


## Go Around/Rejected Landing

<b>Objective</b>	
<p>To ensure the applicant learns the purpose of and can exhibit a clear understanding of the go around maneuver and how to perform the maneuver properly.</p>	
<b>Purpose</b>	
<p>Sometimes approaches and landings go wrong, or other airplanes, cars, or even animals wander onto the runway. The go-around is the safest approach to aborting a landing and climbing back to safety. Practicing go-arounds sharpens a pilot's fundamental flying skills and develops aeronautical decision making skills.</p>	
<b>Schedule</b>	<b>Equipment</b>
<ul style="list-style-type: none"> <li>● <b>Ground Lesson:</b> 15 minutes</li> <li>● Initial <ul style="list-style-type: none"> <li>■ <b>Flight:</b> 10 minutes - <i>Introduction to Maneuver</i></li> <li>■ <b>Flight:</b> 10 minutes (per lesson) - <i>Practice</i></li> </ul> </li> <li>● Solo <ul style="list-style-type: none"> <li>■ <b>Flight:</b> 10 minutes (per solo flight) - <i>Improve Proficiency</i></li> </ul> </li> <li>● Pre-Checkride <ul style="list-style-type: none"> <li>■ <b>Flight:</b> 10 minutes - <i>Demonstrate Proficiency</i></li> </ul> </li> <li>● <b>Debrief:</b> 10 minutes (<i>per flight</i>)</li> </ul>	<ul style="list-style-type: none"> <li>● Airplane POH and Checklist</li> <li>● Whiteboard / Markers (optional)</li> <li>● Model Airplane (optional)</li> </ul>
<b>Student Actions</b>	<b>Instructor Actions</b>
<ul style="list-style-type: none"> <li>● Ask any questions, receive study material for the next lesson.</li> <li>● Watch linked video.</li> <li>● Review listed references.</li> </ul>	<ul style="list-style-type: none"> <li>● Deliver the ground lesson (below).</li> <li>● Demonstrate the maneuver in flight.</li> <li>● Debrief after each flight.</li> </ul>
<b>Completion Standards</b>	
<ul style="list-style-type: none"> <li>● <b>Ground:</b> Student can explain the purpose of the maneuver and how to execute it properly. <ul style="list-style-type: none"> <li>● Can explain the basic go-around procedure, the tendency to overpitch, and how to counter it.</li> </ul> </li> <li>● <b>Flight:</b> Student can perform the maneuver to the applicable ACS standards. <ul style="list-style-type: none"> <li>● Makes a timely go-around decision, and immediately applies full power.</li> <li>● Pitches for and maintains a climb at <math>V_x</math> or <math>V_y</math> as appropriate (+10/-5 knots Private Pilot, +/-5 knots Commercial).</li> <li>● See expanded Completion Standards below.</li> </ul> </li> </ul>	

## References

- ERAUSpecialVFR - "Go Around"
  - YouTube - <https://www.youtube.com/watch?v=yaaZEK22YRg>
- FAA-H-8083-3C (Airplane Flying Handbook) - Chapter 9, Page 10-15 [Go Arounds (Rejected Landings)], Chapter 9, Page 30-37 [Faulty Approaches and Landings]
- FAA-H-8083-25C (Pilot's Handbook of Aeronautical Knowledge) - Chapter 5, Page 15-17 [Longitudinal Stability (Pitching)], Chapter 5, Page 30-33 [Left Turning Tendencies], Chapter 11, Page 7-8 [Rate of Climb, Angle of Climb]
- FAA-S-ACS-6C (Private Pilot ACS) - Area IV Task N
- FAA-S-ACS-7B (Commercial Pilot ACS) - Area IV Task N
- FAA-S-ACS-25 (CFI ACS) - Area VII Task N

## Ground Lesson Outline

- What is a Go Around?
  - Reasons for a go around
  - Stabilized Approach, Energy Management
- Don't Delay
  - Decide quickly, without delay
  - Full power!
- Don't Overpitch
  - Possibility of elevator trim stall
- Transitioning to normal climb
- Left turning tendencies
- Safety considerations
  - Use of checklists
  - Visual traffic scanning, Situational Awareness/Runway Incursions
  - Stall avoidance
  - Windshear, Tailwinds, Wake Turbulence
- Maneuver Description - step-by-step
  - Entry position, airspeed, etc.
- Expanded Completion Standards

## Common Errors

- **Failure to recognize a situation where a go-around/rejected landing is necessary.**
- Hazards of delaying a decision to go-around/rejected landing.
- Improper power application.
- Failure to control pitch attitude.
- **Failure to compensate for torque effect.**
- Improper trim procedure.
- Failure to maintain recommended airspeeds.
- Improper wing flaps or landing gear retraction procedure, if applicable.
- Failure to maintain proper track during climb-out.
- Failure to remain well clear of obstructions and other traffic.

## Ground Lesson Content

- **What is a Go-Around?** Sometimes when landing, things don't go right. Maybe the airplane is too high, too low, a rogue wind gust pops up, an airplane or an animal enters the runway unexpectedly. Whenever the safe outcome of the landing is in doubt, pilots should elect to perform a **go-around**.



- Although go-arounds usually happen before touching the runway, sometimes they can be necessary *after* the initial landing... for example in the case of a bad bounce, 'porpoising', or loss of directional control. Usually the safest course of action is to **go around**.

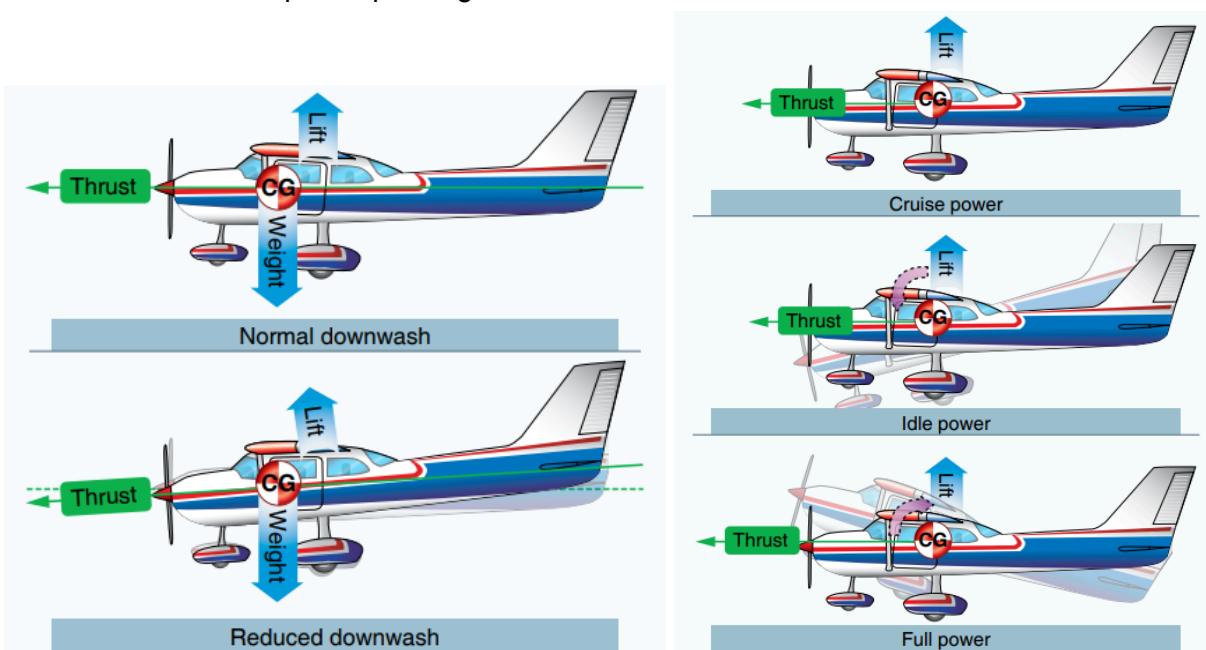


- Every successful landing begins with a stabilized approach, but often poor **Energy Management** necessitates a go around. There is a fundamental difference between a *High Energy* and *Low Energy* approach, as these must be managed very differently.
  - See the lesson on *Area 10 (X) - Task B - Demonstration of Flight Characteristics at Various Configurations and Airspeeds* for more details on energy management.
- **Don't Delay** - Go-arounds are one of the few maneuvers in normal flying where there is little to no margin for delay. When a dangerous situation happens during landing, **it is important to make a decision quickly** and that pilots follow through. Once a decision to go-around has been made, don't change it!
  - A go-around is a fairly simple maneuver: **first, apply full power.**
  - After applying full power, the pilot pitches the airplane up to climb back up away from the runway, usually back into the traffic pattern to attempt another landing.

- After the airplane is safely climbing away from the runway, the airplane can be trimmed and wing flaps and landing gear retracted, if necessary.



- **Don't Overpitch** - When full power is applied in a go-around, the airplane will tend to pitch up on its own, sometimes violently. It is important that pilots are prepared for this and apply *nose-down* elevator pressure to counteract it. **If this pitch up is not stopped by the pilot, it is possible for the airplane to enter a power-on stall!** (An 'elevator trim stall')
  - Airplanes pitch up when power is applied because at low power settings, there is less *downwash* over the tail surface. Because of this, the elevator trim will be set to more *nose up* trim in order to maintain the same airspeed. When engine thrust is increased, this downwash increases dramatically, resulting in a strong pitch up tendency.
  - **It may be necessary to trim nose down quickly and aggressively to overcome the nose-up pitch!**
  - **Proper go-around pitch is similar to proper takeoff pitch.** The nose should be *above the horizon*, but not excessively so.
  - Some airplanes (e.g. High-wing, Cessnas) have the center of gravity located above the *thrust line* (effectively, an imaginary line intersecting the center of the propeller disc), which also contributes to upward pitching.



- Airplanes which have a CG below the thrust line will have a downward pitching tendency when power is applied, and may need less aggressive pitch corrections.

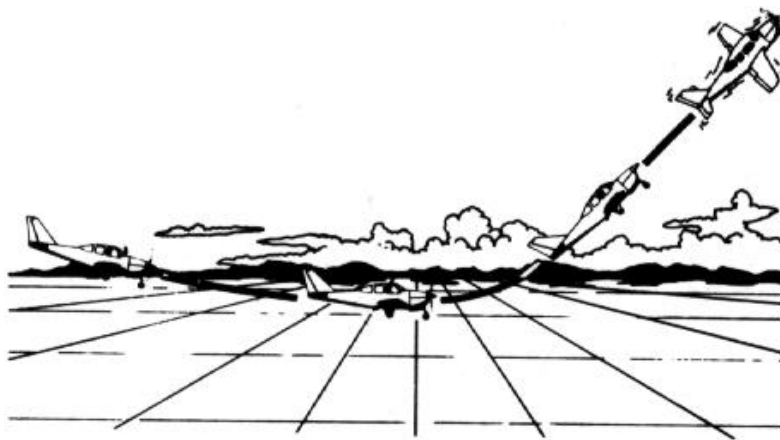
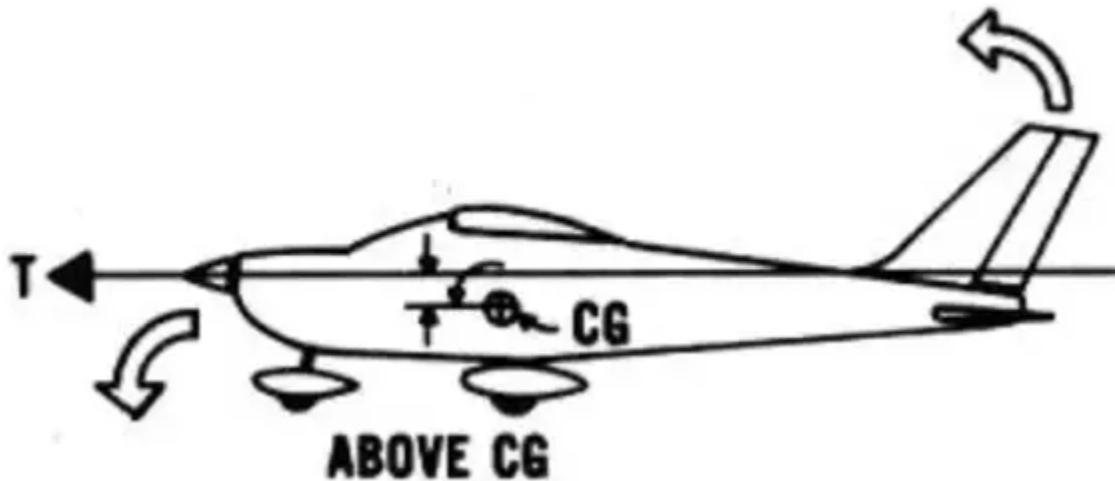
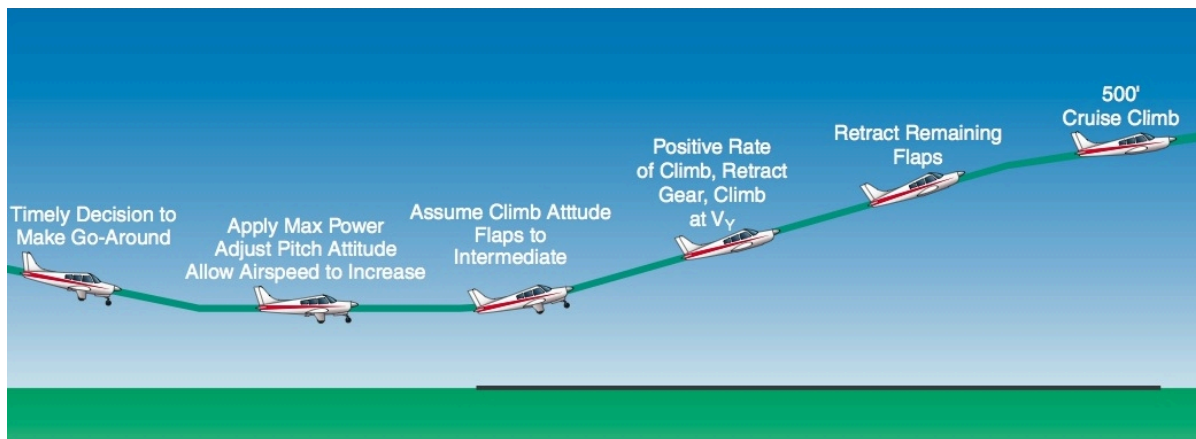


Figure 11-26 Elevator Trim Stall

- **Transitioning to Normal Climb** - After the 'exciting' elements of the go-around are finished, pilots should treat them as a normal climb. This means climbing at the appropriate speed (usually best rate,  $V_y$ ), and cleaning up the airplane (retract flaps, retract landing gear, etc).
  - As with any after-takeoff climb, it is still important to fly runway heading, and be aware of any obstructions, traffic, or other hazards.
  - Most importantly, pilots should always perform a **climb checklist** after the danger has passed and the airplane is climbing again.





- Left-Turning Tendencies** - This maneuver also illustrates the strong effects of left-turning tendencies at low airspeeds and high angle of attack. While climbing, the airplane will be flying at a high angle of attack and high power setting, exaggerating the torque reaction, spiraling slipstream, and P-Factor, requiring **significant right rudder pressure**.

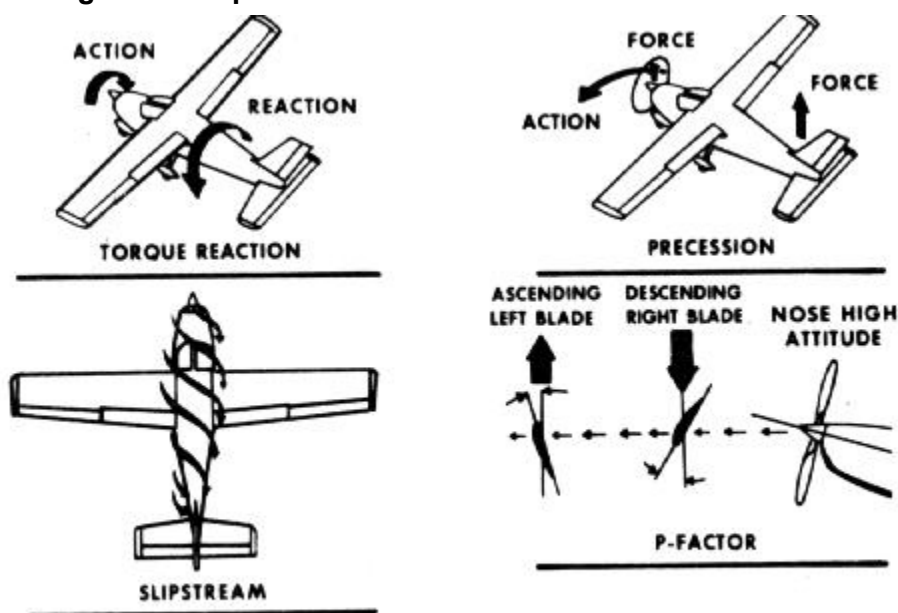


Figure 3-6 Left Turning Tendencies

- Safety Considerations**
  - Similar to any takeoff, the **use of checklists is important**. After the initial climb is established, the climb checklist must be performed.
  - All takeoffs and go-arounds require special caution to be exercised for obstacles on or near the field!** Powerlines, tall trees, or other obstacles may be quite close to the runway environment! These obstacles may be difficult to see in a nose-high attitude after a go-around.
  - Runway incursions are a major cause of go-arounds. These can create an exciting situation, and a go around is a very busy time in an aircraft. It is crucial to not become so focused on tasks inside the cockpit that an unsafe situation is created. Maintain situational awareness, make appropriate radio calls *after establishing a safe climb*.

- One of the major risks is that of a power-on stall. If the stall indicator is heard at any point, **lower the nose!** A power-on stall is likely not recoverable when very close to the ground.
- **Windshear, Tailwinds, Wake Turbulence** - During takeoffs and landings, we are operating near the ground at low speed. Pilots should exercise caution if there are indications of windshear, pay attention to situations where wake turbulence will be a factor. Additionally, taking off or landing with a tailwind creates a much higher ground speed, lengthening the ground roll, and increasing the danger.

## Maneuver Description

- **Go-Around Decision Point** - A go-around can be initiated at any point when the safety of the landing is in doubt and the airplane can still regain sufficient flying speed. When any unsafe condition occurs, decide **promptly** and apply full power.
- **Pitch and Trim** - Establish a proper go-around pitch attitude (similar to takeoff pitch attitude) and apply nose-down trim as necessary.
- **Airspeed** - Establish a climb at  $V_y$ , or  $V_x$  if obstacle clearance is necessary.
- **Checklists** - Pilots must perform a climb checklist after the airplane is safely climbing away from the runway.
- **Coordination** - The maneuver should be flown in coordinated flight at all times. This maneuver creates a risk of a power-on stall or spin entry, so proper coordination is essential!
- **Communicate** - After it is safe to do so, communicate the go-around to ATC or on the CTAF, as necessary.
- **This is a visual maneuver!** Eyes should remain outside the cockpit as much as possible to scan for traffic and ensure obstacle avoidance. *Monitoring for other traffic is especially critical when performing this maneuver at uncontrolled airfields.*

## Expanded Completion Standards

- The pilot can explain the purpose of the go around maneuver and how the various factors, such as left-turning tendencies and downwash affect the performance of the maneuver.
- The pilot can perform the maneuver to the following standards:
  - Pilot sets up a normal approach to land.
  - Pilot makes a timely decision to go around if the safe completion of the landing is in doubt, or if the evaluator commands a go around.
  - Pilot immediately applies full power.
  - Pilot pitches for and maintains a climb at  $V_x$  or  $V_y$  (+10/-5 knots Private Pilot, +/-5 knots Commercial) as appropriate
  - Pilot reconfigures airplane for climb and performs the climb checklist.
  - Pilot makes appropriate radio calls.
  - Pilot divides attention between accurate, *coordinated airplane control* and outside visual references.