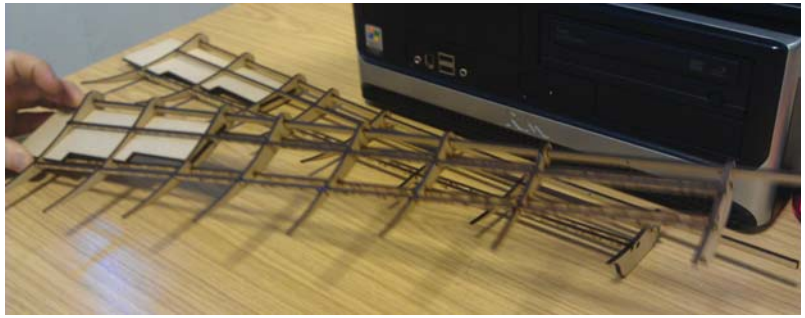
Wind Turbine Project



We chose the GOE 239 profile for its high lift to low speed ratio. The design accomplished 4.3 amps and managed to light 2 light bulbs whilst still rotating. Our calculations showed that it would be effective in reaching our goal of little drag, high lift and powerful torque.

If we were to do the project again we would investigate deeper into other profile ideas and understand the pitfalls of each design so that we could apply them to our final design.

Calculating the Lift Coefficient

By calculating the lift we can look to achieve a high lift to low speed ratio. We have used the lift coefficient equation and have applied the various atmospheric quantities.

L = ½ r A V2 CL
L = lift
r = air density = 1.225kg/m3
A = area = 0.06375 m3
V2 = velocity = 10m/s
CL = coefficient of lift

- When angle of attack is 0, CL is 0.8
- When angle of attack is 8, CL is 1.5
- When angle of attack is 15, CL is 1.6
- When angle of attack is 20, CL is 1.4

Therefore -

L = 8.786 x CL
0°: L = 7.028
8°: L = 13.178
15°: L = 14.057
20°: L = 12.300

Our calculations show that the lift is directly proportional to the lift coefficient and angle of attack.

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