

Steep turns

ADVANCED MANOEUVRES

Objectives

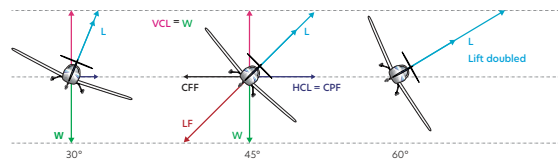
- To change direction through 360 degrees at a constant rate, using 45 degrees angle of bank, maintaining a constant altitude and in balance.
- To become familiar with the sensations of high bank angles and high rates of turn.
- To turn at steep angles of bank while gliding.

Principles of flight

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

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

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



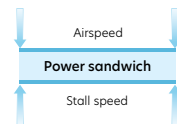
Angle of bank	Load factor	% ↑ in stall speed	New stall speed
0	1		50
45	1.4	20	60
60	2	40	70
75	4	100	100

Steep gliding turn

- Cannot increase power, therefore increase airspeed by lowering nose

Adverse yaw

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



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

- At PPL level, not recommended, but if have to: idle power, max 45° AoB, attitude to maintain speed

Air exercise

Entry

- From S+L
- Choose prominent reference point
- Lookout
- Roll with aileron, balance with rudder
- Through 30° AoB increase power and backpressure
- At 45° AoB, check with ailerons, reduce rudder to maintain balance

In turn

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

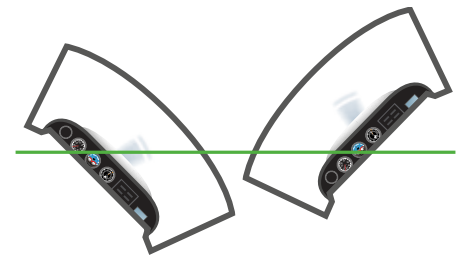


Exit

- 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 _____ kt, reduce power
- Check PAT

Steep gliding turn

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



Airmanship

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

Aeroplane management

- 100 RPM increase

Human factors

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