AE229
Glider Report

Team E

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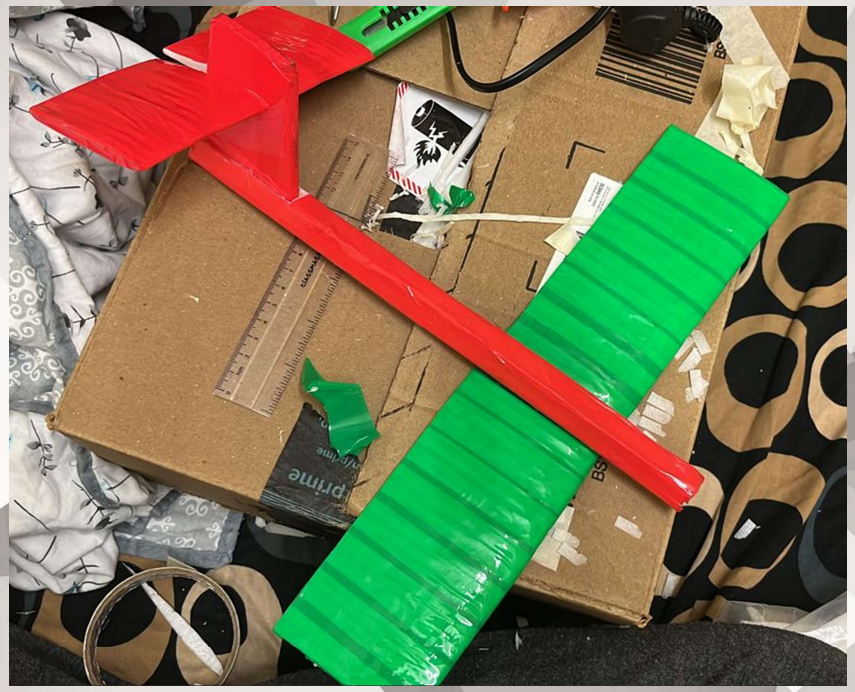
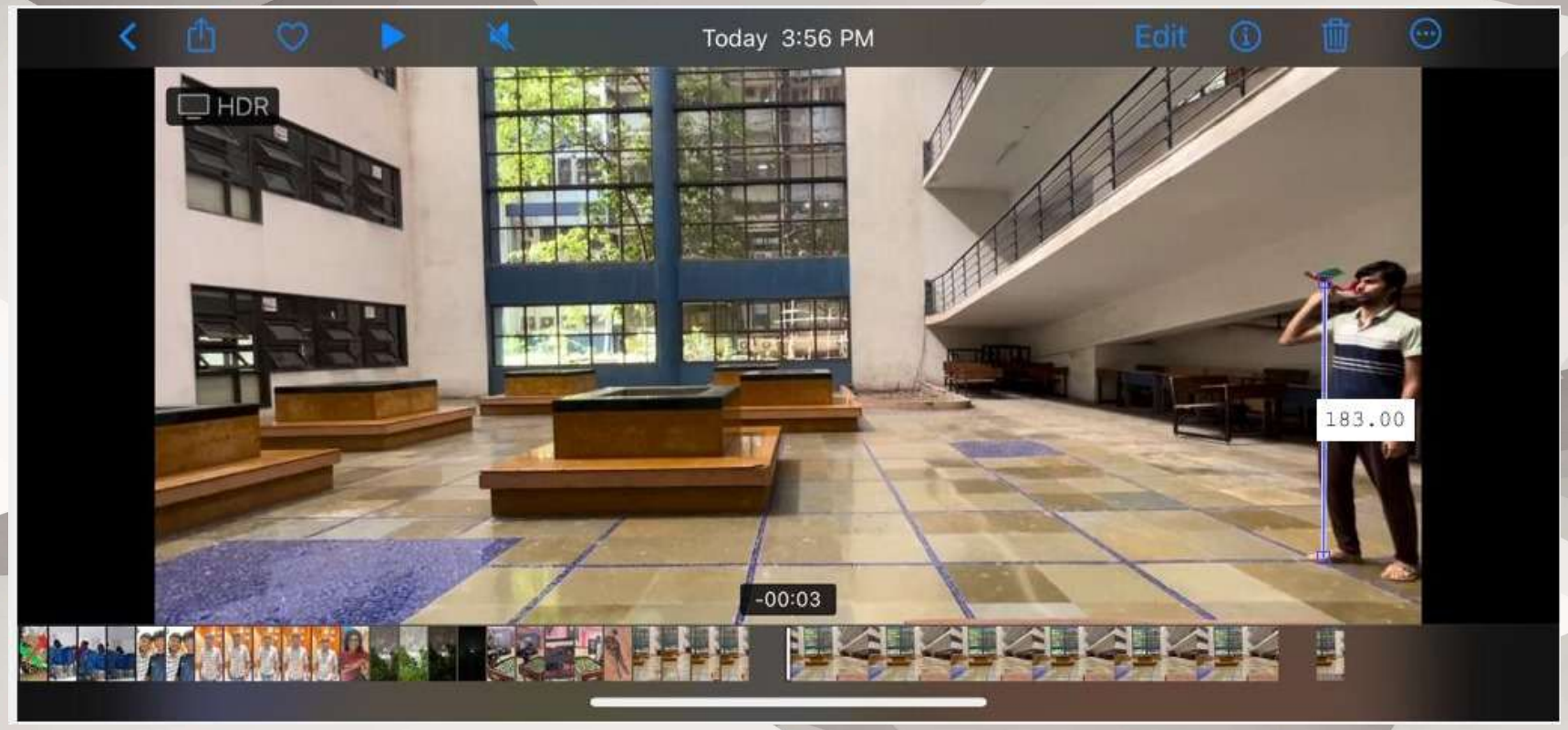


Glider #1

- We used airfoils (SD7003) to design our wings to generate more lift
- We used a trapezoidal fuselage so that we can connect the wings at some dihedral angle (15^{o}) for roll stability
- We placed coins on the nose to shift the CG forward and hence keep the glider in rotational equilibrium
- We placed the horizontal stabilizers at a height on vertical stabilizer so that they receive streamline air and not the turbulent wake of the wings, and hence improve its performance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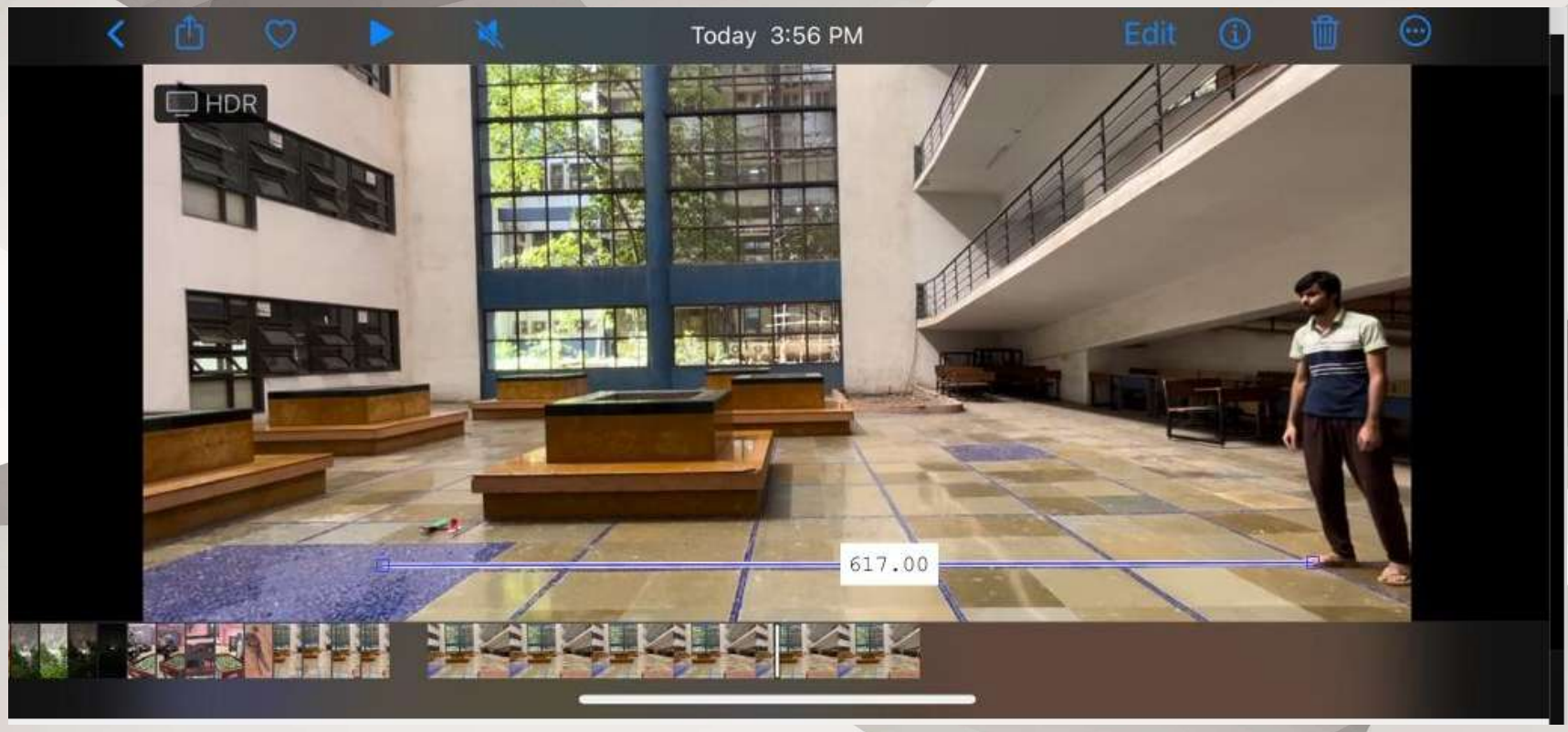
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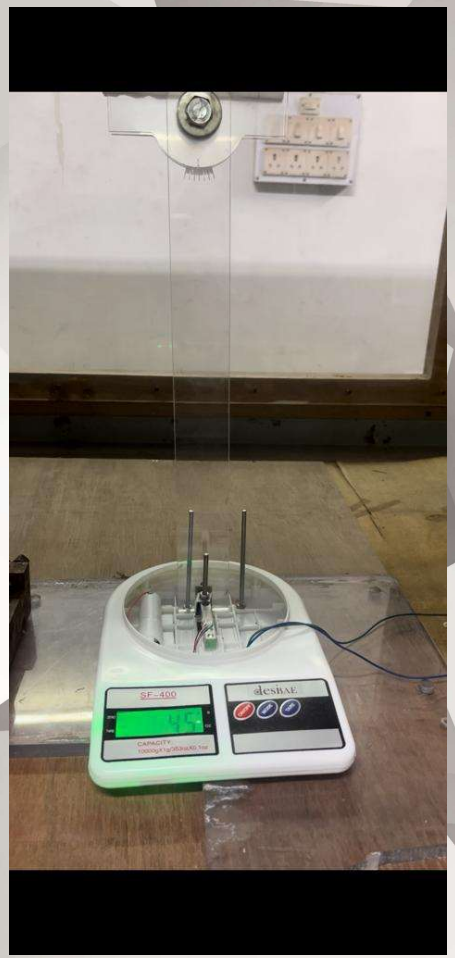
C_l/C_d Ratio

C_l/C_d Ratio = 4.06

- Throw height: 2m
- Horizontal Range: 8.12m

  (29 Nikhil feet (10 size UK) = 29x28 cm = 8.12m)
- Time taken: 1s
- Total distance travelled = 8.36m
- Speed = 8.36 m/s
- Cot Ø = 8.12/2 = 4.06
- Ø= 13.84^o
- C_l/C_d = 4.06



Wind Tunnel Testing

Angle of Attack – Lift

- -5° 15g
- 0° 45g
- 5° 65g
- 10° 76g
- 15° 74g

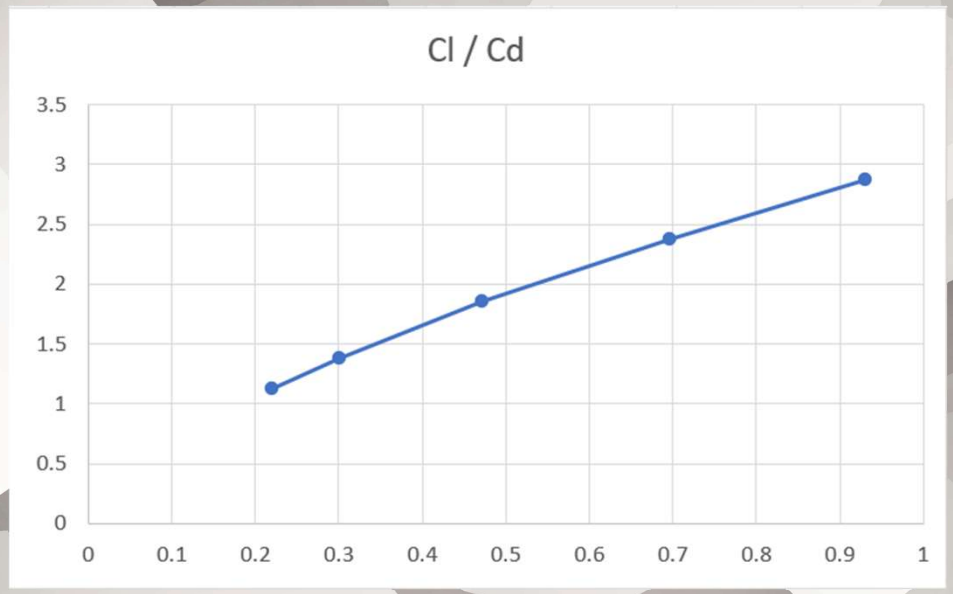
Drawbacks

- Using airfoils, although increased the lift, but it made the plane very sensitive
- Even small imbalances brought large deviations and eventually lead to crash landings
- Hence, we dropped the idea of using airfoils and switched to a simple design

Glider #2

- Least Effort & Most Efficient
- Wings made of single piece of Depron with sanding on the edges to get airfoil-like shape
- Horizontal stabilizers on same level as wings & have small rectangular cuts so as to adjust elevator angles to find optimal glide angle
- Coins placed on nose as usual
- Weighs about 28g

Drag Polar



Lift Coefficient	Drag Coefficient	Cl / Cd
1.13	0.2209	5.115436849
1.38	0.3011	4.583194952
1.85	0.472	3.919491525
2.37	0.6968	3.401262916
2.87	0.9308	3.083369145