

C172 STANDARD OPERATING PROCEDURES

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LIST OF CHANGES

Complete change history of this document can be found in the repository.
<https://github.com/ProStandards/c172-sop>

V2.4 16 Feb 2022

- Updated Checklist
- Updated after landing flow
- Operational philosophy clarified with checklist duties
- Taxi - duties and management

V2.3 30 Jan 2022

- Introduction - Workload Management

V2.2 22 Jan 2022

- Before Start - Added Master Switch
- Added Landings Section
 - Added Go-Around Procedures
- Added Cruise Maneuvers Section
 - Added Pre-Maneuver Flow
- Cruise Checklist Complete

V2.0 20 Dec 2021

- Pro Standards Brand
- Revision date format
- Introduction - Areas of Vulnerability
- Before Taxi - Flight Instruments Typo
- Before Taxi - Bugs removed from checklist
- Before Taxi - Departure changed to Takeoff
- Decent - Arrival changed to Approach
- Decent - Errors corrected in checklist

V1.2 12 Nov 2021

- Update Introduction
- Before Takeoff - Checklist formatting
- Takeoff - Changed to “runway ___ confirmed”.

V1.1 07 Nov 2021

- Introduction - Change PF / PM checklist responsibilities
- Change PF / PM on checklist call out
- Shutdown / Secure - Change postflight responsibilities
- Added this list of changes

INTRODUCTION

OPERATIONAL PHILOSOPHY

This checklist and the operation of the Cessna C172 is designed to meet the standards of professional aviation. The intent is to prepare pilots to the highest possible standards of aviation and professionalism.

The general philosophy is DO-VERIFY method of checklists. This means all the items are completed from memory prior to doing the checklist. Then the items are verified using the checklist.

There are two categories of items, Tasks and Flows. Tasks are items to be completed by the pilot as soon as practical, in any order. Tasks are often more complex and require more attention than Flows. Tasks are all completed prior to doing the flow. Flows are quick patterns to change the configuration of the aircraft.

Once all tasks and flows are completed, the checklist can be preformed.

Checklists should always be performed in the following order:

- Memory Items**
- Quick Reference Items**
- Emergency Checklist**
- Abnormal Checklist**
- Normal Checklist**

When operating as a crew the PM (pilot monitoring) should conduct the checklists, to allow the PF (pilot flying) to maintain focus on flight path management. The PF should verify the tasks are complete, perform the appropriate flow, then call for the checklist from the PM.

When in the training environment the student will complete the checklist. To develop crew communication skills the student will verbalize the single pilot items and the instructor will verbalize the PF items.

AREAS OF VULNERABILITY

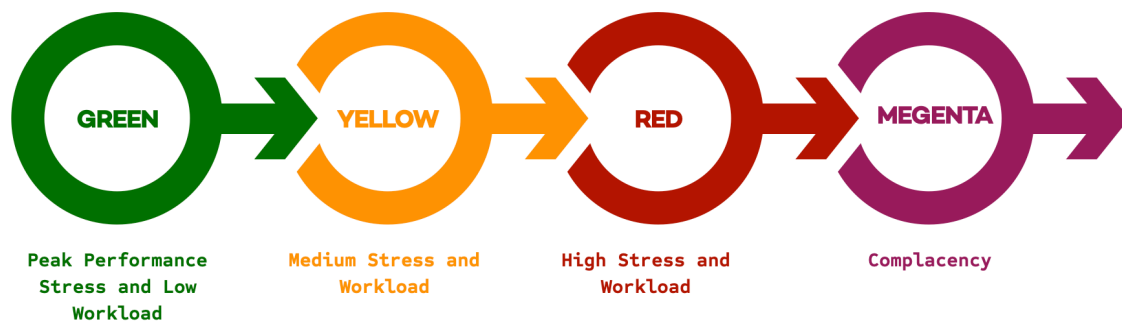
Areas of vulnerability are times during flight which deviations are most likely to occur and require prioritization of flight path management. During Areas of Vulnerability all non-critical tasks should be deferred until the aircraft is in a stable condition.

Areas of Vulnerability:

- Taxi
- Takeoff
- Within 100' of level off
- Landing
- Crossing Runways
- Steril Cockpit

WORKLOAD MANAGEMENT

The majority of aviation accidents are caused by degradation in situational awareness from being oversaturated. It is important for a pilot to be able to identify when they have become saturated and communicate with instructor or crew member.



Green level is an appropriate amount of stress that encourages peak performance. The pilot is able to stay ahead of the airplane with situational awareness and task management.

Yellow level is when the pilot begins to be task saturated, often in the areas of vulnerability, and is no longer easily able to divide attention between tasks. The pilot may miss signals from the environment, degrading situational awareness.

Red is when the pilot is no longer able to complete the required tasks for safe flight path management. At this point the pilot needs to stop, slow down, think, and prioritize tasks. Continuing without task prioritization will most likely result in a pilot deviation or accident.

Magenta is when the pilot does not have a high workload but is missing environmental signals due to complacency. The pilot needs to recognize the distractions and prioritize tasks for safe flight path management.

FFOD (FIRST FLIGHT OF THE DAY)

TASKS

PASSENGER BRIEFING

The PIC is responsible for briefing the passengers aboard the aircraft. The following briefing items are required:

- Smoking**
- Location of exits**
- Use of safety belts**
- Location and use of flotation devices**
- Location of survival equipment**
- Location of fire extinguisher**
- Sterile Cockpit**

Example: *“This is a non smoking flight. Safety belts are required for taxi, takeoff and landing. Use them by inserting the metal fitting into the buckle. Lift the latch to release. There are three exits on the airplane. Two front doors, lift the handle to open the door, and the aft baggage compartment door. (If required) There are life jackets in the baggage compartment. Place them over your head and tighten the buckle. There is a fire extinguisher in between the front seats. Pull the pin and aim at the fire in a sweeping movement. During taxi, takeoff, climb and landing we will keep talking to essential items only to prevent distraction.”*

CREW BRIEFING

The First Flight of the Day crew briefing is meant to establish positive communication for crew members. The following items should be briefed:

- Establish the PIC**
- Positive transfer of flight controls**
- Emergency operation duties and responsibilities**

Example (Student Pilot): *“I will be acting as PIC of the flight, however final authority will be with the instructor. We will use the three-step method to transfer flight controls. Initiated by saying ‘my flight controls’ verified by ‘your flight controls’ and confirmed by saying ‘your flight controls.’ During an emergency the pilot flying will continue flying while the pilot monitoring does the flow items and emergency checklist. Once the checklist is complete we can transfer controls if necessary.”*

AIRWORTHINESS ACCEPTANCE

FAR 91.7 - The PIC is responsible for determining whether the aircraft is in a condition safe for flight. The PIC should begin by checking the aircraft status to verify the inspections are current, and the hobbs and tach time match.

Use the AVIATED acronym to check for the following inspections: **Annual, VOR Check, 100 Hour, Altimeter and Pitot Static System, Transponder, ELT and Airworthiness Directives.**

Additionally, The PIC should ensure the required documents are onboard the aircraft using the ARROWPC acronym. The documents include: **Airworthiness Certificate, Registration (Federal), Radio Operators Permit (International Operations), Operating Limitations, Weight and Balance Data, Placards, and Compass Card.**

The PIC should, by means of external inspection verify the required equipment of 91.205 are operational. If there is any inoperative equipment, the PIC should verify the deferral of the equipment is completed in accordance with 91.213(d) and does not interfere with the safety of flight.

PREFLIGHT

FAR 91.103 - The following items are required preflight action:

Runway Lengths
Takeoff and Landing Distances
Fuel Requirements
IFR Alternates
Weather Reports and Forecasts
ATC Delays

The PIC should also be familiar with all available information including NOTAMs.

An external inspection of the aircraft should be completed in accordance with the POH before each flight.

FLOWS

NOT APPLICABLE

CHECKLISTS

ITEM	SINGLE PILOT RESPONSE	PM RESPONSE	PF RESPONSE
	“First Flight of The Day Checklist”		
PASSENGER / CREW BRIEF	“COMPLETE”	“COMPLETE”	–
AIRWORTHINESS ACCEPTANCE	“COMPLETE”	“COMPLETE”	“COMPLETE”
PREFLIGHT	“COMPLETE”	“COMPLETE”	“COMPLETE”
	“First Flight of The Day Checklist complete”		

BEFORE START

TASKS

Fasten safety belts and shoulder harnesses.

If there are sustained temperatures below 0 degrees, reference cold weather operations.

Batter Master Switch as necessary for before start operations

FLOWS

1. Battery Master Switch - On
2. Fuel Selector - Both
3. Trim - Takeoff
4. Mixture - Set
 1. Rich below 3,000 MSL, or
 2. Above 3,000 MSL the mixture should be leaned one inch of travel.
5. Interior Lights - Set
 1. During daytime operations the interior lights should be turned off and the brightness adjusted on the GPS and electronic instruments. During nighttime operations the dome light, GPS and electronic flight instruments should be adjusted to the lowest visible level. This will promote night vision. As your eyes adapt you will be able to dim the lights more.
6. Exterior Lights - Set
 1. The Nav light should remain on for all operations to indicate the application of power to the aircraft. Additionally, the Nav light should remain on during flight to power the ADS-B out. The Beacon should be turned on prior to starting the engine. The taxi light is used to indicate movement on the surface. Prior to taxing the light should be turn on and once the aircraft is stopped (run-up or waiting clearance) the light should be turned off. Finally, the taxi light should be turned off to indicate giving way to another aircraft an taxiway intersections. The strobe light should only be used when on the runway. When crossing a runway all the external lights should be turned on.
7. Carburetor Heat - Off
8. Circuit Breakers - Checked
 1. Verify all are in
9. Avionics Switch - Off
10. Prime - As Required
 1. Check the oil temperature gauge prior to priming the aircraft. If the gauge is indicating in the green no prime is required for start. If the oil temperature is below the green use three strokes of the primer. Insure the primer is locked when complete.

CHECKLISTS

ITEM	SINGLE PILOT RESPONSE	PM RESPONSE	PF RESPONSE
	“Before Start Checklist”		
SEAT-BELTS	“CHECKED”	“CHECKED”	“CHECKED”
FUEL SELECTOR	“BOTH”	“BOTH”	–
TRIM	“TAKEOFF”	“TAKEOFF”	–
MIXTURE	“SET”	“SET”	–
EXTERIOR / INTERIOR LIGHTS	“SET”	“SET”	
CARBURETOR HEAT	“OFF”	“OFF”	–
CIRCUIT BREAKERS	“CHECKED”	“CHECKED”	–
AVIONICS SWITCH	“OFF”	“OFF”	–
	“Before Start Checklist complete”		



Engine Starting

TASKS

Visually and audibly clear the area to ensure it is safe to start the engine. Look for any movement, people or vehicles in the area.

DO NOT START IF THE FUEL TRUCK IS AT AN ADJACENT AIRPLANE.

FLOWS

1. Brakes - Hold
2. Ignition Switch - turn to start, release when engine begins to fire.
3. Throttle - Adjust RPM to 1000
4. Engine instruments - Oil pressure should indicate at least 25 PSI and be rising.
5. Ammeter - Verify charging
6. Annunciators - Check the low voltage light, electronic flight instruments, and GPS
7. Mixture - Lean one inch for taxi
8. Flaps - Set flaps to the up position or 10 for soft field takeoff
9. Avionics Switch - On
10. Establish crew and passenger communications.

Checklist

ITEM	SINGLE PILOT RESPONSE	PM RESPONSE	PF RESPONSE
	“After Start Checklist”		
ENGINE INSTRUMENTS	“CHECKED”	“CHECKED”	–
AMMETER	“CHECKED”	“CHECKED”	–
ANNUNCIATORS	“CHECKED”	“CHECKED”	–
MIXTURE	“LEANED”	“LEANED”	–
	“After Start Checklist complete”		

BEFORE TAXI

TASKS

DEPARTURE BRIEFING

Copy the ATIS / ASOS in preparation for the departure briefing.

The Departure Briefing should have the following information:

Weather

Brief the current weather, any associated hazards and implications on flight. Key items include wind, visibility, clouds, altimeter setting and low level wind shear.

Departure Procedures

Starting at the aircrafts present location, brief taxi route, hot spots, runway lengths, emergency procedures on departure, and departure procedures.

NOTAMS

Review any NOTAMS effecting the departure.

Threats

Brief the greatest threats to the departure. Examples include, IFR conditions, CFIT, traffic congestion, LLWS and unfamiliar or complex procedures. Discuss ways to mitigate the threats.

Distractions to the pilot should also be considered. Distractions focus primarily on the pilot and human factors such as passengers and doing a sunset flight or tour.

Example: *“Information BRAVO is current, Skies are clear, altimeter is 29.92 and there is a five knot crosswind from the left. We are at transient parking, we will taxi via HOTEL and ALPHA to runway 28R using caution for hotspot three. 28R is 4,598 feet long with a displaced threshold. We require 1,200 feet for takeoff. If there are any critical abnormalities, caution or warning messages on takeoff roll we will abort, stop the aircraft and assess the situation. Clearing the runway if possible. After takeoff, if there is an engine failure or fire will do the appropriate memory item, followed by the checklist and plan to land off field. We are departing straight out to 3,500 feet. Our greatest on departure is traffic congestion in the pattern and incoming traffic from the coast. We will mitigate the threats by keeping our eyes outside and scanning for traffic.”*

FLIGHT PLAN

The PF should build the flight plan in the GPS. If a clearance is associated with the departure procedures ensure that the procedure is built in the navigation system. After entering the

appropriate waypoints the PF should verify the route on the map page. This will ensure there are no erroneous fixes entered. The PM or Instructor will verify the fixes.

The PF should build the VNAV profile by entering the cruise altitude after the top of climb and entering pattern altitude 1NM prior to the destination airport, for descent planning. For IFR flights the departure, arrival and approach procedures will contain VNAV information. The PF should enter the cruising altitude and verify the VNAV restorations match with a current instrument procedure chart.

The PF should also verify all LRUs are operational for every flight. For IFR flights the PF should ensure WAAS, RAIM or EPU will be available depending on the type of operations being conducted.

Once the flight plan has been built and verified the PF should bug the flight instruments in accordance with the departure plan. This should include heading, airspeed and altitude.

FLIGHT INSTRUMENTS

Airspeed - Should indicate zero with no head wind and match the EFI AI.

Altimeter - Set the current altimeter setting and verify it is within 75 feet of airport elevation. This should be within 100 feet of the EFI ALT

Turn Coordinator - Wings level, ball centered with no DC flag. The operation of the gyro can be checked on taxi.

VSI - Should indicate zero. If note zero, not the zero point.

EFI PFD - Ensure the altimeter is set and within 75 feet of field elevations. Check the horizon is level, the trapezoid is centered, airspeed reading zero with no head wind, and the heading aligns with the EFI HSI and mag compass.

Set Synthetic Vision as desired. Check for any advisory messages.

EFI HSI - Choose the appropriate CDI source for navigation. If desired, select the map mode and set the range for taxi. Check for any advisory messages.

COMS / NAVS

COM 1 should be used to communicate with ATC for any instructions (Clearance, Ground, Tower, Approach, etc.) COM 2 should be used for advisory communications only (ATIS, ASOS, FBO, etc.)

Set the next frequency to be used in the Active portion of the radio and the next to be used in standby.

*COM 1 Active - Ground / Standby - Tower
COM 2 Active - Guard 121.5 / Standby - Arrival ATIS*

NAV should be set in the order of use for departure to include active and standby.

When making changes to COMs or NAVs, think ahead and enter the next appropriate frequency in the standby position when available.

FLOWS

NOT APPLICABLE

CHECKLISTS

ITEM	SINGLE PILOT RESPONSE	PM RESPONSE	PF RESPONSE
	“Before Taxi Checklist”		
DEPARTURE BRIEFING	“COMPLETE”	“COMPLETE”	–
FLIGHT INSTRUMENTS	“CHECKED”	“CHECKED”	–
ALTIMETER	“__ . __”	“__ . __ ”	“SET”
COMS / NAVS	“SET”	“SET”	
	“Before Taxi Checklist complete”		

TAXI

The PF will taxi the airplane with no other duties or distractions while the aircraft is moving. During single pilot or training operations, the PF should stop the aircraft before going heads down for any reason. It is permissible for the PM to perform tasks while the PF is taxiing such as programming radios or navigation.

The PF should prioritize flight path management on the ground over checklists. The aircraft should be stopped or in a low area of vulnerability if the PF is to conduct checklists single pilot.

Maximum Taxi Speed 20 KTS on Dry pavement and 10 KTS on contaminated surfaces.

Perform a brake check before beginning taxi.

BEFORE TAKEOFF

TASKS

The Before Takeoff Checklist is divided into two portions. Before Takeoff Checklist above the line and Before Takeoff Checklist below the line. The line segments the engine runup from pre-departure procedures. The Before Takeoff Checklist above the line references the runup which is associated with the Before Takeoff Flow. The above the line portion and run-up only need to be completed prior to the first takeoff of the flight. Subsequent departures or pattern work only require the below the line portion on the checklist. When complex departures are not being complied with the PF may choose to complete all tasks and flows and complete the before takeoff checklist in its entirety.

Turnoff the taxi light when parked to indicate to surrounding aircraft that you have no intention of movement.

For engine run-up, position the aircraft into the wind if possible. This will provide maximum engine cooling while parked.

Monitor tower frequency or CTAF in the runup area or approaching the hold short lines. Tune the next frequency to be used in the standby position.

Verify the flight instruments have no red x's, no flags and are configured for departure. This includes: airspeed bug, altitude bug, heading bug, CDI setting.

Ensure NAV frequencies are tuned, active and standby, and the GPS is programmed accordingly.

The transponder should be set to VFR, appropriate discrete code as assigned by ATC or issued in an IFR clearance.

Flaps should be confirmed or set for the appropriate takeoff configuration.

Doors must be closed during runup and takeoff. It is permissible to have the windows open for runup and takeoff.

If departing into IMC conditions, turn the pitot heat on before takeoff.

Bugs

The flight instrument bugs should be set for departure.

Airspeed bug - Set for the appropriate climb speed

Altitude bug - Set for level off altitude

Heading bug - Set for the departure runway

FLOWS

1. Brakes - Hold

2. Flight Control Check - perform a box check to make sure no items in the cockpit are inhibiting the flight controls. Note iPad and kneeboard position.
3. Fuel Selector - Both
4. Trim - Set to the takeoff indication
5. Mixture - Rich
6. Throttle - 1700 RPM
7. Mixture - Adjust for density altitude above 3,000 to achieve peak RPM.
8. Magneto Check - Turn the ignition key to the R portion (2 clicks) and verify a drop in RPM of no more than 125. Return the key to BOTH. Turn the ignition key to the L portion (1 clicks) and verify a drop in RPM of no more than 125. The maxi difference should be 75 RPM. Verify the key is back in the BOTH position.

NOTE

A rough running engine during a magneto check indicates lead build up and deposits on the spark plugs. This is most often caused by insufficient leaning during taxi. In some instances the magnetos can fail. This is often indicated by the engine dying during the magneto check or excessive drops of 500 RPM or more. To resolve fouled spark plugs, lean the mixture for peak RMP and increase the throttle to full power for one minute. After this procedure attempt a magneto check again. If it fails again return to parking and call maintenance.

9. Ammeter - Check alternator is charging. You can increase the load by turning on lights and pitot heat to verify the alternators ability to charge.
10. Oil Pressure - Green
11. Oil Temperature - Green
12. Annunciators - Check
13. Carburetor Heat Check - Apply carburetor heat and note a drop in RPM. Leave the Carburetor heat applied for Idle check.
14. Throttle - Full idle, verify the engine continues to run above 600 RPM. Close the carburetor heat.

CHECKLISTS

ITEM	SINGLE PILOT RESPONSE	PM RESPONSE	PF RESPONSE
	“Before Takeoff Checklist To the Line”		
FLIGHT CONTROLS	“CHECKED”	“CHECKED”	–
FUEL SELECTOR	“BOTH”	“BOTH”	–
TRIM	“TAKEOFF”	“TAKEOFF”	–
RUNUP	“COMPLETE”	“COMPLETE”	–
MIXTURE	“SET”	“SET”	–
	“Before Takeoff Checklist To the Line complete”		
	“Before Takeoff Checklist Below The Line”		
BUGS	“AIRSPEED ____ KNOTS, ALTITUDE ____ FEET, HEADING BUG SET FOR RUNWAY ____, NO FLAGS”	“SET”	“AIRSPEED ____ KNOTS, ALTITUDE ____ FEET, HEADING BUG SET FOR RUNWAY ____, NO FLAGS” >>INSTRUCTOR ONLY “SET”
COMS / NAVS	“SET”	“SET”	–
TANSPONDER	“SET”	“SET”	–
MIXTURE	“TAKEOFF”	“TAKEOFF”	–
PF/PM FLAPS	“UP” or “10°”	“UP” or “10°”	“CONFIRMED”
ANNUNCIATORS	“CHECKED”	“CHECKED”	–
ENGINE INSTRUMENTS	“CHECKED”	“CHECKED”	–
AMMETER	“CHECKED”	“CHECKED”	–
DOORS / WINDOWS	“CLOSED”	“CLOSED”	–
	“Before Takeoff Checklist Below the Line Complete”		

TAKEOFF

TASKS

Verify the correct runway with a runway sign or marking.

PF: "Runway ____ confirmed."

Once aligned with the runway verify the heading bug is set for the departure runway.

PF: "Heading checked."

PM: "Checked."

FLOWS

Prior to crossing the runway threshold:

1. Lights - Set (All lights are on)
2. Mixture - Takeoff
3. Transponder - Altitude mode

CHECKLISTS

Not Applicable

CLIMB

TASKS

Flap Retraction

Flap retraction should be done at a safe altitude, at or above V_y . A safe altitude is 500 - 1,000 ft AGL. Below 500 ft AGL the pilot should be prepared for engine failure. Leaving the flaps extended above 1,000 ft could hinder climb performance.

Leaning

The mixture should be leaned above 3,000 MSL. Leaning technique for the climb provides a rough estimate before the fuel can be leaned precisely in cruise. At 3,000 MSL lean the mixture one inch travel or three rotations. Continue leaning one rotation per 1,000 ft

Lights

Leave all light on when climbing in busy areas with high traffic volume, to aid in collision avoidance. Otherwise, the Taxi and Landing lights can be turned off. The Strobe, Nav, and Rotating Beacon are required.

Pitot Heat should be used while in visible moisture.

FLOWS

AT 3,000 MSL

1. Mixture - Lean three rotations
2. Lights - Taxi and landing light off or leave on in congested airspace.
3. Pitot Heat - On in visible moisture.

CHECKLISTS

ITEM	SINGLE PILOT RESPONSE	PM RESPONSE	PF RESPONSE
	“Climb Checklist”		
FLAPS	“UP”	“UP”	“CONFIRMED”
MIXTURE	“LEANED”	“LEANED”	–
LIGHTS	“SET”	“SET”	–
PITOT HEAT	“SET”	“SET”	–
	“Climb Checklist complete”		

CRUISE

TASKS

Cruise Power & Leaning

Cruise leaning procedures should be in accordance with the POH using the performance data in Section 5.

Without EGT or CHT indicators, we can suggest using RMP as an indication.

Set the appropriate power setting from the POH. Slowly lean the mixture until there is a slight drop in cruise RPM. Increase the mixture three turns after the drop in RPM. This will result in a rich of peak lean.

At the top of climb the fuel should be compared to the anticipated or planned fuel. Balance the fuel tanks if necessary.

It is recommended to monitor fuel flow on 121.5 while in cruise flight.

FLOWS

1. Power - Verify cruise power is being produced within the planned parameters.
2. Lights - For high traffic volume areas leave all lights on. Otherwise, turn off the taxi and landing light.

CHECKLISTS

ITEM	SINGLE PILOT RESPONSE	PM RESPONSE	PF RESPONSE
	"Cruise Checklist"		
POWER	"SET"	"SET"	-
MIXTURE	"LEANED"	"LEANED"	-
LIGHTS	"SET"	"SET"	-
	"Cruise Checklist complete"		

MANEUVERS

Pre-Maneuver Flow

OVERVIEW

The Pre-Maneuver Flow should be done prior to each maneuver conducted. Use the CARE acronym to complete this task.

OBJECTIVE

The objective is to stabilize the aircraft in a safe environment appropriate to the maneuver being conducted.

PROCEDURE

1. **C**learing Turns
 1. Look for traffic under the raised wing
 2. Two 90° turns in opposite directions
 3. One 180° turn
2. **A**ttitude
 1. Ensure you are at the proper altitude and airspeed for the maneuver
 2. Note your altitude, airspeed and heading for the maneuver
3. **R**adio Call
 1. Announce your intentions for maneuvering on the appropriate frequency (122.75)
 2. Include tail number, locations, altitude and intentions.
4. **E**mergency Landing
 1. Brief emergency landing scenarios in the event of an engine failure.
 2. Determine the best location for an emergency landing.

COMMON ERRORS

Failure to complete the pre-maneuver flow prior to each maneuver.

Failure to divide attention and scan for traffic.

Failure to complete two 90° turns or a 180° turn

COMPLETION STANDARDS

The student successfully manages the flight path while performing the tasks of this maneuver.

Steep Turns

OVERVIEW

The airplane is turned using a constant angle of bank (45° for Private, 50° for Commercial) while maintaining a constant altitude and airspeed. Rollout should be to a predetermined heading.

OBJECTIVE

To teach the student to turn the airplane at steep angles of bank while maintaining altitude and controlling overbanking tendencies, simultaneously dividing attention inside and outside the cockpit.

PROCEDURE

1. Complete the Pre-Maneuver Flow
2. Configure at 90 KIAS and no less than 1,500 feet AGL
3. Choose a visual reference point to begin on and roll out of the steep turn on.
4. Roll the plane left or right as desired to 45° (PVT) or 50° (COM) degrees of bank with coordination of rudder and aileron.
5. Rolling through 30° degrees of bank add 100RPM and back pressure on the elevator to counter the loss of vertical lift during the maneuver.
6. Maintain altitude, airspeed and bank angle with coordinated use of the flight controls.
7. Adjust power as required.
8. Plan to roll out on the desire visual reference point.
9. Use 1/2 your bank angle to lead the roll out.
10. Remove any power, trim or back pressure applied during the maneuver.

Private minimum of one 360° turn as directed by the instructor

Commercial complete one 360° turn followed immediately by the opposite direction turn.

COMMON ERRORS

- | | |
|------------------|---|
| RM.V.A.R1 | Failure to divide attention between airplane control and orientation. |
| RM.V.A.R2 | Collision hazards, to include aircraft and terrain. |
| RM.V.A.R3 | Low altitude maneuvering including stall, spin, or CFIT. |
| RM.V.A.R4 | Distractions, improper task management, loss of situational awareness, or disorientation. |
| RM.V.A.R5 | Failure to maintain coordinated flight. |

COMPLETION STANDARDS

PA.V.A.S5 Maintain the entry altitude ± 100 feet, airspeed ± 10 knots, bank $\pm 5^\circ$, and roll out on the entry heading $\pm 10^\circ$.

CA.V.A.S5 Maintain the entry altitude ± 100 feet, airspeed ± 10 knots, bank $\pm 5^\circ$, and roll out on the entry heading $\pm 10^\circ$.

LOW SPEED MANEUVERS

Slow Flight

OVERVIEW

After clearing turns are completed the airplane is maneuvered at an airspeed approximately 10 knots above the stall speed for the specified configuration at which the stall horn does not sound. The maneuver should be accomplished in straight flight, turns up to 30° of bank, climbs and descents using various configurations.

OBJECTIVE

To teach the student to recognize changes in airplane flight characteristics and control effectiveness at critically slow airspeeds in various configurations while maintaining positive airplane control at all times.

PROCEDURE

1. Complete the Pre-Maneuver Flow
2. Apply carburetor heat and set 1700 RPM
3. Extend flaps on schedule to 30°
4. Maintain heading and altitude while slowing to an airspeed approximately 10 kts above stall speed for the specified configuration.
5. Add power to 2200 RPM to maintain airspeed 10 KTS above stall speed. The stall warning horn should not sound during this maneuver.
6. Perform climbing, depending and turning flight as directed by the instructor.
- 7.

COMMON ERRORS

PA.V.A.R1

COMPLETION STANDARDS

PA.V.A.S5 Maintain

Power-Off Stalls

OVERVIEW

The

OBJECTIVE

To

PROCEDURE

1. Complete the Pre-Maneuver Flow
- 2.

COMMON ERRORS

PA.V.A.R1

COMPLETION STANDARDS

PA.V.A.S5 Maintain

Power-On Stalls

OVERVIEW

The

OBJECTIVE

To

PROCEDURE

1. Complete the Pre-Maneuver Flow
- 2.

COMMON ERRORS

PA.V.A.R1

COMPLETION STANDARDS

PA.V.A.S5 Maintain

DESCENT

TASKS

Weather

Copy the appropriate weather for the destination airport.

Flight Plan

Once copying the weather you can anticipate the landing runway and procedures. Update the GPS flight plan with any changes to approach and arrival procedures.

COMS / NAVS

COM 1 should be used to communicate with ATC for any instructions (Clearance, Ground, Tower, Approach, etc.) COM 2 should be used for advisory communications only (ATIS, ASOS, FBO, etc.)

Set the next frequency to be used in the Active portion of the radio and the next to be used in standby.

COM 1 Active - Tower / Standby - Ground
COM 2 Active - Arrival ATIS / Standby - FBO if needed

NAV should be set in the order of use for arrival to include active and standby.

When making changes to COMs or NAVs, think ahead and enter the next appropriate frequency in the standby position when available.

Arrival Briefing

An arrival **WANT** briefing should be completed prior to beginning the initial decent.

Weather

Review the weather information identifying any threats. Set the current altimeter setting.

Arrival Procedures

From your current position, brief the arrival until the aircraft is parked. This includes: decent/arrival procedures, approach procedures, traffic pattern procedures, missed approach or go-around procedures, landing runway information, taxi routing, and parking.

NOTAMS

Review any NOTAMS effecting the departure.

Threats

Brief the greatest threats to the arrival. Examples include, IFR conditions, CFIT, traffic congestion, LLWS and unfamiliar or complex procedures. Discuss ways to mitigate the threats.

VFR Example: "Information Whiskey is current, wind is 180 at 10 knots, which is a strong left crosswind for runway 28L. Skies are clear and the altimeter is 30.07. Currently, we are 3,500 over Torrey Pines, we will contact tower and request touch and goes, then follow tower's instructions inbound. Most likely this will be south of Mount Soledad to join the left traffic pattern at 1,400ft. It will be a short field landing on 28L that has 4,589 feet of available runway. If we have to go around it will be full power flaps to 20. After landing we will continue in the pattern. The only NOTAM is 28R is closed. High volume of VFR is the largest threat. We will mitigate this by looking outside and using proper scanning techniques."

IFR Example: "Information Charlie..."

FLOWS

1. Fuel Selector - Both
2. Mixture - Enrich the mixture one turn per 1,000 feet of decent. Set the mixture full rich below 3,000 feet. If landing above 3,000 feet, enrich the mixture one turn per 1,000 feet until reaching traffic pattern altitude.
3. Lights - All lights on for decent and landing.
4. Seatbelts - Checked on for landing.

CHECKLISTS

ITEM	SINGLE PILOT RESPONSE	PM RESPONSE	PF RESPONSE
	“Descent Checklist”		
APPROACH BRIEFING	“COMPLETE”	“COMPLETE”	–
FUEL SELECTOR	“BOTH”	“BOTH”	–
MIXTURE	“SET”	“SET”	–
LIGHTS	“SET”	“SET”	
COMS / NAVS	“SET”	“SET”	
ALTIMETER	“__ . __”	“__ . __”	“SET”
SEAT-BELTS	“CHECKED”	“CHECKED”	“CHECKED”
	“Descent Checklist complete”		

LANDINGS

Normal and Crosswind Landing

Short Field Landing

Soft Field Landing

Power-Off 180 Landing

Instrument Landing

Missed Approach

Go-Around

Initiating a Go-Around

A Go-Around should be initiated any time at the discretion of the pilot flying (PF). Conditions that should automatically initiate a go-around include:

1. Unstable approach
2. Low-level Wind Shear (LLWS)
3. Traffic on the runway within 3,000 feet of the aircraft
4. ATC request
5. Collision hazard with aircraft, terrain, obstacles, wires, vehicles, vessels, persons, or wildlife

OVERVIEW

The landing approach is abandoned and the airplane is transitioned to a climb.

OBJECTIVE

To develop the student's ability to correctly perform the go-around/rejected landing procedure.

PROCEDURE

The pilot flying initiates the go-around by making the standard call out, adding full power and being the flap retraction sequence.

1. PF **"Go-around, flaps 20"**
2. Add full power
3. Retract flaps to the 20° position
4. Pitch for the horizon to level off and begin accelerating
5. Once there is a trend reversal on the VSI, retract flaps to 10° position
6. Radio intentions to ATC
7. Accelerating through V_Y , retract flaps to 0° / UP position
8. Above 1,000' AGL complete the *climb checklist*

COMMON ERRORS

- RM.IV.N.R1** Delayed recognition of the need for a go-around/rejected landing. Delayed performance of a go-around at low altitude.
- RM.IV.N.R1** Improper application of power.
- RM.IV.N.R1** Improper airplane configuration.
- RM.IV.N.R1** Collision hazards, to include aircraft, terrain, obstacles, wires, vehicles, vessels, persons, and wildlife.
- RM.IV.N.R1** Low altitude maneuvering including stall, spin, or CFIT.
- RM.IV.N.R1** Distractions, loss of situational awareness, or improper task management.

COMPLETION STANDARDS

- PA.IV.N.S4** Apply takeoff power immediately and transition to climb pitch attitude for V_X or V_Y as appropriate $\pm 10/-5$ knots.
- PA.IV.N.S7** Maintain $V_Y + 10/-5$ knots to a safe maneuvering altitude.
- CA.IV.N.S4** Apply takeoff power immediately and transition to climb pitch attitude for V_X or V_Y as appropriate ± 5 knots.
- CA.IV.N.S7** Maintain $V_Y \pm 5$ knots to a safe maneuvering altitude.

Aborted / Bounced Landing

AFTER LANDING

TASKS

In an effort to not block runway exits, first get a taxi clearance from ground control. When there is a moment of reduced work load or the aircraft is stopped complete the tasks, flows and checklist.

In CRM situations the PF should continue taxing while the PM completes the after landing items.

Flaps

During normal operations, when returning to parking set the flaps to 0. If there is a plan to taxi back to the runway for traffic patter work and the planned departure requires flaps 10, set them accordingly.

The flaps may already be up after completing a short field landing.

FLOWS

Single pilot or PM performs the after landing flow.

1. Trim - Set to Takeoff
2. Mixture - Leaned one inch for ground operations.
3. Carburetor Heat - Off
4. Lights - Landing and strobe off. Taxi, Nav, and rotating beacon remain on.

CHECKLISTS

ITEM	SINGLE PILOT RESPONSE	PM RESPONSE	PF RESPONSE
	The After Landing Checklist is verified silently.		
	"After landing checklist complete"	"After landing checklist complete"	

SHUTDOWN / SECURE

TASKS

Securing the Aircraft

Tie or chain the aircraft and chock at least one wheel.

Post Flight

The post flight inspection should be completed in a similar fashion to the preflight inspection. The primary focus is to detect any damage that happened during the flight, for example looking for indications of a bird strike.

In the event of another crew taking over the the aircraft, the next crew's pre flight can substitute for the post flight on the incoming crew.

Any discrepancies should be written up and reported to maintenance.

Record the hobbs and tach in the flight log.

FLOWS

1. Avionics Switch - Off
2. Magneto Grounding - Check by turning the ignition switch to the **OFF** position momentarily and then back to **BOTH**. If the engine dies, do not attempt to restart.
3. Throttle - Advance to 1200 RPM and immediately move the mixture to idle cut off.
4. Electrical Switches - All light and pitot heat off. The NAV light may be required for repositioning an aircraft at night.
5. Master Switch - Off
6. Ignition Switch - Off

CHECKLISTS

ITEM	SINGLE PILOT RESPONSE	PM RESPONSE	PF RESPONSE
	The Shutdown / Secure Checklist is verified silently.		