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1. Cessna 172r Quick Reference Card.

SPEEDS

Vso		33
Vs		44
Vr		55
Vglide		65
Vref	Full Flap	60-70
	Flap UP	65-75
	Short Field	62
Vx		60
Vy		79
Vcruise		84-89
Vfe	0-10	110
	10-30	85
Va	2400lbs	99
	2000lbs	92
	1600lbs	82
Vno		129
Vne		163
Max Window		163
Max Dem Crosswind		15

POWERPLANT

Lycoming IO-360-L2A		160HP
Oil Pressure	Norm	50-90 PSI
Tach	Norm	1900-2400 RPM
Oil Temp	Norm	100-245 F
Engine Oil		Max 8qts
		Min 5qts

*Never lean using EGT above 80%

FUEL

56	Total
53	Usable
3	Unusable
28	Each Tank Total
26.5	Each Tank usable.

ELECTRICAL

28 Volt Electrical System
24 Volt Battery
60 Amp Belt Driven Alternator

WEIGHT

Max Ramp Weight		2457 lbs
Max Takeoff Weight		2450 lbs
Max Landing Weight		2450 lbs
Max Baggage #1		120 lbs
Max Baggage #2		50 lbs

PATTERN

Downwind		1900-2000 RPM
Abeam.		1500 RPM 10 Flap
Base.		20 Flap
Final.		30 Flap

Steep Turn	1800-2000 RPM	95 KIAS
Slow Flight	1500 RPM	33 KIAS = Vso
Power Off	Idle	65 KIAS
Power On	Full Power	65 KIAS
TAP	1800-2000 RPM	90 KIAS
S Turns	1800-2000 RPM	90 KIAS
Chandelle	1800-2000 RPM	105 KIAS
Lazy 8	1800-2000 RPM	105 KIAS
8's On Pylon	1800-2000 RPM	90 KIAS
	Pivotal Alt 710 FT	

INSTRUMENT PROFILES

Precision Approach

Vectors	1800-2000 RPM	90-100 KIAS
1 dot Below	1500 RPM	Flap10 90 KIAS
<i>Visual above 500 AGL</i>		<i>Flap30 60-70 KIAS</i>
<i>Visual Below 500 AGL</i>		<i>65-75 KIAS</i>

Non Precision Approach

Vectors	1800-2000 RPM	90-100 KIAS
FAF	1500 RPM	Flap10 80 KIAS
Descend from MDA		Flap20 70 KIAS
Final		65 KIAS

2. Acronyms for all aircraft.

Passenger Brief – SAFETY

- S - Seat Belts. Operation and Use.
- A - Air and Heat.
- F - Fire Extinguisher. Location and operation.
- E - Exits and ELT
- T - Talking. Sterile Cockpit.
- Y - Yoke. Positive exchange of flight controls.

Pre-Takeoff Brief – TAR

- T - Type of Takeoff.
- A - Abnormals.
- R - Runway Required and Available.

Pre-Landing Brief - TAR

- T - Type of Landing.
- A - Abnormals.
- R - Runway Required and Available.

Spin Recovery - PARE

- P - Power Idle
- A - Ailerons Neutral.
- R - Rudder Opposite.
- E - Elevators Forward to break stall.

Lost Procedure - CCCCCC

- C - Circle
- C - Climb
- C - Conserve
- C - Communicate
- C - Confess
- C - Comply

3. Cessna 172R Memory Items and Takeoff Profiles.

3a. Abnormals During Takeoff Brief.

Prior to takeoff the pilot should consider and brief abnormal situations and memory items associated with these scenarios. Verbalize the plan. Items in **bold are MEMORY ITEMS**. After memory items are complete finish appropriate checklist as time permits.

Engine failure on runway (Sufficient Runway Remaining)

- **Throttle – IDLE**
- **Brakes – APPLY**
- Wing Flaps - RETRACT
- Mixture - IDLE CUT OFF
- Ignition Switch - OFF
- Master Switch - OFF

Engine failure below 1000ft (Immediately after takeoff)

- **Airspeed – 65 (flaps up) 60 (flaps down)**
- **Place to land – Straight ahead (look for obstacles & clearings) “DO NOT TURN BACK”**
- Mixture - IDLE CUT OFF
- Fuel Shutoff Valve - OFF (pull out)
- Ignition Switch - OFF
- Wing Flaps - AS REQUIRED
- Master Switch - OFF
- Cabin Door - UNLATCH
- Land - STRAIGHT AHEAD

Engine failure in flight

- **Airspeed – Best Glide 65 KIAS**
- **Place to land – Pilots option**
- **Fuel Shutoff Valve - ON (full in)**
- **Fuel Selector Valve - BOTH**
- **Auxiliary Fuel Pump Switch - ON**
- **Mixture - RICH**
- Ignition Switch - Both
 - o If prop is windmilling the engine will restart or turn ignition to start to restart engine.
- Auxiliary Fuel Pump Switch - Off (if engine starts)
- If engine does not start prepare for Forced Landing.

3b. Takeoff Profiles

Type	Power	Flap	Vr	Vx	Vy
Normal	Full	0-10	55	60	79
Short Field	Full	10	55	60	79
Soft Field	Full	10	Slowest Possible	60	79
Crosswind	Full	Min Necessary for Field Length	55	60	79

Normal Takeoff

1. Before takeoff checklist and takeoff brief complete.
2. Verify runway alignment with heading indicator/compass and runway is clear.
3. Add Crosswind Input.
4. Full Power.
5. Verbalize **“Airspeed Alive”, and “Engine Instruments Green”**.
6. Rotate at 55 KIAS.
7. Climb at Vx or Vy as necessary.
8. Add rudder and aileron inputs for coordination and wind correction.
9. Through 1000ft complete after takeoff checklist.

Short Field Takeoff

1. Before takeoff checklist and takeoff brief complete.
2. Use all available runway.
3. Verify runway alignment with heading indicator/compass and runway is clear.
4. Hold Brakes
5. Full Power
6. Release Brakes
7. Verbalize **“Airspeed Alive”, and “Engine Instruments Green”**.
8. Rotate at 55 KIAS.
9. Climb at Vx.
10. Add rudder and aileron inputs for coordination and wind correction.
11. Verbalize **“Obstacle Clear”** retract flaps and climb at Vy.
12. Through 1000ft complete after takeoff checklist.

Soft Field Takeoff

1. Before takeoff checklist and takeoff brief complete.
2. Elevator control full Aft. To maintain nose wheel up.
3. Taxi on runway and verify runway alignment with heading indicator/compass and runway is clear.
4. Do Not Stop
5. Full Power
6. Reduce elevator pressure as necessary. However
7. Verbalize **“Airspeed Alive”, and “Engine Instruments Green”**.
8. Rotate when the aircraft can fly and at slowest possible airspeed.
9. Smoothly apply elevator pressure to maintain in ground effect to build airspeed.
10. Climb at V_x or V_y as necessary.
11. Add rudder and aileron inputs for coordination and wind correction.
12. Verbalize **“Obstacle Clear”** retract flaps and climb at V_y .
13. Through 1000ft complete after takeoff checklist.

4. Traffic Pattern and Approach Profiles**4a. Cessna 172R Landing Criteria**

1. Plan and brief each landing carefully.
2. Enter the traffic pattern at Traffic Pattern Altitude (TPA) trimmed for 90 KIAS in level flight. (Landing profiles depend on this.)
3. Maintain a constant angle glidepath.
4. Whenever possible, fly the traffic pattern at a distance from the airport that allows for a power off landing on a safe landing surface in the event of an engine failure.
5. Maintain final approach speed until round out (flare) at approx. 10' to 20' above the runway.
6. Reduce throttle to touch down with the engine idling and the airplane at minimum controllable airspeed within the first 1,000' of the runway.
7. Touch down on the main gear, with the wheels straddling the centerline.
8. Manage the airplane's energy so touchdown occurs at the designated touchdown point.
9. Maintain a pitch attitude after touchdown that prevents the nose wheel from slamming down by increasing aft elevator as the airplane slows.
10. Maintain centerline until taxi speed is reached and increase crosswind control inputs as airplane slows.
11. Adjust crosswind control inputs as necessary during taxi after leaving the runway.

Good Planning = Good Landing

A good landing is a result of good planning. When planning an approach and landing, decide on the type of approach and landing (visual or instrument, short-field, soft-field, etc.). Decide on the flap setting, the final approach speed, the aiming point, and where the airplane will touch down on the runway surface.

Approach Briefing – Verbalize the Plan

During the Approach Checklist, conduct an approach briefing. This organizes the plan and ensures effective communication between pilots. The briefing should be specific to each approach and landing, but presented in a standard format that makes sense to other pilots and instructors.

Planning considerations:

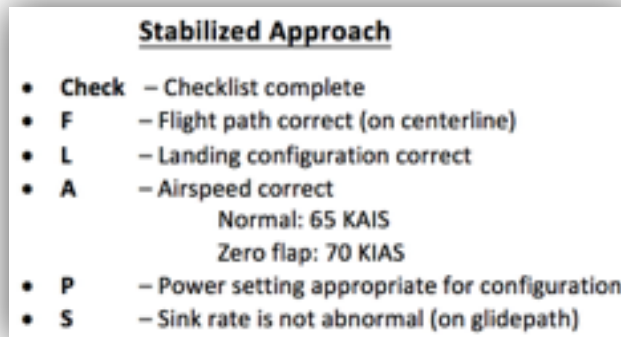
1. Flap Setting
2. Type of Approach & Landing (visual, instrument, short-field, soft-field)
3. Landing Runway
4. Field Elevation
5. Traffic Pattern Altitude
6. Winds (left or right crosswind? tailwind on downwind or base?)
7. Final Approach Speed
8. Aiming Point
9. Touchdown Point

Stabilized Approach

Definition: A stabilized approach is one in which the pilot establishes and maintains a constant angle glidepath towards a predetermined point on the landing runway. It is based on the pilot's judgment of certain visual cues, and depends on a constant final descent airspeed and configuration (FAA-H-8083- 3A, p.8-7).

A stabilized approach is required during visual and instrument approaches in all Performance Aircraft airplanes. The airplane must be stabilized by:

1. 1,000' AGL for an ILS Approach
2. Descending from MDA for a Non-Precision Approach
3. 500' AGL for a Visual Approach
4. Constant angle glidepath: Proper descent angle and rate of descent must be established and maintained. All available landing aids (ILS, VASI, PAPI, etc.) must be used. Non-precision approaches may require a slightly steeper angle until reaching MDA.
5. Aircraft in final landing configuration (gear down and final flaps set).
6. Airspeed must be stable and within range of target speed plus 10 KIAS.
7. The aircraft will touch down in the first 1,000' or first 1/3rd of the landing runway. If this is not assured, a go-around must be executed.



Aiming Point

The Airplane Flying Handbook defines aiming point as "the point on the ground at which, if the airplane maintains a constant glidepath, and was not flared for landing, it would contact the ground."

AIM 2-3-3 – The "Runway Aiming Point Markings" consist of a broad white stripe located on each side of the runway centerline, approximately 1,000' from the landing threshold.

Performance Aircraft requires all landings to occur within the first 1,000' of the landing runway. When flying a visual approach and landing in a C172, the (visual) aiming point chosen by the pilot is often an earlier point on the runway than the AIM defined "aiming point markings" to account for the flare. This technique ensures that the airplane touches down no farther than 1,000' down the runway.

Managing Energy

Managing energy means the pilot controls the airplane's glidepath, speed, and power setting so that altitude and airspeed are depleted simultaneously on the intended touchdown point.

Pitch

Maintain a constant angle glidepath to the aiming point by making pitch adjustments to keep the point stationary in the windshield. If the aiming point moves lower in the windshield, lower the pitch until the aiming point is back in the correct, stationary position. If the aiming point moves toward the top of the windshield, increase the pitch until the aiming point is back in the correct, stationary position.

Power

During a stabilized approach and landing, use power to control deviations from the desired approach speed while maintaining a constant angle glidepath to the aiming point. If the airspeed is fast, reduce power while maintaining the constant angle glidepath. If the airspeed is slow, add power while maintaining the constant angle glidepath.

Since a constant angle glidepath is a requirement for a stabilized approach, airspeed deviations should be corrected by adjusting power. Changing pitch to correct airspeed deviations during a stabilized approach will cause an excursion from the constant angle glidepath, resulting in an unstable approach.

Gust Factor

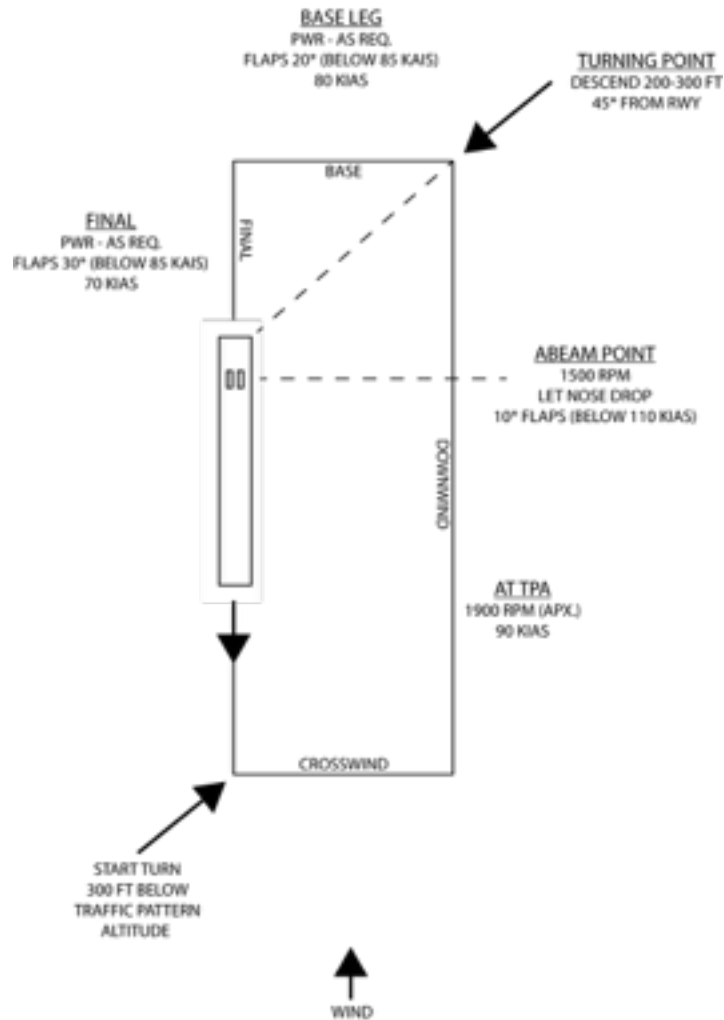
Slightly higher approach speeds should be used under turbulent or gusty wind conditions. Add $\frac{1}{2}$ the gust factor to the normal approach speed. For example, if the wind is reported 8 gusting to 18 knots, the gust factor is 10 knots. Add $\frac{1}{2}$ the gust factor, 5 knots in this example, to the normal approach speed.

Flap Setting

The C172 Operations Manual states: "Normal landing approaches can be made with power on or power off with any flap setting desired. Surface winds and air turbulence are usually the primary factors in determining the most comfortable approach speeds."

Students must be able to determine the best flap configuration and approach speed given the landing conditions.

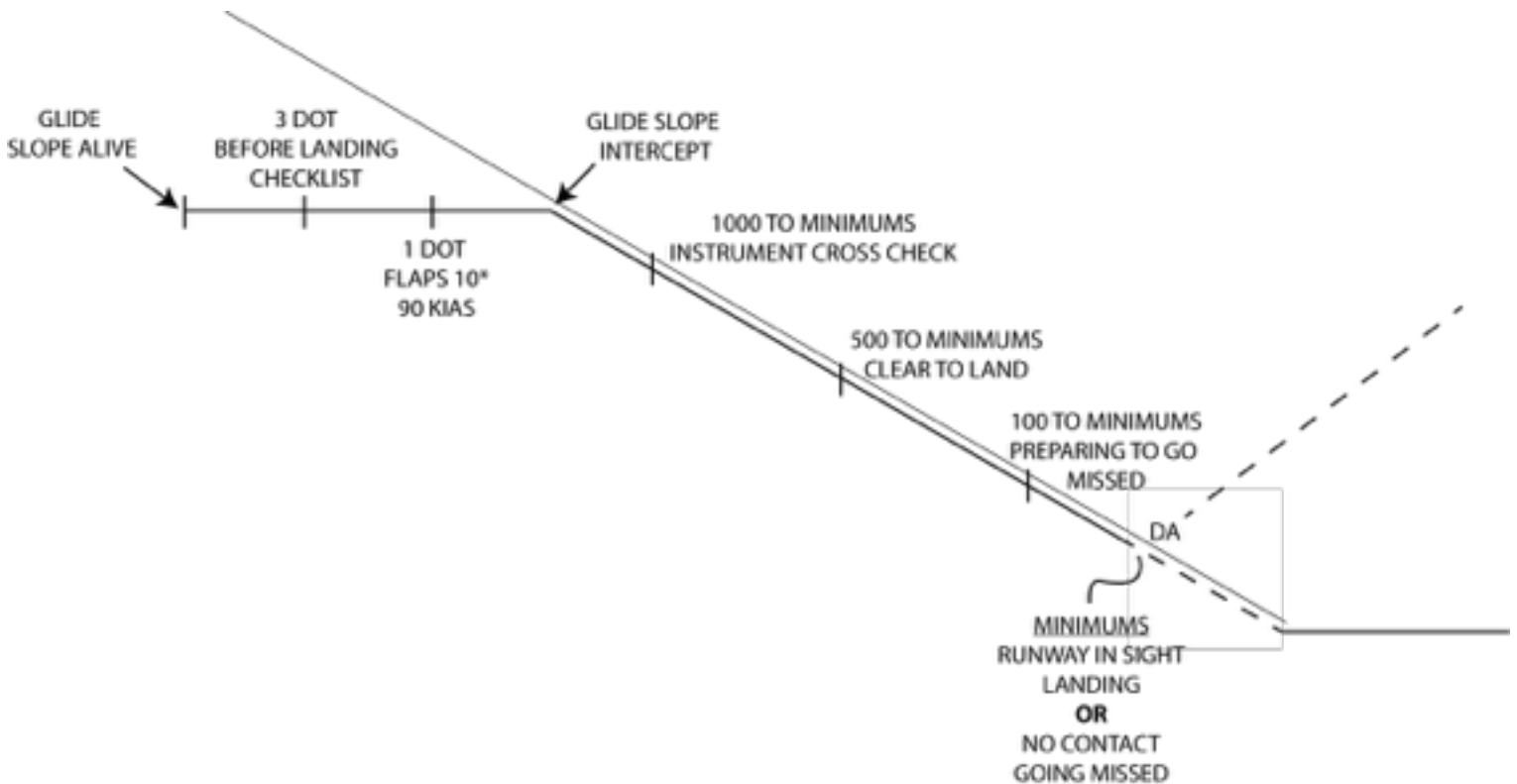
4b. Traffic Pattern Profile



LEG	POWER SETTING	AIRSPEED	FLAP	ALTITUDE
Prior to Pattern	Approx 1800-2000 RPM	90	0	Traffic Pattern Altitude (1000 AGL)
Downwind	Approx 1800-2000 RPM	90	0	Traffic Pattern Altitude (1000 AGL)
Abeam Point	Approx 1500 RPM	90	10	Initiate Descent
Base Turn	Approx 1500 RPM	80	20	Continue Descent
Final Turn	Approx 1500 RPM	70	30	Approx 500 AGL
Over The Numbers	Slow	65	30	Flare

4c. Precision Approach (ILS Approach / RNAV GPS LPV)

1. Complete the “**Approach Checklist**” and identify the localizer as early as possible
2. Slow to 90 KIAS on vectors or when final approach course inbound
3. Announce “**Localizer Alive**” when localizer begins moving toward center
4. Announce “**Glideslope Alive**” when glideslope begins moving toward center
5. Verify no flags at glideslope intercept altitude and marker
6. 3 dot’s below glideslope intercept: “**Before Landing Checklist**”
7. 1 dot below glideslope intercept: Reduce power to Approx 1500 RPM and set Flaps 10
8. At Glideslope announce “**FAF name and Altitude**” and descend at 80 KIAS.
9. Announce at 500’ above DA: “**500 to go, clear to land**”
10. Announce at 100’ above DA: “**100 to go, preparing to go missed**”
11. “**Minimums**”
12. Runway in sight: descend and slow to 70 KIAS
13. On short final, slow to 60-70 KIAS until 10’ to 20’ above the runway



4d. Non-Precision Approach (GPS, VOR, LOC Approach)

1. Load the approach into the GPS, and select appropriate nav source, and frequency if required.
2. Set the desired course on the Nav 1 OBS.
3. Complete the *"Approach Checklist."*
4. Slow to 90 KIAS when on a published segment of the approach or if on vectors.
5. At FAF, complete *"Before Landing Checklist"* - Power Approx 1500 RPM, Flaps 10° - Slow to 80 KIAS. Start time if required.
6. Descend at 400-500 FPM (unless steeper descent required) at 80 KIAS.
7. Announce at 100' above minimums: **"100 to go"**
8. Increase power 50' prior to reaching MDA to maintain 80 KIAS at level off.
- 9. "Minimums"**
10. Maintain MDA (plus 50', minus 0').
11. Runway in sight: descend at predetermined VDP or maintain MDA to MAP.
12. Do not leave MDA until landing is assured.
13. When descending from MDA: Flaps 20° - 70 KIAS.
14. On short final, slow to 60-70 KIAS until 10' to 20' above the runway.

5. Landing Profile

Type	Flap	Vref
Normal Landing	Flaps Full (Flaps Up)	60-70 (65-75)
Short Field Landing	Flaps Full	62
Soft Field Landing	Flaps Full	60-70
Crosswind Landing	Min Necessary for Field Length	60-70 Flaps Full, or 65-75 Flaps Up

5a. Standardized Normal Approach & Landing

1. Complete the “*Approach Checklist*” before entering the airport area; devote full attention to aircraft control and traffic avoidance
2. Slow to 90 KIAS prior to entering downwind or traffic pattern
3. Enter the traffic pattern at published TPA (typically 1,000' AGL)
4. Complete the “*Before Landing Checklist*” when established on downwind
5. When abeam touchdown point, on extended base, or on extended final (when ready to descend out of pattern altitude): Reduce power to approx. 1500 RPM and select flaps 10°
6. Descend out of TPA at 80 KIAS
7. On base leg, select flaps 20° and slow to 70 KIAS
8. On Final select Flaps 30 if appropriate.
9. Maintain 70 KIAS until short final when landing is assured, then slow to 60-70 KIAS until 10' to 20' above the runway

5b. Short-Field Approach & Landing Profile.

“Steps 1-7 are identical to a normal approach and landing procedure.”

8. Select flaps FULL and slow to 62 KIAS on final when landing is assured
9. Close throttle slowly during flare – touch down on intended touchdown point with little or no floating
10. Prevent the nosewheel from slamming onto the runway
11. Retract the flaps after touchdown
12. Simulate and announce “*Max Braking*” for training and checkride purposes

5c. Soft-Field Approach & Landing Profile.

“Steps 1-7 are identical to a normal approach and landing procedure.”

8. On short final when landing is assured, select flaps 30° and slow to 60-70 KIAS
9. Fly the airplane onto the ground, slowly transferring the weight from the wings to the main landing gear
10. Touch down on intended touchdown point at minimum speed with a nose-high pitch attitude
11. Keep the nosewheel off the ground as airplane slows by increasing elevator pressure
12. Prevent nosewheel from rapidly falling by maintaining aft elevator pressure

5d. Circling Approach.

When conducting a circling approach, fly the non-precision approach profile to the published circling minimums . Maintain circling minimums at 80 KIAS until in a position from which a normal landing can be made.

When descending from MDA (circling minimums), select flaps 20° and slow to 70 KIAS. On short final, slow to 65 KIAS until 10' to 20' above the runway.

5e. Balked Landing (Go Around).

The decision to execute a go-around is both prudent and encouraged anytime the outcome of an approach or landing becomes uncertain. Performance Aircraft considers the use of a go-around under such conditions as an indication of good judgement and cockpit discipline on the part of the pilot.

1. Full Power.
2. Reduce to Flaps 20.
3. Positive climb rate reduce flaps to 10.
4. Verbalize "Obstacle Clear" retract flaps to 0 and climb at Vy.

6. Flight Maneuver Criteria.

Flight maneuvers are the foundation of airmanship and what each pilot is tested on for a practical test. It is important to discuss, demonstrate, practice, and perform these maneuvers in order to gain this foundation and be in control of the aircraft. These maneuvers are broken down into Performance based maneuvers and Ground Reference maneuvers.

- Performance Based Maneuvers done above 1500 AGL.
- Ground Reference Based Maneuvers done from 600-1000 AGL.

In addition, there is a difference in testing standards based on the private and commercial applicant. Be familiar with the ACS and what standards apply.

Prior to any maneuver in the practice area and at cruise altitude, complete the following memory items.

- 1. Clearing Turns.**
- 2. Proper Configuration Flow Complete. (See below)**
- 3. Choose a visual reference point outside of the aircraft (road, grain elevator, downtown, lake, etc.). This ensures the use of outside references to maintain a lateral course during the maneuver. This also allows for picking a place to land in the event of an emergency especially at low altitudes.**

Clean Configuration Flow

1. Fuel selector – both
2. Mixture – enrichen
3. Flaps 0°

Landing Configuration Flow

1. Fuel selector – both
2. Mixture – enrichen
3. Carburetor heat – on (carbureted models)
4. Flaps full

6a. Slow Flight

Slow Flight is a performance based maneuver and done above 1500 AGL.

Setup

- Perform two 90° clearing turns
- Landing configuration flow
- Visual Reference Point

Execution

- 1500 RPM (maintain altitude)
- As the aircraft slows, add flaps as required
- Slow to 5-10 knots above 1G stall speed (approximately 45-50 KIAS). Avoid stall warning activation.
- Power as required to maintain a smooth transition and airspeed
- Accomplish level flight, climbs, turns, and descents as required

Recovery

- Max power / maintain altitude / reduce flaps.
- Above VX, retract flaps to 0°
- *“Cruise Checklist.”*

6b. Power Off Stall

Power Off Stall is performance based maneuver and done above 1500 AGL.

Set up

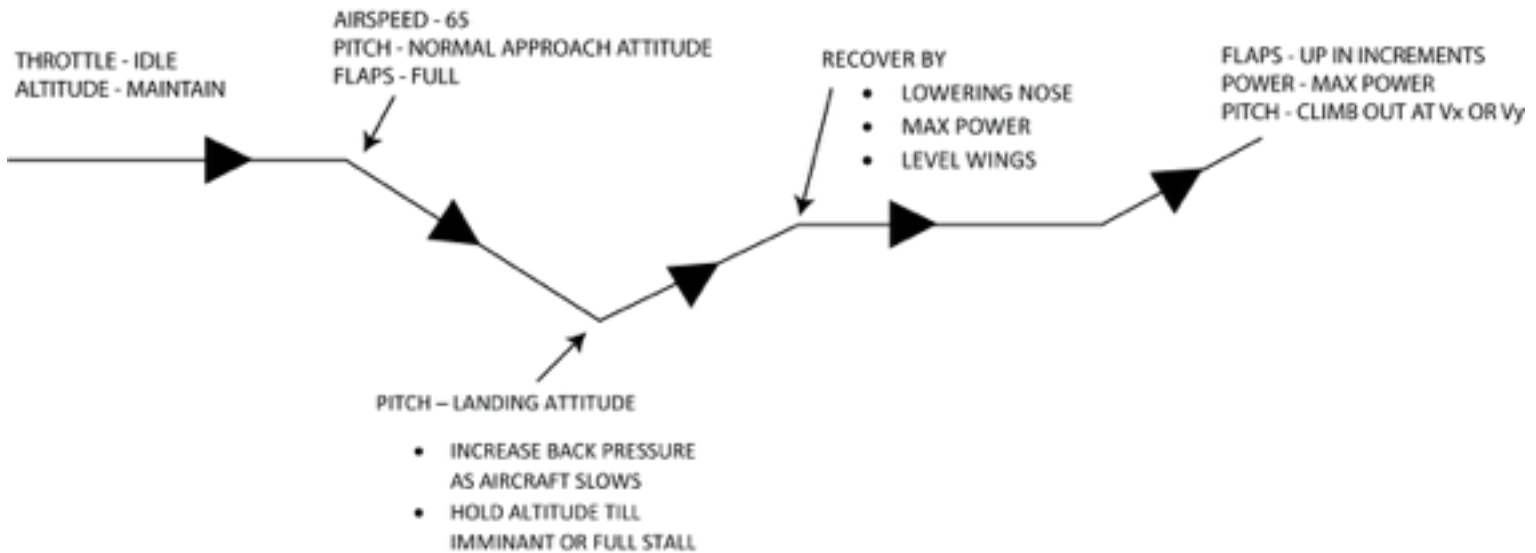
- Perform 90 Degree Clearing turns.
- Landing Configuration Flow.
- Visual Reference Point.

Execution

- Reduce throttle to idle
- Maintain altitude while slowing to 65 KIAS
- Pitch down to establish a normal approach attitude
- Set flaps to full
- Set bank angle as desired (Wings level for normal stall)
- Establish and hold a normal coordinated landing pitch attitude until: horn, buffet, or full stall as specified by instructor

Recovery

- Simultaneously reduce AOA, max power, and level wings
- Retract flaps to 20° (immediately)
- Retract flaps to 10° when airspeed is greater than 55 KIAS
- Increase pitch to arrest descent
- Establish VX or VY as appropriate
- Retract flaps to 0° when accelerating through VX
- "Cruise Checklist."



6c. Power On Stall

Power On Stall is a performance based maneuver and done above 1500 AGL.

Setup

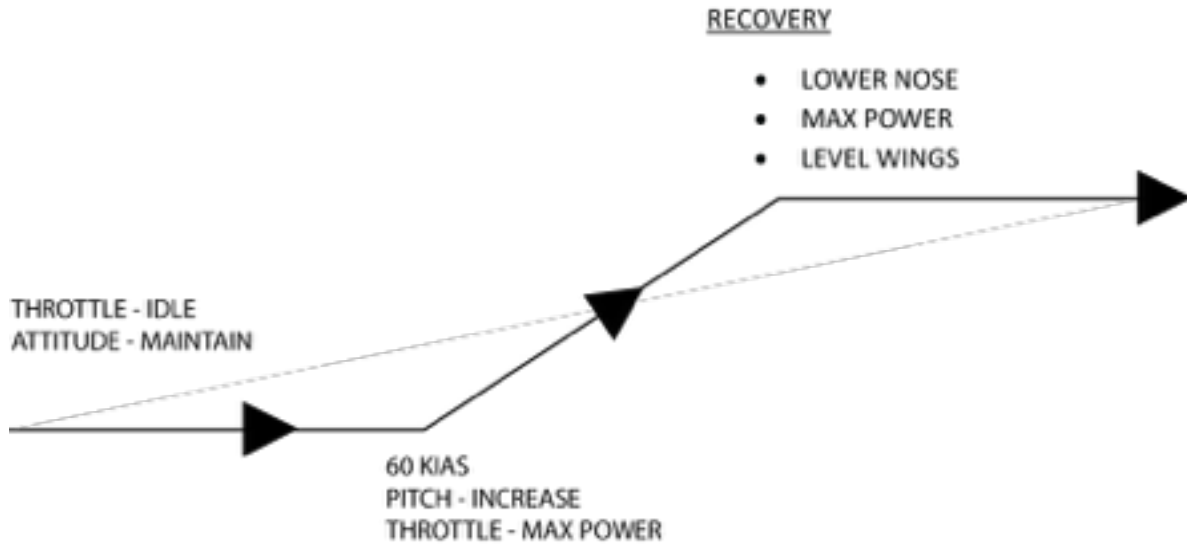
- Perform two 90° clearing turns
- Clean configuration flow
- Visual Reference Point

Execution

- Reduce throttle to idle
- Maintain altitude while slowing to 60 KIAS
- At 60 KIAS, simultaneously increase pitch (slowly) and apply full power
- Increase pitch attitude to induce stall (full or imminent stall as specified)
 - Max 20° pitch up

Recovery

- Simultaneously reduce AOA, max power, and level wings
- *Cruise Checklist*



6d. Steep Turns

Steep turns are a performance based maneuver and done above 1500 AGL

Setup

- Perform two 90° clearing turns
- 90 KIAS (1900 RPM) maintain altitude
- Cruise configuration flow
- Visual Reference Point

Execution

- Perform a 360 turn with 45° of bank (50° commercial)
- Maintain altitude and airspeed (+ back pressure, + approx. 100-200 RPM)
- Roll out 20-25° prior to entry heading
- Clear traffic and perform a 360° turn with 45° of bank in the opposite direction
- Roll out 20-25° prior to entry heading
- *"Cruise Checklist"*

6e. Rectangular Course

Setup

- Pick an altitude between 600-1000ft AGL
- Perform two 90° clearing turns
- 90 KIAS (1900 RPM) maintain altitude
- Cruise configuration
- Visual Reference Point

Execution

- Pick a square area that is one mile in length and width
 - Use fields or roads
- Set up so as that the aircraft is flown $\frac{1}{4}$ to $\frac{1}{2}$ mile left or right of the selected area
- Enter at a 45° to the downwind as you would entering a traffic pattern
- Maintain wind correction so as to parallel the road or field
- Adjust power as necessary to maintain 90 KIAS
- When abeam the boundary line, start the turn as to not get blown past your distance away from the area

Recovery

- Exit the maneuver on the downwind at a 45° angle
- Advance power back towards cruise power
- Cruise Checklist

6f. S-Turns across a road

Setup

- Pick an altitude between 600-1000ft AGL
- Perform two 90* clearing turns
- 90 KIAS (1900 RPM) maintain altitude
- Cruise configuration
- Visual Reference Point

Execution

- Pick a long straight road (that is clear of obstacles) perpendicular to the wind
 - Enter with a tailwind (downwind)
- Pick points ½ miles apart crossing the road and also points ½ mile on either side of the road
- Complete a series of 180* turns across the road to these points
- Recommended radius of the turns should be about a half mile
- Adjust power as required to maintain 90 KIAS

Recovery

- Exit the maneuver on the downwind
- Advance power back towards cruise power
- Cruise Checklist

6g. Turns around a point

Setup

- Pick an altitude between 600-1000ft AGL
- Perform two 90* clearing turns
- 90 KIAS (1900 RPM) maintain altitude
- Cruise configuration
- Visual Reference Point

Execution

- Pick a square field or area that is 1 mile in length and width with an object in the center
 - Field intersections work well
- Pick 4 object that are ½ mile on either side of the object
- Enter the orbit on the downwind side
- Use wind correction to maintain an orbit around the object
 - Reference the 4 points on either side of the object to maintain spacing and wind correction

Recovery

- Exit the maneuver on the downwind
- Advance power back towards cruse power
- Cruse Checklist

6h. Chandelles (Commercial Maneuver)

Chandelles are to be accomplished at an entry altitude that will allow completion no lower than 1,500' AGL, and consist of one maximum performance climbing turn beginning from straight-and-level flight, and ending at the completion of a precise 180° turn in a wings-level, nose-high attitude at the minimum controllable airspeed.

Setup

- Perform two 90° clearing turns
- 100 KIAS (2200 RPM) maintain altitude
- Clean configuration flow
- Visual Reference Point

Execution

- Choose a reference point off wing
- Establish / maintain 30° bank
- Full Throttle - Increase pitch to attain approx. 10-12° pitch up at 90° point
1st 90° of turn, Bank = constant 30°, Pitch = increasing to 10-12° pitch up
- 90° point - maintain pitch - reduce bank angle to attain level flight at 180° point
2nd 90° of turn, Pitch = constant 10-12° pitch up, Bank = decreasing to level flight
- 180° point - wings level - minimum controllable airspeed
- Accelerate while maintaining level flight
- "Cruise Checklist"

6i. Lazy Eights (Commercial Maneuver)

Lazy Eights are to be accomplished at an entry altitude that will allow the task to be completed no lower than 1,500' AGL. The applicant is required to maintain coordinated flight throughout the maneuver, with a constant change of pitch and roll rate.

Setup

- Perform two 90° clearing turns
- 100 KIAS (2200 RPM) maintain altitude – ***Power remains constant for the whole maneuver***
- Clean configuration flow
- Visual Reference Point

Execution

- Choose a reference point off of the wing
- Simultaneously increase pitch and bank (slowly)
- 45° point – 15° pitch up and 15° bank
- Reduce pitch / increase bank
- 90° point – level pitch - 30° bank - min. speed (5-10 knots above stall)
- Continue reducing pitch and reduce bank
- 135° point – 15° pitch down - 15° bank
- 180° point – level flight – entry airspeed and altitude
- Repeat in opposite direction
- *“Cruise Checklist”*

6j. Eights on Pylons (Commercial Maneuver)

Eights on Pylons are to be accomplished at the appropriate pivotal altitude ($\text{groundspeed}^2/11.3 + \text{field elevation}$), governed by the aircraft's groundspeed. The applicant is required to maintain coordinated flight while flying a figure eight pattern which holds the selected pylons using the appropriate pivotal altitude. At the steepest point, the angle of bank should be approximately 30-40°.

Setup

- Enter pivotal altitude (approximately 900' AGL at 100 KIAS - 2200 RPM) – **Power remains fixed**
- Perform two 90° clearing turns
- Clean configuration flow
- Visual Reference Point

Execution

- Select two pylons to allow for minimal time spent wings level between the two
- Enter maneuver on a 45° midpoint downwind
- Apply appropriate pitch corrections to compensate for changes in groundspeed and;
- To maintain line of sight reference with the pylon (pitch forward if point moves toward nose and pitch back if point moves toward tail)
- Begin rollout to allow the airplane to proceed diagonally between the pylons at a 45° angle
- Begin second turn in the opposite direction of the first
- Exit maneuver on entry heading
- *"Cruise Checklist"*

6k. Steep Spirals (Commercial Maneuver)

Setup

- Altitude – at least 3,000' AGL
- Perform two 90° clearing turns
- Best glide speed (65 KIAS)
- Clean configuration flow
- Visual Reference Point

Execution

- Choose visual reference point
- Reduce throttle to idle
- Track at least three constant radius circles around reference point
- Airspeed – constant
- Bank angle – adjust for winds – not to exceed 60°
- Clear engine once every 360° turn
- Recover – roll out on specified heading (visual reference)
- Adjust DG/HSI to compass
- *“Cruise Checklist”*

6I. Accelerated Stall (Commercial Maneuver)

Accelerated stalls are accomplished at an altitude that allows completion no lower than 3,000 feet AGL. A smooth transition should be made from cruise attitude to a bank angle of 45°, maintaining coordinated turning flight, while increasing elevator back pressure steadily to induce the stall.

Setup

- Perform two 90° clearing turns
- Slow to approximately 80 KIAS (during clearing turns)
- Clean configuration flow
- Visual Reference Point

Execution

- Establish a coordinated 45° bank turn
- Slowly reduce power to idle
- Maintain altitude to induce stall

Recovery

- Recover at the onset (buffeting) stall condition
- Simultaneously reduce AOA, max power, and level wings
- *“Cruise Checklist”*

6m. Secondary Stall Power On (CFI Maneuver)

Secondary Stalls are to be accomplished above 3,000 AGL. The purpose is to demonstrate the effect of attempting to hasten the completion of a stall recovery before the airplane has regained sufficient flying speed. Demonstrate and simultaneously explain secondary stalls from an instructional standpoint.

Setup

- Perform two 90 clearing turns
- 1500 RPM (maintain altitude)
- Clean configuration flow
- Visual Reference Point

Execution

- At 60 KIAS, simultaneously increase pitch (slowly) and apply full power Increase pitch attitude to induce stall
- At stall, recover – simultaneously reduce AOA, max power, and level wings
- When stall horn silences, increase pitch to induce a secondary stall At stall, recover – simultaneously reduce AOA, max power, and level wings
- *“Cruise Checklist”*

6n. Secondary Stall Power Off (CFI Maneuver)

Secondary Stalls are to be accomplished above 3,000 AGL. The purpose is to demonstrate the effect of attempting to hasten the completion of a stall recovery before the airplane has regained sufficient flying speed. Demonstrate and simultaneously explain secondary stalls from an instructional standpoint.

Setup

- Perform two 90 clearing turns
- 1500 RPM (maintain altitude)
- Landing configuration flow
- Visual Reference Point

Execution

- Stabilized descent at 65 KIAS
- Throttle idle (slowly)
- Maintain altitude to induce stall
- At stall, recover – simultaneously reduce AOA and level wings (do not add power)
- When stall horn silences, increase pitch to induce a secondary stall
- At stall, recover – simultaneously reduce AOA, max power, and level wings
- Retract flaps to 20° (immediately)
- Retract flaps to 10° when airspeed is greater than 55 KIAS
- Increase pitch to arrest descent
- Establish VX or VY as appropriate.
- Retract flaps to 0° when accelerating through VY
- *“Cruise Checklist”*

6o. Elevator Trim Stall (CFI Maneuver)

Elevator Trim Stalls are to be accomplished above 3,000 AGL. The purpose is to demonstrate what can happen when full power is applied for a go-around and positive control of the airplane is not maintained. Demonstrate and simultaneously explain elevator trim stalls from an instructional standpoint.

Setup

- Perform two 90 clearing turns
- 1500 RPM (maintain altitude)
- Landing configuration flow
- Visual Reference Point

Execution

- Trim for stabilized descent at 65 KIAS Apply full power (slowly)
- Allow the nose to rise and turn left
- When stall is approaching (high AOA) recover – simultaneously reduce AOA, max power, and level wings
- Adjust trim while accelerating to VY Retract flaps to 0° at 65 KIAS
- *“Cruise Checklist”*

6p. Cross Control Stall (CFI Maneuver)

Cross-Control Stalls are to be accomplished above 3,000 AGL. The purpose is to demonstrate the effect of improper control technique and to emphasize the importance of using coordinated control pressures whenever making turns. This demonstration shows what can happen during poorly executed base-to-final turn where too much rudder is applied in the direction of the turn. Demonstrate and simultaneously explain cross-control stalls from an instructional standpoint.

Setup

- Perform two 90 clearing turns
- 1500 RPM (maintain altitude)
- Clean configuration flow
- Visual Reference Point

Execution

- Stabilized descent at 65 KIAS
- Establish a 30° banked turn
- Smoothly apply excessive rudder pressure in the direction of the turn
- As rudder pressure increases, opposite aileron will be necessary to maintain constant bank angle
- Increase aft elevator pressure
- At first indication of stall, recover – simultaneously reduce AOA, max power, and level wings
- *“Cruise Checklist”*

7. Abnormal and Emergency Operations.

7a. Methodology

As much as we prepare for normal operations as pilots we should also discipline ourselves to practice abnormal and emergency operations as well. The following is a foundation to consider when training for such events or having been dealt an abnormal or emergency situation. Take the time to build the muscle memory and understand your aircraft.

For the most part in the flight training environment we operate as one single crewmember and build on our experience each lesson to strengthen our Single Pilot Resource Management (SRM). When a CFI and student are onboard and faced with an abnormal operation we must utilize Crew Resource Management (CRM). Examples and a sequence of procedures are listed below for both SRM and CRM.

Single Pilot Resource Management (SRM).

SRM is the art of managing all onboard and outside resources available to a pilot. The definition is vague, however during normal operations we do just that. We manage all onboard and outside resources before, during, and after the flight for a successful outcome. This essentially is following the process to stay one step ahead of the airplane in terms of checklists, weather, navigation, power setting, communications, etc. During training and building on our SRM the PIC is responsible for all aeronautical decision making. The PIC is also responsible to make safe and conservative decisions during abnormal and emergency ops.

Crew Resource Management (CRM).

CRM is also the art of managing all onboard and outside resources available to the pilot before, during, and after a flight for a successful outcome. However, one major difference is now we are part of a team effort and must utilize each other to complete the flight safely. We are interdependent on each other to complete the mission. In training your Aeronautical decision making will be challenged as if you were the Pilot in Command (PIC) therefore SRM. If you advance your aviation career and operate in a multi crew flight deck you will start to integrate CRM. Crew resource management differs from Single pilot resource management in the following ways.

1. Aeronautical decision making is a 2-way street and both pilots will consider the options and make a safe decision.
2. CRM will utilize split job duties (procedure below). Generally, one crewmember flying and the other working on the issue at hand.

Abnormal and Emergency Sequence of Procedures.

Whenever a situation is not part of our normal procedures in an aircraft consider the following.

1. Aviate
2. Navigate
3. Communicate

Aviate

As pilots our one job is to take a moving object airborne and then bring it back safely to the ground. It is human nature and many studies have shown that if our attention is directed off course, such as an emergency we omit our primary objective of flying the aircraft. The following term has been used in aviation for many years at all levels. Fly the airplane first! Maintain aircraft control of altitude, configuration, and safe flying before attempting to solve the problem.

Navigate

Ensure the aircraft is navigating where it needs to be. Whether that is a heading issued from ATC, or radio and gps navigation.

Communicate

Communicate your situation to local air traffic control, or on the CTAF. The two things to consider are **declaring an emergency or an advisory**. Do not hesitate to declare an emergency if the situation requires it. You are telling ATC that you need priority and assistance is requested. An advisory communicates to controllers or other aircraft that you have a scenario that is not favorable but the safety of the flight is not affected.

After these three things have been considered continue to isolate the problem.

Dealing with the Abnormal or Emergency.

When dealing with abnormal ops follow the procedure in order listed below.

1. Memory Items
2. Abnormal or Emergency Checklists

Memory Items

Memory items are quick acting actions in an aircraft during an emergency. They are listed with some emergency checklists as the first several items and generally are **BOLD** in our aircraft POH. These are memory items and should be committed to memory so that they can be completed during an emergency in a timely manner.

Checklists

Once memory items are complete and there is sufficient time, find and complete the appropriate checklist in the aircraft checklist or aircraft POH.

Management of Abnormal or Emergency Operation Procedures.

SRM

As PIC of an aircraft in solo operations you are responsible for all items and must use Aeronautical Decision Making to choose the safest course of action. When following this **sequence of procedures** listed below the key is not to fast and not to slow. However a smooth, steady, quick response should be expected to put yourself in the best position.

1. Aviate
2. Navigate
3. Communicate (consider)
 - a. Memory Items or Checklists may need to be completed prior to communicating to ATC or over the CTAF.
4. Memory Items.
5. POH Checklists.

CRM

When flying with an instructor and faced with an abnormal situation (not training) you will act as a crew and utilize crew resource management to share tasks and safely complete the flight.

CFI

The CFI will take control of the aircraft and complete the following tasks.

1. Aviate.
2. Navigate.
3. Communicate.
4. Direct student to memory items and checklists.
5. Consider all options from both crewmembers.

Student

The student will give aircraft control to the CFI.

1. Assist with memory items and abnormal checklists.
- Consider all options from both crewmembers.