CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
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Project Number
31756

Project Title
Lift and Drag: A Combination for Flight

Abstract

Objectives/Goals
The purpose of this project was to determine which of the two most popular overseas flight planes was the most aerodynamic. Two planes were purchased online from an online model company. It was made sure that they were both the same scale before buying, and they both were the exact ones felt would be big enough to test and observe. Then, many different arrangements and formulas for testing the airplanes were created and it was realized that there was no way to test the full aerodynamics of the plane, so it was found the next best thing would be to test the lift to drag ratio. With this and the apparatus that was designed and finally chosen, it could be tested very quickly, so it was decided to do more tests than before.

Methods/Materials
The plane was put in front of the fan on the apparatus on top of a postal scale, and then tested at particular speeds. When it started, there were a few problems, but then it started to get the testing right. Finally it was figured out one way to test that does not affect the outcome. The plane was made to stay level by adding minimal weight to the back wings of the plane, so the tip would stay even in the wind. When it was done the weight made it so the plane would stay even and the apparatus could still test the drag correctly.

Results
. The Airbus A-380 had a higher lift to drag ratio on levels 1 and 2 of the air fan, but on level 3, surprisingly, the Boeing 747 won. But I had to dismiss this as useful but not so useful evidence. That speed, at life-size, is 1440 mph. No commercial plane can go that fast.

Conclusions/Discussion
The average cruise speed is around 640 mph. The cruising speed of an Airbus A-380 is 590 mph. That does just prove something though. The Airbus needs less wind speed to lift off, so it must have more lift and less drag (or a higher lift to drag ratio) to be able to cruise at that speed. In this project I learned that testing aerodynamics is much harder than it seems without a wind tunnel. One error that could have occurred was that I built the planes myself. It was hard to build these planes, and they were not by any means perfect. To anyone who is going to try this project, try to find easy planes to build.

Summary Statement
Testing the lift to drag ratios of two different planes.

Help Received
Mentor helped with build apparatus