CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)

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Project Number

J1324

Project Title

Is Radiant Barrier a More Energy Efficent Alternative to Fiberglass Insulation?

Abstract

Objectives/Goals

The purpose of our science project was to determine if relying on radiant barriers instead of the standard insulation used in home construction can result in homes that are more energy efficient to cool and equally as efficient to heat.

Methods/Materials

We built five 30 inch high, model A-frame houses. The houses were built the same with inside and outside walls, an attic and a living room. Each model had vents that opened and closed to allow or prevent air movement. The inside the walls and attic were varied:
Model #1 was the control with no radiant barrier and no insulation;
Model #2 was the base with standard fiberglass insulation;
Model #3 was a modified base which added radiant barrier to the fiberglass insulation;
Model #4 was the test with radiant barrier only; and
Model #5 was a modified test which added foam insulation to the radiant barrier.
We put thermometers in the living room and in the attic of each model and recorded the temperatures as they were exposed to winter and simulated summer conditions at regular intervals over 2 days for each season.

Results

In the summer test, when we compared Model #4 with Model #2, we found that Model #4 was almost 200% better than Model #2. Model #3 did almost the same as Model #4 but Model #5 was the best. It was 300% better than Model #2. In the winter tests, when we compared Model #4 with Model #2 we found that Model #4 was about 33% worse than Model #2. Model #3 did almost the same as Model #2 but Model #5 was the best. It was about 50% better than Model #2.

Conclusions/Discussion

Our hypothesis for the summer was correct but our hypothesis for the winter was incorrect. Our study suggests that people who have existing homes that are built in warmer climates should consider adding radiant barrier to the underside of their roof in addition to the fiberglass insulation that is already there. This will help keep the home cooler in the summer and cut down on energy costs for air-conditioning. In cold climates, fiberglass insulation is effective at keeping the home warm. But people who are building new homes in either hot or cold climates could consider using foam backed radiant barrier in the walls and in the attic instead of fiberglass insulation to make the home more energy efficient in both summer and winter.

Summary Statement

We wanted to see if radiant barrier would keep a house cooler than fiberglass insulation in the summer.

Help Received

Mother helped type report and take photos; Father designed and helped construct houses and testing facility