CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)
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Project Number
34318

Project Title
Make Your Own Speed: Novel Use of Fluid Dynamics in Channel Bottoms

Abstract

Objectives/Goals
This experiment sought to discover the most effective angle of channel, and at what angle does air speed begin to decrease? Also the correlation between the opening of the channel and the angle in relation to windspeed.

Methods/Materials
materials: wood-hinges-shop vac -anemometer - air duct -tupperware-weather stripping-caulking sandpaper-electric sander-latches.
Procedure:
1 # set channel to 0 degrees
2 # turn shop vac to blow
3 # measure m/s using anemometer
4 # repeat steps 1 - 3 for angles 5 to 25 degrees
5 # repeat steps 1 - 4 five times, take the average of each angle for the five trials

Results
My experiment concluded that the optimum angle of a channel was 20 degrees with a four inch opening. Any angle larger that that would detriment the wind speed.

Conclusions/Discussion
My first idea was to make a complex yet interesting water channel, it became apparent however that that design would be much too advanced and would require unattainable materials. I then regressed to a simpler yet still complex set of three different channel designs. Soon after, I replaced water with another fluid, air. Though different, air can be used to exemplify the properties of fluid dynamics. My final project, instead of a whole channel focused specifically on the angles of the channel. I wanted to discover at what angle does the speed of the air increase, and at what angle does the small opening begin to be a detriment to the speed. When I first began my experiment. My design worked as I expected, however, my hypothesis was incorrect; I thought that 15 degrees of angle would produce the most speed. My findings showed that 20 degrees actually created the most speed, from that point speed decreased. Even though my final experiment did not occur exactly how I imagined, it taught me about the intricacies of fluid dynamics. Channel Bottoms can be used in many other fields, such as shipping, boats and any application involving fluids. The increased speed a channel provides could be useful in a multitude of designs.

Summary Statement
To discover the correlation between channel angle and opening in relation to wind velocity.

Help Received
My father was a huge help in creating the wind/channel device, and Dwight Rowe provided the anemometer.