CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
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Project Number
S0224

Project Title
The Effect of Building Shape on Its Ability to Resist Hurricane Force Winds

Abstract

Objectives/Goals
The purpose of the experiment was to determine if the shape of a building affected its ability to resist hurricane velocity winds by utilizing a wind tunnel to test different building shapes.

Methods/Materials
A wind tunnel with laminar flow was constructed. A building model was placed on a rolling platform within the testing chamber of the wind tunnel. The air resistance caused the platform to roll back onto a force sensor which read the force of air resistance in Newtons. Ten trials were performed for a control and each of the 6 building models: rectangular tower (narrow face side), square tower (face side), square tower (corner/vertex side), cone, cylinder, and sphere.

Results
The sphere had the least amount of air resistance in proportion to its surface area (0.0006 N/cm^2) and its volume (0.00007 N/cm^3). The cylinder shaped building model had the next least resistance with 0.001 N/cm^2 and 0.0001 N/cm^3 respectively.

Conclusions/Discussion
The spherical and the cylindrical building designs support the initial hypothesis that a symmetrically shaped building with a curved face would best be able to resist high velocity winds.

Summary Statement
The purpose of the experiment was to determine if the shape of a building affected its ability to resist high velocity winds.

Help Received
My father used power saws to cut wood and PVC pipes for the construction of the wind tunnel.