Name(s)

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Project Number

J0204

Project Title

Howe vs. Pratt

Abstract

Objectives/Goals
The objective is to determine which truss bridge design is more effective at dissipating the force of a load, the Howe truss or the Pratt truss.

Methods/Materials
Three models of each bridge type were constructed from Balsa wood. Three beam bridges, without and additional truss, were used as the control group. Each bridge's mass was recorded. Then, a bucket was suspended from the bridge. The bucket was slowly loaded with weights and the deflection of the bridge was also measured. Once the bridge collapsed, the mass of the load was recorded and the final deflection was also recorded. A load-to-mass ratio of each bridge was conducted, along with the amount of deflection, to determine which bridge was stronger on average.

Results
The beam bridge had an average load-to-mass ratio of 194.92 and deflected 27.52 mm on average. The Howe truss had an average load-to-mass ratio of 512.61 and deflected 13.23 mm on average. The Pratt truss had an average load-to-mass ratio of 528.93 and deflected 9.53 mm on average. The Pratt truss deflected the least and had the highest load-to-mass ratio.

Conclusions/Discussion
The Pratt truss disspipated the load more efficiently than the Howe truss, although both truss bridges dissipated the force significatnly more effectively than the beam bridge. In addition, the Pratt truss deflected the least and held the most, on average, while the beam bridge deflected the most and held the least. This brings one to the conclusion that the more rigid the structure is, the stonger it is and the more load it can hold. Therefore, the Pratt truss dissipated the force of the load the most effectively, due to its rigid design.

Summary Statement

Determine how structure of the truss bridge affects its ability to dissipate the force of a load

Help Received

Dad helped to build bridges, Mom helped to prepare the poster board