could be made from waste materials without affecting the strength.

**Methods/Materials**
The experiment involved adding different amounts of waste materials to test cylinders of concrete. Ten concrete cylinders were prepared, including a control, and different amounts of Styrofoam, cardboard, and tire rubber were added to nine cylinders. Then, the cylinders were brought to the concrete testing lab to cure for 30 days. After the concrete cylinders cured for 30 days, the strength of the concrete cylinders was tested. The strength was tested by using a compression machine that increased the pressure placed on the concrete cylinders until they failed.

**Results**
The waste materials made the concrete cylinders weaker. The Styrofoam cylinders were the strongest and the tire rubber cylinders were the weakest. The weight of the concrete samples was affected as well. Generally, adding waste materials to the concrete cylinders decreased the weight of the cylinders.

**Conclusions/Discussion**
The waste materials made the concrete weaker. The more of the waste material added, the weaker the concrete became. Surprisingly, the rubber, the densest of the waste materials, had the most negative affect on the concrete strength. The Styrofoam concrete was the strongest. The weight of the concrete samples was affected as well. Generally, adding waste materials to the concrete cylinders decreased the weight of the cylinders.

**Summary Statement**
While adding waste materials to concrete may help the environment, the strength of the concrete is weakened.

**Help Received**
My father helped me carry and mix the concrete. Geotechnics, Inc. provided the testing facility.