CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
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Project Number
S0219

Project Title
Increasing the Deflection of Concrete

Abstract

Objectives/Goals
My primary focus in this experiment was to see if I could increase the deflective properties of concrete by strengthening the crystaline stucture of concrete through the addition of chemicals with higher molar fractions of hydrogen than water. This is because concrete gets its strength from silicon and hydrogen bonding.

Methods/Materials
portland cement, fine sand, 28% ammonium hydroxide, denatured alcohol, hexane, water, wax, plastic wrap, 1000ml graduated cylinder, triple beam balance, laser, resperator, gloves, power supply, improvised deflection testing base, measuring board, gogles, concrete molds, notebook.

Results
Addition of a 3.5% concentration of Ammonium hydroxide solution to a dry concrete mixture increased the amount of deflection by at least 30% compared to the control (normal concrete w/water).

Conclusions/Discussion
It can be concluded that the addition of ammonium hydroxide solution increases the strength of concrete a only specific concentrations and that certain concentrations of ammonia can actually decrease the concretes deflective properties. It cannot be concluded however whether or not this increase in deflection is due to catalytic processes or the concentration of hydrogen in the system. Nonpolar solvents decrease the strength of the concrete significantly. Increasing the flexibility of concrete is very important in securing key structures during an earthquake.

Summary Statement
This project focuses on increasing the deflective strength of concrete.

Help Received
I had my mentor Stephen Hubbard supervise my use of the chemicals and wood crafting machinery.