



Cactus Aviation Cessna 172S/R/N Maneuvers Guide

RUNWAY INCURSION MITIGATION

- **Know airport markings**
- **Read back clearances**
- **Know your position**
- **Check before crossing any runway**
- **Write down taxi instructions**
- **Have an airport diagram**

CRAGS CHECKLIST

Objective: To ensure the aircraft is in a safe configuration and surrounding airspace is clear of traffic before initiating any flight maneuver. This preparation minimizes risks and enhances situational awareness.

Clearing Turns

- Perform clearing turns as per standard procedure to ensure the area is free of traffic.

Radio Calls

- Announce your position, altitude, and intentions to other aircraft in the area.

Altitude

- You are at an appropriate altitude for the maneuver.

GUMPS Check

- Complete the GUMPS flow check
(Gas, Undercarriage, Mixture, Propeller, Seat Belt/Switches)

Suitable Landing Site Ensure

- Verbally identify and note an emergency landing site before starting the maneuver.

GUMPS CHECKLIST

Objective: To confirm the aircraft's configuration is correct and ready for maneuvering or landing. This flow check ensures that critical systems such as fuel, landing gear, mixture, and seatbelts are set for safe operation.

Gas (Fuel Selector)

- Ensure the fuel selector is set to **Both** for balanced fuel delivery.

Undercarriage (Landing Gear)

- Check gear position. In fixed gear aircraft like the 172, simply confirm the gear is down (as it's non-retractable).

Mixture

- Set mixture full rich (or as needed for altitude).

Propeller (RPM & Pitch)

- Ensure the throttle is set appropriately (for 172s with fixed pitch propellers, adjust throttle for desired RPM).

Seatbelts/Switches

- Verify electrical switches (landing lights, etc.) are on as needed and ensure seatbelts are fastened.

NORMAL TAKEOFF AND CLIMB

Objective: To develop the student's ability to safely take the aircraft off the ground and depart the takeoff area during normal conditions.

Procedure:

1. Taxi onto the runway and align the nose wheel with the centerline.
2. Smoothly apply full throttle
3. Check and Announce: "Engine instruments in the green, and airspeed is "alive."
4. Maintain directional control with rudder pedals.
5. Rotate at 55 KIAS.
6. Pitch up until the top of the engine cowling is approximately one inch above the horizon.
7. Initial climb speed 74 KIAS. (Vy may vary depending on model. Refer to POH). **When OAT is greater than 85° climb at an airspeed of 85 KIAS.**
8. At traffic pattern altitude, lower pitch slightly to maintain altitude.
9. Accelerate to 90 KIAS and set power to 2300 RPM.
10. Uncontrolled airport, departing the pattern:
Continue straight out, or exit with a 45° turn in the direction of the traffic pattern.
11. At 1000' AGL complete the climb checklist.

CROSSWIND TAKEOFF AND CLIMB

Objective: To develop the student's ability to safely take the aircraft off the ground and depart the takeoff area during crosswind conditions.

Procedure:

1. Note wind direction and speed.
2. Taxi onto the runway and align the nose wheel with the centerline.
3. Apply FULL ailerons into the wind and elevator neutral.
4. Smoothly apply full throttle
5. Check and Announce "engine instruments in the green and airspeed's alive"
6. Maintain directional control with the rudder pedals.
7. Adjust ailerons to keep wings level and control drift during takeoff roll.
8. Rotate at 55 KIAS.
9. Once airborne, crab into the wind to maintain runway alignment.
10. Pitch up until the top of the engine cowling is approximately one inch above the horizon.
11. Initial climb speed Vy 74 KIAS. (Vy may vary depending on model. Refer to POH). **When OAT is greater than 85° climb at an airspeed of 85 KIAS.**
12. At traffic pattern altitude, lower pitch slightly to maintain altitude.
13. Accelerate to 95 KIAS and set power to 2300 RPM.
14. Uncontrolled airport, departing the pattern:
Continue straight out, or exit with a 45° turn in the direction of the traffic pattern.
15. At 1000' AGL, complete the climb checklist.

SHORT FIELD TAKEOFF AND CLIMB

Objective: To teach the student to obtain maximum performance during the takeoff phase so as to minimize runway length required for takeoff.

Procedure:

1. Set 10° degrees of flaps.(Check POH for your particular model for flap usage)
2. Taxi into position and align nose wheel with the centerline
3. Hold brakes
4. Apply full throttle
5. Check engine instruments and RPM for abnormalities.
6. Release the brakes.
7. Maintain directional control with the rudder pedals.
8. Announce “Engine instruments in the green, and airspeed is “alive”.
9. Rotate at 55 KIAS.
10. Maintain 56 KIAS until the 50’ obstacle is cleared. Once the 50’ obstacle is cleared, lower pitch and accelerate to Vy (74 KIAS) for a normal climbout or use 85 KIAS for hot operations.
11. Retract the flaps above obstacles and at a safe altitude while maintaining a positive rate of climb.
12. At traffic pattern altitude, lower pitch slightly to maintain altitude.
13. Accelerate to 95 KIAS and set power to 2300 RPM.
14. Uncontrolled airport, departing the pattern:
Continue straight out, or exit with a 45° turn in the direction of the traffic pattern.
15. At 1000’ AGL, complete the climb checklist.

SOFT FIELD TAKEOFF AND CLIMB

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

Procedure:

1. Set 10° of flaps for S models, N models Flaps Up.
2. When cleared for departure, taxi onto the runway rounding the corners without stopping and using full aft elevator.
3. Smoothly apply full throttle without stopping.
4. Check engine instruments and RPM for abnormalities.
5. Maintain directional control with the rudder pedals.
6. Announce “Engine instruments in the green, and airspeed is alive”.
7. As the nose wheel lifts off the ground, maintain a pitch attitude that allows the nose to remain off the ground without striking the tail.
8. As the main wheels lift off, lower the pitch to a level flight attitude to stay in ground effect.
9. No obstacle – Accelerate to 74 KIAS and climbout.
10. With obstacles – Accelerate to 56 KIAS until the 50’ obstacle is cleared. Once the 50’ obstacle is cleared, lower nose and accelerate to Vy (74 KIAS) for a normal climbout or 85 KIAS during hot operations.
11. Retract the flaps at a safe altitude while maintaining a positive rate of climb.
12. At traffic pattern altitude, lower pitch slightly to maintain altitude. Accelerate to 95 KIAS and set power to 2200 RPM.
13. Uncontrolled airport, departing the pattern:
Continue straight out, or exit with a 45° turn in the direction of the traffic pattern.
14. At 1000’ AGL, complete the climb checklist.

TRAFFIC PATTERN OPERATIONS

Objective: To develop the ability to conduct safe and efficient arrival and departure procedures at uncontrolled airports.

Arrival Procedure:

1. Determine the active runway. (Listen to ATIS or CTAF)
2. Establish traffic pattern altitude 2 miles prior.
3. Establish a 45° entry to the midpoint of the downwind leg.
4. Turn the plane onto the downwind leg and maintain approximately ½ to 1 mile from the active runway.
5. Slow the aircraft to 95 KIAS (2200 RPM).
6. While on Downwind perform pre-landing checklist; (GUMPS) Fuel on Both, Under carriage, Mixture Set, Prop, Seatbelts/Switches (landing light on)
7. When abeam the point of intended landing, reduce throttle to 1700 R.P.M., set flaps to 10°, allow the aircraft to slow to 85 KIAS and reduce pitch attitude to maintain 85 KIAS.
8. When the touchdown point is positioned 45° behind the wing of the aircraft turn on Base, lower flaps to 20° and maintain a pitch attitude for 75 KIAS.
9. Turn onto the final leg with the airplane aligned on the runway centerline, lower flaps to 30°, maintain a pitch attitude for 65 KIAS and use a power setting that allows a stabilized descent for the appropriate glide path.
10. Refer to the appropriate landing procedure.
11. If remaining in pattern clear for traffic and begin the turn to the crosswind leg 300 feet below traffic pattern altitude or end of runway.
12. Continue from **step 4**

CLEARING TURNS

Objective: To teach the student to exercise conscientious and continuous surveillance of the airspace in which the airplane is being operated.

Procedure:

First 90° clearing turn:

1. Refer to leaning procedure outlined in C-172 POH.
2. Fuel selector on BOTH.
3. Visually scan the area to the left and right of the aircraft.
4. Pick a visual landmark off the wing tip in the direction of turn to rollout on
5. Raise wing in direction of turn to clear for traffic and enter a 30° bank turn.
6. Continuously scan the area ABOVE, BELOW and AHEAD of the flight path.
7. After 90° of turn is completed, rollout wings level on your selected landmark.

Second 90° clearing turn:

8. Visually scan the area to the left and right of the aircraft.
9. Pick a visual landmark off the wing tip in the direction of turn to rollout on.
10. Enter a 30° bank turn in the same or opposite direction.
11. Continuously scan the area ABOVE, BELOW and AHEAD of the flight path.
12. After 90° of turn is completed, rollout wings level on your selected landmark.

MANEUVERING DURING SLOW FLIGHT

Objective: To teach the student to recognize changes in aircraft flight characteristics and control effectiveness at critically slow airspeeds in various configurations.

Procedure:

1. Perform maneuver so that recovery is a minimum of 1500 ft AGL.
2. Complete CRAG.
3. Reduce power to 1500 R.P.M.
4. Adjust pitch to maintain altitude.
5. With flaps:
 - a. Set flaps 10° degrees (maximum 110 KIAS Vfe)
 - b. Set flaps 20° degrees (maximum 85 KIAS Vfe)
 - c. Set flaps 30° degrees (maximum 85 KIAS Vfe)
6. When airspeed is approximately 10 KIAS above target, add power (see chart)

CONFIGURATION TARGET AIRSPEED POWER

- CLEAN 55 KTS 1600
- FLAPS 45 KTS 1900

7. Maintain minimum controllable airspeed.
8. Turns, climbs and descents should be practiced.
9. Recovery:
 - a. Slowly apply full power.
 - b. Slowly lower the pitch to maintain altitude.
 - c. Slowly retract flaps, 10° degrees at a time!
 - d. Accelerate to 95 KIAS and set power to 2200 RPM.
10. Complete the cruise checklist

STEEP TURNS

Objective: To develop smoothness, coordination, orientation, division of attention, and control techniques while executing high performance turns.

Procedure:

1. Perform maneuver so that recovery is by 1500ft AGL
2. Complete CRAG's.
3. Pick a visual reference point.
4. Perform at or below maneuvering speed (V_a 90-105 @1900 – 2550 lbs) (2200 RPM = 95 KIAS).
5. Note pitch attitude for level flight
6. Roll into the turn
7. Rolling through 30° of bank
 - a. Increase power 200 – 300 rpm to maintain airspeed.
 - b. Increase back pressure to maintain altitude.
 - c. Maintain altitude with reference to the horizon.
8. Add trim to relieve back pressure.
9. Use your reference point to lead your rollout.
10. Going through 30° of bank
 - a. Reduce power to maintain airspeed (2200 RPM)
 - b. Decrease back pressure to maintain altitude.
11. Repeat steps 3-8 for the turn in the opposite direction.
12. After the maneuver is complete, trim the airplane for cruise.
13. Complete the cruise checklist.

POWER-OFF STALL

Objective: To teach the student to recognize the indications of an imminent or full stall during power off situations and to make prompt, positive, and effective recoveries with a minimum loss of altitude.

Procedure:

1. Perform maneuver so that recovery is by 1500ft AGL.
2. Complete CRAG.
3. Reduce power to 1500 R.P.M.
4. Adjust pitch to maintain altitude.
5. With flaps:
 - a. Set flaps 10° degrees (maximum 110 KIAS, Vfe)
 - b. Set flaps 20° degrees (maximum 85 KIAS, Vfe)
 - c. Set flaps 30° degrees (maximum 85 KIAS, Vfe)
 - d. As flaps are lowered, adjust pitch to maintain altitude.
6. Slow maintain altitude until 65 KIAS then; establish a stabilized approach at 65 KIAS for up to 200 feet.
7. Slowly increase pitch for a Vy attitude.
8. At the stall, announce the stall “stalling”.
 - a. Simultaneously lower pitch slightly below a level pitch attitude and use rudder to maintain directional control.
 - b. Maintain ailerons neutral.
 - c. Add full power.
 - d. Set flaps to 20° degrees.
9. Increase pitch to a Vy attitude.
10. As airspeed accelerates through 65 KIAS, slowly set flaps 10° degrees then zero.
11. Lower pitch to maintain altitude.
12. Accelerate to 95 KIAS and set power to 2200 RPM.
13. Complete the cruise checklist.

NOTE: ** The maneuver should also be practiced in turns up to 30°, and in the clean configuration.

POWER-ON STALLS

Objective: To teach the student to recognize the indications of an imminent or full stall during power on situations and to make prompt, positive, and effective recoveries with a minimum loss of altitude.

Procedure:

1. Perform maneuver so that recovery is by 1500ft AGL.
2. Complete CRAG.
3. Reduce power to 1500 R.P.M.
4. Adjust pitch to maintain altitude.
5. At 55 KIAS, add full power.
6. Add right rudder to maintain coordination.
7. Slowly increase pitch to an attitude that results in a decreasing airspeed.
8. At the stall, announce the stall “stalling”.
 - a. Simultaneously lower pitch slightly below a level pitch attitude and use rudder to maintain directional control.
 - b. Maintain ailerons neutral
 - c. Verify full power.
9. Increase pitch to a V_y attitude and retract the remaining flaps slowly.
10. As airspeed accelerates through 65 KIAS, lower pitch to maintain altitude.
11. Accelerate to 95 KIAS and set power to 2200 RPM.
12. Complete the cruise checklist.

NOTE: ** The maneuver should also be practiced in turns up to 20° of bank and in the landing configuration.

SECONDARY STALLS

Objective: To teach the student to recognize the effects of improper control usage after initiating recovery from a stall.

Procedure:

1. Perform maneuver so that recovery is by 1500 ft AGL.
2. Complete CRAG.
3. Set up as directed, Power-on or Power-off stall.
4. At the stall, announce the stall “stalling”.
 - a. Lower pitch slightly below a level pitch attitude.
 - b. Use rudder to maintain directional control.
 - c. Maintain ailerons neutral
 - d. Add full power.
5. Before full stall recovery, increase pitch attitude to induce a secondary stall.
6. At the stall, announce the stall “stalling”.
 - a. Lower pitch slightly below a level pitch attitude.
 - b. Use rudder to maintain directional control.
 - c. Maintain ailerons neutral
 - d. Verify full power.
 - e. Set flaps to 20° degrees (if extended).
7. Increase pitch to a Vy attitude.
8. Retract flaps to 10° degrees
9. As airspeed accelerates through 65 KIAS, slowly set flaps zero
10. Lower pitch to maintain altitude.
11. Accelerate to 95 KIAS and set power to 2200 RPM.
12. Complete the cruise checklist.

ELEVATOR TRIM STALLS

Objective: To teach the student the effects of not maintaining positive airplane control during a go around.

Procedure:

1. Perform maneuver so that recovery is by 1500ft AGL.
2. Complete CRAG.
3. Reduce power to 1500 R.P.M.
4. Adjust pitch to maintain altitude.
5. With flaps:
 - a. Set flaps 10° (maximum 110 KIAS, Vfe)
 - b. Set flaps 30° (maximum 85 KIAS, Vfe)
 - c. As the flaps are lowered, adjust pitch to maintain altitude.
6. Maintain altitude until 65 KIAS then,
 - a. Pitch to maintain 65 KIAS.
 - b. Trim for 65 KIAS at 1500 RPM and descend up to 200 feet.
7. Add full power
 - a. Allow the pitch to increase to approximately Vx pitch attitude.
 - b. Allow the aircraft to roll left.
8. When the stall is imminent, announce the stall “stalling”.
 - a. Lower pitch slightly below a level pitch attitude.
 - b. Use rudder to maintain directional control.
 - c. Maintain ailerons neutral
 - d. Verify full power.
 - e. Set flaps to 20°.
 - f. Trim the airplane.
9. Increase pitch to a Vy attitude.
10. Retract flaps to 10 degrees.
11. As airspeed accelerates through 65 KIAS, slowly set flaps zero (0).
12. Lower pitch to maintain altitude.
13. Accelerate to 95 KIAS and set power to 2200 RPM.
14. Complete the cruise checklist.

CROSSED CONTROL STALLS

Objective: To teach the student to recognize the effects of improper control technique.

Procedure:

1. Perform maneuver so that recovery is by 1500ft AGL.
2. Complete CRAG.
3. Reduce power to 1500 R.P.M.
4. Adjust pitch to maintain altitude.
5. At 65 KIAS, power to idle.
6. Increase pitch attitude to maintain bank angle.
9. When the stall is imminent, announce the stall “stalling”.
 - a. Lower pitch slightly below a level pitch attitude.
 - b. Use rudder to maintain directional control.
 - c. Level the wings.
 - d. Add full power.
10. Increase pitch to a Vy attitude.
11. As airspeed accelerates through 65 KIAS, lower pitch to maintain altitude.
12. Accelerate to 95 KIAS and set power to 2200 RPM.
13. Complete the cruise checklist.

ACCELERATED STALLS

Objective: To show the student that stall is a function of angle of attack rather than airspeed.

Procedure:

1. Perform maneuver so that recovery is by 2,500 AGL.
2. Complete CRAG.
3. Reduce power to 1500 R.P.M.
4. Reduce power to idle.
5. Adjust pitch to maintain altitude.
6. At 65 KIAS, establish 45° of bank.
7. Smoothly, firmly and progressively increase the angle of attack until a stall occurs.
8. At the stall announce the stall “stalling” and note indicated airspeed.
 - a. Lower pitch slightly below level pitch attitude.
 - b. Use rudder to maintain directional control.
 - c. Level the wings
 - d. Add full power.
9. Increase pitch to a Vy attitude.
10. As airspeed accelerates through 65 KIAS, lower pitch to maintain altitude.
11. Accelerate to 95 KIAS and set power to 2200 RPM.
12. Complete the cruise checklist.

NOTE: ** This maneuver should be recovered no lower than 2,500 feet. This maneuver will be performed in the clean configuration only.

SPINS

Objective: To develop the student's ability to recognize, recover, and enter spins.

Limitation: This procedure is authorized in the utility category and clean configuration only, with the rear seat and baggage area unoccupied. Slow deceleration required on the recovery.

Procedure:

1. Initiate maneuver at 6000 AGL, Recover by 4,000 AGL.
2. Complete CRAG.
3. Simultaneously reduce power to idle and raise the nose of the aircraft to an attitude that will induce a stall.
4. At first indication of stall,
 - a. Apply full rudder in the direction of the desired rotation.
 - b. Apply full aft elevator.
 - c. Throttle to idle.
5. At the completion of three full rotations,
 - a. Verify throttle to idle.
 - b. Ailerons neutral.
 - c. Apply and HOLD full rudder opposite to the direction of the rotation.
 - d. Just after the rudder reaches the stop, move the control wheel briskly forward. (Far enough to break the stall)
 - e. Hold these control inputs until rotation stops.
 - f. As rotation stops, neutralize rudder, and make smooth recovery from the resulting dive.
6. Complete the cruise checklist.

NOTE: ** This maneuver is only authorized in the CFI course.

CHANDELLES

Objective: To develop the pilot's coordination, orientation, planning, and feel for maximum performance flight, and to develop positive control techniques at varying airspeeds and attitudes.

Procedure:

1. Perform maneuver so that recovery is by 2,000 AGL.
2. Complete CRAG.
3. Perform at or below maneuvering speed (V_a 90-105) (2200 RPM = 95 KIAS).
4. Set power to 2200 RPM (95 KIAS or V_a , whichever is less).
5. Pick a reference point off your wing tip.
6. Roll into a 30° bank.
7. Add full power.
8. Increase pitch to a maximum (approximately 10°) at your reference point.
9. At the 90° point (your reference point) slowly start to roll the bank out.
10. Increase back pressure to maintain a constant pitch attitude (approximately 10° nose up.)
11. Roll wings level at the 180° point. (Your reference point on the opposite wing tip.)
12. At the completion of the maneuver, airspeed should be 45 KIAS.
13. Maintain altitude and heading as airspeed increases.
14. At 95 KIAS, reduce power to 2200 RPM.
15. Complete the cruise checklist.

LAZY EIGHTS

(COMMERCIAL ONLY)

Objective: To develop the pilot's feel for varying control forces, and the ability to plan and remain oriented while maneuvering the plane with positive and accurate control.

Procedure:

1. Perform maneuver so that recovery is by 2,000 AGL.
2. Complete CRAG.
3. Perform at or below maneuvering speed (Va 90-105KIAS)
(2200 RPM = 95 KIAS).
4. Pick 45°, 90°, 135°, and 180° reference points.
5. Slowly increase the bank and pitch to the 45° point.
6. At the 45° point:
 - a. 15° of bank,
 - b. Maximum pitch up (Approx. 12° - 15° nose up).
7. Continue to increase the bank to the 90° point.
8. Pitch will slowly decrease to the 90° point.
9. At the 90° point,
 - a. Bank 30°,
 - b. Pitch level for that airspeed (5-10 KTS above a stall).
10. After the 90° point,
 - a. Slowly decrease bank angle,
 - b. Continue to lower pitch.
11. At the 135° point,
 - a. Bank angle approximately 15°,
 - b. Maximum pitch down (Approx. 12° - 15° nose down).
12. At the 180° point,
 - a. Continue to decrease bank angle to achieve wing level,
 - b. Increase pitch attitude to the entry pitch attitude.
13. Repeat items 4-12 in the opposite direction.
14. Complete the cruise checklist.

NOTE: ** It is important that the airplane remain coordinated throughout the

WIND DRIFT CIRCLE

Objective: To develop the student's ability to recognize the effect of wind on the airplane's ground track. (This is a method a student can use to determine wind direction and strength while in flight.)

Procedure:

1. Complete CRAG.
2. Perform at or below maneuvering speed (V_a 90 – 105 KIAS) (2200 RPM = 95 KIAS.)
3. Select a reference point that is near an area where an emergency landing can be made.
4. Set power to 2200 RPM (95 KIAS).
5. Over the reference point, perform a 360° turn using a 30° bank angle.
6. After completing the turn, roll wings level.
7. Any difference between the start and finish position indicates the approximate wind direction and speed.

NOTE: ** Other ways to determine wind speed and direction are by observing the movement of smoke or dust, or the wave patterns on water or grain fields.

STEEP SPIRAL

Objective: To teach the student to demonstrate smoothness, coordination, orientation, division of attention, and control techniques in the performance of steep spirals.

Procedure:

1. Perform clearing turns and set mixture. N model Carb Heat ON
2. Perform at or below maneuvering speed (V_a 90 – 105 KIAS) (2200 RPM = 95 KIAS.)
3. Select an altitude sufficient to continue through a series of at least three 360° turns.
4. Select a suitable ground reference point.
5. Apply wind-drift correction to track a constant radius circle around the selected reference point with the bank angle not to exceed 60° at the steepest point in the turn.
6. Divide your attention between airplane control and ground track, while maintaining coordinated flight.
7. Maintain the specified airspeed, +/- 10 KIAS, and roll out facing a specified ground object or on a specified heading +/- 10°.

NOTE: ** The steep spiral should be performed at a safe selected airspeed, usually the airplane's best glide speed to 10 KIAS above best glide speed.

CAUTION!: The engine may run rough or stop when you advance the throttle at the completion of the maneuver. The engine should be cleared periodically by briefly advancing the throttle to a normal cruise power, and then back to maneuver power setting!

RECTANGULAR COURSE

Objective: To teach the student to maneuver the airplane over a predetermined ground path while dividing attention inside and outside the airplane.

Procedure:

1. Complete CRAG.
2. Perform at or below maneuvering speed (V_a 90 – 105 KIAS) (2200 RPM = 95 KIAS).
3. Determine the wind direction.
4. Select a square or rectangular area that is near an area where an emergency landing can be made.
5. Plan to enter the maneuver for a left or right pattern.
6. Enter at (800-1000ft AGL)
7. Enter 45° to downwind at 95 KIAS (2200 RPM).
8. Establish a crab angle to maintain a uniform distance around the rectangular reference area, approximately $\frac{1}{2}$ mile.
 - a. Start turns at the corner of rectangular pattern
9. Vary the bank angle to maintain a constant radius during the turns.

TURNS AROUND A POINT

Objective: To teach the student to maneuver the airplane over a predetermined ground path while dividing attention inside and outside the airplane.

Procedure:

1. Perform clearing turns and set the mixture.
2. Perform at or below maneuvering speed (V_a 90 – 105 KIAS) (2200 RPM = 95 KIAS).
3. Determine the wind direction.
4. Select a reference point that is near an area where an emergency landing can be made.
5. Plan to enter the maneuver from the left or right.
6. Enter at 600-1000ft AGL(best pivotal altitude for your airspeed)
7. Enter downwind at 95 KIAS (2200 RPM).
8. Adjust bank angle to maintain a constant radius.
9. Steepest bank angle should not exceed 45° of bank.

Note ** Complete two revolutions or as required by the instructor, and depart on the entry heading.

S-TURNS ACROSS A ROAD

Objective: To teach the student to maneuver the airplane over a predetermined ground path while dividing attention inside and outside the airplane.

Procedure:

1. Complete CRAG.
2. Perform at or below maneuvering speed (V_a 90 – 105 KIAS) (2200 RPM = 95 KIAS).
3. Determine the wind direction.
4. Select a reference line that is perpendicular to the direction of the wind and that is near an area where an emergency landing can be made.
5. The first series of turns should be entered from the left or right.
6. Enter at (600-1000ft AGL(best pivotal altitude for you speed)
7. Enter downwind at 95 KIAS (2200 RPM).
8. Begin a 180° turn back towards the road.
9. Adjust bank angle to correct for wind drift, to maintain a constant radius turn.
10. Adjust pitch attitude to maintain altitude.
11. Wings should be level as the airplane crosses the road.
12. Begin the next 180° turn in the opposite direction.
13. Adjust bank angle to correct for wind drift, to maintain a constant radius turn.
14. Adjust pitch attitude to maintain altitude.
15. After completing the 2nd turn, depart the maneuver on entry heading.

EIGHTS ON PYLONS

(COMMERCIAL ONLY)

Objective: To teach the student to maneuver the airplane over a predetermined ground path while dividing attention inside and outside the airplane.

Procedure:

1. Complete CRAG.
2. Perform at or below maneuvering speed (V_a 90 – 105 KIAS) (2200 RPM = 95 KIAS).
3. Determine the wind direction.
4. Select two reference points that are near an area where an emergency landing could safely be made.
5. Entry altitude: Pivotal altitude may be approximated by squaring groundspeed, in knots, then dividing by 11.3.
6. Enter at 45° to downwind at 95 KIAS (2200 RPM).
7. Abeam pylon, begin turn: maximum bank angle 40° .
8. Maintain reference line on the pylon.
 - a. Pylon forward – control forward – reduce bank
 - b. Pylon rearward – control rearward – increase bank
9. After completing turn around first pylon, allow 3-5 seconds of straight and level, when abeam second pylon, begin turn in the opposite direction.
10. After completing turn around second pylon, depart the maneuver on entry heading.

LOSS OF O2 EMERGENCY DESCENT

Objective: To develop the student's ability to descend the airplane as rapidly as possible, within the limitations of the airplane.

Procedure:

1. Brief passengers.
2. Perform clearing turns.
3. Throttle to idle.
4. Apply Full Flaps (below Vfe 85 KTS).
5. Lower pitch.
6. Roll into a 45° bank.
7. Adjust pitch to maintain 85 KTS.
8. Roll out after 90° of heading change and use 30° degrees S-turn to clear the area.
9. Set mixture, as necessary.
10. Smoothly advance power.
11. Retract flaps in a step-wise manner, one at a time to 20° degrees then 10° degrees then slowly zero
12. Recover to normal cruise at the specified altitude.

NOTE: ** This maneuver is only permitted on dual flights. Recover no lower than 1500 feet AGL with no more than a 2000 feet descent.

ENGINE FIRE EMERGENCY DESCENT

Objective: To develop the student's ability to descend the airplane as rapidly as possible, within the limitations of the airplane.

Procedure:

1. Brief passengers.
2. The instructor assures the area is clear.
3. Throttle to idle.
4. Complete memory items (simulated). (Bold print items in POH)
5. Roll into a 45° bank and lower pitch to maintain 100 KIAS minimum.
6. Fly toward the emergency landing site.
7. If fire still persists, lower pitch as necessary to increase speed within limitations. This should provide an incombustible mixture.
8. Roll out after 90° of heading change and use 30° bank S-turn to clear the area.
9. Complete the remaining checklist when able.
10. At the termination of the emergency then:
11. Smoothly advance power.
12. Set mixture, as necessary.
13. Recover to normal cruise at the specified altitude.

NOTE: ** This maneuver is only permitted on dual flights.
Recover no lower than 500 feet AGL.

DIVERSION

Objective: To develop skills necessary for plotting a new course and determining a new ETA while enroute.

Procedure:

1. When diverting to a nearby airport (25 miles or less) and fuel is not critical, the students will be expected to make estimates with a reasonable degree of accuracy rather than actual computations.
2. Determine present position and location of new destination.
3. Turn to an estimated heading that will avoid any restricted airspace, obstructions, or adverse weather.
4. Note the starting position and time.
5. Select some prominent landmarks to aid in flying the new course.
6. Determine distance, magnetic heading and altitude.
7. Compute ETE, ETA, fuel required, and compass heading.
8. Amend flight plan with Flight Service Station (FSS).

LOST PROCEDURES

Objective: To gain proficiency in determining aircraft position and the corrections needed to reestablish the aircraft on course.

Procedure:

1. Use topographical features and/or nav aids to determine your position.
 - a. Topographical features:
 - i. Reset the heading indicator
 - ii. Turn the sectional chart to match your heading.
 - iii. Look outside to find prominent landmarks.
 - iv. Match the landmarks to the chart.
 - b. Nav aids:
 - i. Reset the heading indicator.
 - ii. GPS: NRST-APT-Direct-ENT
 - iii. Tune and identify the available stations.
 - iv. VOR: Center the CDI with a FROM indication
 - v. NDB: Determine magnetic bearing FROM the station.
 - vi. Two stations or VOR/DME are required to determine the approximate position.
 - c. Contact Flight Service Station and advise of the situation. Comply with instruction for a DF Steer.
2. If location is determined, return to original course or proceed with diversion.
3. If unable to locate position complete the 6 C's
 - a. CONFESS – Admit to yourself that you are lost.
 - b. CONSERVE – Reduce throttle and lean mixture to get better fuel consumption.
 - c. CLIMB – Climb to avoid obstructions, better visibility, and radio reception. Maintain cloud separation.
 - d. CIRCLE – Pick a nearby landmark and stay in the general vicinity of the landmark.
 - e. COMMUNICATE – Talk to ATC or FSS.
 - f. COMPLY – Follow ATC or FSS instructions.

NORMAL APPROACH AND LANDING

Objective: To develop the student's ability to safely and accurately land the airplane in a designated area.

Procedure:

1. Fly traffic pattern per standard procedure.
2. Final leg:
 - a. Set flaps 30° degrees.
 - b. Adjust pitch and power for a stabilized approach at 65 KIAS.
 - c. Add ½ gust factor as necessary.
 - d. N model, Carb Heat On
3. At the round out, reduce power to idle and continue the flare to touchdown on the main wheels first.
4. Hold the nose off with back pressure.
5. After the nose wheel is down, gently apply brakes.

NOTE: ** When in doubt, give way to other aircraft.

SHORT FIELD APPROACH AND LANDING

Objective: To teach the student to obtain maximum performance from the airplane so that the landing may be constantly accomplished in a short distance.

Procedure:

1. Fly traffic pattern per standard procedure.
2. Final leg:
 - a. Set flaps 30°.
 - b. Adjust pitch and power for a stabilized approach at 61 KIAS.
 - c. It may be necessary to use a slightly higher glide path to clear a 50' obstacle.
 - d. Add ½ gust factor as necessary
 - e. N model, Carb Heat On
3. Maintain aiming point with pitch / power corrections until approaching round out.
4. At the round out, reduce power to idle and continue the flare to touchdown on the main wheels first.
5. Touch down at specified point.
6. After the nose wheel is down.
7. Retract flaps to zero.
8. Full aft yoke.
9. Smoothly apply brakes.

SOFT FIELD APPROACH AND LANDING

Objective: To teach the student to obtain maximum performance from the airplane so a soft touchdown at the slowest possible airspeed can be accomplished.

Procedure:

1. Fly traffic pattern per standard procedure.
2. Final leg:
 - a. Set flaps 30° degrees.
 - b. Adjust pitch and power to maintain a stabilized approach at 65 KIAS.
 - c. Add ½ gust factor as necessary
 - d. N model, Carb Heat On
3. At the round out, reduce power to idle and continue the flare to touchdown on the main wheels first.
4. A slight addition of power during and immediately after touchdown will aid in easing the Nosewheel down.
5. Hold the nose off with back pressure.

FORWARD SLIP TO LANDING

Objective: To teach the student to dissipate altitude without increasing the airplane's speed during a forward slip to landing.

Procedure:

1. Fly traffic pattern per standard procedure.
2. Don't descend below **500 AGL** until final.
3. Final leg:
 - a. Throttle idle.
 - b. Note wind direction.
 - c. Apply excessive rudder opposite of wind.
 - d. Use the opposite aileron to slip into the wind.
 - e. Speed 65 KIAS.
 - f. Add ½ gust factor as necessary
4. At the round out, align the airplane with centerline
5. Flare to touchdown on the main wheels first.
6. After the nose wheel is down, gently apply brakes.

NOTE: ** Because of the location of the pitot tube and static vents, the airspeed indicator may have a considerable degree of error.

NOTE: AVOID** slips with flaps extended due to disrupted airflow over the elevator. If practicing slip with flaps increase airspeed to prevent a tail stall.

CROSSWIND LANDING

Objective: To develop the student's ability to safely land the aircraft on the ground during crosswind conditions.

Procedure:

1. Fly traffic pattern per standard procedure.
2. Note wind direction and speed.
3. Final Leg.
 - a. Wing flap degrees dependant on wind speed
 - b. Final speed slightly faster (70 KIAS).
 - c. Add ½ gust factor as necessary.
 - d. N model, Carb Heat ON
4. Maintain runway centerline and directional control with side slip.
5. At round out, reduce power to idle and continue the flare to touch down on the upwind main wheel. Touch down at slightly higher airspeed.
6. After the nose wheel is down, gently apply brakes.
7. Adjust ailerons to keep wings level during ground roll.
8. As speed decreases, continue to increase ailerons to full deflection.
9. Continue crosswind correction for all taxi operations.

NOTE: ** With less than full flaps, the airplane will be in a higher nose-up attitude.

NOTE: ** Commercial students will be required to demonstrate crab technique.

GO - AROUND

Objective: To teach the student for safety reasons to discontinue the approach and attempt another approach under more favorable conditions.

Procedure:

1. Decision to go-around.
 - a. Smoothly advance throttle full open.
 - b. Retract wing flaps to 20°.
 - c. Climb speed 60 KIAS.
 - d. Wing flaps 10° until obstacles are cleared.
 - e. Retract remaining flaps after reaching 1000ft AGL and 65 KIAS.
2. At traffic pattern altitude, lower pitch, accelerate to 95 KIAS and set power to 2200 rpm.
3. Uncontrolled airport, departing the pattern:
Continue straight out, or exit with a 45° turn in the direction of the traffic pattern.
4. At 1000' AGL complete the climb checklist.

NOTE: ** The earlier you recognize a dangerous situation, the sooner you can decide to reject the landing and start the go-around, and the safer the maneuver will be.