CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
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Project Number
S0202

Project Title
The Differences of Two Propeller Characteristics Affecting Efficiency in Air vs. Water Due to Different Slips

Abstract

Objectives/Goals
The objective of this project was to ascertain different amounts of slip that water and air each respectively have. Also, to determine the effect radius and chord have on the efficiency of propellers in air vs. water.

Methods/Materials
Materials: 10 propellers (2 groups of 5) modified to produce different amounts of chord and radius, propeller and motor assembly and apparatus (to hold and direct propellers), and a stress meter to record thrust of propeller and motor. Methods: the propeller assembly, apparatus, and stress meter were built. The propellers were modified and fitted to the motor shaft. The propellers were tested in water and air, data were recorded from stress meter.

Results
All propellers were more efficient in water than in air. Reducing radius in water increased efficiency, but only up to a point. The most efficient air propeller when tested in water had the shortest radius and longest chord. Overall, altering radius affected propellers more than altering chord.

Conclusions/Discussion
The operational hypothesis for this project was "if water has less "slip" than air, then a longer chord and a shorter radius should make the propeller more efficient in water and a shorter chord and longer radius should make the propeller more efficient in air". This seems to be supported by the data, that water has less slip than air; a longer chord and a shorter radius are more efficient in water, and a shorter chord and longer radius are more efficient in air.

Summary Statement
This project demonstrated that water has less slip than air and altering two propeller characteristics affects efficiency differently in water vs. air.

Help Received
I extend my thanks to my parents for their support, wisdom, and knowledge. I also extend my thanks to Ms. Markson for assigning this project, and for being so patient with me.