CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)

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Project Number

36132

Project Title

The Effect of Bridge Designs on the Forces They Can Endure

Abstract

Objectives/Goals

The objective of this study is to find out which bridge design can endure the most force before breaking.

Methods/Materials

Up to 2,000 cm. of balsa wood, strong glue, an x acto knife, weights, a platform, several sheets of foam core board, a self-healing mat, a ruler, several nuts and bolts, a scale, a notebook and a pencil/pen. Tested several bridge designs by slowly applying weight to the bridge.

Results

The bridge design that was capable of sustaining the most force after I placed weight atop each bridge was the through truss bridge. It held 2230 grams of weight. The bridges with more support at the top that were battling compression generally did better.

Conclusions/Discussion

After testing each bridge design once, I came to the conclusion that bridges with more support at the top (i.e. the through truss and suspension) sustained forces superiorly to bridges with more support at the bottom (i.e. the deck truss and beam bridge). It is also concluded that bridges with a triangular truss design were (generally) capable of sustaining more weight that other designs.

Summary Statement

I built four bridge designs and slowly applied weight and found out that the through truss bridge can hold more weight than other designs.

Help Received

I used West Point Bridge Designer 2015 to help design my bridges. My father, Wayne Shepherd, helped me find the design program explained the forces and design tips of the bridge. I built the bridges and conducted the experiment by myself.