

Seven Peaks Aviation

C-172-M/N Maneuver Standardization Manual

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The objective of this document is to help establish a standard for performing maneuvers in this specific make/model aircraft. The following is a guide to performing maneuvers in a safe and consistent way. This does not outline tolerances for maneuvers but should be used as a study guide on how to perform each one.

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FIVE C'S OF MANUEVERS

Objective: To create a standard process to prepare for each maneuver safely and effectively.

1. Clear - Perform an adequate clearing turn
2. Call - Make an appropriate radio call on the appropriate frequency
3. Configure - Determine starting Altitude, Airspeed, Heading and configure the plane to match
4. Calm - Make sure the plane is stable, you are ready, and all is good to go for maneuver
5. Commence - Execute the maneuver

CLEARING TURNS

Objective: To exercise conscientious and continuous surveillance of the airspace in which the airplane is being operated. To be completed before commencing a maneuver, to visually scan and clear the area where a maneuver is to be performed. The goal is to establish the aircraft is safe from obstructions, terrain, and traffic, while identifying sufficient references required for the maneuver to be performed.

Execute one of the clearing turn procedures outlined below:

1. Two 90° Turns
 - a. Complete a 90° turn in either direction, and scan for traffic above, below, and ahead of the flight path.
 - b. Roll out to wings level and complete a 90° turn in the opposite direction, scanning for traffic throughout.
2. One 180° Turn
 - a. Complete a 180° turn in either direction, scanning for traffic above, below, and ahead of the flight path.

Note: Raise and look under the wing prior to turning in any direction. For instance, if turning left, raise the left wing and look under it prior to turning.

POWER-OFF STALL

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

1. Select an altitude that will allow recovery no lower than 1500' AGL.
2. Perform 5 C's.
3. Reduce power to 1500 RPM
4. Incrementally extend the flaps by 10° to full
5. At an altitude specified (within 300' of current altitude) rotate from the approach attitude, arrest descent and increase pitch to maintain altitude
6. Verbalize the stall indications, approaching stall, and when full stall occurs
7. Reduce the angle of attack to break stall, and apply full power, carb heat in
8. Use the rudder to level the wings and prevent a spin as needed
9. To recover with minimum loss of altitude, adjust pitch to a positive climb attitude, trimming as necessary. Maintain heading.
10. Retract flaps to 20°
11. Retract flaps to 10° at 60 MPH (55 KIAS)
12. Retract flaps to 0° Above 65 MPH (60 KIAS), Safe altitude, and positive airspeed
14. Return to the altitude, heading, and airspeed specified.

POWER-ON STALL

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

1. Select an altitude that will allow recovery no lower than 1500' AGL.
2. Perform 5 C's.
3. Reduce power to 1500 RPM, adjusting pitch to maintain altitude.
4. Turn on carb heat (Out of the green arc)
5. At 65 MPH (60 KIAS), turn off carb heat.
6. At 60 MPH (55 KIAS), set full power and slowly increase pitch to approximately 20° in straight flight or in turns with up to 20° bank.
7. Verbalize the stall indications, approaching stall, and when full stall occurs
8. Reduce the angle of attack and break the stall
8. Use the rudder to level the wings and prevent entering a spin.
9. To recover with minimum loss of altitude, adjust pitch to a positive climb attitude, trimming as necessary. Maintain heading.
10. Verify full throttle.
11. Return to the altitude, heading, and airspeed specified.

STEEP TURNS

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

1. Perform 5 C's.
2. Select a prominent visual reference point directly ahead of the airplane and out towards the horizon.
3. Adjust the pitch and power to maintain altitude and speed 80-90 MPH (75-85 KIAS)
4. Note the pitch attitude required for level flight.
5. Roll into a 45° bank (Private) or 50° bank (Commercial) in the direction previously cleared.
6. Rolling through 30° of bank, increase power to maintain airspeed while pitching up to maintain altitude.
7. Referencing the selected visual point, initiate your rollout as appropriate (1/2 bank angle).
8. Rolling out of 30° of bank, reduce power to maintain airspeed and decrease pitch to maintain altitude.
9. Return to wings-level flight at the entry heading, altitude, and airspeed.
10. (Commercial) Immediately roll into a 50° bank in the opposite direction and repeat steps 5 through 9.
11. Upon completion of the maneuver, resume normal cruise.

SLOW FLIGHT

Objective: To configure the airplane into a slow controllable airspeed, often mimicking final approach speed and configuration. Increases the pilot's skill to handle the aircraft with precision at low speeds/approach to landing.

1. Pick an altitude > 1,500' AGL
2. Perform 5'Cs
3. Slow the aircraft down using the throttle, carburetor heat as needed
4. Apply flaps in 10-degree increments, mimicking pattern speed and flap settings
5. Maintain 70 MPH (65 KIAS) with Flaps 30, or as specified by the instructor
6. Maintain Heading, Altitude, and Airspeed. Complete all turns at *standard rate* to new headings
7. To recover, apply full throttle, carburetor heat off, and retract flaps while maintaining altitude at the standard flap retraction process/speeds.

URNS AROUND A POINT

Objective: To maneuver the airplane in a way to compensate for the effects of wind to maintain a constant radius around a predetermined point. The pilot must vary the bank angle to maintain a desired ground track as the relative wind direction changes.

1. Determine the wind direction.
2. Perform 5 C's.
3. Select a reference point that is clear of terrain and in an area where an emergency landing can be made if necessary.
4. Establish and maintain 90 MPH (85 KIAS) and 600' to 1000' AGL. (8,800MSL for practice area)
5. Enter on a downwind to one side of the selected reference point at a distance equal to the desired radius of the turn. Note the entry heading.
6. Abeam the reference point, roll into the steepest bank (not to exceed 30°) to initiate maintaining a constant radius.
7. Modulate the bank as necessary to maintain a constant radius.
8. Complete one 360° turn and depart on the entry heading.
9. Resume normal cruise.

S-TURNS

Objective: To teach how wind greatly affects turn radius, requiring the pilot to vary bank angle to maintain a desired ground track as the relative wind direction changes.

1. Determine wind direction.
2. Perform 5 C's.
3. Select a straight ground reference line or road that is clear of terrain and in an area where an emergency landing can be made if necessary.
4. The reference line should be as close to 90° perpendicular to the direction of the wind as possible.
5. Establish and maintain 90 MPH (85 KIAS) and 600' to 1000' AGL.
6. Enter on a downwind heading.
7. When directly over the line or road, roll into the steepest bank (not to exceed 30°), to initiate the first turn.
8. Begin to reduce the angle of bank as necessary to maintain a constant radius throughout the maneuver.
9. Roll through wings level when crossing the reference line and immediately begin rolling back in the opposite direction.
10. Begin to increase the angle of bank, as necessary, to maintain a constant radius.
11. Level the wings upon crossing the reference line.
12. After completing the second turn, depart on the entry heading.
13. Resume normal cruise.

SHORT FIELD TAKE-OFF

Objective: To obtain maximum performance during takeoff to minimize runway length required per the POH

1. Prior to taking the active runway, complete the pre-takeoff checklist and set the flaps to 10°-0° (Refer to note requiring flaps at high altitude in the POH for a short field take-off) .
2. Taxi into takeoff position utilizing all available runway. Position the flight controls for existing wind conditions.
3. Smoothly apply full throttle.
4. Check and out loud call out oil pressure, temperature, and RPMs as appropriate.
5. Place the yoke slightly aft
6. Release Brakes and maintain centerline control
7. Hold elevator back pressure slightly tail low, to allow liftoff at the slowest possible airspeed.
8. As appropriate, call out, "Airspeed Alive."
10. After liftoff, establish and maintain 65 MPH (59 KIAS) (Climb speed (Flaps 10) or V_x 68MPH (61 KIAS) Flaps 0
11. With obstacle(s) cleared, lower the nose slightly to begin accelerating to V_X/V_Y.
12. As appropriate, callout, "Safe Altitude, Above XX mph, Positive Rate of Climb, Flaps Up" and retract the flaps to 0°. Establish and maintain V_X/V_Y MPH, as appropriate.

SOFT-FIELD TAKE-OFF

Objective: To obtain maximum performance and safety when taking off from a soft, contaminated, or rough surface runway.

1. Prior to taking the active runway, complete the pre-takeoff checklist and set the flaps to 10°
2. Taxi toward the takeoff position while holding the control yoke fully aft, positioning the flight controls for existing wind conditions.
3. Align the airplane on the runway centerline, and smoothly apply full power
4. Check and out loud call out oil pressure, temperature, and RPMs as appropriate
5. Call Airspeed Alive as Appropriate
6. As the nose wheel leaves the ground, adjust back pressure to keep the nose wheel just off the runway
7. When the main lift off, reduce back pressure to allow the plane to "rotate along the nosewheel" and keep the aircraft in ground effect
8. After reaching V_x or V_y, begin a climb
9. As appropriate, callout, "Safe Altitude, Above XX mph, Positive Rate of Climb, Flaps Up" and retract the flaps to 0°. Establish and maintain V_X/V_Y MPH, as appropriate.

PRE-LANDING - CGUMPS CHECKLIST

Objective: Provide a low pilot workload flow to prepare the airplane for landing

C- Carburetor heat On/Hot

G - Gas - Fuel selector to both

U - Undercarriage - Check condition of tires and positive brake pressure

M - Mixture set as needed

P - Primer in and locked

S - Seatbelts on and secure

S - Switches -All lights on

NORMAL LANDING / TRAFFIC PATTERN

Objective: To provide a smooth transition to landing

1. Enter the traffic pattern safely at a 45-degree angle to the downwind. Overfly the airport at midfield 1,000 feet over pattern altitude if necessary to do a teardrop entry
2. Downwind - 90 MPH (85 KIAS) 0° Flaps - 2,300 RPM good starting power setting, fine-tune as necessary to maintain speed
3. Complete CGUMPS Checklist
4. Abeam the touchdown point, reduce power to ~1,700 RPM, allowing the nose to descend and adding flaps 10° and maintain 90 MPH (85 KIAS) and appropriate decent rate, adjusting power as needed
5. Base - Once the leg is squared, add 20° Flaps, 80 MPH (75 KIAS) (Avoid adding flaps while banked)
6. Final - Once stabilized and on glide slope, put flaps to 30° and 70MPH (65 KIAS)
(Flaps 40° NOT RECOMMENDED for a normal landing due to the added risks and heavily increased drag)
7. Maintain a specified aiming point that allows a smooth flare to touchdown to the intended touchdown point
8. Once the aiming point is made, slowly reduce power to idle and transition to flare
9. Touch down main wheels first, then slowly lower the nose wheel

GO-AROUND/REJECTED LANDING

Objective: Safely transition at a critical time from the approach and landing phase to the climb.

Maneuver Standards:

1. Make the decision to go-around sooner rather than later when needed
2. CRAM - Apply full throttle, then put carb-heat to cold/off
3. CLIMB - Positively pitch the airplane to stop the descent, and use available airspeed energy to gain maximum altitude and climb at maximum performance
3. CLEAN - Retract Flaps in accordance to the flap retract speed/process
4. COOL - Verify positive control of the airplane and calm focus
5. CALL - Report a go-around to the appropriate runway and frequency. State intentions as necessary

FLAP RETRACTION PROCESS

Objective: Safely retract flaps back to 0° with minimal loss of altitude/performance

1. Ensure full power as necessary
2. Retract flaps to 20°
3. Retract flaps to 10° at 60 MPH (55 KIAS)
4. Retract flaps to 0° above 65 MPH (60 KIAS), Safe altitude, and stable airspeed
5. Return to the altitude, heading, and airspeed as needed.

TOUCH AND GO OPERATIONS

Objective: To safely transition the aircraft from an approach and landing to the takeoff phase of flight.

1. Complete the appropriate landing procedure.
2. After the nose wheel is down and directional control is maintained, retract the flaps, and turn carb heat off.
3. Apply half - Full power (Only on high-density altitude days, or where performance is a concern to conserve aircraft speed into take-off)
3. Visually verify flaps are retracted, then place the flap lever in the neutral position
4. Full throttle, maintaining directional control and runway centerline. Check engine instruments and tachometer (RPM).
6. Check and out loud call out oil pressure, temperature, and RPMs as appropriate
7. At VR, callout “Rotate”, and increase back pressure to a pitch attitude that will yield VX/VY.
8. After liftoff, establish and maintain VX/VY MPH as appropriate, while maintaining the flight path over the extended runway centerline. Trim as necessary.

SOFT-FIELD APPROACH AND LANDING

Objective: To maintain a stabilized approach to land the airplane on a soft, contaminated, or rough surface by touching down at the slowest possible airspeed and preventing the nose-wheel from damage/digging into the surface

1. Fly a normal pattern and approach with speeds and flaps
3. Pull power near to idle upon making the aiming point
4. Use power as necessary to arrest the descent rate, hold the nose-wheel off, and maintain momentum through the runway surface
5. Touchdown main wheels first, using back pressure to hold the nose wheel off the runway
6. Braking - Avoid
7. Wing Flaps - Leave full down to keep weight off the tires
8. After nose touchdown, place the yoke full aft to keep as much weight off the nose as possible, throughout taxi

SHORT-FIELD APPROACH AND LANDING

Objective: To safely and accurately establish and maintain a stabilized approach to a landing, obtaining maximum performance by landing at the beginning of the runway and stopping in minimum distance.

1. Fly a normal pattern with speeds and flaps
2. On Final, after the plane is stable at 30° Flaps, add Flaps 40°
3. Airspeed - 69 MPH (60 KIAS)
4. Determine an aiming point prior to the desired touchdown point as necessary to complete a flare and touchdown at the touchdown point.
5. Power - Reduce to idle after the plane has made the aiming point, and adjust as necessary to make the desired touchdown point
6. Touchdown - Main wheels first
7. Brakes - Apply maximum
8. Wing Flaps - Retract to 0 immediately to place more weight on the wheels, making the brakes more effective

EMERGENCY DESCENT

Objective: To get the aircraft down from a high altitude due to a time-critical emergency requiring a landing as fast as possible, while trading as much vertical speed for as little airspeed.

1. Perform 5 C's
2. Determine an altitude to descend >1,500ft AGL
3. Pull power idle and carb heat on
4. Bank the plane to 45° left or right turn to help keep airspeed low and vertical speed high
5. Pitch down for VNO-145MPH (128 KIAS), without exceeding 145mph/128kias
6. Roll wings level, then pitch the plane to a level altitude to capture the desired altitude
7. Resume normal cruise or continue into an emergency forced landing

UNUSUAL ATTITUDE RECOVERY

Objective: To recover the aircraft into a normal and safe flight attitude after an extreme, unusual attitude/disorientation flight condition

1. Perform 5 C's
2. Follow CFI instructions to induce an unusual attitude
3. When the command "Recover" is given by the CFI, take controls and complete the recovery
4. Cross checking the horizon and flight instruments, determine if the aircraft is in a nose-high or nose-low condition, and note the direction of bank

Nose-High Condition

1. Apply FULL Throttle, turn off carburetor heat as necessary
2. Simultaneously level the wings and pitch the plane down into straight and level flight
3. Resume normal cruise

Nose-Low Condition

1. Reduce power to IDLE and apply carburetor heat
2. Slowly level the wings being mindful of stress on the aircraft, separately of step 3
3. Increase pitch to the horizon
4. Resume normal cruise

