CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Alexander T. Ryan

Project Number
J1928

Project Title
Fire Prevention by Water Retention

Abstract

Objectives/Goals
During the recent San Diego wildfires, some homeowners protected their houses with a preventive fire fighting gel. I wanted to test how effectively these gels protect wood. I theorized that the gels would be ineffective because all of the water would soak into the wood, or the wood would heat to a point where it would spontaneously combust.

Methods/Materials
I tested painted and unpainted samples of Douglas fir 2x4, Douglas fir 2x6, and cedar 1x6. I used 12 samples of each kind of wood, half of which were primed and painted. I used tongs to place one of the painted samples of 2x6 into a grill. I then repeated all of the above steps with different materials until I ended with 3 samples of each possible combination of wood, protection, and paint. There were four other samples, which were two 2x6 pieces tested with extra Barricade, and two 2x6 pieces tested with Thermo-Gel, another brand of fire fighting gel. The reason that I did not test a full set of Thermo-Gel samples is because I was not able to obtain enough of the gel from the manufacturers.

Results
The averages for the unprotected samples were as follows: time before sparking of 20 seconds, time before flaming of 20 seconds, time before smoking of 78.5 seconds, weight loss of 22 grams. The averages for the protected samples were as follows: time before sparking of 37.5 seconds, time before flaming of 68 seconds, time before smoking of 69.5 seconds, weight loss of 13.5 grams.

Conclusions/Discussion
The gel did work, increasing the time before sparking by 88%, and the time before catching fire by 240%, on average. It did decrease the time before smoking by 11%, but this may have been because some of the Barricade boiled off, creating steam that I thought was smoke. The effectiveness was also less than it would have been had the gel been used in a real situation, because I applied the gel only approximately one-eighth of an inch thick, while the manufacturer recommends at least one-quarter of an inch thickness. I would recommend that anyone living in an area prone to wildfires buy a case of this product, because if a wildfire occurs and your house is in danger, it might make the difference between escaping unscathed and total destruction.

Summary Statement
My project tested the effectiveness of fire fighting gels in protecting Douglas fir building materials from combustion.

Help Received
Father helped purchase materials and supervised me during testing; Science teacher provided helpful suggestions; Barricade and Thermo-Gel companies donated materials.