

**Louisiana Tech University
Flight Operations
Cessna 172S VFR Maneuvers Guide**

Attitude Flying

Attitude + Power = Performance

The desired attitude is obtained by using the outside horizon as a reference in relation to the cowling, dash, or instrument panel of the airplane.

The desired power is obtained using the RPM.

The pilot adjusts the attitude and the power to get the desired performance.

The performance of the aircraft can be seen by looking at the following flight instruments:

- a. Airspeed Indicator
- b. Turn Coordinator
- c. Altimeter
- d. Vertical Speed Indicator
- e. Directional Gyro

Use the integrated method of instruction: using both outside and inside references to obtain desired performance.

TASKS

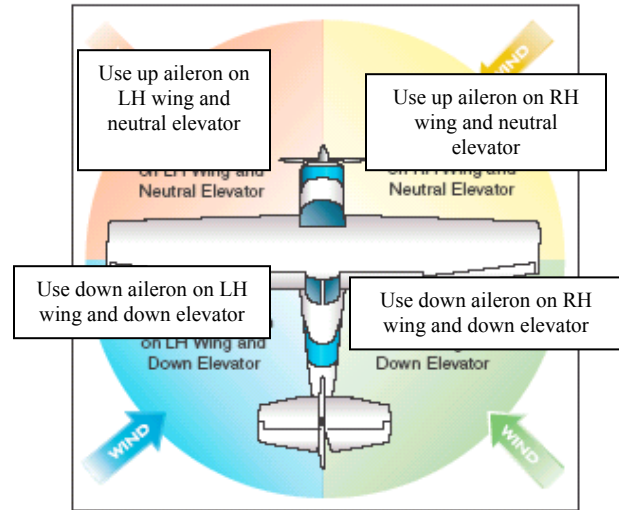
Passenger Briefing

During the before start checklist, each passenger shall be briefed on:

- Seatbelt operations
- Aircraft emergency exits
- Location of emergency equipment (i.e. fire extinguishers)
- No smoking flight

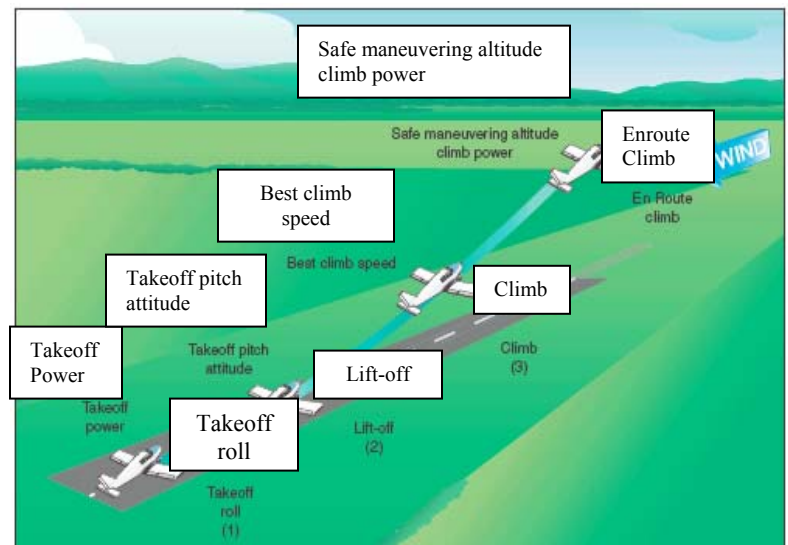
Taxiing

- Before taxiing, complete the passenger briefing.
- Set the proper wind correction with the flight controls before taxiing.
- Let the airplane roll forward and then test the brakes at both pilot positions to ensure that they work properly.
- Taxi with the minimum power required to keep the airplane moving at a brisk walk speed and use the rudder pedals to turn the airplane. Differential braking can be used to tighten the turn.
- Normally the heels of both feet should rest on the floor while taxiing and are only lifted when braking is necessary.
- Taxi using the centerline unless the ground maneuver requires otherwise.



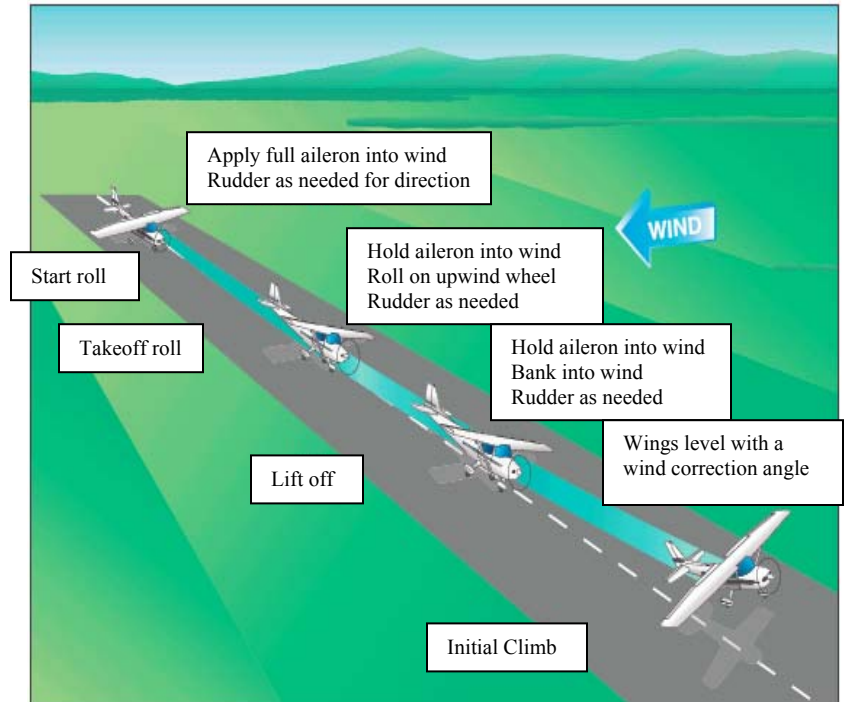
Normal Take-Off and Climb

- Finish the before takeoff briefing.
- Taxi on the runway centerline with proper wind correction.
- Advance the power smoothly to full.
- Check the engine instruments.
- Rudder - To maintain runway centerline
- Rotate - 55 kts
- Climb - Set pitch attitude for 74 kts (V_y)



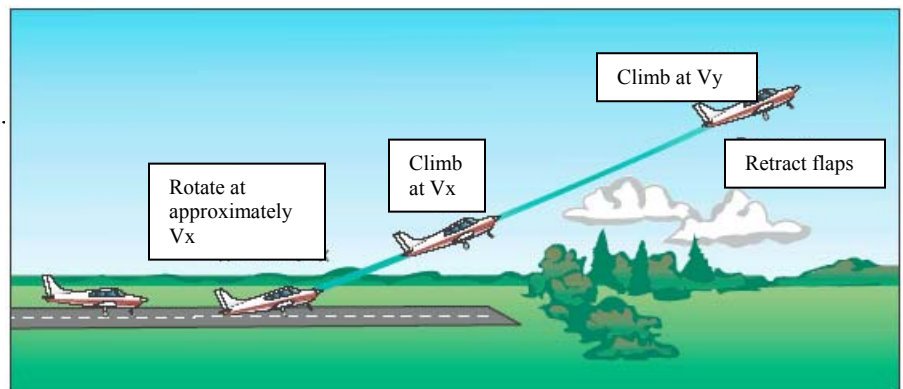
Crosswind Take-Off and Climb

- Finish the before takeoff briefing.
- Taxi on the runway centerline with proper wind correction.
- Position the aileron full deflection into the wind and as the airplane accelerates, gradually reduce the deflection into the wind.
- Rotate at 55 kts with the upwind wheel first.
- Roll into a crab into the wind after a positive rate of climb is established.
- Climb out at V_x if an obstacle exists or V_y if no obstacles exist.



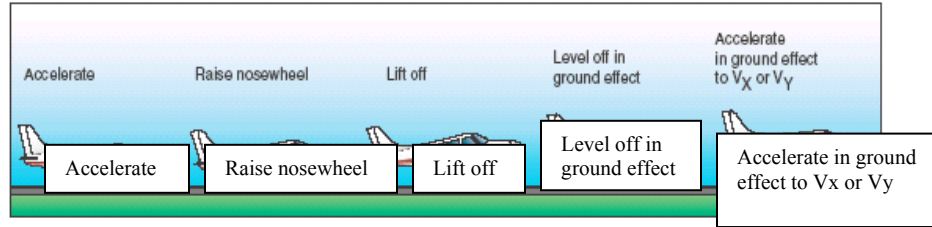
Short Field Take-Off and Maximum Performance Climb

- Finish the before takeoff briefing.
- Flaps - 10°
- Taxi on the runway centerline with proper wind correction.
- Hold the brakes, add full power, check engine instruments, and release the brakes.
- Rotate - 55 kts
- Climb - 56 kts until obstacle clear
- Flaps - 0° above 60 kts. Set pitch attitude for 74 kts (V_y)
- Climb Checklist

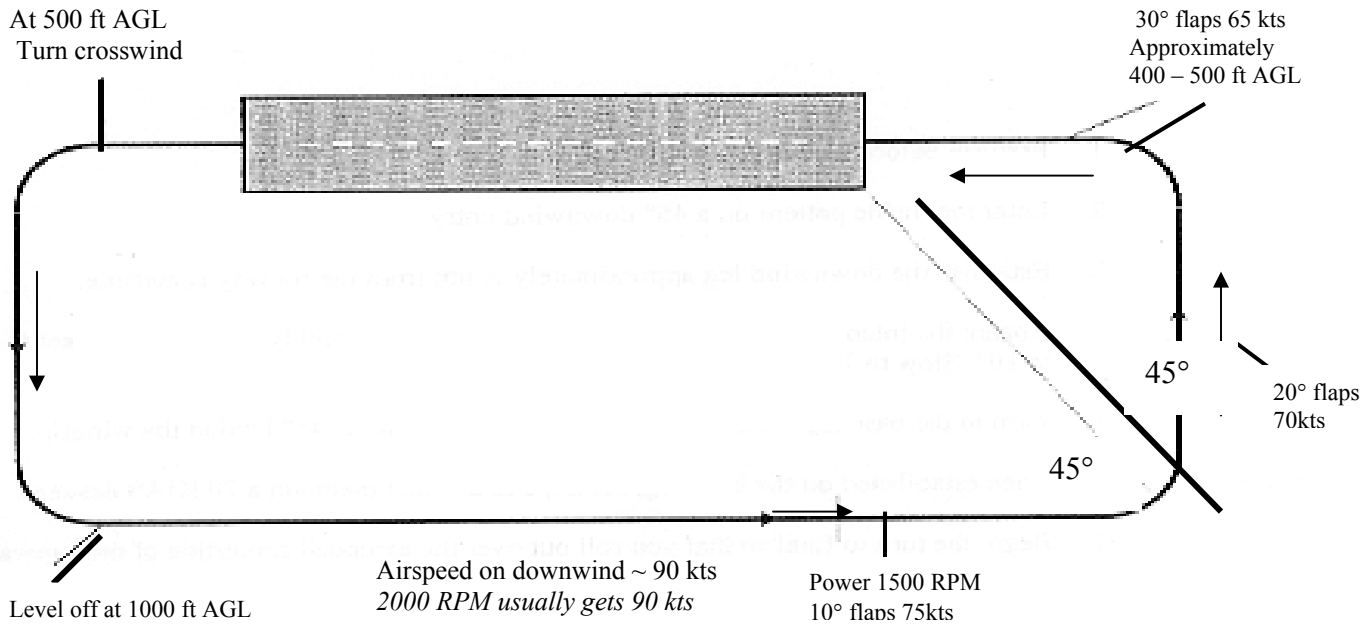


Soft Field Takeoff and Climb

- Finish the before takeoff briefing.
- Flaps - 10°
- Taxi on the runway centerline with proper wind correction.
- Smoothly advance the throttle to full power.
- Check the engine instruments.
- Hold enough back pressure to keep the nosewheel slightly off the ground.
- Stay in ground effect until Vy (or until Vx to clear obstacle)
- Climb - Vy or (Vx until clear obstacle)
- Flaps- 0° above 60 kts. Set pitch attitude for 74 kts (Vy)
- Climb Checklist



Normal Traffic Pattern



The traffic pattern shown above uses standard traffic pattern procedures. The traffic pattern may vary to suit the situation.

Normal and Crosswind Approach and Landing

Altitude - TPA 1000 ft AGL, before landing checklist complete before entering the traffic pattern or on downwind if remaining in the pattern.

1. Downwind abeam point

- Power 1500 RPM, 10° flaps down below 110 kts.
- Maintain 75 kts with the power.

2. Base (Turn when 45° from an end of runway)

- Flaps - 20° or as required below 85 kts (V_{fe})
- Maintain 70 kts with the power.

3. Final (Approximately 500 ft AGL)

- Flaps - 30° or as required, **maintain stabilized approach**
- Apply aileron into wind to control drift.
- Apply rudder as needed to keep the nose of the aircraft straight and on centerline.
- Maintain 65 kts with the power.

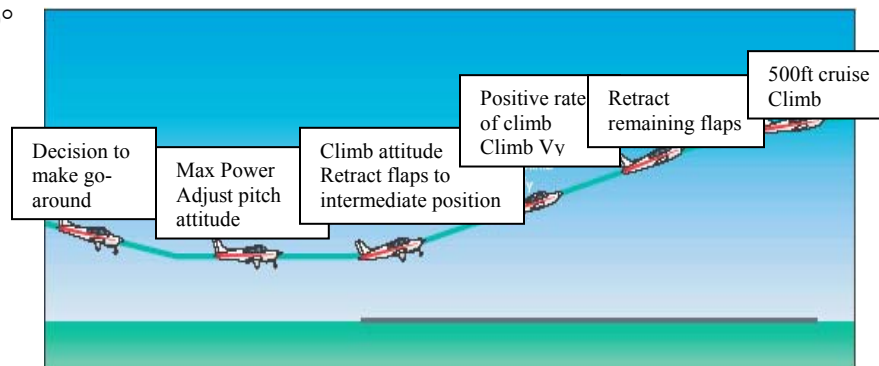
4. Roundout and Flare

- Transition from approach attitude to landing attitude.
- Start roundout approximately 10~20 ft above the ground.
- Gradually, reduce power and increase pitch attitude until touchdown and maintain wind correction and directional control of the airplane.



Go-Around/Rejected Landing

- Power - Maximum, retract flaps to 20° with positive control of the airplane.
- Airspeed - 60 kts, positive rate of climb, retract another 10°
- Airspeed - 65 kts (V_y), positive rate of climb and clear obstacle, retract remaining flaps slowly.
- Maneuver to side of runway.
- Climb Checklist



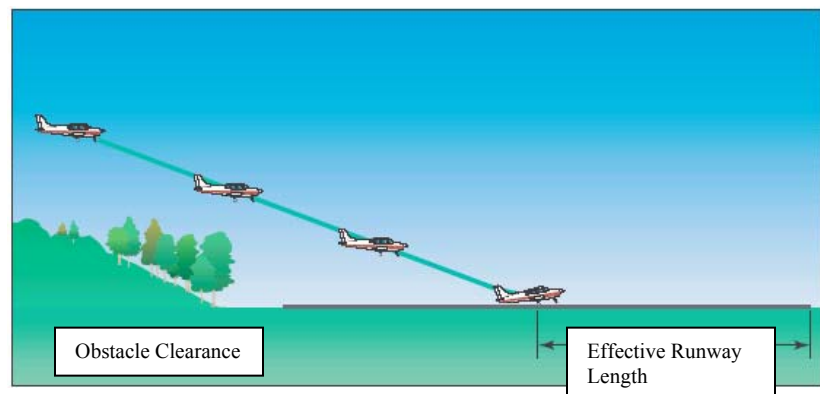
Forward Slip to a Landing

- Avoid slip with flaps extended beyond 20°
 - Avoid slip with less than 1/4 tank fuel
- Altitude - TPA 1000 ft AGL, before landing checklist complete before entering the traffic pattern or on downwind if remaining in the pattern.
 - 1. Downwind abeam point**
Power 1500 RPM, maintain 80 kts with the power.
 - 2. Base** (45° from an end of runway)
Maintain 75 kts with the power.
 - 3. Final** (Approximately 500 ft AGL)
Power - Idle
Maintain 70 kts with the power.
Simultaneously place aileron into the wind to hold centerline and full opposite rudder.
Maintain proper pitch attitude to hold airspeed and a ground track aligned with the centerline.
Discontinuing the slip - wings level, and neutral rudder
 - 4. Roundout and flare** - Transition from approach attitude to landing attitude.

Short Field Approach and Landing

Altitude - TPA 1000 ft AGL before landing checklist complete before entering the traffic pattern or on downwind if remaining in the pattern. If an obstacle is given, the student must select an aiming point that will allow the student to clear the obstacle and utilize the maximum amount of runway.

- 1. Downwind abeam point**
 - Power 1500 RPM, 10° Flaps down below 110 kts.
 - Maintain 75 kts with the power.
- 2. Base** (45° from an end of runway)
 - Flaps - 20° or as required below 85 kts (V_{fe})
 - Maintain 70 kts with the power.
- 3. Final** (Approximately 500 ft AGL)
 - Flaps - 30° or as required, maintain a stabilized approach with sideslip if required to the centerline.
 - Maintain 61 kts with the power.
 - Reduce throttle to idle after clearing obstacle. Continue to aiming point.
- 4. Roundout and flare** - Transition from approach attitude to landing attitude.
 - Touchdown - Apply brake then retract flaps, maintain runway centerline.



Soft Field Approach and Landing

Altitude - TPA 1000 ft AGL before landing checklist complete before entering the traffic pattern or on downwind if remaining in the pattern.

1. Downwind abeam point

- Power 1500 RPM, 10° flaps down below 110 kts
- Maintain 75 kts with the power.

2. Base (45° from an end of runway)

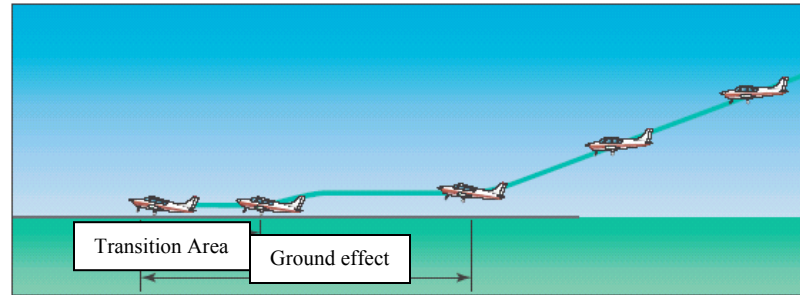
- Flaps - 20° or as required below 85 kts (Vfe)
- Maintain 70 kts with the power.

3. Final (Approximately 500 ft AGL)

- Flaps - 30° or as required, maintain stabilized approach with sideslip if required to the centerline.
- Maintain 65 kts with the power.

4. Roundout and flare - Transition from approach attitude to landing attitude.

- Set the pitch attitude to protect the nose wheel and use power as necessary to touchdown at the minimum descent rate and keep the nose protected.



Straight-and-Level Flight

Straight and level flight occurs when a constant heading and altitude are maintained. To achieve straight flight: Use outside visual reference points directly ahead of the airplane.

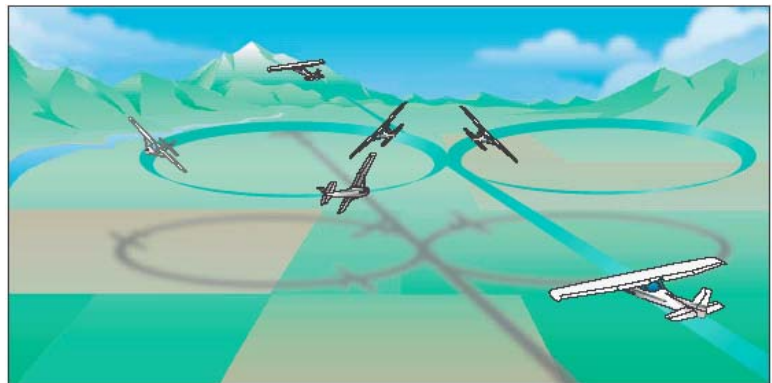
Periodically, check with your heading indicator.

To achieve level flight: Use airplane's nose as a reference point with trim set.

Periodically, check with your altimeter.

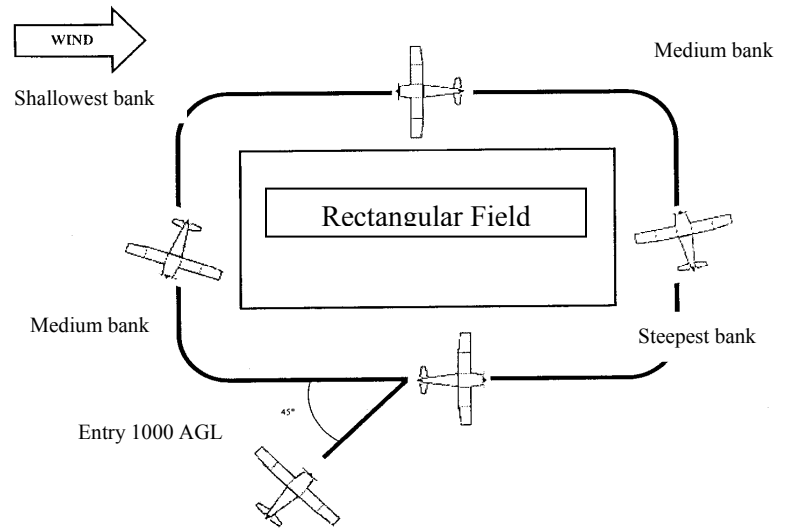
Steep Turns

- Altitude - At least 1500 ft AGL, check fuel valve on both, and mixture rich.
- Perform clearing turns.
- Power - 1900 - 2100 RPM (below Va)
- Reference point on horizon or heading.
- Bank - 45° for private standards or 50° for commercial standards.
- Adjust control wheel pressure and power to maintain the bank angle, altitude, and airspeed.
- Roll out of the bank on the selected reference point and reduce power if necessary.



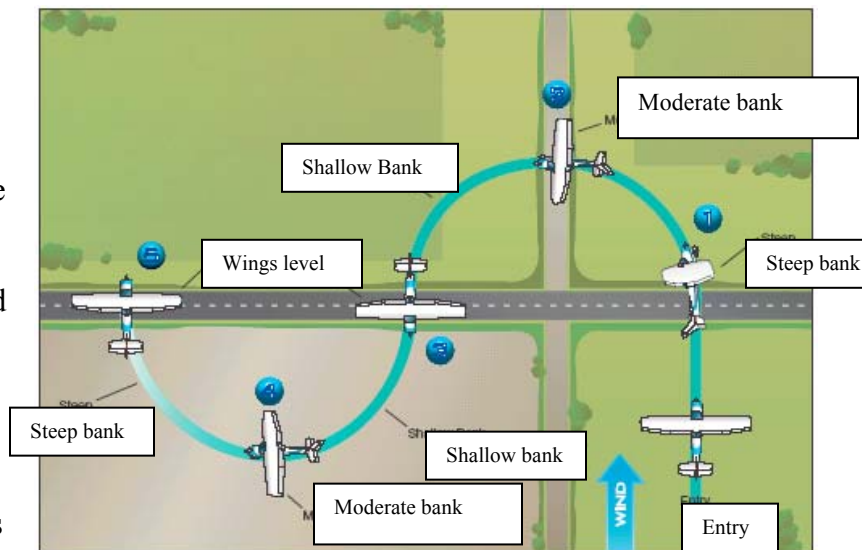
Rectangular Course

- Altitude – 1000 ft AGL,
- Airspeed - Below V_a , with emergency landing field available.
- Check fuel valve on both.
- Constant power and level flight
- Entrance- On downwind
- Change Bank (Max. 45°) to stay the same distance around the rectangular field with crab (wind correction into the wind).



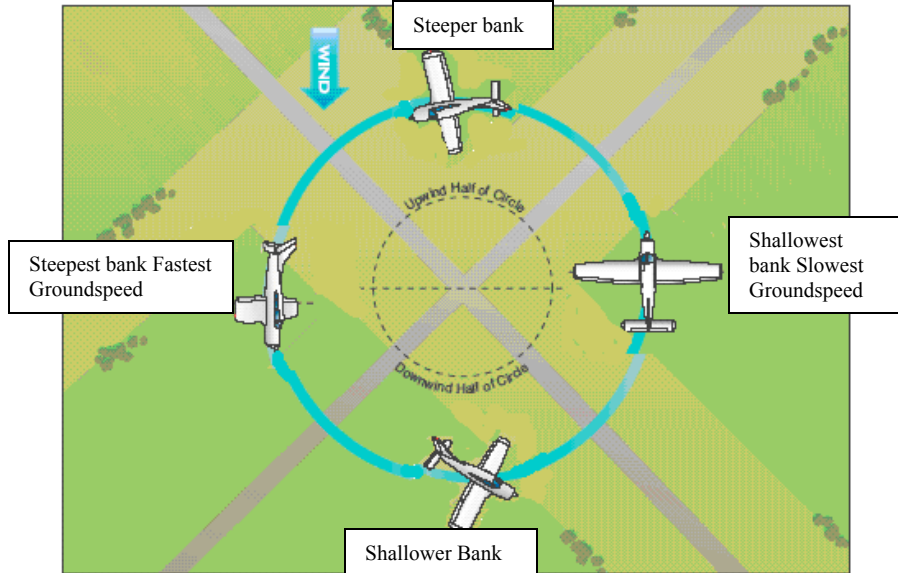
S-Turns Across a Road

- Altitude – 1000 ft AGL
- Airspeed - Below V_a with emergency landing field available
- Check fuel valve on both
- Constant power and level flight
- Reference Line - Perpendicular to wind
- Entrance- On downwind
- Vary bank (max 45°)
 1. Max bank on downwind
 2. Downwind to crosswind - slowly decrease bank
 3. Crosswind to upwind - wings level crossing reference line
 4. Upwind to crosswind - slowly increase bank
 5. Crosswind to downwind - increase bank to maximum
- Exit - On downwind



Turns around a point

- Altitude – 1000 ft AGL
- Airspeed - Below V_a , with emergency landing field available
- Check fuel valve on both
- Constant power and level flight
- Entrance- On downwind
- Vary bank (max 45°) as necessary to keep the same radius around the point
- Exit - On downwind



Maneuvering During Slow Flight

Altitude – Completed no lower than 1500 ft AGL, clearing turn, Airspeed - MCA without stalling. Check fuel valve on both, and mixture rich.

1. Entry

Power – 1500 RPM and maintain altitude by pitch

Flaps set below 85 kts (V_{fe}) - 30°

Maintain altitude by power and airspeed by pitch

2. Recovery

Power - Maximum, 10° flaps retract with positive control of the airplane

Airspeed - 62 kts (V_x), positive rate of climb, retract another 10°

Airspeed - 74 kts (V_y), positive rate of climb, retract 10°

Cruise Checklist

Power-On Stalls

Can be done with up to 20° bank

Altitude - Completed no lower than 1500 ft AGL, clearing turn, check fuel valve on both, and mixture rich.

1. Entry

Power – 1500 RPM, maintain altitude by pitch

Airspeed - 55 kts with the same pitch hold

Power - Max, increase the pitch until stall

2. Recovery

Pitch - Decrease pitch attitude to the horizon

Wing - Level with positive control of the airplane

Airspeed - 74 kts (Vy), positive rate of climb

Cruise Checklist

Power-Off Stalls

Can be done with up to 20° bank

Altitude - Completed no lower than 1500 ft AGL, clearing turn, check fuel valve on both, and mixture rich.

1. Entry

Power – 1500 RPM, maintain altitude by pitch

Flaps - 30° below 85 kts (Vfe)

Maintain stabilized approach path at 65 kts with constant pitch attitude

Power - Idle, increase the pitch attitude until the stall

2. Recovery

Power - Maximum, nose to the horizon

Retract 10° flaps with positive control of the airplane

Airspeed - 62 kts (Vx), positive rate of climb, retract another 10°

Airspeed - 74 kts (Vy), positive rate of climb, retract 10°

Cruise checklist

Spins (Stall with rotation)

Spin Recovery

1. Power to idle.

2. Aileron in neutral position.

3. Full opposite rudder to stop the rotation.

4. As rotation stops, apply briskly forward pressure to break the stall.

5. Gradually, pull back flight control for level flight.

6. Cruise flight checklist.

Emergency Approach and Landing

Set the pitch attitude for best glide speed 68 kts (V_g).

Ensure that the flaps are up to minimize drag.

Select a suitable landing field.

NOTE: An engine failure will be simulated by retarding the throttle to idle. Never kill the engine for an emergency approach and landing. The maneuver should terminate at 1000 ft AGL unless over an airport.

Complete engine restart checklist (normal and aux.) if altitude and time permits.

Complete forced landing checklist

Always maintain positive control of the airplane.

Maneuver to be abeam the landing point (Key downwind position) on downwind at 1000 ft AGL.

