Louisiana Tech University
Flight Operations
Cessna 172 RG 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 passenger briefing
- Set the proper wind correction before taxiing
- Let the airplane roll forward and then test the brakes to ensure that they work
- Taxi with 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 before takeoff briefing
- Taxi on the runway centerline with proper wind correction
- Advance the power smoothly to full
- Rudder - to maintain runway centerline
- Check engine instruments
- Carb Heat – Cold
- Cowl Flaps - Open
- Rotate - 55 kts
- Climb – 70 - 80 kts
- Brakes - Apply
- Gear - Up after positive rate of climb, obstacles clear, and no available runway
- Normal Climb Checklist
Crosswind Take-Off and Climb

- Finish 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 Vx if an obstacle exists or 70 – 80 kts if no obstacles exist.
- Brakes - Apply
- Gear - Up after positive rate of climb, obstacles clear, and no available runway
- Climb Checklist

Short Field Take-Off and Maximum Performance Climb

- Finish before takeoff briefing.
- Flaps - 0°
- 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 - 63 kts until obstacle clear (Vx)
- Gear - Up after positive rate of climb, obstacles clear, and no available runway
- Set pitch attitude for 70 - 80 kts
- Climb Checklist
Soft Field Take-Off and Climb

- Finish before takeoff briefing.
- Flaps - 10° (below 2550 lbs)
- Taxi on the runway centerline with proper wind correction
- Smoothly advance the throttle to full power
- Hold enough back pressure to keep the nosewheel slightly off the ground
- Stay in ground effect until 70 - 80 kts or 63 kts (Vx) to clear obstacle
- Gear – Up: Positive rate of climb, clear obstacles, and no more available runway
- Flaps- 0°, set pitch attitude for 70 – 80 kts
- Climb Checklist

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
   - Carb heat - on, power 15" MP,
   - Props - full fwd, 10° flaps down below 130 kts
   - Maintain 75 kts with the power and with proper wind correction

2. Base (Turn when 45° from an end of runway) - CGUMPS
   - Flaps - 20° or as below 100 kts (Vfe)
   - Maintain 70 kts with the power and with proper wind correction

3. Final (Approximately 500 ft AGL) - CGUMPS
   - Flaps - 30° or as required, maintain stabilized approach with sideslip if needed to the centerline
   - Maintain 65 kts with the power and with proper wind correction

4. Roundout and flare - Transition from approach attitude to landing attitude
   - Start roundout about 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
180º Accuracy Power-Off Approach and Landing

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

1. Abeam the specified touchdown point closes throttle and establishes appropriate glide speed.
2. Completes final airplane configuration.
3. Touches down in a normal landing attitude, at or within 200 feet beyond the specified touchdown point.

Go-Around/Rejected Landing

- Ensure props are full forward
- Power - maximum, 10° flaps retract with positive rate of climb and control of the airplane
- Check engine instruments
- Carb heat - off, cowl flaps – open
- Climb Speed – 55 kts
- Wing Flaps – Retract slowly after reaching 65 kts
- Positive Rate of Climb – Gear up after obstacles clear
- Airspeed - 65 kts and positive rate of climb, retract remaining flaps slowly
- Maneuver to side of runway
- Climb checklist
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.

1. **Downwind abeam point**
   - Carb heat - on, Power 15” MP,
   - Props - Full fwd
   - Flaps - 10° down below 130 kts,
   - Determine obstacle. Pitch to establish a glide path over the obstacle to a point on the runway. This point on the runway is your aiming point.
   - Maintain 75 kts with the power and with proper wind correction

2. **Base** (45° from an end of runway)
   - CGUMPS
   - Flaps - 20° or as required below 100 kts (Vfe)
   - Adjust pitch as necessary to maintain glide path to your aiming point.
   - Maintain 70 kts with the power and with proper wind correction

3. **Final** (Approximately 500 ft AGL) – CGUMPS
   - Flaps - 30° or as required, maintain stabilized approach with sideslip if required to the centerline.
   - Adjust pitch as necessary to maintain glide path to your aiming point.
   - Maintain 63 kts with the power and with proper wind correction
   - Once obstacles are clear, power idle, maintain wind correction and directional control, and continue to aiming point

4. **Roundout and flare** - Transition from approach attitude to landing attitude
   - Start roundout about 10~20 ft above the ground
   - 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**
   - Carb heat - on, Power 15" MP, props full fwd, 10° flaps down below 130 kts
   - Maintain 75 kts with the power and with proper wind correction

2. **Base (45° from an end of runway)**
   - CGUMPS
   - Flaps - 20° or as required below 100 kts (Vfe)
   - Maintain 70 kts with the power and with proper wind correction

3. **Final (Approximately 500 ft AGL) - CGUMPS**
   - Flaps - 30° or as required, maintain stabilized approach with sideslip if required to the centerline
   - Maintain 65 kts with the power and with proper wind correction

4. **Roundout and flare** - Transition from approach attitude to landing attitude
   - Start roundout about 10~20 ft above the ground
   - Gradually, increase pitch attitude until touchdown and increase power as necessary to hold the nose off the ground.

**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.

   Constantly, check with your Heading Indicator

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

   Constantly, check with your Altimeter

**Steep Turns**

- Altitude - at least 1500 ft AGL, Check fuel valve on both, mixture rich, cowl flaps closed, and clearing turn
- Power - 19 - 21” MP, 2300 RPM (below Va)
- Reference point on horizon or heading
- Add 1” MP to maintain airspeed
- Bank - 50° maintain ± 5° and roll out the entry heading ± 5°
Steep Spirals

- Altitude – sufficient to complete three 360° spirals.
- Check fuel valve both, mixture rich, cowl flaps closed, and clearing turn
- Abeam reference point
- Carb heat - On, power - idle (clear engine occasionally)
- Airspeed - 73 kts (Vg)
- Maintain distance from reference point by varying bank
- Bank - 60° max.
- Rollout - At specified altitude

Chandelles

- Altitude - At least 1500 ft AGL, Check fuel valve on both, mixture rich, cowl flaps – open, and clearing turn
- Maneuvers into the wind (starts at crosswind), pick a reference at 90° point
- Power - 19 - 21" MP, 2500 RPM (below Va)
1. First 90°
   - Roll in and maintain constant bank - 30° Max.
   - Increase power to 25” MP
   - Increase pitch at constant rate
   - Max pitch up at 90° point
2. After 90°
   - Constant pitch
   - Begin rollout of bank
3. At 180°
   - Wings level at MCA without stalling and with minimal loss of altitude
4. Cruise checklist
Lazy Eights

Altitude - At least 1500 ft AGL, Check fuel valve on both, mixture rich, cowl flaps closed, and clearing turn
Maneuvers into the wind (starts at crosswind)
Pick references at 45°, 90°, 135° point
Power - 19 - 21" MP, 2000 - 2300 RPM (below Va)

1. Entry to 45°
   Simultaneously increase pitch to max. and gradually bank for 15°
2. 45° to 90°
   Continue to steepest bank (30°), and decrease pitch for horizon (level pitch)
3. 90° to 135°
   Pitch max. down, and decrease bank for 15°
4. 135° to 180°
   Gradually pitch for level and bank for straight flight same as entry
5. Cruise checklist
**Eights-on-Pylons**

*This is the only maneuver that La Tech Aircraft will be allowed to descend below 1,000 AGL*

Check fuel valve both, mixture rich, cowl flaps closed, and clearing turn.

Power: 20" MP, 2300 RPM, straight and level flight

Altitude: Pivotal altitude = \((\text{GS}^2/11.3)\) ft AGL

Pick two points that are perpendicular to the wind, are a reasonable distance apart, and also have emergency landing field available.

Enter the maneuver on a 45° to downwind between two pylons with the first turn to the left.

Once the wing tip is abeam the first point, start a left turn around the point and hold the wing on the point (the line of sight).

If the point moves back on the wing, pitch back to bring the wing back even with the reference point.

If the point moves forward on the wing, pitch forward to bring the wing back even with the reference point.

When on a 45 to downwind again, roll straight and level with a crab into the wind and head towards the second reference point (3~5 sec) Climb back to pivotal altitude if not already there.

Once the wing tip is abeam the second point, start a right turn around the point and hold the wing on the point using the same procedure as above.

Exit the maneuver on a 45 to downwind, the same way you entered it.

Cruise checklist

![Diagram of Eights-on-Pylons maneuver](image)
Maneuvering During Slow Flight

Altitude - At least 1500 ft AGL, Airspeed – MCA

**Landing**

1. **Entry**
   Fuel valve – Both
   Cowl flaps - Open
   Gear - Down below 140 kts
   Carb heat - On
   Power - 15” MP and maintain altitude by pitch
   Props - Full forward
   Mixture - Rich
   Flaps set below 100 kts (Vfe)
   Slow to MCA
   Maintain altitude by power and airspeed by pitch

2. **Recovery**
   Power - Maximum, 10° flaps retract with positive rate and positive control of the airplane
   Carb heat – Off
   Gear – up with positive rate of climb
   Airspeed - 65 kts, Slowly retract remaining flaps
   Cruise checklist

**Clean**

1. **Entry**
   Fuel valve – Both
   Cowl flaps – Open
   Carb heat – On
   Power – 15” MP and maintain altitude by pitch
   Props – Full forward
   Mixture – Rich
   Slow to MCA
   Maintain altitude by power and airspeed by pitch

2. **Recovery**
   Power – Max
   Carb heat – Off
   Cruise checklist
Power-On Stalls (Takeoff)
*Can be done with up to 20° bank*
Altitude - At least 1500 ft AGL

1. Entry
Fuel Valve – Both
Cowl flaps - Open
Gear – Down below 140 kts
Carb heat - On
Power - 15” MP, maintain altitude by pitch
Props - Full forward
Airspeed - 55 kts with the same pitch hold
Power - Max, maintain a continuous pitch attitude that will induce a stall
Carb heat - Off

2. Recovery
*If simulating max power, do not apply throttle*
Pitch - Decrease pitch attitude to level pitch
Wing - Level with positive control of the airplane
Positive rate of climb, gear up
Airspeed – 70 - 80 kts, positive rate of climb
Cruise checklist

Power-On Stalls (Departure)
*Can be done with up to 20° bank*
Altitude - At least 1500 ft AGL

1. Entry
Fuel Valve - Both
Carb heat - On
Props – Full Forward
Power - 15” MP, maintain altitude by pitch
Airspeed - 55 kts with the same pitch hold
Power – Max (simulated-max power at 21” is acceptable), maintain a continuous pitch attitude that will induce a stall.
Carb heat - Off

2. Recovery
*If simulating max power, do not apply throttle*
Power – Full and simultaneously decrease pitch attitude to level pitch
Wing - Level with positive control of the airplane
Airspeed – 70 – 80 kts, positive rate of climb
Cruise checklist
Power-Off Stalls
*Can be done with up to 20° bank*
Altitude – Sufficient to complete the maneuver above 1500 ft. AGL

1. **Entry**
   - Fuel Valve - Both
   - Gear – Down below 140 kts
   - Carb heat - On
   - Power - 15” MP, maintain altitude by pitch
   - Props - Full forward
   - Mixture - Rich
   - Flaps - 30° below 100 kts (Vfe)
   - Maintain stabilized approach path at 65 kts with constant pitch attitude
   - Power - idle and transition to a pitch attitude that will induce a stall

2. **Recovery**
   - Power - Full and simultaneously decrease pitch attitude to level pitch
   - Carb heat - Off
   - Retract 10° flaps with positive rate and positive control of the airplane
   - Gear up with positive rate of climb
   - Above 65 kts, retract flaps slowly
   - Cruise checklist

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Spins (Stall with rotation)

**Spin Recovery**
1. Power to idle
2. Aileron in neutral position
3. Full opposite rudder to stop rotation
4. As rotation stops, briskly apply forward pressure to break the stall
5. Gradually, pull back flight control for level flight
6. Cruise checklist

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Emergency Approach and Landing
Set the pitch attitude for best glide speed 61~73 kts (Vg)
Ensure that the flaps and gear 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 except for during stage checks with an MOI team member. The maneuver should terminate at 1000 ft AGL unless over an airport.

Engine restart procedures if altitude and time permits
Pull the prop out to the high pitch to increase gliding distance
Complete the forced landing checklists
Always maintain positive control of the airplane
Establish circling procedures between the touchdown and key downwind position (preferred)
Maneuver to be abeam the landing point (Key downwind position) on downwind at 1000ft. AGL