Effect of a Gurney Flap on the Lift of an Airfoil
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The problem investigated in this experiment was which height of Gurney Flap gives the best lift improvement on an airfoil without increasing drag. The Gurney Flaps’ heights are determined as a percentage of the airfoil’s chord length. The hypothesis is that a Gurney Flap will produce the best lift to drag ratio when its height is two percent of the airfoil’s chord length.

The hypothesis was tested under simulated conditions in a wind tunnel, using a teardrop shaped wing constructed from aluminum. To measure lift in grams, a triple beam balance scale was used. A clean airfoil was tested to determine the baseline lift at a ten degree angle of attack. Gurney Flaps of one, two, and three percent of the airfoil’s chord length were attached to the airfoil and tested for lift. The drag was tested with a clean airfoil each time, using an OHM meter to determine resistance and then calibrated to a drag scale consisting of a spring, copper wire, and graduations.

All trials were performed three times per Gurney Flap, and averaged for accuracy. Both lift and drag were tested, and a lift to drag ratio was calculated. It was determined from the experiment that the Gurney Flap that was two percent of the airfoil’s chord length gave the most desirable lift to drag ratio. This experiment proved that my hypothesis was correct: that a Gurney Flap which is two percent of the airfoils chord length is the best to use. This can have applications in the field of aerodynamics when using Gurney Flaps to obtain optimal lift to drag ratio.