CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
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Project Number
22723

Project Title
Under Pressure

Abstract

Objectives/Goals
There is a guide that states that the strongest beam is the shape with the greatest amount of material away from the axis. I want to see if it applies to tunnels as well.

Methods/Materials
I used poster board, cardstock, and construction paper to build tunnels. I tested by placing either washers, checkers, or gram blocks on a board placed on the tunnel. I decided that I would use cardstock and washers to test the strongest shape.

Results
The engineering guide for beams did not apply to tunnels because the shape the guide predicted would be the weakest was actually the strongest.

Conclusions/Discussion
I have a better understanding of structural shapes after this experiment. Triangles have strong bases, letting the pressure be dispersed over the larger area, so they make good supports on large buildings. Circles and arches have curved tops, allowing pressure to be evenly distribute on them and the ground, so they are found as tunnels and pipes. Squares are sturdy so they can support a lot of weight from the inside, but none from the outside.

Summary Statement
Does an engineering formula for beams apply to tunnels?

Help Received
Mother typed some of project, Mr. Larson helped with math, Mrs. Dolan and Mrs. Flatt helped with numerous ideas and helped ready the project for each fair.