



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

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Project Title
Will Adding a Triangular Wing Shaped Flap to an Existing Wing Decrease Vortices?

Abstract

Objectives/Goals
The question that I'm going to investigate is if a triangular wing flap is added to the back of an existing wing, will this create an opposite spinning vortex to cancel the potentially dangerous vortex at the wing tip.

Methods/Materials
Method:
#1: Take the block of polyfoam, cut a triangle 3-1/2 in. in height, and 9 in. in length,
#2: Take the wing, and attach the triangular flap with pins 6 in. from the tip of the wing,
#3: Cut up tissue paper 1/4 in. strips, and tape onto specific places on the wing. Place one on the tip of wing, 2 on both ends of triangular flap, and one at the center of the wing,
#4: Secure the wing 30.50 cm. from fan,
#5: With the high speed fan on, watch which way the streamers rotate demonstrating the direction of the vortices, clockwise or counterclockwise. Also, with the meter, measure different wind speeds around wing.

Materials:
The materials that I used for this experiment, were one polyfoam wing, one block of thinner polyfoam for a triangular flap, one sheet of tissue paper cut into streamers, one fan, and a wind meter.

Results
Qualitative: With the triangular wing flap on the wing, the tissue paper streamers from the triangular flap rotate in a counterclockwise direction, demonstrating a counterclockwise vortex. The paper streamer on the tip of the wing rotate in a clockwise direction. Additionally, the wind speeds around the triangular flap are lower than the unmodified wing.
Quantitative: The air speed at the center of the wing on the side without the added triangular flap was 4.8km./hr. near the center to 5.5km./hr. at the tip of the wing. The side with the triangular flap was 4km./hr. near the center, to 6.5km./hr. at the tip of the wing. The air speed without the wing was 13.6km./hr.

Conclusions/Discussion
My hypothesis was, if you change the wing by adding triangular wing flaps to an existing wing, then the vortex created by the added flap will nullify the wing tip vortex. I agree with my hypothesis because the vortices generated and observed did spin in opposite directions.

Summary Statement
My project explored how alteration of standard wing geometry resulted in changing the airflow patterns over and behind the wing.

Help Received
My father advised on project development.