CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
Madison A. Marks-Noble

Project Number
J1316

Project Title
A Green Solution to Reducing Cooling Loads on a Building, A Two-Year Project

Abstract

Objectives/Goals
My goal was to determine the effectiveness of passively conditioning a building in the San Joaquin Valley of California.

Methods/Materials
I built two scale model roofs using the following materials: normal wood constructing materials (plywood, galvanized sheet metal, asphalt shingles, and 2x4s), nails, and z-purlins. I also used two sensored thermometers and an infrared heat gun. Roof's orientation was northern exposure. Temperatures were measured daily (or 2x daily) at the following locations: roof, roof deck, and attic space of each roof. The duration of the test was 1 year.

Results
I found the temperature of the attic space in the engineered air channel system (EACS) was around 10-20 degrees C lower than the composition roof. Generally, these results were the same throughout the duration of my testing.

Conclusions/Discussion
My results showed that I discovered that natural convection generally reduced the attic space by 10-20 degrees C depending on the season.

Summary Statement
This project explores the use of natural convection to passively reduce temperatures in buildings.

Help Received
Father helped with construction and advised on testing; Engineer advised on content of project board.