INTRODUCTION

The following maneuver guide is designed to provide a technique for completing each VFR maneuver required by the FAA's Practical Test Standards for Airman Certification Standards. By performing each maneuver as described, you will consistently fly the aircraft (and think through the maneuver) the same way every time. This will develop a sound knowledge and flying skills base and allow you to handle any emergency or unusual flight situation in a predictable fashion based on a solid foundation of the basics.

This manual does not take the place of current FAA publications. These references should be used to enhance understanding of each maneuver in combination with FAA publications and other training materials.

C-182P MANEUVERS GUIDE

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GENERAL FLIGHT PROCEDURES

These are the normal procedural steps to be followed when conducting training in the C-182P.

BRIEFINGS

To ensure a positive flight training experience, briefings should be used for certain phases of flight so that all parties involved understand important characteristics of the flight.

TAKEOFF BRIEFINGS- During the "Before Takeoff" checklist, the pilot should give a takeoff briefing that includes:

1. Type of takeoff.
2. Applicable aircraft V-speeds.
3. Takeoff distances.
4. Emergency procedures during takeoff.

APPROACH BRIEFINGS- When approaching an airport for landing under VFR, the pilot should give an approach briefing that includes:

1. Active runway and winds.
2. Type of landing.
3. Landing distance.
4. Emergency procedures during landing.

POSITIVE EXCHANGE OF FLIGHT CONTROLS

During flight training, there must always be a clear understanding between students and flight instructors of who has control of the aircraft. A positive three-step process in the exchange of flight controls will be conducted.

When the instructor wishes the student to take control of the aircraft, he or she will say, "You have the aircraft." The student will acknowledge by saying, "I have the aircraft." The flight instructor again says, "You have the aircraft." When control is returned to the instructor, follow the same procedure. A visual check by both student and instructor to verify the exchange is also recommended.

CLEARING TURNS

A minimum of two clearing turns are required before each maneuver to ensure there is no traffic in the area. Clearing turns should be done at a bank angle of 30° with each turn being at least 90°. There must be a break between each turn (one 180° turn does not substitute for two individual 90° turns). Emphasis should be placed on keeping the

aircraft in a limited geographic area to complete the maneuver. It is recommended that the aircraft be momentarily banked in the direction opposite of the clearing turn to clear the area above the wings.

MANEVUER CHECKLISTS

Every maneuver begins and ends the same way: SLUF (strait and level unaccelerated flight – i.e.; cruise power, trimmed, on altitude and heading, and stabilized). That way, you know exactly when you are beginning the maneuver, and exactly when you're done.

At the conclusion of the in-flight maneuver, the cruise checklist will normally be completed after returning to training or normal cruise, as appropriate.

Cruise Checklist	
Throttle	17" MP
Propeller	2350 RPM
Mixture	LEAN
Cowl Flaps	Closed
Engine Instruments	CHECK

MINIMUM ALTITUDES

Simulated engine failures will be practiced on dual flights only and will not descend below 500 ft. above ground level. Apart from ground reference maneuvers, all maneuvers will be completed no lower than 1500 ft. above ground level.

TRIM

The importance of proper trim techniques cannot be over emphasized. Trim constantly changes throughout the flight. Any change in power, pitch, bank, airspeed or weight/cg (fuel burn) requires a corresponding trim change. You should constantly strive to keep the aircraft trimmed "hands off." A properly trimmed aircraft will allow you to do other things with your eyes and hands (e.g. navigating, taking notes, and inserting coordinates in the gps) without having to constantly monitor altitude, airspeed and heading.

182P V-SPEEDS IN MPH

Symbol	Speed	MPH	Symbol	Speed	MPH
V_{NE}	Never Exceed	198	V_{SO}	Stall Speed Flaps 40 °	63
V_{NO}	Max. Structural Cruise	160	V_S	Stall Speed Flaps Up	68
V_A	Design Maneuvering Speed: 2950 lbs.	126	V_X	Best Angle of Climb	70
			V_Y	Best Rate of Climb	90
V_{FE}	Max. Flap Extended Speed:	110	—	Enroute Climb	100-110
V_{GLIDE}	Best Glide Flaps Up	80	—	Normal Approach Flaps 20°	70-80
X-Wind	15 kts.		—	Normal Approach Flaps 40°	70

TAXI OPERATIONS

Maneuver:
Taxiing is the controlled movement of the airplane under its own power while on the ground. Since an airplane is moved under its power between the parking area and the runway, the pilot must thoroughly understand and be proficient in taxi procedures.

Objective:
Develop the student's ability to safely operate the airplane during ground and taxi operations.

Procedure:

1. When first beginning to taxi, the brakes should be tested for operation as soon as the airplane is put in motion. If braking action is unsatisfactory, the engine should be shut down immediately.
2. Announce intentions to taxi on the appropriate frequency. *(KGUC 122.7)*
    a. "Gunnison Traffic, Skylane 21119 on the ramp taxing runway XX via Alpha, XX Departure."
3. Steering the airplane is accomplished with rudder pedals and minimal usage of brakes. Turns should be made at a slow, safe speed.
4. The taxi speed should be slow enough so that when the throttle is closed the airplane can be stopped promptly.
5. When yellow taxiway centerline stripes are provided, the airplane's nose wheel should remain on the line unless necessary to clear other airplanes or obstructions.
6. In no-wind, the ailerons and elevator controls should be held in a neutral condition.
7. In windy conditions;
    a. Headwind: Deflect ailerons into the wind, neutral elevator.
    b. Tailwind: Deflect ailerons away from the wind, elevator full forward.
8. While taxiing, clear all taxiway and runway intersections visually and verbally. Also, when taxiing onto an active runway clear the final approach paths in both directions. **Call out-** "Clear left, clear right."

NORMAL TAKEOFF AND CLIMB

Maneuver:
The normal takeoff is one in which the airplane is headed directly into the wind, or the wind is calm. Also, the takeoff surface is firm and of sufficient length to permit the airplane to accelerate to lift-off and climb out speed, and there are no obstructions along the takeoff path.

Objective:
Develop the student's ability to safely takeoff and depart the takeoff area under normal conditions.

Procedure:

1. Holding short of the runway make departure radio call.
    a. "Gunnison traffic, Skylane 21119, taking active runway XX, XX departure" or "XX closed traffic."
2. Taxi into takeoff position.
3. Smoothly and continuously apply full throttle (three seconds count).
4. Check RPM (approximately 2600 RPM), Manifold Pressure, and verify engine gauges and airspeed rising. **Call out-** "Airspeed alive, engine gauges in the green,"
5. Use rudder as necessary to maintain directional control.
6. When the flight controls become effective, gradually apply back-elevator pressure to attain a lift-off pitch attitude, Vr (60 MPH).
7. Note the position of the airplanes nose in relation to the horizon and adjust as necessary to attain a V_Y pitch attitude (90 MPH) and extended centerline.
8. At 300 feet AGL (8,000 ft.), flaps up **Call Out-** "Gear up, Flaps up"
9. At 500 feet AGL (8,200), set prop to 2450 RPM.
10. At 1,000 ft. AGL, slightly lower the nose to attain a cruise climb pitch attitude (100-110 MPH).

CROSSWIND TAKEOFF AND CLIMB

Maneuver:
A crosswind will affect the airplane during takeoff much as it does during taxiing. Therefore, the crosswind takeoff technique closely parallels the crosswind correction techniques used in taxiing.

Objective:
Develop the student's ability to safely takeoff and depart the takeoff area during crosswind conditions.

Procedure:

1. Holding short of the runway make departure radio call.
    a. "Gunnison traffic, Skylane 21119, taking active runway XX, XX departure" or "XX closed traffic".
2. Taxi into takeoff position.
3. Note wind direction and deflect full ailerons into the wind.
4. Smoothly and continuously apply full throttle.
5. Check RPM (approximately 2600 RPM), Manifold Pressure, and verify engine gauges and airspeed rising. **Call out-** "Airspeed alive, engine gauges in the green"
6. Use rudder as necessary to maintain directional control.
7. As airspeed builds, reduce aileron input to maintain a wings level attitude.
8. When the flight controls become effective, gradually apply back-elevator pressure to attain a lift-off pitch attitude, Vr (60 MPH).
9. Note the position of the airplanes nose in relation to the horizon and adjust as necessary to attain a V_Y pitch attitude (90 MPH).
10. Crab to maintain extended centerline.
11. At 300 feet AGL flaps up **Call Out-** "Gear up, Flaps up"
12. At 500 feet AGL, set prop to 2450 RPM.
13. At 1,000 ft. AGL, slightly lower the nose to attain a cruise climb pitch attitude (100-110 MPH).

TRAFFIC PATTERN OPERATIONS

Maneuver:
To assure that air traffic flows into and out of an airport in an orderly manner, an airport traffic pattern is established appropriate to the local conditions, including the direction and placement of the pattern, the altitude to be flown, and the procedures for entering and leaving the pattern.

Objective: To develop the student's ability to conduct safe and efficient traffic pattern operations when approaching to land at an airport.

Procedure:

1. Determine the active runway.
2. Complete the before landing checklist. CCGUMPS
3. Establish traffic pattern altitude and a 45-degree entry at the midpoint to the downwind leg and slow to 17" MP at approximately 100-110 MPH.
4. Call downwind leg position
    a. "Gunnison traffic, Skylane 21119, entering XX downwind at a 45 for runway XX, touch and go" or "full stop."
    b. When remaining in the pattern. – "Gunnison traffic, Skylane 21119, entering XX downwind, runway XX, touch and go" or "full stop."
5. Turn onto the downwind leg and maintain ½ mile from the active runway, approximately half the distance on the wing-strut.
6. Abeam the point of intended landing-
    a. Power to 12" MP
    b. Flaps to 10 degrees
    c. Prop full forward
7. Maintain altitude while decelerating to 90 MPH.
8. Throttle to 10" MP.
9. Upon reaching 90 MPH start descending.
10. At a point, approximately 45 degrees from the approach end of the runway, set flaps to 20 degrees and slow to 80 MPH.
11. Begin a medium bank turn onto the base leg and visually clear the final approach area. (Flaps, turn, talk).
12. Call base.
    a. "Gunnison traffic, Skylane 21119, XX base, runway XX, touch and go or "full stop".
13. Refer to the appropriate landing procedure.

NORMAL APPROACH AND LANDING

Maneuver:
This type of approach and landing involves the use of procedures for what is considered a normal situation; that is, when engine power is available, the wind is light or the final approach is made directly into the wind, the final approach has no obstacles, and the landing surface is firm and of sufficient length to gradually bring the airplane to a stop.

Objective:
Develop the student's ability to safely and accurately land the airplane.

Procedure:

1. Set an aiming point to land within the first 1/3 of the runway.
2. Flaps 20^{o} – 80 MPH, Flaps 30^{o} - 70 MPH
3. Maintain aiming point with pitch, power, and trim corrections until approaching round out.
4. At the appropriate flare altitude, reduce power toward idle and continue the flare to touchdown on the main wheels first at approximately stalling speed.
5. Upon touchdown, hold the nose wheel off the runway as long as the elevator remains effective to provide aerodynamic braking, as appropriate.
6. Maintain directional control using rudder.
7. Do not initiate the after-landing checklist until clear of the runway.

*Note: The 182 will develop a definite sink rate if the power is decreased to the idle prior to touchdown. A normal flare and touchdown is accomplished with power at approximately 10" MP. Decrease the throttle to the idle after touchdown

CROSSWIND APPROACH AND LANDING

Maneuver:
Many runways or landing areas are such that landings must be made while the wind is blowing across rather than parallel to the landing direction. All pilots should be prepared to cope with these situations when they arise. The same basic principles and factors involved in a normal approach and landing apply to a crosswind approach and landing; therefore, only the additional procedures required for correcting wind drift are presented here.

Objective:
To develop the student's ability to safely and accurately land the airplane while correcting for a crosswind during the landing approach, touchdown, and roll out.

Procedure:

1. Establish approach configuration (normal, short-field, soft-field).
2. Maintain alignment with centerline using the wing-low method.
3. At the appropriate flare altitude, reduce power toward idle and continue the flare to touchdown on the upwind main wheel first.
4. As the airplane slows, increase aileron deflection into the wind, slowly increase back-elevator pressure, and gently apply brakes.
5. Do not initiate the after-landing checklist until clear of the runway.

*Note: The 182 will develop a definite sink rate if the power is decreased to the idle prior to touchdown. A normal flare and touchdown is accomplished with power at approximately 10" MP. Decrease the throttle to the idle after touchdown.

TURBULENT AIR APPROACH AND LANDING

Maneuver:
Power-on approaches at airspeeds slightly above the normal approach speed should be used for landing in turbulent air. This provides for more positive control of the airplane when strong horizontal wind gusts, or up and downdrafts, are experienced.

Objective:
To develop the student's ability to land the airplane when turbulent and gusty wind conditions are encountered.

Procedure:

1. Set an aiming point to land within the first 1/3 of the runway.
2. Set flaps to no greater than 20 degrees.
3. Final approach speed 80 MPH + ½ gust.*
4. Maintain aiming point with pitch adjustments and power for airspeed until approaching roundout.
5. At the roundout, and just as the main wheels contact the landing surface in approximately a level pitch attitude, reduce the power to idle.*
6. Maintain directional control with rudder and apply brakes gently.
7. Do not initiate the after-landing checklist until clear of the runway.

*Gust factor: Take the difference between the maximum sustained surface winds and the reported gusts, and add this number to the final approach speed.
Example: 360/10G20. Maximum wind = 10 knots
Maximum gust = 20 knots
Difference = 10 knots/2 = 5 knot gust factor.

*Note: The 182 will develop a definite sink rate if the power is decreased to the idle prior to touchdown. A normal flare and touchdown is accomplished with power at approximately 10" MP. Decrease the throttle to the idle after touchdown.

SOFT-FIELD TAKEOFF AND CLIMB

Maneuver:
Takeoffs and climbs from soft fields require operational techniques for getting the airplane airborne as quickly as possible to eliminate drag caused by tall grass, soft sand, mud, snow, etc., and may or may not require climbing over an obstacle. These same techniques are also useful on a rough field where it is advisable to get the airplane off the ground as soon as possible to avoid damaging the landing gear.

Objective:
Obtain maximum performance when taking off from other than a smooth, hard surface runway.

Procedure:

1. Verify flaps are set to 20 degrees.
2. Taxi into takeoff position while maintaining full aft elevator at a speed consistent with safety. Avoid stopping on a soft surface.
3. Smoothly apply full power.
4. Check RPM (approximately 2600 RPM), Manifold Pressure and verify airspeed rising. **Call out** "Airspeed alive, engine gauges in the green."
5. Use rudder as necessary to maintain directional control.
6. Maintain a nose-high attitude throughout the takeoff run.
7. As the nose wheel leaves the ground, slightly reduce back-elevator pressure until the main wheels leave the ground.
8. Establish Vx (70 MPH) pitch attitude.
9. At 100 feet AGL flaps up to 10 degrees.
10. At 300 feet AGL flaps up, **Call out** – "Gear up, Flaps Up."
11. At 500 feet AGL set prop to 2450 RPM.
12. At 1,000 ft. AGL, slightly lower the nose to attain a cruise climb pitch attitude (100-110 MPH).

SOFT-FIELD APPROACH AND LANDING

Maneuver:
Landings on fields that are rough or have soft surfaces, such as snow, sand, mud, or tall grass requires unique procedures. The approach for the soft-field landing is similar to the normal or short-field depending on field selection. The major difference between the two is that during the soft-field landing, the airplane is held 1 to 2 feet off the surface as long as possible to dissipate the forward speed sufficiently to allow the main wheels to touch down gently at minimum forward speed and minimum rate of descent.

Objective:
Develop the student's ability to land safely on soft fields.

Procedure:
1. Fly a normal or short-field approach procedure.
2. Flaps 20° – 80 MPH, Flaps 30° - 70 MPH.
3. When the intended landing area is assured, reduce power toward idle. As you initiate the flare, increase power to break the descent rate of the aircraft just above the landing surface.
4. Touch down on the main wheels first at the slowest possible airspeed and with a nose-high pitch attitude.
5. Hold sufficient back-elevator pressure to keep the nose wheel off the ground until it can no longer aerodynamically be held off the field surface.
6. Do not initiate the after-landing checklist until clear of the runway.

SHORT-FIELD TAKEOFF AND CLIMB

Maneuver:
Takeoffs and climbs from fields where the takeoff area is short or the available takeoff area is restricted by obstructions require that the pilot operate the airplane at the limit of its performance capabilities. To depart from such an area safely, the pilot must exercise positive and precise control of airplane's attitude and airspeed so that takeoff and climb performance results in the shortest ground roll and the steepest angle of climb.

Objective:
Develop the student's ability to obtain maximum airplane performance during the takeoff and climb-out phases.

Procedure:

1. Verify flaps are set to 20 degrees.
2. Taxi into position at the end of the runway so that maximum runway is available for takeoff.
3. Smoothly and continuously apply full throttle.
4. Check RPM (approximately 2600 RPM), Manifold Pressure, and release the brakes and verify airspeed rising. **Call out** – "Airspeed alive, engine gauges in the green"
5. Use rudder as necessary to maintain directional control.
6. Smoothly and firmly apply back-elevator pressure as the calculated lift-off speed approaches, Vr (60 MPH).
7. Maintain a V_X (70 MPH) climb attitude until the obstacles have been cleared or 50 feet, if there are no obstacles.
8. At 100 feet AGL, slightly lower the nose to attain a V_Y (90 MPH) and maintain extended centerline.
9. At 300 feet AGL flaps up, **Call out** – "Gear up, Flaps Up."
10. At 500 feet set prop to 2450 RPM.
11. At 1,000ft AGL, slightly lower the nose to attain a cruise climb pitch attitude. (100-110 MPH).

SHORT-FIELD APPROACH AND LANDING

Maneuver:
Short-field approaches and landings require the use of procedures and techniques for landing at fields with a relatively short landing area or where an approach is made over obstacles that limit the available landing area.

Objective:
To develop the student's ability to obtain maximum aircraft performance to land safely within confined landing areas.

Procedure:

1. Set desired aiming point to clear obstacles.
2. Flaps 30° - 80 MPH
3. Adjust pitch to maintain a steeper than normal angle of descent and power to maintain airspeed.
4. At the roundout, continue the flare to touchdown on the main wheels first in approximately the pitch attitude that will result in a power-off stall just as the power is reduced to idle.
5. Begin smoothly applying brakes immediately after touchdown. Retract the flaps while holding positive backpressure on the elevator. Continue applying full elevator backpressure and maximum braking (without skidding the tires) until the aircraft has slowed to normal taxi speed.
6. Do not initiate the after-landing checklist until clear of the runway.

180 DEGREE POWER-OFF ACCURACY APPROACH

Maneuver:
Power-off accuracy approaches and landings are made by gliding with the engine idling, through a specific pattern to a touchdown beyond and within 200 feet of a designated line or mark on the runway.

Objective:
The objective is to instill in the pilot the judgment and procedures necessary for accurately flying the airplane, without power to a safe landing.

Procedure:

1. Fly the normal traffic pattern. Perform CCGUMPS.
2. Reduce power to idle abeam desired landing spot, PROP- Full
3. Establish a normal glide pitch attitude at 80 MPH.
4. Use a medium to steeper bank turn to the base leg and set flaps as required. Plan the base leg turn for varying wind conditions.
5. The base-to-final turn should be planned so that when rolling out on final the airplane will be aligned with the runway centerline.
6. Use flaps as needed and slow to normal approach speed.
7. Do not initiate the after-landing checklist until clear of the runway.

*Note: Although accurate spot touchdowns are important, safe and properly executed approaches are vital. The pilot must never sacrifice a good approach and landing just to land on the desired spot.

FORWARD SLIP TO LANDING

Maneuver:
A forward slip can be used to increase the airplane's descent angle without increasing airspeed. This could prove useful in making an emergency landing, or in landing in an area with obstructions.

Objective:
To develop the student's ability to perform forward slips.

Procedure:

1. Reduce power to idle, lower the upwind wing using aileron and apply opposite rudder to prevent the airplane from turning toward the lowered wing.
2. Adjust the pitch attitude to maintain 80 MPH.
3. Maintain the slip until the normal glide path is attained, and then the slip may be discontinued.
4. Continue with the appropriate landing procedure.

GO-AROUNDS (REJECTED LANDINGS)

Maneuver:
Occasionally, it may be advisable to discontinue the landing approach and make another approach under more favorable conditions. Air traffic control requirements, low base to final turns, wake turbulence, or unexpected hazards on the runway are some examples of hazardous situations that would demand initiating a go-around.

Objective:
To develop the student's ability to safely initiate a go-around during a rejected landing.

Procedure:

1. Throttle- Full, Carb heat- off, Flaps to 20 degrees.
2. Transition to a V_y (90 MPH) climb pitch attitude to slow or stop the descent.
3. If obstacles are present, establish a Vx (63) pitch attitude and maintain Vx until clear of obstacles.
4. Cowl Flaps – Open
5. As the aircraft accelerates, retract flaps to 10 degrees at Vx (70 MPH) and flaps up at Vy (90 MPH). Continue climb to pattern altitude.
6. Side step to the right if conflicting runway traffic.

STEEP TURNS

Maneuver:
This maneuver consists of a turn in either direction using a bank angle steep enough to cause an over banking tendency during which maximum turning performance is attained and relatively high load factors are imposed.

Objective:
The objective of the maneuver is to develop smoothness, coordination, orientation, division of attention, and control techniques while executing high performance turns.

Procedure:

1. Power 17" MP and 2350 RPM.
2. Smoothly roll into a bank angle of 45 degrees.
3. Maintain altitude and airspeed by adjusting the pitch, bank, and power as necessary.
4. After completing a 360-degree turn, roll wings level. Begin a steep turn in the opposite direction.
5. The rollout from the turns should be timed so that the wings reach level exactly on the entry heading.
6. Return to cruise flight by setting cruise power, and trimming the aircraft to maintain altitude and heading.

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SLOW FLIGHT

Maneuver:
This maneuver demonstrates the flight characteristics and degree of controllability of an airplane at just above stall speed. The pilot's ability to estimate the margin of safety above the stalling speed by the diminishing control effectiveness is of great importance.

Objective:
To develop the student's ability to recognize changes in airplane flight characteristics and control effectiveness at critically slow airspeeds.

Procedure:

1. Clear the area using clearing turns.
2. Establish and announce altitude and heading.
3. Power 12" MP, Carb Heat- On, Flaps- 10°, Propeller- Full, Cowl Flaps- Open
4. Airspeed in flap operating range, extend flaps in 10-degree increments to desired setting.
5. As airspeed diminishes, adjust power and pitch attitude to maintain level flight.
6. Establish and maintain an airspeed at which any further increase in pitch, load factor, and/or reduction in power would result in an immediate stall. (45 MPH).
7. Recognize and announce the first aerodynamic indications of an oncoming stall (e.g., stall warning, mushy flight controls, buffeting).
8. Perform coordinated turns, climbs, and descents as directed by the instructor.
9. Recover to cruise flight by simultaneously applying maximum power, carburetor heat cold, flaps 20°. Adjust pitch attitude to maintain altitude.
10. As the aircraft accelerates, retract flaps to 10 degrees at Vx (70 MPH) and flaps up at Vy (90 MPH), cowl flaps open. (The recovery is analogous to a Go-Around procedure).
11. Return to cruise flight. Perform Cruise Checklist. Throttle-17" MP, Prop-2350, Cowl Flaps- Cruise.

*Note: Minimum controllable airspeed is defined as the airspeed at which any further increase in angle of attack or load factor, or reduction in power will cause an immediate stall. The aural stall warning horn should remain activated throughout the maneuver.

POWER-OFF STALL

Maneuver:
The practice of power-off stalls is usually performed in a normal approach to landing configuration to simulate an accidental stall occurring during landing. The stalls can be performed to either imminent or full stall conditions. Also, they should be practiced in a no-flap configuration, with full flaps, and in turns.

Objective:
The objectives in performing intentional stalls are to familiarize the pilot with conditions that produce stalls, to recognize an approaching stall, and to develop the habit of taking prompt corrective action.

Procedure:

1. Clear the area using clearing turns.
2. Establish and announce altitude and heading.
3. Power 12" MP, Carb Heat- On, Flaps- 10°, Propeller- Full, Cowl Flaps- Closed
4. Airspeed in flap operating range, extend flaps in 10-degree increments to desired setting, normally 20°.
5. When airspeed reaches an approach speed of 80 MPH, reduce power to idle. Establish a glide for 200 ft. and trim for 80 MPH while continuing to maintain heading unless instructor directs a turn.
6. Recognize and announce the first aerodynamic indications of an oncoming stall (e.g., stall warning horn, mushy controls, buffeting).
7. Recognize and announce the stall, then promptly recover by simultaneously:
    a. Decreasing angle of attack (relaxing backpressure)
    b. Maintaining wings level using primarily rudder inputs.
    c. Applying full power, carburetor heat cold, flaps 20°.
8. Adjust pitch to maintain altitude.
9. As the aircraft accelerates, retract flaps to 10 degrees at Vx (70 MPH) and flaps up at Vy (90 MPH), cowl flaps open. (The recovery is analogous to a Go-Around procedure).
10. Return to cruise flight. Perform Cruise Checklist. Throttle-17" MP, Prop-2350, Cowl Flaps- Cruise.

*Note: Recovery from power-off stalls should also be practiced from shallow banked turns not to exceed 20 degrees, to simulate an inadvertent stall during a base to final turn. The stall should normally be made to occur within a heading change of approximately 90 degrees.

POWER-ON STALL

Maneuver:
Power-on stall recoveries are practiced from straight climbs and climbing turns with up to 20 degrees of bank to simulate an accidental stall during takeoffs and climbs. Flaps should be set to the normal or short-field takeoff configuration.

Objective:
To teach the student to recognize the indications of an approaching or full stall during power on situations and to take prompt corrective action to prevent a prolonged stalled condition

Procedure:

1. Clear the area using clearing turns.
2. Establish and announce altitude and heading.
3. Power 12" MP, Carb Heat- On, Flaps- 10°, Propeller- Full, Cowl Flaps- Open
4. Slow to lift-off speed (60 MPH), then simultaneously apply full power, carb heat off, and establish a takeoff attitude.
5. Establish desired bank angle (as directed by instructor). If a turn is used, 20-degree max bank angle.
6. Transition smoothly from the takeoff attitude to the pitch attitude that will induce a stall. (Feet on the horizon or approximately 20 degrees nose high).
7. Recognize and announce the first aerodynamic indications of the oncoming stall (e.g., stall warning horn, mushy aileron control, buffeting).
8. Announce the stall (at the buffet); then promptly recover by simultaneously:
    a. Decreasing angle of attack (relaxing backpressure).
    b. Maintaining wings level using primarily rudder inputs.
9. Maintain present altitude and accelerate to Vy (90 MPH).
10. Flaps Cruise at Vy (90 MPH).
11. Return to cruise flight. Perform Cruise Checklist. Throttle-17" MP, Prop-2350, Cowl Flaps- Cruise.

S-TURNS ACROSS A ROAD

Maneuver:
This is a training maneuver in which the airplane's ground track describes semicircles of equal radii on each side of a selected straight line on the ground. The maneuver consists of crossing a line at a 90-degree angle and immediately beginning a series of 180 degree turns of equal radius in opposite directions, recrossing the line at a 90 degree angle just as each 180-degree turn is completed.

Objective:
The objectives are to develop the ability to compensate for drift during turns, orient the flight path with ground references, and divide the pilot's attention inside and outside the aircraft.

Procedure:

1. Select a suitable ground reference line, perpendicular to the wind and well away from other air traffic and near where an emergency landing can be made.
2. Power 17" MP and 2350 RPM.
3. Plan to enter the maneuver downwind at 800 feet AGL. *
4. Apply adequate wind-drift correction and bank angle to track a constant radius 180 degree turn back towards the reference line using up to a maximum bank angle of 45 degrees.
5. After 180 degrees of turn, and back over the reference line with wings level, continue the maneuver in the opposite direction.
6. Depart the maneuver on the entry heading.

*Note: The ACS allows this maneuver to be completed at an altitude between 600 and 1,000 feet AGL.

TURNS AROUND A POINT

Maneuver:
This is a training maneuver in which the airplane is flown in two or more complete circles of uniform radius from a prominent ground reference point. Wind drift control, altitude and airspeed must be maintained throughout the entire maneuver.

Objective:
The objective, as in other ground reference maneuvers, is to help the pilot develop the ability to control the airplane while dividing attention between the flight path and ground references, and watching for other air traffic, obstacles, and birds.

Procedure:

1. Select a suitable ground reference point well away from other air traffic and near where an emergency landing can be made.
2. Power 17" MP and 2350 RPM.
3. Plan the maneuver to enter a left or right pattern downwind at 800 feet AGL. *
4. Maintain constant airspeed, altitude, and radius around the point while adjusting bank and drift correction using up to but not exceeding 45 degrees of bank angle.
5. Depart the maneuver after a minimum of two circles on the entry heading.

*Note: The PTS allows this maneuver to be completed at an altitude between 600 and 1,000 feet AGL.

EMERGENCY APPROACH AND LANDING

Maneuver:
An emergency approach and landing is used when the aircraft experiences engine power loss during any phase of flight.

Objective:
The objective of this maneuver is to safely transition the aircraft to the ground after a loss of power. The maneuver is designed to increase the student's ability to maintain aircraft control while performing the emergency checklist and judging aircraft gliding distance.

Procedure:

1. After determining a loss of power has occurred, establish best glide speed (80 MPH) by maintaining a level pitch attitude as the airplane slows.
2. Select the most appropriate landing site and head to it. Observe wind conditions.
3. Attempt to fly a normal traffic pattern to land at the selected site.
4. Complete the "Engine Failure in Flight" emergency checklist.
5. If the restarting the aircraft is unsuccessful, maintain aircraft control and proceed to the "Forced Landing" checklist.
6. MAYDAY Call, Squawk to 7700.
7. If the maneuver is being conducted in training area, recover to a cruise climb before reaching 500' AGL.

EMERGENCY DESCENT

Maneuver:
This is a maneuver for descending as rapidly as possible to a lower altitude or to the ground for an emergency landing. The need for an emergency descent may result from an in-flight fire, a sudden loss of cabin pressure, or any situation requiring an immediate and rapid descent.

Objective:
The objective is to descend as soon and as rapidly as possible, within the structural limitations of the airplane.

Procedure:

1. Reduce power to idle.
2. Carb Heat- On
3. Simultaneously pitch down and bank 45 degrees in the descent to clear the area and maintain positive load factor.
4. Stabilize the descent at the top of the green arc.

*Note: For training purposes, as soon as the descent is established and stabilized, terminate the maneuver to prevent shock cooling the engine.

NO-FLAP LANDING

Maneuver:
The no-flap landing demonstrates the airplane's handling and performance characteristics when approaching to land without wing flaps extended.

Objective:
To develop the student's ability to safely land in a no-flap configuration.

Procedure:

1. Follow the normal traffic pattern operations procedure.
2. Abeam the point of intended landing, reduce power to idle. Begin a gradual descent at 80 MPH. Do not extend the flaps during the pattern.
3. At a point, approximately 45 degrees from the approach end of the runway, begin a medium bank turn onto the base leg and slow to 75 MPH.
4. While on the base leg, visually clear the final approach area.
5. Final approach:
6. Set an aiming point to land within the first 1/3 of the runway.
7. Flaps should remain retracted.
8. No-flap approach speed 70 MPH.
9. Maintain aiming point with pitch and power corrections until approaching round out.
10. At the round out, reduce power to idle and continue the flare to touchdown on the main wheels first at approximately stalling speed.
11. Upon touchdown, hold the nose wheel off the runway as long as the elevator remains effective to provide aerodynamic braking, as appropriate.
12. Maintain directional control using rudder.
13. Do not initiate the after-landing checklist until clear of the runway.

*Note: The descent angle in a no-flap condition is much shallower than when using flaps. Also, landing distances will be increased due to the higher approach speed used.

RECOVERY FROM UNUSUAL ATTITUDES

Maneuver:
An unusual attitude is an airplane attitude not normally required for instrument flight. Unusual attitudes may result from many conditions such as turbulence, disorientation, or instrument failure, etc.

Objective:
To develop the student's ability to recognize and recover from unusual attitudes using visual and instrument references.

Procedure:

1. Nose-high attitudes- Recognizing:
    a. Airspeed decreasing.
    b. Altitude increasing.
    c. VSI shows a climb.

   Recovery:
    d. Apply full power.
    e. Simultaneously apply forward elevator pressure to lower the nose and use coordinated aileron and rudder pressure to level the wings.
    f. Resume straight-and-level flight.
    g. Return to assigned heading and altitude.

2. Nose-low attitudes- Recognizing:
    a. Airspeed increasing.
    b. Altitude decreasing.
    c. VSI shows a descent.

   Recovery:
    d. Reduce power to idle.
    e. Simultaneously correct the bank attitude with coordinated aileron and rudder pressure and apply smooth back-elevator pressure to raise the nose.
    f. Resume straight-and-level flight.
    g. Return to assigned heading and altitude.

*Note: The recovery from unusual attitudes should be accomplished using smooth control inputs to maintain a 1g flight load factor.

TRACKING VOR RADIALS

Maneuver:
Tracking a VOR radial allows a pilot to navigate directly to or from a Very-High Frequency Omnidirectional Range (VOR). The process of tracking involves crabbing into the wind while maintaining the airplane's ground track constant.

Objective:
To develop the student's ability to navigate a direct course either to or from a VOR.

Procedure:

1. Rotate the omni bearing selector (OBS) until a TO flag appears, then center the course deviation indicator (CDI).
2. Turn to the course indicated by the index and fly that heading.
3. If the CDI needle moves either left or right, initially turn 20 degrees in the direction that the needle deflects. *
4. When the CDI centers again, reduce the course correction by half.
5. If the CDI moves left or right now, it should do so much slower, and you can make a smaller heading correction. This is called "bracketing the course" until you've established a wind correction angle that will hold you on course.
6. To track a radial outbound, initially rotate the OBS until a FROM flag appears and repeat steps #2 thru #5.

*Note: To avoid reverse sensing, always fly to a VOR with a TO flag or away from a VOR with a FROM flag. This will allow you to always fly towards the direction that the CDI deflects and towards the course selected.

INTERCEPTING VOR RADIALS

Maneuver:
Intercepting and tracking VOR radials can be used to fly the aircraft along a desired course, either to or from the VOR.

Objective:
To develop the student's ability to orient themselves around the VOR and develop skills at intercepting and tracking VOR Radials.

Procedure:

1. Tune and identify the appropriate VOR.
2. Check and set the heading indicator against the magnetic compass.
3. Determine which VOR radial the aircraft is currently located on.
4. Determine the difference between the aircraft's current radial and the radial to be intercepted.
5. Double the difference between the aircraft's current radial and its desired location to find the intercept angle.
6. Rotate the OBS to the desired radial.
7. Apply the intercept angle in the direction the Course Deviation Indicator (CDI) deflects.
8. Turn the aircraft to this heading.
9. Once the CDI moves from full scale deflection, determine the rate of turn to roll out on the appropriate radial. *
10. Apply wind drift correction and track along the desired radial.

*Note: When within 5 NM of a VOR station, use no greater than a 30-45-degree intercept angle, to avoid overshooting due to course sensitivity.

DIVERSION

Maneuver:
Cross country diversion.

Objective:
The objective of this maneuver is to pilot the aircraft to an alternate airport in case the point of intended landing is no longer available. This can include reasons due to unpredicted weather, a system malfunction, or poor preflight planning.

Procedure:

1. Once the decision to divert to an alternate airport is made, consideration should be given to returning to your last checkpoint or a prominent landmark and circling until your navigation planning is complete.
2. Estimate an approximate heading, distance, and time enroute (ETE) to the alternate airport and note the time that the diversion began. *
3. Turn to the estimated magnetic heading and attempt to identify any prominent landmarks nearby.
4. If time permits, and once established on course towards the alternate airport, an accurate course, groundspeed, ETE, and fuel consumption can be determined using the E6B Flight Computer.
5. Call the appropriate Flight Service Station (FSS) and approach control if applicable, to amend your flight plan and provide a pilot report (UA/UUA).
6. Use the Airport Facilities Directory (AF/D) to determine any airport restrictions at the alternate airport.
7. Identify airspace along the diversion route.

*Note: Because of limited cockpit space, and because attention must be divided between flying the airplane, making calculations, and scanning for other air traffic, take advantage of all possible shortcuts and rule of thumb calculations. For example: Use a straight edge and a VOR compass rose for magnetic heading. For groundspeed, 120 MPH (100 knots) equals 1 2/3 nautical miles per minute. Thus, it would take approximately 6 minutes to travel 10 nautical miles, plus or minus winds aloft. During a diversion, priority must be given to flying the airplane while dividing attention between navigation and planning.

LOST PROCEDURES

Maneuver:
Lost Procedures

Objective:
The objective of this maneuver is to identify different methods of determining aircraft location in the event of becoming lost during flight. This can occur during a cross country into unfamiliar terrain, by poor preflight planning, or restricted visibility due to weather.

Procedure:

1. Climb, being mindful of traffic and weather conditions, to identify prominent landmarks.
2. Scan the area around the aircraft for prominent landmarks to determine the aircraft's location.
3. Using the aircraft's navigational instruments, plot an azimuth from either two VOR or NDB facilities, to determine approximate location.
4. If installed, use GPS to determine position.
5. Circle, so as not to aggravate the situation or wander into restricted or controlled airspace.
6. Communicate if still unable to determine location, and request assistance from ATC. Comply with all ATC or FSS instructions.
7. Remain Calm at all times.
8. Conserve fuel by reducing power to 55% and lean the mixture.
9. If the situation becomes an emergency, squawk "7700" on the transponder and seek assistance on 121.50.