CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Rohun K. Atluri

Project Number
J0103

Project Title
Blowing in the Wind: The Optimal Design of a Horizontal-Axis Wind Turbine

Abstract

Objectives/Goals
The objective of this experiment was to determine the optimal design of a horizontal axis wind turbine.

Methods/Materials
Five model wind turbines with identical rotor, yaw and windswept area, but different pitch and number of blades were constructed. Three turbines have 4 blades with varied pitch. After determining the optimal pitch from these three turbines, two new turbines with 2-blade and 3-blade configurations with the same pitch were built. The electricity generated by the turbines at three different wind speeds was measured.

Results
The wind turbine with a 3-blade configuration at 30° pitch provided the most efficient design for a wind turbine.

Conclusions/Discussion
The conclusion from this experiment is that the pitch and the number of blades are important factors in the optimal design of a horizontal-axis wind turbine at various wind speeds.

Summary Statement
My project is about the wind turbines that are used to generate electricity and their efficiency.

Help Received
My teachers Mrs. Trevino and Mrs. Schumpelt provided encouragement. Dad helped with the tools to build the wind turbines. Mom and brother helped with pictures.