STANDARDIZATION MANUAL
and
AMPLIFIED PROCEDURES

LAKE ELMO AERO

BEECHCRAFT BE-76
DUCHESS

Revised August 2026

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GENERAL INFORMATION

This standardization manual is published to serve as a master reference document for expanded aircraft procedures during training. It does not replace the Pilot's Operating Handbook or any other document published by the manufacturer, nor does it replace the Airplane Flying Handbook or any other document published by the FAA.

This manual is intended as a reference for training **at the Commercial certificate level**. Ensure that you are studying, training and performing maneuvers to the applicable standards and procedures.

References to "POH" indicate the aircraft Pilot's Operating Handbook for the 1981 Beechcraft Duchess.

References to "AFH" indicate the Airplane Flying Handbook, FAA-H-8083-3C.

References to "IPH" indicate the Instrument Procedures Handbook, FAA-H-8083-16B.

With regards to emergencies, "Land as Soon as Practical" means that a return to the home base airport (21D) is recommended. "Land as Soon as Possible" means a landing at the nearest suitable airport or landing site is recommended, and return to the base airport should not be prioritized.

Operating Rules – Multiengine Training

On any flight which involves simulated engine shutdowns below 1000' AGL, no rear seat passengers are permitted. In general, rear seat passengers are discouraged during single-engine operation and training due to deteriorated climb performance.

Intentional full shutdown of an engine for training purposes will not commence below 3000' AGL, and only within gliding distance of an airport with major powerplant maintenance available.

Simulated engine failures on the ground during takeoff run for training purposes must take place below 50% of published V_{MCA}, which is 33 KIAS. These engine failures may not be practiced on runways less than 100 feet wide.

The normal practice-area cruise power setting is 21" MP at 2300 RPM.

The zero-thrust setting for simulated single-engine operation is 11" MP at 2000 RPM.

Revision History

- 4/21/2026: WIP Version published. Some information still missing or incomplete.
- 7/19/2026: Emergency checklists reworked. W&B info corrected. Various maneuver performance-control settings corrected.
- 8/4/2026: Emergency checklists reworked. Systems info corrected.

QUICK REFERENCE GUIDE

V-Speeds

V_{S0}	60 KIAS	Stall speed – Full landing configuration
V_{MCA}	65 KIAS	Minimum Controllable Airspeed (one engine inop)
V_{S1}	70 KIAS	Stall speed – Full clean configuration
V_{SSE}	71 KIAS	Minimum safe speed for single-engine training maneuvers
V_X	71 KIAS	Best angle-of-climb speed
V_{XSE}	85 KIAS	Best angle-of-climb speed (one engine inop)
V_Y	85 KIAS	Best rate-of-climb speed
V_{YSE}	85 KIAS	Best rate-of-climb speed (one engine inop)
V_{FE}	110 KIAS	Maximum flap extension speed
$V_{LO - RET}$	112 KIAS	Maximum landing gear retraction speed
$V_{LO - EXT}$	140 KIAS	Maximum landing gear extension speed
V_{LE}	140 KIAS	Maximum landing gear extended speed
V_A	132 KIAS	Maneuvering speed
V_{NO}	154 KIAS	Maximum structural cruising speed
V_{NE}	194 KIAS	Never-exceed speed

Takeoff Performance

(Assumes no wind/ISA/MTOW/flaps 0)	Sea Level	2000’ MSL	4000’ MSL
Takeoff Over 50’ Obstacle	1000 feet	1250 feet	1450 feet
Accelerate-Stop Ground Roll	2150 feet	2500 feet	3100feet

Cruise Performance

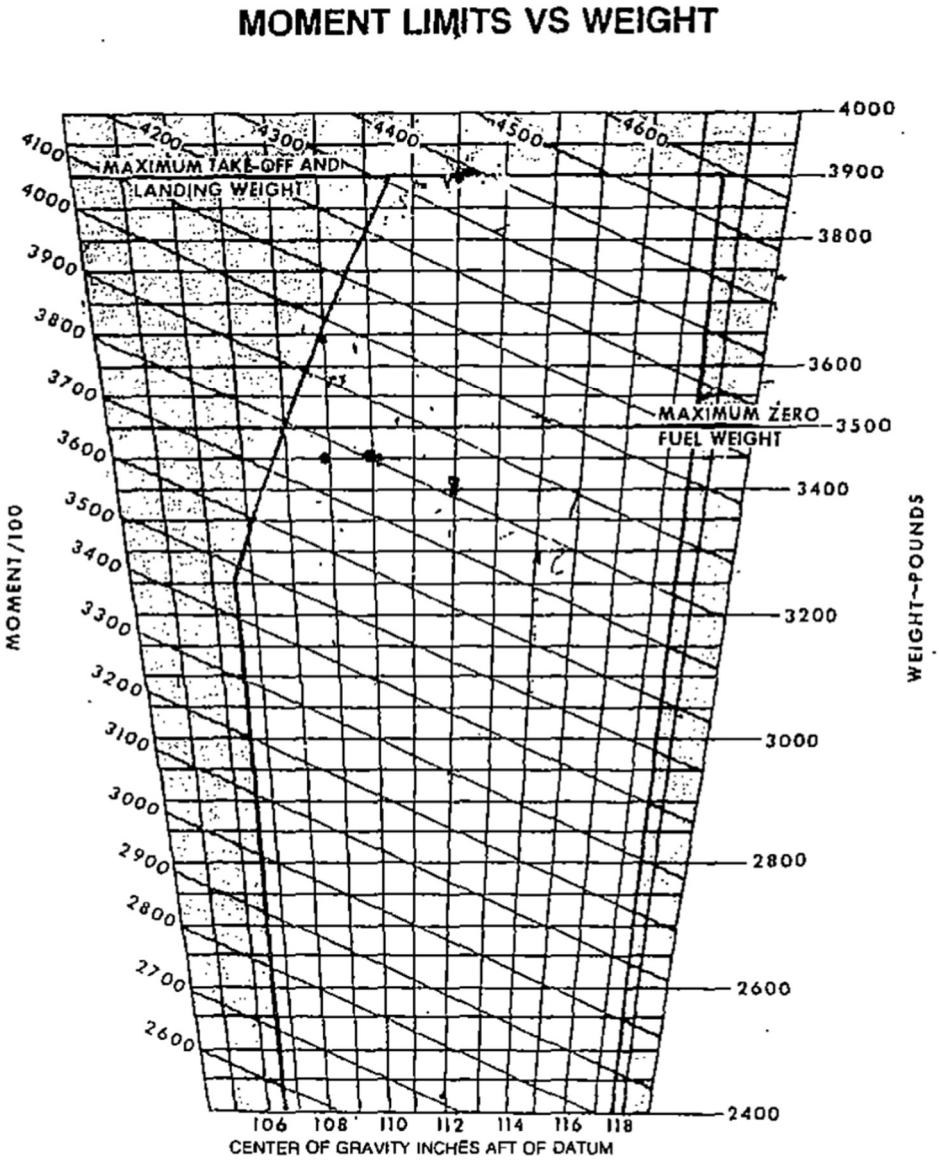
(Assumes leaned mixture/ISA/MTOW/full fuel/60min reserve)	RPM	MAP	KTAS	GPH	Range	Endurance
3000’ MSL	2500	24.0	155	20.4	604	3:54
	2300	20.0	132	14.0	809	6:08
	2100	18.0	111	10.4	954	8:36
6000’ MSL	2500	23.6	162	21.0	607	3:45
	2300	20.0	140	15.0	793	5:40
	2100	18.0	121	11.6	921	7:37
Simulated Zero Thrust – All Altitudes	2000	11.0				
Cruise Power – Practice Area Maneuvering	2300	21.0				
Service Ceiling	19500’ MSL					
Service Ceiling – One Engine Inoperative	5800’ MSL					
Absolute Ceiling – One Engine Inoperative	7700’ MSL					

Landing Performance

(Assumes no wind/ISA/MLW/flaps down	Sea Level	2000’ MSL	4000’ MSL
Ground Roll	1000 feet	1060 feet	1150 feet
Total to Clear 50’ Obstacle	1850 feet	1920 feet	2070 feet

Weight and Balance Information

	N3692X
Basic Empty Weight	**2615 lb**
Maximum Takeoff Weight	**3900 lb**
Maximum Landing Weight	**3900 lb**
Usable Fuel Capacity	100 gal (670 lb)
Baggage Compartment Capacity	200 lb
Useful Load – Zero Fuel at MTOW	**1285 lb**
Available Passenger Load – Full Fuel at MTOW	615 lb



ACS TASKS – COMMERCIAL MULTIENGINE ADD-ON

Ref: FAA-S-ACS-7A (Commercial ACS) Table A-14 (Addition of Airplane Multiengine Land)

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SYSTEMS INFORMATION

Engines

Ref: POH 7-17

The Beechcraft Duchess is equipped with two engines. The left engine is a Lycoming O-360-A1G6D. The right engine is a Lycoming LO-360-A1G6D, which is functionally identical except that it spins in the opposite direction of a conventional piston engine, to aid in directional control in the event of an engine loss. For simplicity, both engines will be referred to as the O-360-A1G6D throughout this manual.

The O-360-A1G6D is a reciprocating, carbureted, four-stroke, normally-aspirated, four-cylinder engine, with 360 cubic inches of displacement. It produces 180 brake horsepower at sea level under standard day conditions.

Each engine is equipped with manually operable cowl flaps to aid in engine cooling. These cowl flaps should be open during takeoff and landing to ensure sufficient engine cooling at high power and low airspeed, but can be closed during cruise to maximize true airspeed.

Each engine's ignition is supplied by a dual-redundant magneto system, which does not require electrical power to operate. The engine will keep running normally in the event of an electrical system failure.

Propellers

Ref: POH 7-21

Each engine is equipped with a fully-feathering, constant-speed Hartzell propeller. The propeller governor is actuated by oil pressure; an increase in oil pressure will provide a more fine propeller pitch and an increased RPM setting.

A complete loss of oil pressure will cause the propeller to fully feather, to allow maximum drag reduction in the event of an engine failure.

The propellers are equipped with feathering locks that engage at 950 RPM. For this reason, if an engine needs to be feathered, it must be done before the propeller is allowed to slow below 950 RPM.

The Beechcraft Duchess is equipped with unfeathering accumulators. When an in-air restart is desired, pushing the propeller knob from full feather to full forward will use oil pressure to return the propeller to a finer pitch, allowing a windmill start under most conditions. In the unlikely event that this does not suffice, the starter must be used to windmill the propeller. Do not engage the starter for more than ten seconds at a time, and avoid more than six consecutive duty cycles without a 5-minute cooldown period.

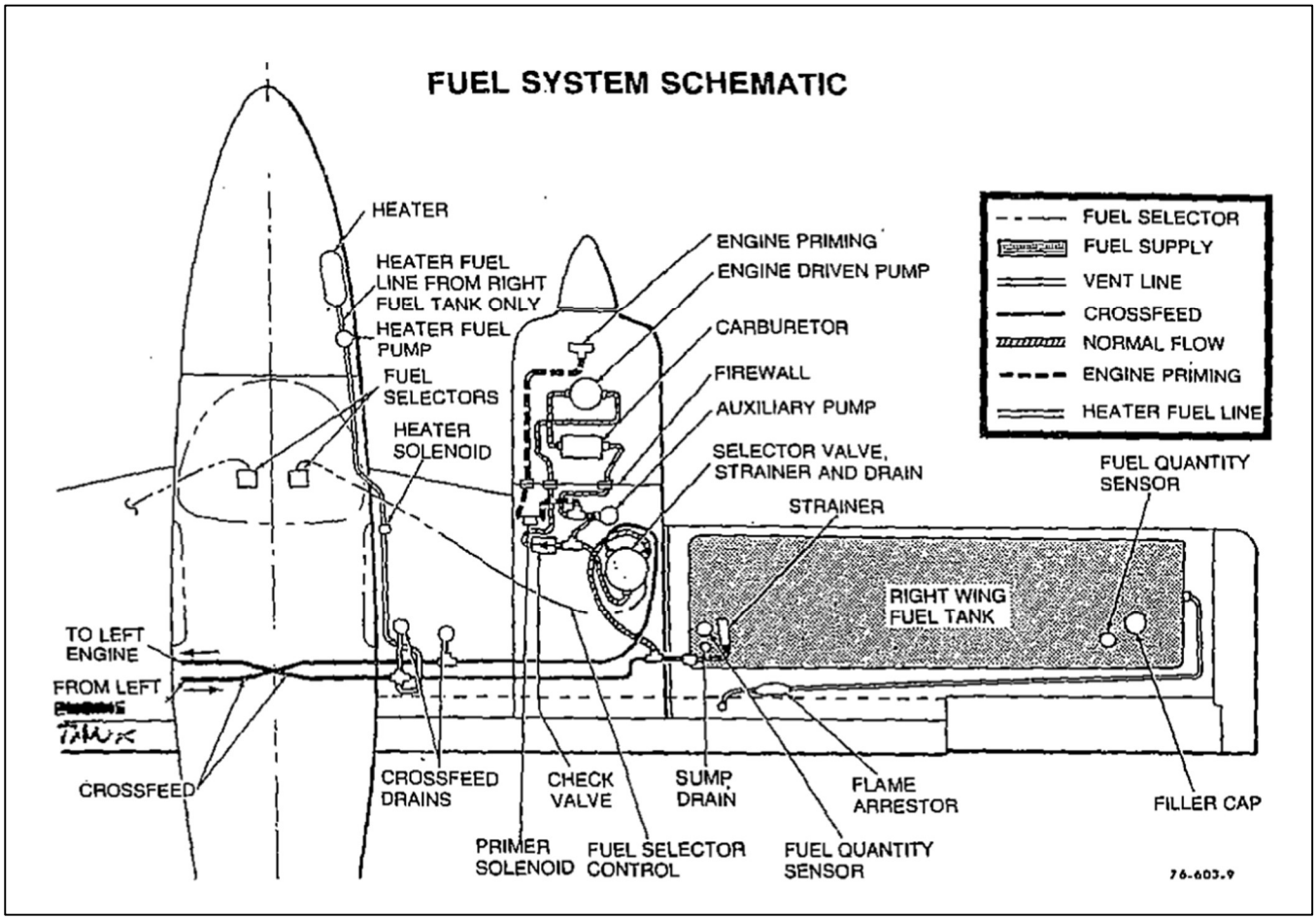
Fuel System

Ref: POH 7-21

The Beechcraft Duchess has one 51.5-gallon fuel tank in each wing, for a total of 103 gallons of fuel. 3 gallons are unusable (1.5 per wing), leaving a usable fuel capacity of 100 gallons for flight.

An engine-driven pump on each engine is the primary means of fuel supply for each engine. An electric auxiliary pump is also available on each engine for redundancy.

Under normal conditions, each wing's fuel system feeds its respective engine. In the event that fuel balancing is required, typically during prolonged single-engine operations, crossfeed selector valves are available for use. Crossfeeding may be used in level flight only (climbing or descending is prohibited). Both fuel selectors should never be in the crossfeed position at the same time in flight.



Electrical System

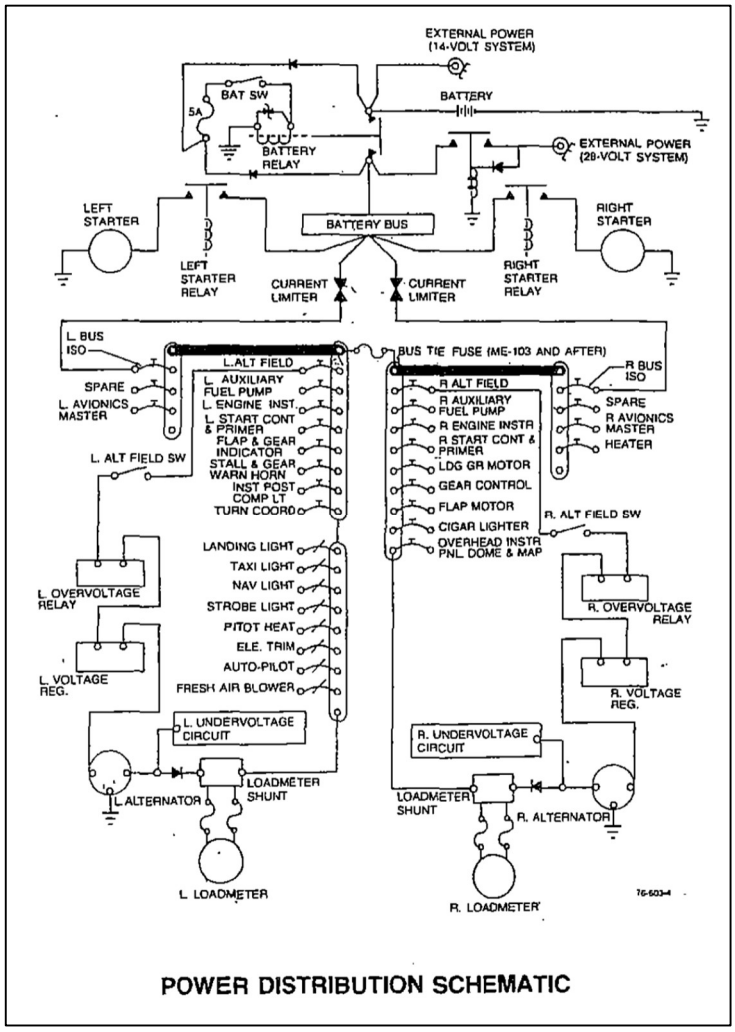
Ref: POH 7-26

The Beechcraft Duchess is powered by a one-battery, dual-alternator electrical system.

The 24-volt, 35-amp-hour battery is located in the battery box in the aft fuselage.

The 28-volt alternators are located on the front of each engine, just aft of the spinner. These alternators are protected by voltage regulators and an overvoltage safety relay. They will stop functioning if output exceeds 28 volts.

The electrical system is protected by circuit breakers, eliminating the need for spare fuses to be carried on board at night in accordance with FAR 91.205(c)(6).



POWER DISTRIBUTION SCHEMATIC

Landing Gear System

Ref: POH 7-10

The Beechcraft Duchess is equipped with retractable landing gear. This system is electrically commanded and hydraulically actuated. Full extension or retraction of the gear takes approximately six to seven seconds, and direction of the gear should not be reversed once it is in transit to avoid damaging the hydraulic pump.

The gear is held in the retracted position by positive hydraulic pressure, and does not have any mechanical up-locks. For this reason, even in the event of a loss of hydraulic pressure or control, the landing gear can still be extended and locked by following the emergency landing gear extension procedure. The system does have a set of mechanical down-locks, which can be confirmed by the three green indicator lights on the instrument panel.

The system is equipped with a safety switch in the pitot static system to prevent the gear from being inadvertently retracted on the ground. This switch does not allow the landing gear to be retracted when the airplane is traveling less than 59 KIAS.

The landing gear system is also equipped with a warning horn, which will sound if the landing gear switch is up on the ground (from the safety switch), if the flaps are extended with the gear retracted, or if the throttles are positioned below approximately 12” MAP with the gear retracted.

Heater

Ref: POH 7-35

The Beechcraft Duchess is equipped with a 45000-BTU combustion air heater, located in the nose compartment.

During operation, this heater draws fuel from the right wing fuel tank at approximately 0.7 gallons per hour.

There are two knobs to control airflow to the cabin from the heater. The Defrost - Pull On knob directs air towards the front windshield for defrosting. The Cabin Air - Pull Off knob controls airflow to the general cabin. If this knob is pulled more than halfway closed, heater operation will be inhibited to avoid overheating.

The Cabin Temp - Pull to Increase knob controls the temperature of the air entering the cabin from the heater.

In the event that the heater is shut down during flight, prior to landing, no additional cooling procedures are required.

In the event that the heater is shut down on the ground, the heater control switch should be moved to Blower Only for at least one minute to cool the system prior to aircraft shutdown.

External Lights

Navigation (Position) Lights

Navigation lights consist of one rear-facing white light on the rudder, one red light on the left wingtip, and one green light on the right wingtip.

The Nav Lights switch also causes the green landing gear position lights to dim. For this reason, the navigation lights should not be turned on unless operating at night or in reduced visibility.

Strobe (Anticollision) Light

Strobe Lights consist of two white flashbulbs, one on each wingtip. They should be used any time the engine is running, except when taxiing at night. During these conditions, turn strobe lights off to avoid blinding others. While operating in IMC after dark, consider turning off strobe lights to prevent blinding induced by reflection.

Landing Light

The landing light is a forward-facing white light, angled to provide optimal visibility during a takeoff or an approach to landing. It is mounted on the leading edge of the left wing.

Taxi Light

The taxi lights are also forward-facing white lights, but angled further down to provide optimal visibility during taxi. They are mounted on the wingtips.

Lighting Guide

The following is a set of recommended lighting configurations for various operating conditions.

Engine Start

Day: Strobe Lights On

Night: Nav Lights On, Strobe Lights On (for 3 seconds, then Off)

After Start

All: Taxi Lights On (or as reqd for taxi)

Before Takeoff

Day: Landing Light On

Night: Landing Light On, Strobe Lights On

Climb

All: Landing Light Off, Taxi Lights Off

Approach

All: Landing Light On, Taxi Lights On

After Landing

Day: Landing Light Off

Night: Strobe Lights Off, Taxi Lights On (or as reqd for taxi), Landing Light Off

COMMON TASKS

Traffic Pattern Arrival

Ref: AFH Ch. 7, AC 90-66B
Objective: To safely and efficiently arrive at an airport and perform traffic pattern operations.

1. Complete the Approach Checklist.
2. At least 10nm from the airport, attempt to determine the runway in use*.
3. At least 2nm from the runway, enter the traffic pattern at the published Traffic Pattern Altitude on a 45-degree entry to the downwind leg, maintaining a ½-mile distance from the runway once established.
    a. If approaching from the opposite side of the airport, overfly the airport at least 500' above Traffic Pattern Altitude.
4. Complete the Before Landing Checklist.

The above procedure assumes an ideal traffic pattern situation. Other traffic, ATC, local traffic pattern restrictions, obstacles, etc may require a modification of these procedures. In all cases, the pilot shall exercise good judgement and maintain positive airplane control.

* If the runway in use cannot be determined, overfly the airport at least 500' above Traffic Pattern Altitude to observe traffic and/or wind direction indicators to determine a runway for use.

Standards
Maintain proper spacing from other aircraft.
Maintain orientation with landing runway.

Traffic Pattern Departure

Ref: AFH Ch. 7, AC 90-66B
Objective: To safely depart an airport after takeoff or integrate into the flow of traffic when remaining in the traffic pattern.

If departing the traffic pattern…

1. Climb straight out on runway heading until above traffic pattern altitude, or…
2. Exit with a 45-degree turn to the left (assuming left-hand traffic) beyond the departure end of the runway, OR exit on the downwind leg once above traffic pattern altitude.
3. Complete the Climb Checklist.

If remaining in the traffic pattern…

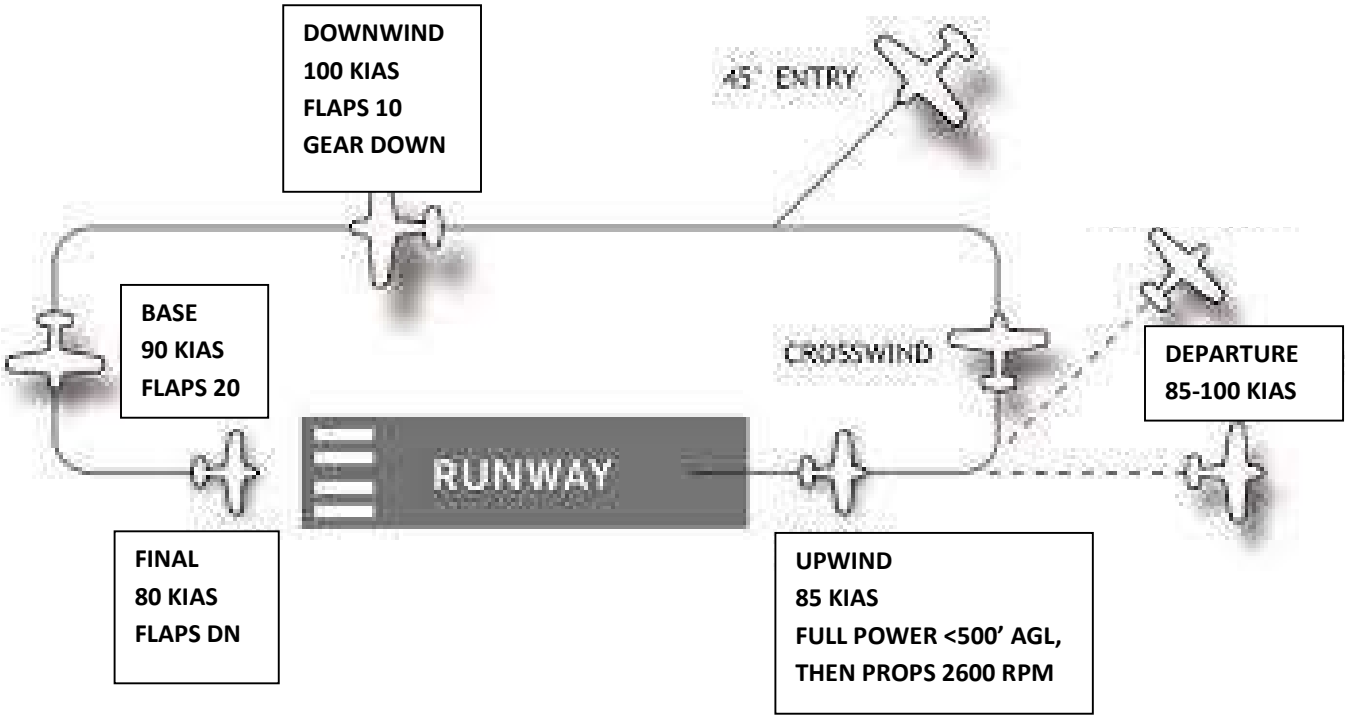
1. Begin a turn to the crosswind leg when beyond the departure end of the runway and within 300 feet of Traffic Pattern Altitude.

The above procedure assumes an ideal traffic pattern situation. Other traffic, ATC, local traffic pattern restrictions, obstacles, etc may require a modification of these procedures. In all cases, the pilot shall exercise good judgement and maintain positive airplane control.

Standards
Maintain proper spacing from other aircraft.
Maintain orientation with runway.

Traffic Pattern Quick Reference

Rotate	**71 KIAS**
Pattern Departure	**85-100 KIAS**
Upwind	**85 KIAS [V_Y]**
Downwind	**100 KIAS**
Base	**90 KIAS**
Final	**80 KIAS**



Clearing Turns

Ref: AIM Sec. 4
Objective: To observe any local threats or hazards, including obstacles or other traffic, prior to commencing any training maneuver.

1. Visually scan the area to the left and right of the aircraft.
2. Select a visual landmark off the wingtip in the direction of the turn to be executed as a 90-degree reference point.
3. Enter a 30-degree bank in the direction of the visual landmark.
4. Continuously scan the area above, below, and ahead of the flight path.
5. After completing a 90-degree turn, roll wings level on the selected landmark.
6. Select another visual landmark off the opposite wingtip in the direction of the next 90-degree turn.
7. Enter a 30-degree bank in the direction of the visual landmark.
8. Continuously scan the area above, below, and ahead of the flight path.
9. After completing the second 90-degree turn, roll wings level on the selected landmark. The aircraft should now be on its original heading.

Note: Clearing turns do not absolve a pilot of his/her responsibility to see and avoid traffic while performing training maneuvers.

Configuring the Aircraft for Maneuvers

Prior to commencing any maneuvers, the following configuration settings should be considered. Recommendations are offered below for individual maneuvers.

BOOST/FUEL PUMP
The Boost Pumps should be used during takeoff, landing, and any training maneuvers.

CARBURETOR HEAT
Carburetor heat should be used any time the engine will experience continuous RPM settings below 2200 RPM.

GAS/FUEL TANKS
The fuel selector should be set to the normal position. Crossfeed should never be used during maneuvers.

UNDERCARRIAGE/LANDING GEAR
If required by the maneuver, the landing gear should be confirmed in the down-and-locked position.

MIXTURE
Mixture should always be set to full rich for maneuvers.

POWER/PROPELLER
Engine power and/or propeller RPM should be set as needed for the maneuver to be performed.

SEAT BELTS
All occupants' seat belts should be fastened at all times, and any baggage that may shift during maneuvers should be secured with seat belts if possible.

SWITCHES
All aircraft lights should be on for maneuvers. Additionally, pitot heat should be used if entering instrument conditions or in any form of visible moisture.

The preceding configuration can be accomplished by following the acronym: **BCGUMPSS**

Boost Pump
Carburetor Heat
Gas
Undercarriage
Mixture
Power
Seat belts
Switches

TAKEOFFS AND LANDINGS

Normal Takeoff and Climb

Ref: POH 4-11, AFH 6-3 and 13-15
Objective: To safely execute a takeoff under normal conditions.

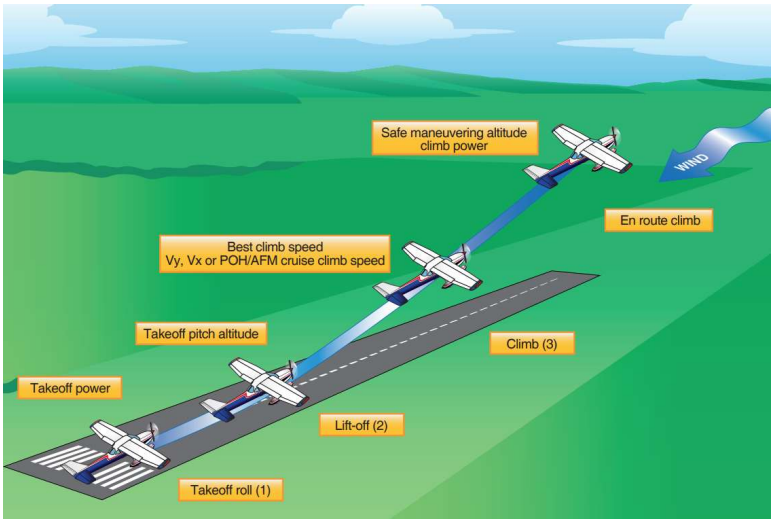
1. Complete the Before Takeoff Checklist.
2. Center the aircraft on the runway centerline with the nose wheel straight ahead.
3. Advance the throttles to 20" MAP. Hold brakes if required to prevent rolling forward.
4. When both engine gauges indicate symmetrically at 18" MAP, call out *"Stable"*.
5. Advance the throttle to full power.
6. Check engine instruments as power increases.
7. When airspeed indicator begins moving, call out *"Airspeed Alive"*.
8. Accelerate aircraft to 71 KIAS.
9. Increase back pressure on the control yoke to pitch up until the glare shield meets the horizon (approximately 10 degrees nose-up).
10. When a positive rate of climb is confirmed, call out *"Positive Rate"* and retract the landing gear.
11. When clear of obstacles, retract flaps.
12. Accelerate to 85 KIAS [V_Y] and climb on centerline. Trim as necessary.
13. Above 500 feet AGL, set throttle and propeller to climb power (full throttle, 2600 RPM).

If departing the pattern…

14. Execute a Traffic Pattern Departure procedure as applicable.
15. Above 1000' AGL, complete the Climb Checklist.

If remaining in the pattern…

16. Begin a turn to the crosswind leg when beyond the departure end of the runway and within 300 feet of Traffic Pattern Altitude.



Standards
Maintain airspeed +5/-5 KIAS from V_Y.

Crosswind Takeoff and Climb

Ref: AFH 6-6 and 13-15
Objective: To safely execute a takeoff in crosswind conditions.

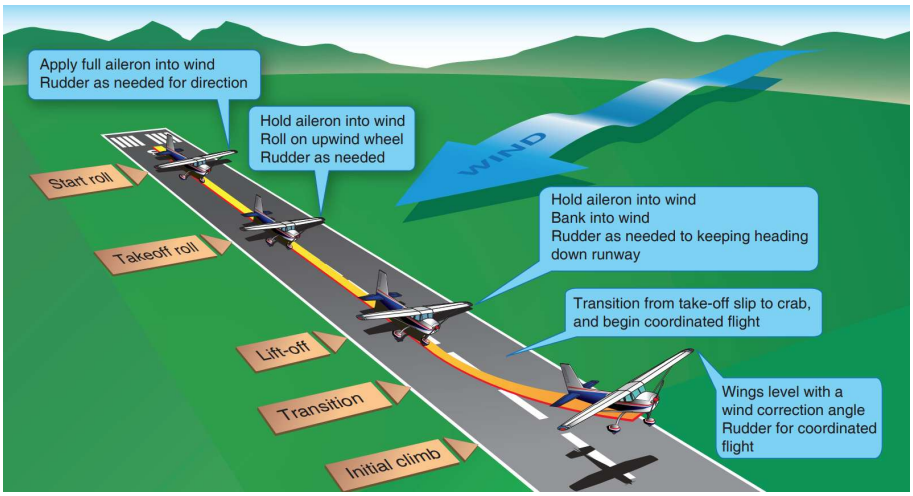
1. Complete the Before Takeoff Checklist.
2. Center the aircraft on the runway centerline with the nose wheel straight ahead.
3. Position flight controls for the wind conditions (ailerons into the wind).
4. Advance the throttles to 20" MAP. Hold brakes if required to prevent rolling forward.
5. When both engine gauges indicate symmetrically at 18" MAP, call out *"Stable"*.
6. Advance the throttle to full power.
7. Check engine instruments as power increases.
8. When airspeed indicator begins moving, call out *"Airspeed Alive"*.
9. Throughout the takeoff roll, gradually reduce aileron input as required.
10. Accelerate aircraft to 71 KIAS.
11. Increase back pressure on the control yoke to pitch up until the glare shield meets the horizon (approximately 10 degrees nose-up).
12. When a positive rate of climb is confirmed, call out *"Positive Rate"* and retract the landing gear.
13. When clear of obstacles, retract flaps.
14. Accelerate to 85 KIAS [V_Y] and climb on centerline. Trim as necessary.
15. Above 500 feet AGL, set throttle and propeller to climb power (full throttle, 2600 RPM).

If departing the pattern…

1. Execute a Traffic Pattern Departure procedure as applicable.
2. Above 1000' AGL, complete the Climb Checklist.

If remaining in the pattern…

3. Begin a turn to the crosswind leg when beyond the departure end of the runway and within 300 feet of Traffic Pattern Altitude.

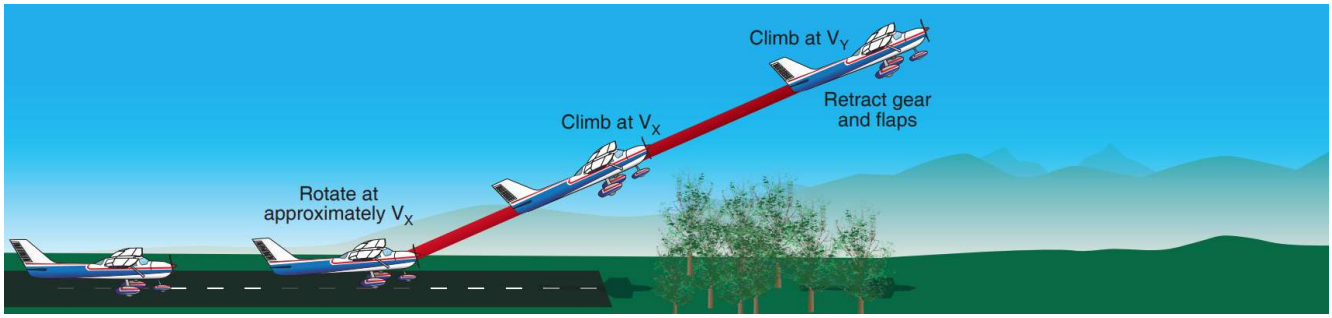


Standards
Maintain airspeed +5/-5 KIAS from V_Y.

Short Field Takeoff

Ref: AFH 6-11 and 13-17
Objective: To obtain maximum performance during takeoff and minimize runway length required.

1. Complete the Before Takeoff Checklist.
2. Center the aircraft on the runway centerline with the nose wheel straight ahead. Use all available runway surface.
3. Firmly press and hold both brake pedals.
4. Advance the throttles to 20" MAP. Hold brakes to prevent rolling forward.
5. When both engine gauges indicate symmetrically at 18" MAP, call out *"Stable"*.
6. Advance the throttle to full power.
7. Check engine instruments as power increases.
8. When airspeed indicator begins moving, call out *"Airspeed Alive"*.
9. Accelerate aircraft to 71 KIAS.
10. Increase back pressure on the control yoke to pitch for an initial climb speed of 71 KIAS [V_X].
11. When a positive rate of climb is confirmed, call out *"Positive Rate"* and retract the landing gear.
12. When clear of obstacles, retract flaps.
13. Accelerate to 85 KIAS [V_Y] and climb on centerline. Trim as necessary.
14. Above 500 feet AGL, set throttle and propeller to climb power (full throttle, 2600 RPM).



Standards
Maintain airspeed +5/-5 KIAS from V_X/V_Y.

Takeoff Briefing

Prior to takeoff in a multiengine airplane, a takeoff briefing must be performed. This briefing will cover all possible outcomes of an engine failure during the takeoff and/or departure.

If an engine fails…

Below rotation speed (71 KIAS)

- Immediately close both throttles and apply maximum braking to stop the aircraft on the runway.
- Pilot flying is responsible for exiting the runway promptly and safely, if able.
- Pilot monitoring is responsible for radio communications.

After takeoff with landing gear still extended and usable runway remaining

- Immediately close both throttles and land on remaining runway. Upon landing, apply maximum braking.
- Pilot flying is responsible for landing and exiting the runway promptly and safely, if able.
- Pilot monitoring is responsible for radio communications.

After takeoff with landing gear retracted and/or no usable runway remaining

- Discuss backup plan regarding local airports with suitable instrument approaches and/or long runways if needed.
- Consider whether it is safe to return to the departure airport on a single engine.

Normal Approach and Landing

Ref: POH 4-14, AFH 9-2 and 13-20
Objective: To safely and accurately establish and maintain a stabilized approach to a landing.

1. Enter the traffic pattern as described in this manual – see Traffic Pattern Arrival.
2. Abeam the point of intended landing on downwind, reduce throttles to 18" MAP and allow the airplane to begin descending at 100 KIAS.
3. Apply carburetor heat.
4. Set flaps to 10 degrees.
5. Set propellers to full forward.
6. Extend the landing gear.
7. When the touchdown point is 45 degrees to the rear of the wing root (or as appropriate for wind conditions), turn to the base leg.
8. Slow the aircraft to 90 KIAS and extend flaps to 20 degrees. Continue to maintain appropriate descent rate (500-700 fpm) and adjust power if necessary.
9. Visually verify that the final approach (including the extended centerline and the opposite base) is clear of traffic, then turn to final.
10. Extend the flaps to DN. Maintain 80 KIAS on final approach (+ ½ gust factor, if applicable). Trim for minimum control input on a stable descent to the runway.
11. When landing on runway is assured, reduce power to idle. Keep the nose of the airplane at or below level until within 10 feet of the ground.
12. When in close proximity to the runway, pitch the nose up so that the main wheels will touch down prior to the nose wheel. Allow the aircraft to settle gently.
13. Maintain directional control on centerline with rudders throughout flare, landing and rollout.
14. Apply brakes as necessary. Ensure that the airplane is slower than 10 knots before turning onto a taxiway.

NOTE: If the approach is unstable at or below 200' AGL, execute a go-around.

NOTE: Multiengine airplanes will suffer a noticeable loss of lift when both throttles are set to idle. Pilots accustomed to single-engine aircraft may tend to reduce power too early, causing instability on the approach.

Standards
Maintain airspeed +5/-5 KIAS.
Touch down within 200 feet of landing point.

Crosswind Approach and Landing

Ref: POH 4-14, AFH 9-15 and 13-21
Objective: To safely and land the aircraft during crosswind conditions.

1. Enter the traffic pattern as described in this manual – see Traffic Pattern Arrival.
2. Abeam the point of intended landing on downwind, reduce throttle to 18" MAP and allow the airplane to begin descending at 100 KIAS.
3. Apply carburetor heat.
4. Set flaps to 10 degrees.
5. Set propellers to full forward.
6. Extend the landing gear.
7. When the touchdown point is 45 degrees to the rear of the wing root (or as appropriate for wind conditions), turn to the base leg.
8. Slow the aircraft to 90 KIAS and extend flaps to 20 degrees. Continue to maintain appropriate descent rate (500-700 fpm) and adjust power if necessary.
9. Visually verify that the final approach (including the extended centerline and the opposite base) is clear of traffic, then turn to final.
10. Extend the flaps to DN. Maintain 80 KIAS on final approach (+ ½ gust factor, if applicable). Trim for minimum control input on a stable descent to the runway.
11. Use aileron to lower the upwind wing on final, and use rudder to keep airplane on extended centerline. This will result in a slightly cross-controlled "slip" style input.
12. When landing on runway is assured, reduce power to idle. Keep the nose of the airplane at or below level until within 10 feet of the ground. Keep upwind wing slightly low and maintain centerline with rudder input.
13. When in close proximity to the runway, pitch the nose up so that the main wheels will touch down prior to the nose wheel. Allow the aircraft to settle gently on the upwind main wheel first, then the downwind main wheel, then the nosewheel.
14. Maintain directional control on centerline with rudders throughout flare, landing and rollout. Use aileron input to maintain wings level through rollout.
15. Apply brakes as necessary. Ensure that the airplane is slower than 10 knots before turning onto a taxiway.

Standards
Maintain airspeed +5/-5 KIAS.
Touch down within 200 feet of landing point.

Short Field Approach and Landing

Ref: POH 6-11, AFH 9-20 and 13-22
Objective: To safely land the aircraft in the shortest distance possible.

1. Complete the Before Landing checklist.
2. Enter the traffic pattern as described in this manual – see Traffic Pattern Arrival.
3. Abeam the point of intended landing on downwind, reduce throttles to 18" MAP and allow the airplane to begin descending at 100 KIAS.
4. Set flaps to 10 degrees.
5. Set propellers to full forward.
6. Extend the landing gear.
7. When the touchdown point is 45 degrees to the rear of the wing root (or as appropriate for wind conditions), turn to the base leg.
8. Slow the aircraft to 90 KIAS and extend flaps to 20 degrees. Continue to maintain appropriate descent rate (500-700 fpm) and adjust power if necessary.
9. Visually verify that the final approach (including the extended centerline and the opposite base) is clear of traffic, then turn to final.
10. Extend the flaps to DN.
11. Maintain 76 KIAS on final approach (+ ½ gust factor, if applicable). Trim for minimum control input on a stable descent to the runway.
12. When landing on runway is assured, reduce power to idle. Keep the nose of the airplane at or below level until within 10 feet of the ground.
13. When in close proximity to the runway, pitch the nose up so that the main wheels will touch down prior to the nose wheel. Allow the aircraft to settle gently.
14. Maintain directional control on centerline with rudders throughout flare, landing and rollout.
15. Apply maximum braking without locking the wheels. Additional aerodynamic braking can be accomplished by holding back elevator pressure.

NOTE: If the approach is unstable at or below 200' AGL, execute a go-around.

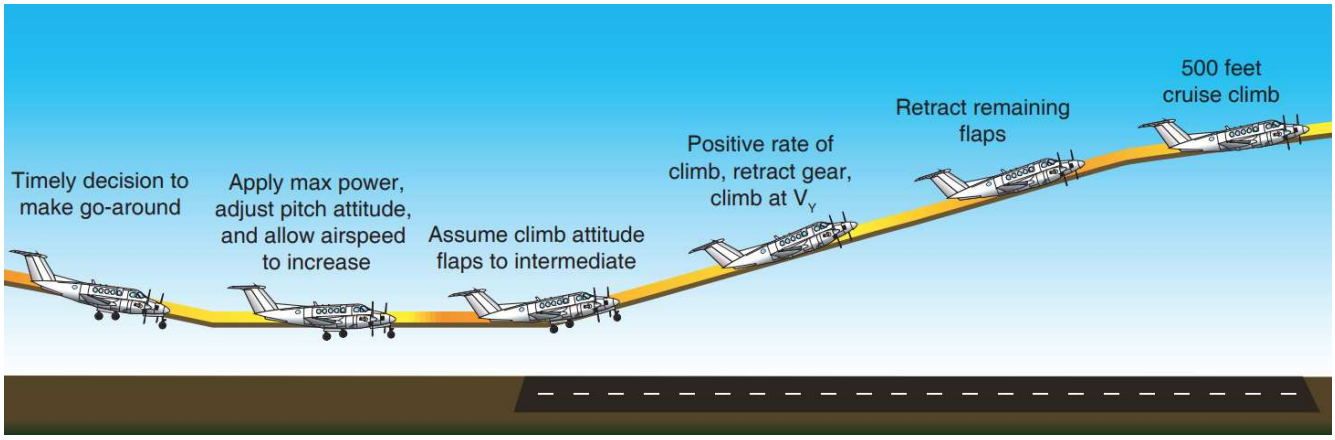
Standards
Maintain airspeed +5/-5 KIAS.
Touch down within 100 feet of landing point.

Go-Around/Balked Landing

Ref: AFH 9-10, POH 4-14A

Objective: To safely abandon a landing and climb away from the runway, to return to the traffic pattern.

1. Apply full throttle to initiate the go-around procedure. Maintain at least 65 KIAS [V_{MCA}] at all times.
2. Close carburetor heat to maximize climb performance.
3. Pitch the aircraft's nose up to establish a positive rate of climb.
4. When a positive rate of climb is confirmed, retract flaps fully.
5. Retract the landing gear.
6. Maintain a climb speed of at least 71 KIAS [V_X].
7. When clear of obstacles, accelerate to 85 KIAS [V_Y].
8. When obstacles are clear, retract remaining flaps slowly.
9. Above 500 feet AGL, set throttle and propeller to climb power (full power, 2600 RPM).
10. Follow departure procedures listed in this manual (see "Traffic Pattern Departure") as appropriate.



Standards

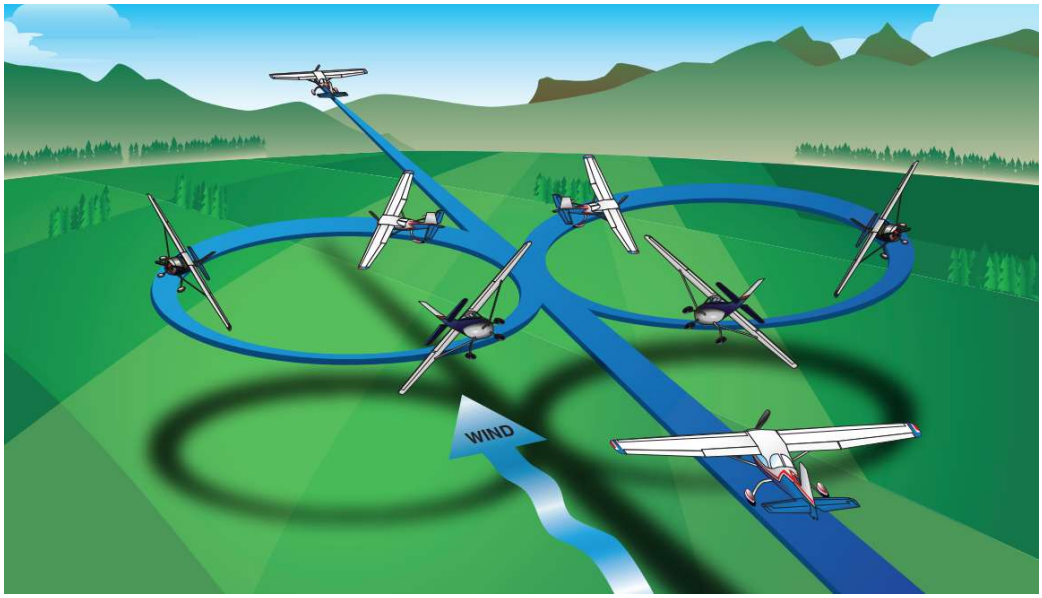
Apply takeoff power immediately and transition to climb pitch attitude for V_X or V_Y as appropriate +5/-5 KIAS.

PERFORMANCE MANEUVERS

Steep Turns

Ref: AFH 10-1
Objective: To safely perform turns at 50 degrees of bank while maintaining controlled flight.

1. Complete clearing turns and configure the airplane for maneuvering.
2. Establish airspeed of 110 KIAS and trim as necessary for level flight.
3. Choose a prominent landmark straight ahead and/or note current aircraft heading.
4. Roll into a 50-degree bank in your direction of choice and begin a 360-degree turn.
5. Add power as required to maintain altitude and airspeed. A typical power setting for this maneuver is 23" MAP and 2300 RPM if the cowl flaps are open.
6. If necessary, use nose-up pitch input and/or trim to maintain altitude.
7. Begin rolling the wings level approximately 15-20 degrees prior to the original landmark or heading. They should be level upon reaching the original heading.
8. Immediately roll into a 50-degree bank to begin a 360-degree turn in the opposite direction. Be careful to maintain altitude while rolling through wings level by using nose-down input or trim as applicable.
9. Begin rolling the wings level approximately 15-20 degrees prior to the original landmark or heading. They should be level upon reaching the original heading.
10. Return to cruise power.



Standards
Maintain airspeed +/-10 KIAS.
Maintain altitude +/-100 feet.

Slow Flight

Ref: AFH 5-9
Objective: To maintain flight at the aircraft's minimum controllable airspeed.

1. Complete clearing turns and configure the airplane for maneuvering.
2. Reduce throttle to 15" MAP to begin slowing the airplane. Apply carburetor heat.
3. As the airplane's speed decreases, use nose-up trim to maintain altitude.
4. When below 140 KIAS [V_{LE}], extend the landing gear.
5. Gradually increase propellers to full forward RPM, ensuring not to exceed redline (2700 RPM).
6. When below 110 KIAS [V_{FE}], gradually extend flaps to DN. Use trim to maintain altitude.
7. Slow to a speed just above the first indication of a stall (about 70 KIAS).
8. Upon reaching the target speed, add power to maintain altitude.
9. Use pitch to make minor corrections in airspeed, while continuing to use throttle to make minor corrections in altitude.

To recover…

10. Add full throttle. Use trim to maintain altitude.
11. Close carburetor heat.
12. When a positive rate of climb is confirmed, retract landing gear.
13. Gradually retract flaps. Use caution not to exceed 110 KIAS [V_{FE}].
14. When flaps are fully retracted, return to cruise power.

NOTE: This maneuver may involve prolonged flight near or below V_{MCA}. In the event of an engine failure, this maneuver must be discontinued immediately and the airspeed increased to at least 65 KIAS [V_{MCA}] to maintain control.

Standards
Maintain airspeed +5/-0 KIAS from V_{S0}.
Maintain altitude +/-50 feet.
Maintain heading +/-10 degrees.

Power-On Stall

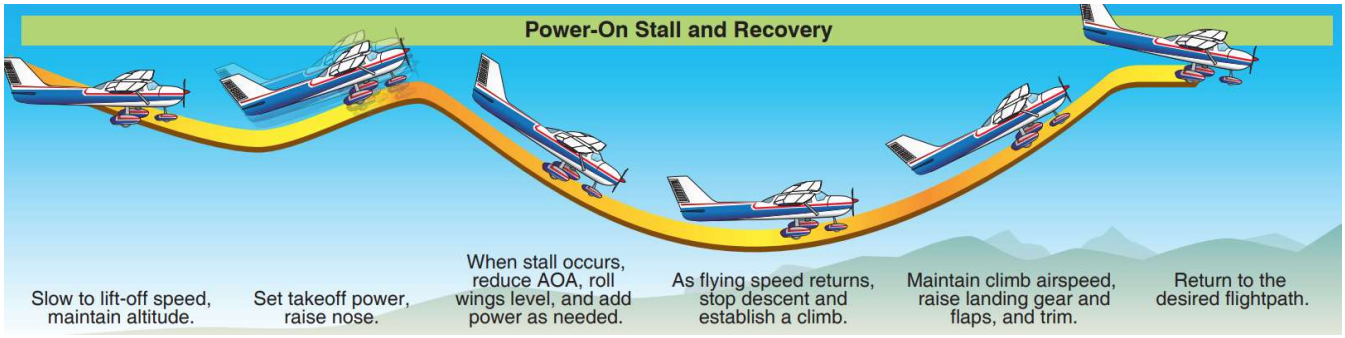
Ref: AFH 5-18
Objective: To demonstrate and safely recover from the power-on stall characteristics of the aircraft.

1. Complete clearing turns and configure the airplane for maneuvering.
2. Reduce throttle to 15” MAP to begin slowing the airplane.
3. As the airplane’s speed decreases, use nose-up trim to maintain altitude.
4. Gradually increase propellers to full forward RPM, ensuring not to exceed redline (2700 RPM).
5. When the airplane slows to approximately 85 KIAS, set throttles to 21” MAP.
6. Establish a pitch up attitude to induce a stall indication (approximately 15 degrees).

To recover…

1. At the first indication of a stall, immediately reduce the angle of attack by using forward pressure to lower the nose.
2. When aircraft is stable, return to cruise power.

NOTE: This maneuver may be practiced at full power as desired by the instructor/examiner.



Standards

Maintain heading +/-10 degrees.
Maintain angle of bank (if specified) +/-10 degrees.
Recover promptly after the first indication of a stall.

Power-Off Stall

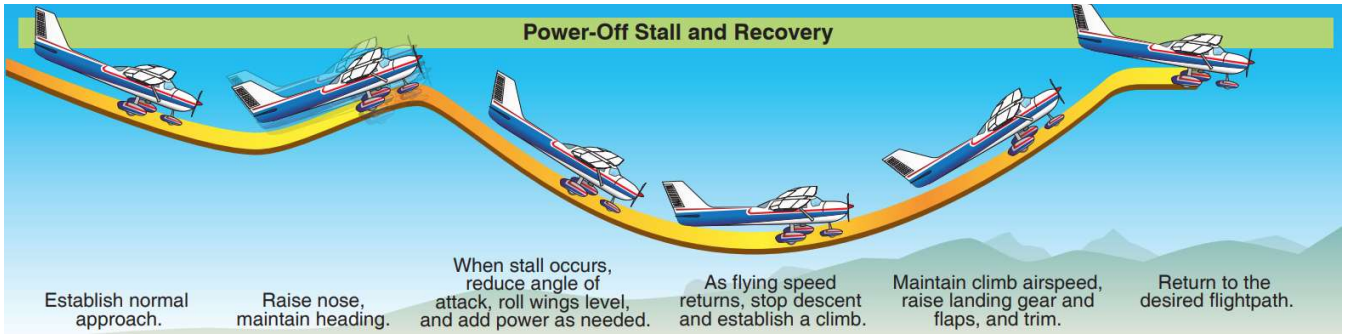
Ref: AFH 5-11

Objective: To demonstrate and safely recover from the power-off stall characteristics of the aircraft.

1. Complete clearing turns and configure the airplane for maneuvering.
2. Reduce throttle to 15” MAP to begin slowing the airplane. Apply carburetor heat.
3. As the airplane’s speed decreases, use nose-up trim to maintain altitude.
4. When below 140 KIAS [V_{LE}], extend the landing gear.
5. Gradually increase propellers to full forward RPM, ensuring not to exceed redline (2700 RPM).
6. When below 110 KIAS [V_{FE}], gradually extend flaps to DN. Use trim to maintain altitude.
7. Establish a glide similar to a final approach around 500 feet per minute.
8. Reduce throttles to idle and raise pitch to induce stall indication.

To recover…

9. At the first indication of a stall, immediately apply full power and reduce the angle of attack by using forward pressure to lower the nose.
10. Close carburetor heat.
11. When a positive rate of climb is confirmed, retract landing gear.
12. Gradually retract flaps. Use caution not to exceed 110 KIAS [V_{FE}].
13. When flaps are fully retracted, return to cruise power.



Standards

Maintain heading +/-10 degrees.

Maintain angle of bank (if specified) +/-5 degrees.

Recover promptly after the first indication of a stall.

Accelerated Stall

Ref: AFH 5-19
Objective: To recognize the relationship between bank, angle of attack, and stall speed.

1. Complete clearing turns and configure the airplane for maneuvering.
2. Reduce throttle to 15” MAP to begin slowing the airplane.
3. As the airplane’s speed decreases, use nose-up trim to maintain altitude.
4. Gradually increase propellers to full forward RPM, ensuring not to exceed redline (2700 RPM).
5. When the airplane slows to approximately 90 KIAS, promptly enter a turn at 45 degrees of bank.
6. Use a strong pitch-up control input to induce a stall indication.

To recover…

1. Immediately release back pressure to decrease angle of attack.
2. Roll the wings level.
3. Return to cruise power.

Standards
Recover promptly at the first indication of a stall.

Demonstration of V_{MCA}

Ref: AFH 13-26
Objective: To demonstrate the single-engine handling abilities of the aircraft at low speed and high power.

1. Complete clearing turns and configure the airplane for maneuvering.
2. Reduce throttle to 15" MAP to begin slowing the airplane.
3. Choose one engine to be designated as the "critical" engine, and close that engine's cowl flap.
4. Apply the designated critical engine's carburetor heat.
5. As the airplane's speed decreases, use nose-up trim to maintain altitude.
6. Gradually increase propellers to full forward RPM, ensuring not to exceed redline (2700 RPM).
7. Set the designated critical engine's throttle to idle.
8. Gradually increase the opposite engine's throttle to full, while maintaining directional control as required. Pitch to establish controlled flight at 85 KIAS [V_{YSE}].
9. Increase pitch angle such that indicated airspeed begins to slowly decrease. Maintain directional control with rudder and no more than 5 degrees of bank towards the operating engine.
10. Begin recovery process at the first indication of either a stall or a loss of directional control.

To recover…

11. Idle the operating engine's throttle.
12. Immediately pitch the nose down to reduce angle of attack and increase airspeed, in order to regain directional control.
13. When directional control is regained and stall indications have stopped, apply full throttle on the operating engine.
14. Establish a climb at 85 KIAS [V_{YSE}]. Maintain directional control.
15. Return to cruise power.

NOTE: The Beechcraft Duchess does not have a critical engine, which allows the pilot or examiner to choose an engine for this demonstration. Both should perform identically in this maneuver. If this maneuver is performed multiple times in a single training session, engine selection should be alternated to minimize wear.

Demonstration of Drag

Ref: AFH 13

Objective: To demonstrate the drag effects and climb capability of various aircraft configurations on a single engine.

This maneuver will be for demonstration purposes only, unless in the case of an MEI candidate.

1. Complete clearing turns and configure the airplane for maneuvering.
2. Choose one engine to be designated as the “critical” engine, and close that engine’s cowl flap.
3. Apply the designated critical engine’s carburetor heat.
4. Set both propellers to full forward RPM.
5. Reduce the “critical” engine’s throttle to idle.
6. Increase the operating engine’s throttle to full, while maintaining directional control.
7. Establish controlled flight at 85 KIAS [V_{YSE}] and continue to maintain that speed throughout the maneuver. Note current vertical speed.
8. Extend the landing gear. Note resulting vertical speed.
9. Extend the flaps. Note resulting vertical speed.
10. Retract the landing gear, leaving flaps extended. Note resulting vertical speed.
11. Retract flaps and return to cruise power.

NOTE: The Beechcraft Duchess does not have a critical engine, which allows the pilot or examiner to choose an engine for this demonstration. Both should perform identically in this maneuver. If this maneuver is performed multiple times in a single training session, engine selection should be alternated to minimize wear.

INSTRUMENT FLIGHT

Recovery From Unusual Attitudes

Ref: AFH 5-1
Objective: To safely recover the aircraft from an unusual flight attitude induced by spatial disorientation.

1. Scan primary flight instruments (Attitude indicator, Airspeed indicator, Altimeter) to assess the situation.

If the aircraft is in a nose-low unusual attitude:

2. Reduce power to idle.
3. Roll the wings to level with aileron input.
4. Pitch the aircraft to level with elevator input.
5. When aircraft is flying straight and level, return to cruise power. Carefully monitor primary flight instruments.

If the aircraft is in a nose-high unusual attitude:

2. Immediately add power to full and pitch the aircraft's nose to level with aileron input.
3. Roll the wings to level with aileron input.
4. When aircraft is flying straight and level, return to cruise power. Carefully monitor primary flight instruments.

NOTE: Remember the phrase "slow is smooth, and smooth is fast". Do not rush unusual attitude recoveries, or you may make incorrect inputs that worsen the situation.

Standards
Recognize unusual flight attitude.
Perform correct, coordinated and smooth flight control application to resolve unusual attitude.

Instrument Approach

Ref: IPH Ch 4
Objective: To safely conduct an instrument approach to a landing.

Upon crossing the **Initial Approach Fix** or intercepting a vector to the final approach course:

1. Start a timer if the approach or procedure calls for it.
2. Begin a turn at standard rate to the applicable course, heading, or track.
3. Set the throttle for 100 KIAS.
4. Ensure that the appropriate course or track is tuned, and that the correct navigation source is selected and displayed.
5. Communicate as required with radios.
6. Confirm that the Approach checklist has been completed.

Upon crossing the **Final Approach Fix** or starting final descent to land...

1. Start a timer.
2. Extend the landing gear.
3. Set the throttle for descent at 100 KIAS.
4. Extend the flaps to 10 degrees.
5. On a non-precision approach, trim for a descent rate of 500 feet per minute or greater. Do not exceed 1000 feet per minute of descent under any circumstances while in instrument flight conditions on final approach.
6. Communicate as required with radios.

NOTE: In all phases of instrument flight, remember to Aviate, *then* Navigate, *then* Communicate.
NOTE: See Lake Elmo Aero Instrument Syllabus for more specific IFH/IPH references.

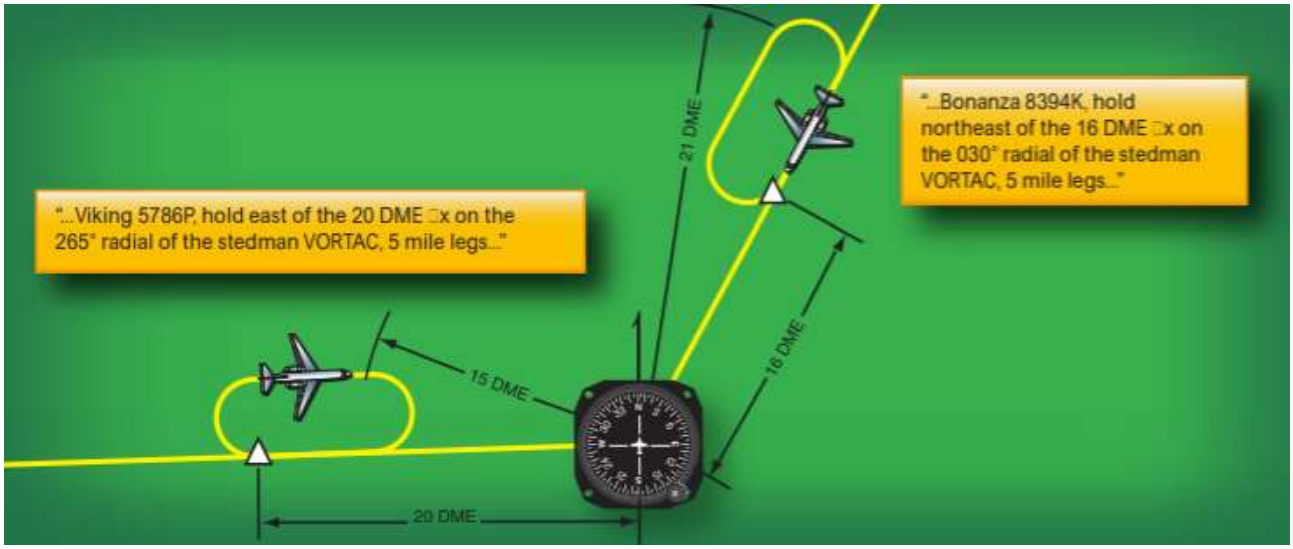
Standards
Maintain altitude +/-100 feet.
*Beyond FAF, maintain all published altitudes and MDA +100/-0 feet.
Maintain airspeed +/-10 KIAS.
Maintain heading +/-10 degrees.
Maintain course +/- ¾ scale deflection.

Holding

Ref: IPH 3-21
Objective: To safely execute published or requested holding procedures in instrument conditions.

Upon crossing the holding fix for entry…

1. Start a timer.
2. Turn to the applicable heading, course or track for your chosen hold entry.
3. Set the throttle for 100 KIAS.
4. Ensure that the appropriate course or track is selected, and that the correct navigation source is selected and displayed.
5. Communicate as required with radios.
6. Repeat steps 1-5 each time the holding fix is crossed for a new lap.



Standards
Maintain airspeed +/-10 KIAS.
Maintain altitude +/-100 feet.
Maintain heading +/-10 degrees.
Maintain course +/- ¾ scale deflection.

EMERGENCIES

Engine Failure in Flight

Ref: AFH 13-34, POH 3-11

Objective: To safely configure the aircraft in the event of a complete loss of engine power.

1. Maintain directional control at all times. Be aware that any engine control inputs may cause a "lurch" in directional control and should be corrected promptly and smoothly.
2. Establish flight at 85 KIAS [VYSE] or greater. Maintain altitude if possible.
3. Set both mixtures to full rich.
4. Set both propellers to full forward.
5. Set both throttles to full power.
6. Retract the flaps, if extended.
7. Retract the landing gear, if extended.
8. Identify the engine that is malfunctioning. This can be accomplished by checking which foot is no longer applying rudder pressure to maintain directional control of the airplane (hence the adage "dead foot, dead engine").
9. Verify the affected engine by gradually pulling its throttle to idle. No change in performance should occur.

If necessary to attempt to troubleshoot or restart engine…

10. Go to the Engine Roughness/Failure Checklist.

If necessary to secure engine rather than attempting to troubleshoot…

11. Feather the affected engine by gradually pulling its propeller control to feather.
12. Go to the Engine Secure/Feather Checklist.

Engine Securing and Feathering

Ref: AFH 13-34
Objective: To safely secure a failed engine in flight.

1. Trim as required to alleviate control pressure while operating on a single engine.
2. Maintain zero side slip flight attitude (3-5 degrees of bank towards operating engine, coordination ball halfway out towards operating engine).
3. Turn off the auxiliary fuel pump to the inoperative engine.
4. Set the mixture of the inoperative engine to idle cutoff.
5. Turn off the magnetos on the inoperative engine, one at a time. There should be no change in performance.
6. Close the cowl flaps on the inoperative engine.
7. Turn off the alternator on the inoperative engine.
8. Reduce electrical load to prevent overloading remaining alternator or depleting battery.
9. Set the fuel selector on the inoperative engine to “OFF”.

NOTE: Crossfeed operations should be considered if required to balance fuel.

Engine-Out Instrument Approach

Ref: AFH 13-34
Objective: To safely conduct an instrument approach with one engine inoperative.

Upon crossing the **Initial Approach Fix** or intercepting a vector to the final approach course:

1. Start a timer if the approach or procedure calls for it.
2. Begin a turn at standard rate to the applicable course, heading, or track.
3. Set the throttle for 100 KIAS.
4. Ensure that the appropriate course or track is tuned, and that the correct navigation source is selected and displayed.
5. Communicate as required with radios.
6. Confirm that the Approach checklist has been completed.

Upon crossing the **Final Approach Fix** for a **Precision Approach**:

1. Start a timer if the approach or procedure calls for it.
2. Extend the landing gear.
3. Set the throttle for descent at 100 KIAS.
4. Communicate as required with radios.

Do not extend flaps until runway is in sight and landing is assured.

Upon crossing the **Final Approach** Fix for a **Non-Precision Approach**:

1. Start a time if the approach or procedure calls for it.
2. Set the throttle for descent at 100 KIAS. In the absence of vertical guidance, descent rate should never exceed 1000 feet per minute.
3. Communicate as required with radios.

Do not extend landing gear or flaps until runway is in sight and landing is assured.

NOTE: Accomplishing a single-engine go-around from an instrument approach is extremely dangerous and should be avoided at all costs. If approach is unstable, consider abandoning early and requesting vectors to re-establish to provide better terrain clearance.

Fuel Crossfeeding

Ref: POH 3-12, AFH 13-7
Objective: To balance fuel if required during flight with one engine inoperative.

1. Ensure the auxiliary fuel pump to the inoperative engine is off.
2. Ensure the auxiliary fuel pump to the operating engine is on.
3. Quickly and forcefully move the fuel selector from the “ON” to the “CROSSFEED” position on the operating engine.
4. Monitor fuel flow and pressure.
5. The auxiliary fuel pump on the operating engine may be turned off if the PIC determines that it is not required for the safety of flight.

To return to normal operation…

6. Turn on the auxiliary fuel pump to the operating engine.
7. Quickly and forcefully move the fuel selector from the “CROSSFEED” to the “ON” position on the operating engine.
8. Monitor fuel flow and pressure.
9. The auxiliary fuel pump on the operating engine may be turned off if the PIC determines that it is not required for the safety of flight.

NOTE: For training flights, the auxiliary fuel pump on the operating engine should be left on whenever an engine is shut down in flight.

FUEL CROSSFEED	
Inop Engine Fuel Pump	OFF
Good Engine Fuel Pump	ON
Good Engine Fuel Select	XFEED
Fuel Flow, Pressure	MONITOR
---	---
Good Engine Fuel Pump	ON
Good Engine Fuel Select	ON
Fuel Flow, Pressure	MONITOR
Good Engine Fuel Pump	AS REQD

Engine Air Start

Ref: POH 3-12

Objective: To restart a previously failed and secured engine and return to normal cruise flight.

1. Turn the fuel selector on the inoperative engine to the “ON” position.
2. Set the throttle on the inoperative engine to its normal starting position (about ¼ travel).
3. Turn on the auxiliary fuel pump on the inoperative engine.
4. Turn on both magnetos on the inoperative engine.
5. Pitch to increase airspeed above 100 KIAS.
6. Set the propeller control on the inoperative engine to full forward. Unfeathering accumulators should cause propeller pitch to change and windmilling to begin.

If engine begins to windmill…

7. Lower the propeller to around the middle of its travel range (in order to target 2000 RPM after start).
8. Set the mixture control on the inoperative engine to full rich. This should cause the engine to begin running.
9. Set the restarted engine’s throttle and propeller controls to 15” MAP and 2000 RPM for 2 minutes to warm the engine back up to operating temperature (or until the affected engine’s CHT indicates at least 200 degrees). Do not increase throttle above 15” MAP.

If engine does not begin to windmill…

10. Set propeller control on the inoperative engine to mid-range (to target 2000 RPM once engine starts).
11. Set the mixture control on the inoperative engine to full rich.
12. Attempt to use engine starter to commence propeller windmilling.
13. After 6 starter duty cycles of 10 seconds on, 10 seconds off, allow starter to cool for 3 minutes.
14. If the engine does not start, prepare for a Single-Engine Approach and Landing, and land as soon as possible.

Engine Warm-Up

Objective: To safely return a recently restarted engine to normal operating temperature.

1. Set the restarted engine's throttle to 15" MAP.
2. Set the restarted engine's propeller to 2000 RPM. This may require some throttle adjustment to maintain 15" MAP.
3. Set the restarted engine's cowl flap as desired. This will typically be closed, so that the engine can more easily return to operating temperature.
4. Monitor the restarted engine's Cylinder Head Temperatures via the JPI engine monitor. Wait until these temperatures reach at least 200 F before returning to cruise power. In the event that no engine monitoring is available, wait at least two minutes in the throttle/propeller configuration described above.

ENGINE WARM-UP	
Use this procedure after starting an engine in flight.	
Throttle	15" MAP
Propeller	2000 RPM
Cowl Flaps	SET
Alternator	ON
Engine Instruments	MONITOR
Wait 2 minutes or until 200 CHT before adding additional power on the engine.	

Engine Failure on Takeoff

Ref: AFH 13-17, POH 3-12a and 3-13
Objective: To safely control the airplane in the event of an engine failure on or shortly after takeoff.

If on the ground…

1. Immediately close throttles.
2. Apply maximum braking to stop airplane on runway.

If in the air with usable runway remaining and landing gear is still extended…

1. Immediately close throttles.
2. Land on remaining runway surface.
3. Apply maximum braking to stop airplane on runway.

If in the air with no usable runway remaining and landing gear is still extended…

1. If time and altitude permit, retract landing gear and proceed to Engine Failure in Flight checklist.
2. If time and altitude are insufficient for landing gear extension, immediately find the most suitable landing area and attempt to touch down with minimal groundspeed.

If in the air with no usable runway remaining and landing gear retracted…

1. Establish climb at 85 KIAS [V_{YSE}].
2. Proceed to Engine Failure in Flight.

Engine Fire in Flight

Ref: AFH 18-9, POH 3-6
Objective: To safely extinguish an engine fire in cruise flight.

1. Set the affected engine's fuel selector to "OFF".
2. Set the affected engine's mixture to idle cutoff.
3. Set the affected engine's propeller to feather.
4. Turn the affected engine's auxiliary fuel pump off.
5. Turn the affected engine's magnetos off.
6. Turn the affected engine's alternator off.
7. Close the affected engine's throttle to idle.

If fire extinguishes…

8. Land as soon as practical.

If fire does not extinguish…

9. Proceed to Emergency Descent procedure if necessary.
10. Land as soon as possible.

Engine Fire on Start

Ref: POH 3-16
Objective: To safely extinguish an engine fire during the starting process.

1. Continue cranking starter to attempt to suck flames and accumulated fuel back into the engine.
2. Set affected engine mixture to idle cutoff.
3. Turn Fuel Selector off.
4. Set affected engine throttle to full open.
5. Turn affected engine auxiliary fuel pump off.

When fire is extinguished and engine is no longer running…

6. Discontinue cranking starter (if applicable) and turn off master switches and magnetos.
7. Evacuate aircraft as soon as practical.

Electrical Fire

Ref: AFH 18-10
Objective: To safely extinguish an electrical fire in cruise flight.

1. Turn the master switches Off.
2. Turn all individual radio and electrical switches Off.
3. If available, use a fire extinguisher on the afflicted area.
4. Proceed to Electrical Fire Checklist.

If fire does not extinguish…

5. Land as soon as possible. Consider off-airport landing if necessary for safety of occupants.

If fire extinguishes…

6. Land as soon as practical.
7. If electrical power is necessary for continuance of flight, turn master switch on.
8. Check circuit breakers for signs of a faulty circuit. Do not reset any breakers that have been tripped.
9. Turn on individual electrical components one at a time, and ensure that a fire does not restart.
10. Open cabin air and cabin heat/defrost vents as applicable.

Emergency Descent

Ref: AFH 18-8
Objective: To safely and rapidly descend the aircraft.

1. Reduce the throttles to Idle.
2. Set the propellers to full forward.
3. Increase the mixtures to rich, unless an engine is on fire.
4. Extend the landing gear.
5. Enter a steep bank (30-45 degrees).
6. Lower the nose of the aircraft and pitch for 140 KIAS [V_{LE}].
7. Plan to recover by 1000’ AGL.

To recover…

8. Level the wings to the horizon and stop the descent.
9. Apply throttle when airspeed decreases safely below 132 KIAS [V_A].
10. Return to cruise flight or complete the Power-Off Landing procedure, as applicable.

NOTE: In a non-training scenario requiring this action, descent at up to 194 KIAS [V_{NE}] is permitted if necessary, while leaving the landing gear retracted.

Engine Roughness or Failure

Ref: AFH 18-16
Objective: To diagnose and rectify a rough-running or failed engine in flight.

1. Turn the auxiliary fuel pumps on.
2. Apply carburetor heat.
3. Ensure that both fuel selectors are in the ON position.
4. Set the mixtures to full rich. If already full rich, attempt to slowly lean the mixture by about an inch and a half. This will cause the engine's combustion temperature to increase, which could burn away lead or carbon deposits causing roughness. If no change is observed after one minute, return the mixture to full rich.
5. Switch one magneto off at a time to test for operation of each unit.
6. If Engine Roughness continues, land as soon as possible and prepare for a loss of engine power.

Emergency Landing Gear Extension

Ref: POH 3-14

Objective: To extend the landing gear in the event of a loss of direct control of the system.

1. Check the circuit breaker panel for faults.
2. Ensure the aircraft's master switch is on.
3. Check the output of the alternators.
4. Ensure the aircraft's navigation lights are turned off, to avoid false indications of retracted landing gear due to the automatic dimming feature.
5. Slow the aircraft to 100 KIAS or less.
6. Pull the Landing Gear Motor circuit breaker to disable the electrical pump.
7. Set the landing gear lever to the down position.
8. Use the Emergency Extension Wrench to open the Extension Valve by turning it counterclockwise.
9. Check landing gear indicator lights for position.

If gear does not indicate fully extended and locked…

10. Use abrupt rudder or stabilator control inputs to lock landing gear into place.
11. Have a ground observer confirm the position of the landing gear (preferably a control tower).
12. If landing gear appears down and locked to observers, land normally.
13. If landing gear does not appear down and locked, land at an airport with crash and rescue facilities available and touch down with flaps retracted at the slowest possible speed.

NOTE: In an actual emergency, once landing gear is confirmed down and locked, landing gear controls should not be manipulated any further, due to the wide variety of potential issues requiring attention from maintenance personnel.

Loss of Oil Pressure

Ref: AFH 18-16
Objective: To safely manage a loss of oil pressure in flight.

If Low Oil Pressure is accompanied by **Normal or Low Oil Temperature…**

1. Land as soon as practical.

If Oil Pressure is completely lost, or if Low Oil Pressure is accompanied by **High Oil Temperature…**

1. Prepare for a loss of engine power or engine failure.
2. If the airplane is climbing, stop the climb.
3. Reduce throttles to 18” MAP and maintain level flight.
4. Set mixtures to full rich.

If Oil Pressure and Oil Temperature do not return to normal range…

5. Land as soon as possible.

High Oil Temperature

Ref: AFH 18-16
Objective: To safely cool the engine in the event of an overheat.

If High Oil Temperature is accompanied by **Low Oil Pressure…**

1. See “Loss of Oil Pressure” procedure.

If High Oil Temperature is detected, and **Oil Pressure is normal…**

1. If the airplane is climbing, stop the climb.
2. Reduce throttle to 18” MAP for a minute or so while allowing the airplane to accelerate. This will force more air over the engine. If airplane is equipped with CHT gauge, monitor this as well (keep below 420F/215C if possible).

If Oil Temperature returns to normal…

3. Resume normal operations, but climb at a higher speed (at least 85 KIAS [V_Y] to facilitate cooling) when required.

If Oil Temperature does not return to normal…

4. Land as soon as practical.

Alternator Failure

Ref: AFH 18-13
Objective: To manage electrical load and return for a safe landing in the event of an alternator failure.

1. Cycle the affected alternator's master switch.
2. Prepare for the possibility of an electrical fire. Go to the Electrical Fire procedure if applicable.
3. Turn off all unnecessary electrical equipment to reduce system load, including…
    a. External lights (as safe/required).
    b. Secondary communication radio(s).
4. Unplug all devices from the airplane's 12-volt charging socket.
5. Check circuit breakers.
    a. If no circuit breakers are tripped, cycle the Alternator Master Switch.
        i. If Alternator power is not restored, land as soon as possible.
    b. If one or more circuit breaker(s) is tripped…
        i. If the equipment is unnecessary for the safety of flight, leave it tripped and cycle the Alternator Master Switch.
        ii. If the equipment *is necessary* for the safety of flight, the use of emergency authority to reset the breaker can be used. Land at the nearest suitable airport.
6. Minimize inputs that require heavy electrical load, including transmitting on Communication radios.
7. Land as soon as practical (if in IMC, land as soon as possible).

NOTE: Resets of circuit breakers protecting necessary equipment can be attempted, but prepare for the possibility of an Electrical Fire and do not attempt to reset the same breaker more than once.

NOTE: The Beechcraft Duchess is equipped with a overvolt-sensing alternators, which will shut off if output voltage exceeds 14 volts.

Electrical System Failure

Ref: AFH 18-13

Objective: To manage electrical load and return for a safe landing in the event of a loss of electrical power.

1. Turn off battery and alternator master switches.
2. Turn off all individual electrical switches (such as lights and Avionics Master switch).
3. Prepare for the possibility of an electrical fire. Go to the Electrical Fire procedure if applicable.
4. Turn the battery master switch on.
    a. If electrical power is not restored, land as soon as practical and do not continue troubleshooting. Due to the electrical system being inoperative, plan to land without flaps.

If electrical power is restored…

5. Turn the alternator master switches on.
    a. If alternator remains failed, turn alternator master switch Off.
6. Individually, turn on each component to isolate the problem. Use caution and make sure each individual component does not cause an electrical abnormality.
7. Land as soon as practical.

Spin Recovery

Ref: AFH 5-22
Objective: To safely recover from an uncoordinated, aggravated stall.

1. Reduce the Throttles to Idle.
2. Return the Ailerons to the neutral position. Attempting to recover from a spin with aileron input can further aggravate the spin.
3. Apply Rudder input in the direction opposite to the spin. The aircraft should stop spinning and become oriented in a steep dive.
4. Apply forward pressure on the Elevators to break the stall condition. Do not invert the aircraft or exceed 194 KIAS [V_{NE}].

When the stall is broken and the aircraft is controllable…

5. Gradually recover from the dive and return to level flight with elevator input. Do not recover abruptly in order to avoid overstressing the aircraft beyond its rated structural limits (+3.8G) or inducing a secondary stall.
6. When level flight has been achieved, apply throttle as necessary to return to cruise flight.

NOTE: Remember the following mnemonic in the event of a spin: **PARE**.

Power: Idle.
Ailerons: Neutral.
Rudder: Opposite, to break the spin.
Elevator: Forward, to break the stall. Then back to recover from the dive.