CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
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Project Number
J1810

Project Title
Which Truss?

Abstract

Objectives/Goals
For my science fair project, I decided to test different roof trusses and come to a conclusion of which one can hold the most weight. I chose five roof trusses (kingpost, queen truss, fink truss, raised heel truss, gable truss) to test. They are all made out of spruce wood, using balsa wood to make the gussets. When I had finished making all the trusses, I created what I called the #gweight-tester#h. It is a device made out of pine wood, that holds the truss up. I would put the weight-tester over two sturdy objects that were about a foot apart, and then place a truss into it. I would tie twine string in the appropriate places so that bricks were able to hang from the bottom. I started by adding 6 lb. 10 oz. bricks because I figured that they were all capable of holding that amount of weight. I would then add up to 2 lb. increments. Once the truss broke, I would record the amount of weight it held and I would continue with another truss.

Methods/Materials
1. spruce wood 2. balsa wood 3. pine wood 4. wood glue 5. twine string 6.bricks of different weights 7. scotch tape 8. two sturdy objects of equal height

Results
When my testing was done, I discovered that the queen truss held the most. This was different than my hypotheses which said that I thought the gable truss would hold the most because it was made with the most materials. The order of strength from most strength to least strength is as follows: 1. queen truss, 2. gable truss, 3. raised heel truss, 4. fink truss, 5. kingpost. After the queen truss, everything gets weaker as fewer materials were used in creating it. I found this odd because the queen truss uses the least amount of materials after the kinpost, yet it was the strongest.

Conclusions/Discussion
I think my results are the way they are because of the way the weight is distributed throughout the truss. There was a vertical post as well as two angular posts which could help with the arrangement of stress on certain points. The amount of tension and compression in a truss have a lot to do with the arrangement of posts. Although my hypotheses was incorrect, I was amazed by my results and I think it would be interesting to try different types of roof trusses.

Summary Statement
Which roof truss design will support the most weight?

Help Received
Father taught me how to use power tools