SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A+' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF AEROSPACE ENGINEERING

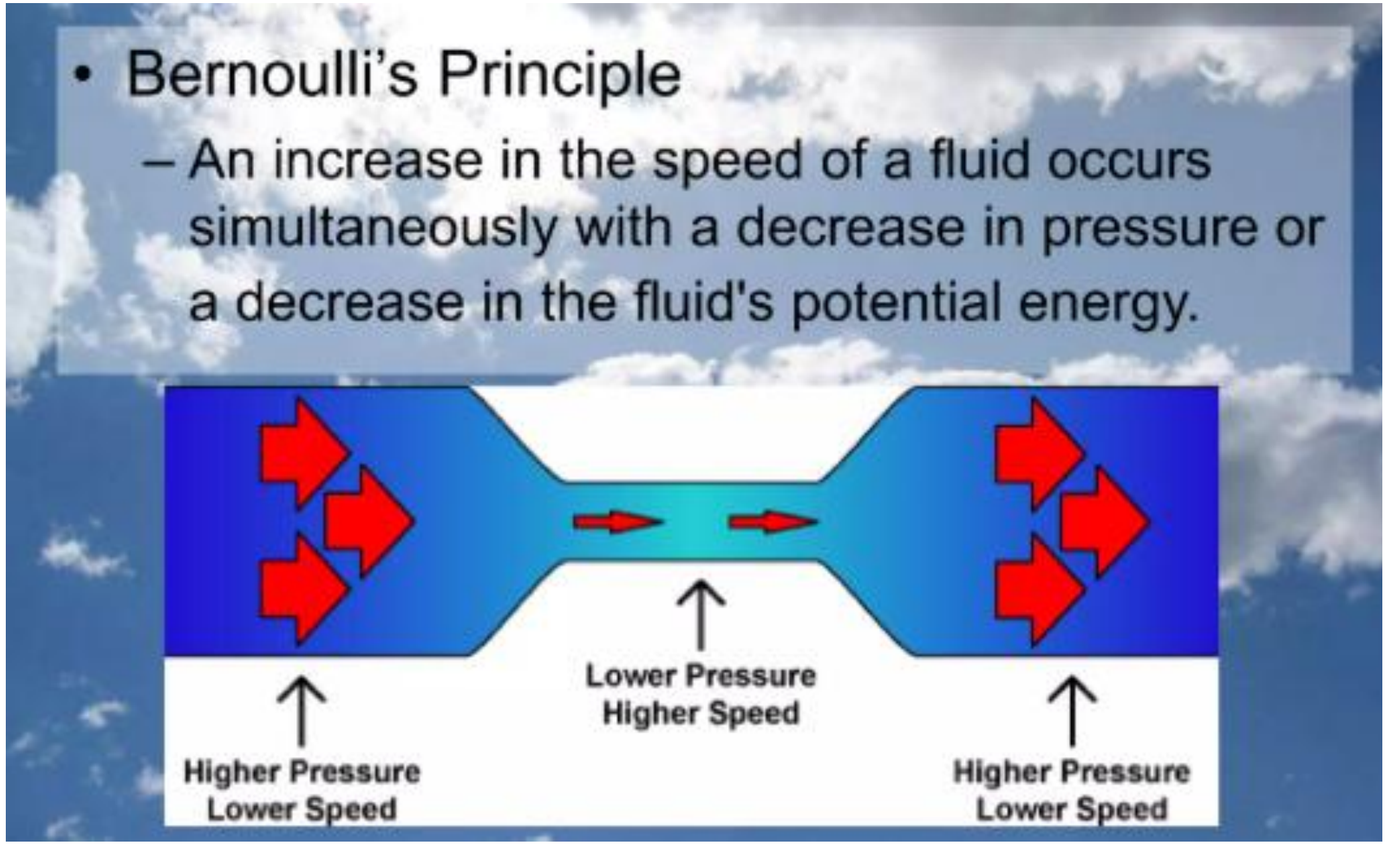
23AST206 – AERODYNAMICS

II YEAR IV SEM

UNIT 3 – PARAMETERS FOR AIRFOIL AND WING CHARACTERISTICS

TOPIC – WING OF FINITE SPAN, LIFT, DRAG, LIFT/DRAG RATIO

WING OF FINITE SPAN, LIFT, DRAG, LIFT/DRAG RATIO



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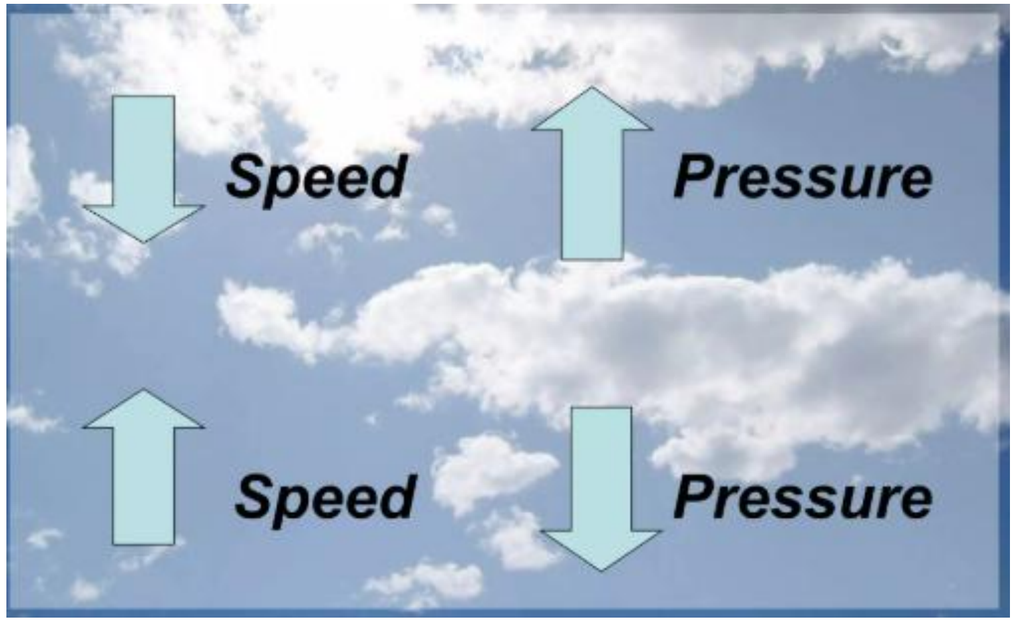

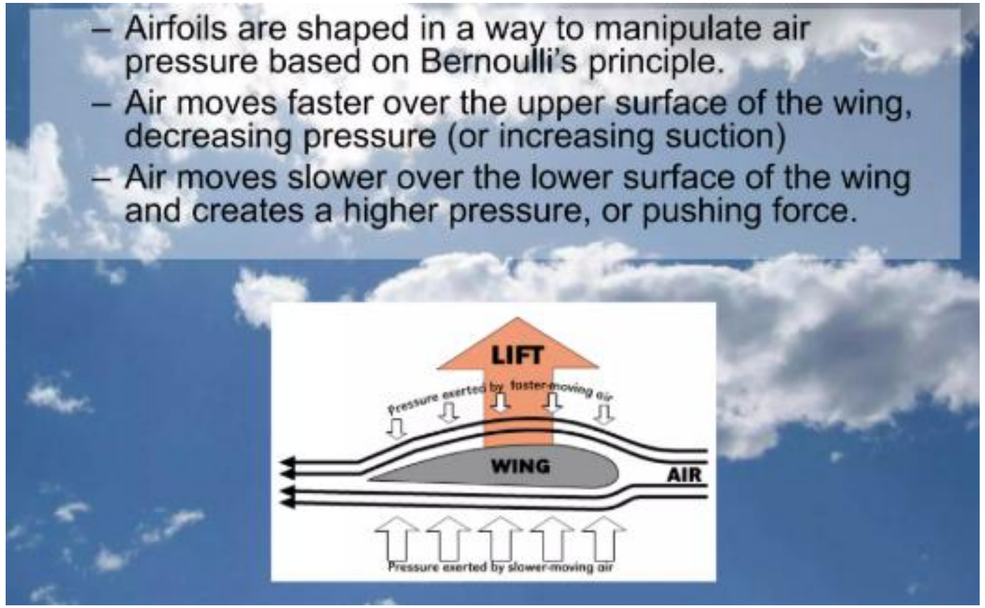

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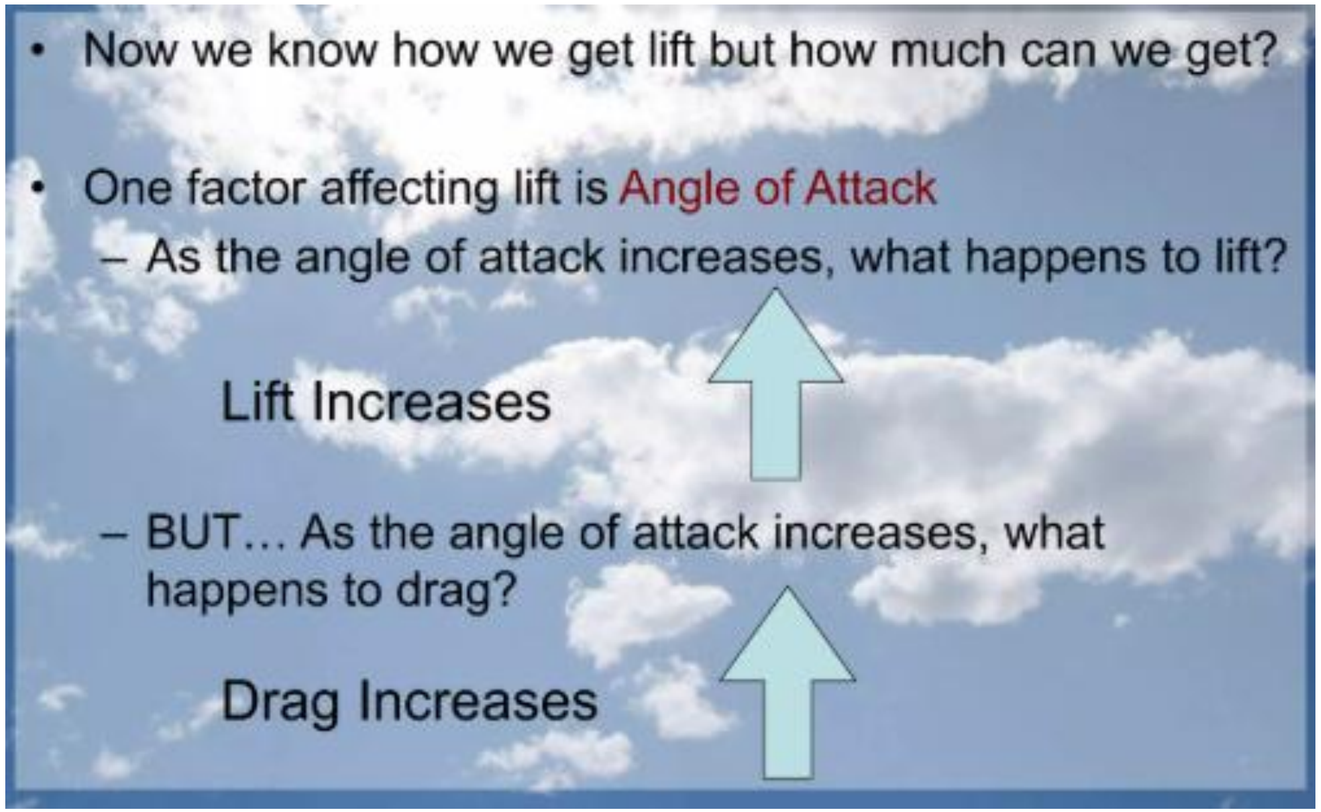


WING OF FINITE SPAN, LIFT, DRAG, LIFT/DRAG RATIO

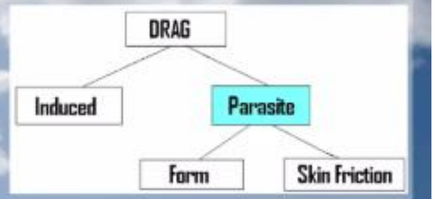
There are 2 main types of Drag:

1. Parasite Drag– This drag is further broken down
   - Form drag
   - Skin Friction
2. Induced Drag

Parasite Drag

Drag of all those parts the airplane which DO NOT contribute to lift
- This drag is hard to eliminate but it can be minimized

- Form drag is caused by the shape of the aircraft
  - Landing gear
  - Antennas
  - Struts
  - Wing tip fuel tanks



WING OF FINITE SPAN, LIFT, DRAG, LIFT/DRAG RATIO

Lift Equation

As shown in the middle of the slide, the L/D ratio is also equal to the ratio of the lift and drag coefficients. The lift equation indicates that the lift **L** is equal to one half the air density **rho (ρ)** times the square of the velocity **V** times the wing area **A** times the lift coefficient C_l:

$$L = C_l \cdot \frac{\rho \cdot V^2 \cdot A}{2}$$

Drag Equation

Similarly, the drag equation relates the aircraft drag **D** to a drag coefficient C_d:

$$D = C_d \cdot \frac{\rho \cdot V^2 \cdot A}{2}$$

Dividing these two equations give:

$$\frac{L}{D} = \frac{C_l}{C_d}$$

Act

Thank You