Maximum rate turns

Objective

To carry out a balanced, maximum rate, level turn using full power.

Principles of flight

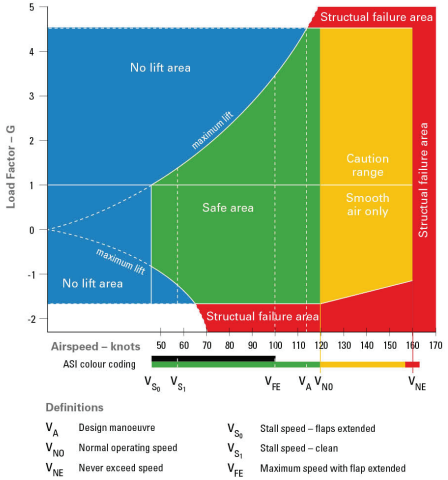
- To change direction at the highest possible rate – maximum degrees in minimum time

Maximum lift

- L ∝ AoA and Airspeed
- Max C_L at start of stall warning or edge of buffet

Airspeed

- Max rate turns limited by V_A
- V_A is the speed at which you can make abrupt and extreme control movements and not overstress the aeroplane's structures
- Found in Flight Manual
- Affected by weight



Rate of turn and radius of turn

- Rate of turn = rate of change of direction – ° /min
- Radius of turn = size of the arc made by the aeroplane
- Slow speed – high rate of turn
- High speed – low rate of turn
- Turning at max rate requires max CPF and max lift
- Rate of turn ∝ velocity therefore power is limiting factor in a max rate turn

Angle of bank

- Between level and 90°

Structural limit

- For this aeroplane is _____ G

Limiting angle of bank

- ↑ in AoB requires ↑ in AoA to ↑ lift, associated ↑ drag → decrease in airspeed
- Power available limited therefore airspeed will reduce as AoB ↑
- Stalling speed ↑ as the √ load factor
- Maximum AoB limited by the amount of power available

Considerations

Entry above V_A

- Smooth roll in, delay power until decelerated to V_A

Entry below V_A

- Lead with power or at same time as roll in

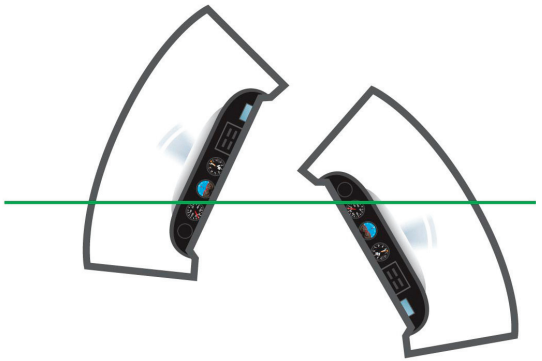
Air exercise

Entry

- Choose reference altitude and prominent reference point
- Check speed relative to V_A
- Apply full power, roll in smoothly, balance with rudder – will need more rudder than usual
- Through 30° AoB increase backpressure to maintain altitude
- Stop at the stall warning (light buffet)
- Check ailerons and rudder
- Maintain backpressure and AoB

Maintaining

- **LAI**
- Attitude differences due side by side seating
- Maintain first note of stall warning with backpressure
- Altitude maintained with AoB
- With stall warning sounding if altitude is being gained or lost, alter AoB



Exit

- Anticipate roll out by 30°
- Smoothly roll wings level with aileron, balance with rudder, and relax the backpressure to re-select the level attitude
- Delay power reduction
- Through _____ kt, reduce power to cruise RPM

Airmanship

- V_A is _____ kt
- Smooth control movements
- Minimum altitude

Aeroplane management

- RPM limit
- C of G limits

Human factors

- 360° turn to minimise disorientation
- Physical G limits during turn, generally ≤ 2G