

Steep Turns

ADVANCED MANOEUVRES

Objectives

To change direction through 360 degrees at a constant rate, using 45 degrees angle of bank, maintaining a constant altitude and in balance.

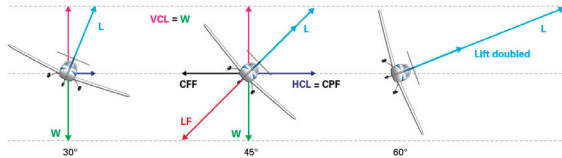
To become familiar with the sensations of high bank angles and high rates of turn.

To turn at steep angles of bank while gliding.

1. Principles of Flight

- 45° AoB
- Avoidance / coordination – practice 360° turn
- Also cover steep gliding turns

$$\frac{L}{W} = LF = \frac{1}{1} = 1 \text{ or } 1 G$$



- Increased apparent weight increases stall speed
- Increased drag: 100% at 45° AoB, 300% at 60° AoB
- Reduces airspeed → power sandwich
- Need to increase power

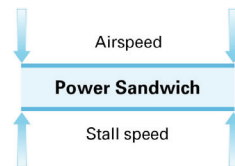
Angle of Bank	Load Factor	% ↑ in stall speed	New stall speed
0	1		50
45	1.4	20	60
60	2	40	70
75	4	100	100

Steep Gliding Turn

- Cannot increase power, ∴ increase airspeed by lowering nose

Adverse Yaw

- Amount of rudder required to overcome depends on rate of roll
- Low airspeeds require more aileron deflection ∴ more adverse yaw



2. Considerations

Out of Balance

- When correcting with rudder keep correct AoB and adjust attitude

Spiral Dive

- Caused by overbanking
- Aeroplane descends, tendency to ↑ backpressure, → turn tightening and ↑ RoD
- Recover by closing throttle, rolling wings level, ease out of dive

Steep Gliding Turn

- Not recommended, but if have to: flap, idle power, max 45° AoB, attitude to maintain speed

3. Airmanship

- Minimum altitude
- **SADIE** checks
- VFR minima
- Sick bags

4. Aeroplane Management

- 100 rpm increase

5. Human Factors

- 360° turns
- Lookout restrictions
- Effect of G
- May be uncomfortable

6. Air Exercise

Entry

- From S+L
- Choose prominent reference point
- Lookout
- Roll with aileron, balance with rudder

In Turn

- Lookout
- Attitude
- Instruments
- Angle of bank controlled with aileron
- Altitude controlled with backpressure
- Lookout
- If altitude changing check AoB first, then backpressure

Exit

- Look for reference point
- Anticipate rollout by half the angle of bank (20°)
- Roll wings level
- Balance with rudder
- Relax backpressure
- Reset S+L attitude
- Through _____ kts, reduce power
- Check **PAT**

Steep Gliding Turn

- Carb heat HOT
- Close throttle
- Roll to 45° AoB
- Maintain height until glide speed reached
- Lower the nose to maintain glide speed
- Trim

