BPPP Instructor Standards Manual

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Revision 8
December 2012

AMERICAN BONANZA SOCIETY

INTRODUCTION

AUTHORITY

The *BPPP Instructor Standards Manual* (Manual) is published under the authority of the Beechcraft Pilot Proficiency Program, Inc. (BPPP), a wholly owned subsidiary of the American Bonanza Society Air Safety Foundation.

PURPOSE

The *BPPP Instructor Standards Manual* is provided to BPPP designated flight instructors for their use when conducting flight training on behalf of BPPP. It also serves as a text in the ABS Flight Instructor Academy and as a resource for Academy graduates. The Manual contains limitations, best practices and maneuver elements intended to promote procedural standardization among BPPP instructors when conveying to the BPPP clinic pilot the knowledge, flying skills and confidence to operate their airplane safely and efficiently. The material in this manual is intended solely for the use of BPPP administrators and instructors when conducting flight training within the scope of the BPPP Program.

ISSUANCE

Initial issuance of a *BPPP Instructor Standards Manual* is free of charge to flight instructors in the BPPP program. Replacement of the Manual is made at a cost to the instructor as determined at the time of replacement. The Manual remains the exclusive property of BPPP and may not be copied or transferred in whole or in part to any other person or entity without the express permission of the BPPP Director of Training and Instructor Standardization. At the time the instructor is no longer participating in the BPPP flight training program, the Manual must be returned to BPPP.

REVISION

Revision to the *BPPP Instructor Standards Manual* is made from time to time as changes in content require. All revisions are made and distributed in electronic format. Changed portions of the text are marked with a black bar in the left margin corresponding to the lines on which the change appears. When a revision is made, the instructor is to save the new version, delete the previous version, and destroy any printed copies of previous versions.

ACKNOWLEDGEMENTS

BPPP acknowledges the efforts of Maj. Gen. Henry D. Canterbury (USAF, Retired) in developing the original BPPP Instructor's Inflight Guide. BPPP also acknowledges the suggestions of the many instructors who since have contributed to the evolution and development of the BPPP Instructor Standards Manual.

INSTRUCTOR READ FILE

The BPPP Instructor Read File (Read File) is compiled and updated on-line by the BPPP Flight Training and Safety Committee. It is used to share experiences with operational safety implications occurring during BPPP clinics with all BPPP instructors. The Read File contains selected accident and incident summaries, analyses and lessons learned from them.

To assure the effectiveness of the Read File, BPPP provide a detailed written report of any accident, incident or other unusual circumstance with a safety implication as soon as possible following the occurrence. These reports will be analyzed, de-personalized and shared with others in the Read File.

The Instructor Read File is available on-line at www.bonanza.org/913-instructors. You are responsible to review the Read File periodically and comply with the guidance provided.

Changes required to BPPP clinic policies and procedures as a result of operational experience will be made in revisions to the Manual.

CONTENTS

DEFINITIONS / ABBREVIATIONS / ACRONYMS

ACFP	Altitude Compensating Fuel Pump
AFE	Above Field Elevation
AFH	Airplane Flying Handbook (FAA)
AFM	FAA Approved Airplane Flight Manual
AGL	Above Ground Level
AI	Attitude Indicator
AIM	Aeronautical Information Manual (FAA)
APS	Advanced Pilot Seminars
ASOS	Automatic Surface Observing System
ATC	Air Traffic Control
ATIS	Airport Terminal Information Service
AWOS	Automatic Weather Observing System
Bonanza	Bonanza and Debonair as applicable in this Manual
Bonanza Challenge	BPPP Instructor Silent Checklist prompt to challenge Bonanza/Debonair fuel selector position
BPPP	Beechcraft Pilot Proficiency Program, Inc.
By-the-Numbers	See PAC
CAUTION	Information which, if not observed, could result in damage to equipment
Cowl Flaps	Some Debonair models are not equipped with cowl flaps. For these models, disregard references in this Manual to cowl flaps.
DA	Decision Altitude
DG	Directional Gyro
EGT	Exhaust Gas Temperature
FAA	Federal Aviation Administration
FAF	Final Approach Fix
FD	Flight Director
FPM	Feet per Minute
FR	Flight Review

G	Gravity unit of force
GPH	Gallons Per Hour
GPS	Global Position System
GPSS	Global Position System Steering
HSI	Horizontal Situation Indicator
IAF	Intermediate Approach Fix
IMC	Instrument Meteorological Conditions
Instructor	An FAA certified and current flight instructor under contract to BPPP and conducting flight instruction in a BPPP participant's airplane or an FAA-approved Flight Training Device simulating a Bonanza, Debonair, Baron or Travel Air.
IPC	Instrument Proficiency Check
KIAS	Knots Indicated Airspeed
LOP	Lean of Peak (EGT)
Manual	BPPP Instructor Standards Manual
MAP	Missed Approach Point
MDA	Minimum Descent Altitude
MFD	Multifunction Display
MEL	Minimum Equipment List. May be referred to also as Required Equipment for Various Conditions of Flight or Known Equipment List
MP	Manifold Pressure
MPH	Miles Per Hour
NOTE	Information requiring emphasis
PA	Pressure Altitude
PAC	Power/Attitude/Configuration
PFD	Primary Flight Display
PIC	Pilot in Command
Pilot	The recipient of training in an airplane operated in a BPPP pilot training program
POH	Pilot's Operating Handbook and FAA Approved Airplane Flight Manual
PTS	Practical Test Standards (FAA)

PTT	Push-to-Talk (switch)
Read File	BPPP Instructor Read File
ROP	Rich of Peak (EGT)
Speed Sheet	The worksheet used by BPPP Initial pilots to determine critical airspeeds for their airplane and used during flight training.
Suitable Airport	An airport at which, all factors considered, a safe landing can be accomplished under conditions anticipated at the time of landing. Factors include but may not limited to: airplane performance, day/night, weather, terrain, air traffic, runway length and condition, and airport services and facilities.
TC	Turbocharged Engine
TN	Turbonormalized Engine
VA	In this Manual, maneuvering airspeed adjusted for airplane present gross weight.
VGs	Vortex Generators
VMC	Minimum control speed with the critical engine inoperative
VMC	Visual Meteorological Conditions
! WARNING !	Information which, if not observed, could result in personal injury or loss of life.

BPPP OPERATING POLICIES AND INFORMATION

BPPP INSTRUCTOR GUIDANCE

The following are the expectations BPPP has for instructors conducting flight training in a BPPP-recognized training event. Each instructor is to:

- Be qualified to serve as pilot in command during the operation being conducted.
- Maintain control of the training situation being conducted.
- Use mature and conservative judgment regarding the training environment, and pilot and airplane capabilities.
- Anticipate the possibility of inappropriate pilot action and intervene without hesitation to prevent an unsafe condition from developing.
- Recognize a personality conflict when it develops or when things are not going well. Back off, consider the pilot's needs and limitations and make a fresh start.

FLIGHT INSTRUCTOR EQUIPMENT

When conducting flight training for BPPP, have the following equipment available:

- Current VFR and IFR chart information for the clinic area, including an airport diagram for the clinic base.
- A headset for personal use.
- A view limiting device (hood or "Foggles", e.g.) for use by the pilot during simulated instrument flight.
- Instrument covers to simulate flight instrument failures.
- For multiengine instruction, an emergency yaw string kit (a length of knitting yarn and tape) to use in the event a yaw string has not been attached to the windshield.

If the pilot does not provide an airplane with an interphone system, or a push-to-talk (PTT) switch or microphone access from the right seat, inform the customer you cannot conduct the flight unless you have a portable interphone system for use during flight operations.

PILOT BRIEFINGS

Before each maneuver or event, including simulated failures, be certain that the pilot understands its purpose, the associated procedure or technique and the desired outcome with briefing as required. Except as a follow-up to assure pilot understanding and successful performance, no event or simulated failure is to come as a surprise to the pilot.

FLIGHT INSTRUCTION IN A DUAL CONTROL WHEEL AIRPLANE

In single and multiengine airplanes with dual control wheels, instrument flight instruction may be conducted in simulated and actual IMC, whether or not the pilot is instrument qualified or current. The instructor must be instrument qualified and current. 14 CFR § 91.109(a) does not apply to instrument flight instruction in an airplane with dual controls.

FLIGHT INSTRUCTION IN A SINGLE CONTROL WHEEL AIRPLANE

14 CFR § 91.109 permits flight instruction, including instruction required to obtain an IPC, in single-control airplanes under these conditions:

1) The instructor has determined that the flight can be conducted safely; and
2) The person manipulating the controls has at least a private pilot certificate with appropriate category and class ratings.

14 CFR § 91.109 permits flight instruction in single control airplanes, including instruction required to obtain a Flight Review required by § 61.56 of this chapter, or to obtain recent flight experience or an instrument proficiency check required by § 61.57, under these conditions:

1) The airplane is equipped with operable rudder pedals at both pilot stations;
2) The pilot manipulating the controls is qualified to serve and serves as pilot in command during the entire flight;
3) The instructor is current and qualified to serve as pilot in command of the airplane, meets the requirements of § 61.195(b), and has logged at least 25 hours of pilot-in-command flight time in the make and model of airplane; and
4) The pilot in command and the instructor have determined the flight can be conducted safely.

There is no longer a requirement for BPPP to hold an exemption to FAR 91.109.

The following table provides a summary of pilot and instructor currency requirements for instrument instruction in a BPPP program in an airplane with a throw-over control wheel under § 91.109.

INSTRUMENT FLIGHT INSTRUCTION – SINGLE THROW-OVER CONTROL WHEEL AIRPLANE						
Instrument Current ?		Single or Multiengine	Simulated IMC OK?	IMC OK?	PIC *	AUTH.
Pilot	Instructor					
No	No †	S	Yes	No	P or I	§ 91.109(a)
No	No †	S or M	Yes	No	P **	7810
No	Yes	S or M	Yes	No	P **	7810
Yes	Yes	S or M	Yes	Yes	P **	7810

† BPPP policy requires the instructor to be qualified and current.
* PIC P = Pilot, I = Instructor
** The pilot must serve as PIC. The pilot and instructor both must be fully qualified to serve as PIC.

DEPARTURE IN IMC

For initial departure during a BPPP recognized instructional flight, the weather must be at or above the lowest usable circling minimums. The pilot and instructor both must be comfortable with any decision to depart in weather less than VMC.

OPERATIONS WITH THUNDERSTORMS IN THE AREA
If thunderstorms are observed or reported in the area of operations, flight training is permitted only if the pilot's airplane is equipped with at least one electronic means of thunderstorm detection, e.g., weather radar, XM NEXRAD or lightning detection equipment. As Pilot-in-Command the BPPP instructor determines the applicability of this requirement.

E33B, E33C AND F33C BONANZA AEROBATIC LIMITATION
Although these airplanes are certified for aerobatic flight, it is BPPP policy that no aerobatic maneuvers be performed during BPPP clinic operations in these or any other airplane.

AIRPLANE SYSTEMS ISSUES

KINDS OF OPERATIONS EQUIPMENT LIST

For departure in BPPP operations, the systems and equipment in the pilot's airplane must be operative in accordance with the POH, Section II Limitations, Kinds of Operations Equipment List or, for airplanes without a KOEL, the Required Equipment listing.

LANDING GEAR DOWN
In every instance when the landing gear is lowered and a check of the landing gear "down" is called for, check that the landing gear switch is in the down position and all landing gear indications, including the nose gear mechanical indicator on earlier airplanes, show a landing gear "safe" condition.

On approach to landing at 500' AFE, if the landing gear is not confirmed down, a go-around must be executed.

WARNING HORN AND LIGHT
Check the stall warning horn or light, as applicable, before flight. It must be operative. If a stall warning or landing gear warning is determined to be inoperative during flight, return to the departure airport or nearest suitable airport for maintenance evaluation.

THROTTLE POSITION TO RAISE THE LANDING GEAR
Effective with the 1989 airplane model year, the following Beechcraft airplanes require an advanced throttle position in order to retract the landing gear:

F33A, F33C, A36, G36, B36TC, 58, G58

The 58 and G58 require that either throttle be advanced to allow raising the landing gear. This permits raising the gear in the event of a single engine go-around.

The throttle-activated switch should be positioned to require 17" MP on Bonanzas and 15" MP on Barons at sea level. This switch can be improperly positioned. Thus, if the landing gear cannot be raised, momentarily advance the throttle(s) further, raise the landing gear, then reset the throttle(s) as desired.

PARKING BRAKE
Do not to depend on the airplane parking brake. If the parking brake is set, be alert to unintended airplane movement.

FLIGHT TRAINING

OBJECTIVE
The objective of the BPPP flight training program is to provide training that improves the flying skills of Beechcraft pilots to the extent that they become safer and more confident than before and derive enhanced satisfaction from the operation of their airplanes. The program is not intended to bring a pilot's proficiency to the highest level but rather to assure safe operations and, if indicated, to identify areas in which the pilot may need additional practice or flight instruction.

If the pilot demonstrates a safe and effective plan or procedure for meeting an intended objective, e.g., lowering the landing gear, be reluctant to suggest changing the pilot's habit. If the pilot does not have such a plan or procedure, do recommend one. Alternate techniques based on the guidance in this Manual or intended to reduce pilot workload, improve airplane performance and/or operating efficiency (including maintainability or longevity of the airplane) are within the scope of the BPPP program.

Both the Initial and Recurrent flight training programs' content is provided below in this section. Most pilots expect to complete an FAA flight review, training under the Wings Program and, if instrument rated, an FAA instrument proficiency check. See INITIAL FLIGHT TRAINING and RECURRENT FLIGHT TRAINING, below.

INITIAL FLIGHT TRAINING
BPPP Initial flight training is provided for a pilot attending a BPPP clinic for the first time. As a minimum for Initial pilots, accomplish the following:

- Stall series
- Spiral demonstration
- By-the-Numbers (Power/Attitude/Configuration or PAC)
- Unlatched door in flight (unless a Baron or Travel Air equipped with VGs)
- Simulated engine failure
- Emergency gear extension
- For an instrument rated pilot, administer instrument proficiency training/check

RECURRENT FLIGHT TRAINING
BPPP Recurrent flight training is provided for pilots who have attended the Initial portion of a BPPP clinic in the past. Recurrent flight training should build on the learning and proficiency developed during the pilot's Initial or previous Recurrent flight training event(s).

Pilot Recurrent flight training should follow the content of Initial flight training with the exception that specific pilot requests should be accommodated to the extent possible within BPPP limitations and guidelines, even if portions of the Initial flight training program are not fully accomplished.

PILOT CENTERED LEARNING
Pilot centered learning is an informal pilot learning and evaluation process whereby learning accomplished during a period of training is reinforced immediately following the training event. The process requires both the pilot and instructor to assess independently the pilot's performance during the period. Led by the instructor, the pilot then discusses performance during each element of training.

The instructor provides reinforcement and corrects the pilot's analysis if necessary. This dialogue should be positive, leaving the pilot with a positive feeling about a good performance and accepting about an honest critique in areas that require additional practice or instruction. No official record is made of this process other than a completed BPPP, Inc., Flight Instructor's Review and Check Sheet. See Pilot Performance Report, below.

PILOT PERFORMANCE REPORT

At the completion of the training flight, complete the BPPP, Inc., Flight Instructor's Review and Check Sheet. If unable to complete a flight review, IPC, or Wings Basic flight credits, record an explanatory comment. If a pilot's performance is judged to be unsafe in any area, notify a BPPP officer without delay.

BPPP INSTRUCTOR SILENT CHECKLISTS

As a minimum to insure the airplane's safe configuration before an operation is conducted, verify that the following items are properly configured or accomplished. These items are to be checked before every operation, silently and as unobtrusively as possible. For those items such as the Bonanza/Debonair fuel selector that cannot be observed visually, obtain verbal verification from the pilot.

BEFORE TAKEOFF

Fuel Selector(s) - Bonanza Challenge

Fuel Pump(s)

Cowl Flaps

Trim(s)

Flaps

Mixture(s)

Prop(s)

Doors & Windows

Transponder

Before taking the active runway: Review ATC and tower instructions

BEFORE INSTRUMENT APPROACH

Fuel Selector(s) - Bonanza Challenge

Instrument Air

Altimeter

Radios and CDI / HSI Approach Course

Minimums and Missed Approach Review

BEFORE LANDING

Fuel Selector(s) - Bonanza Challenge

G-U-M-P

Landing Clearance

500 Feet - Gear not down, go-around

INITIAL DEPARTURE

GROUND OPERATIONS

BEFORE START

The following is provided for instructor guidance before engine start:

- Observe the pilot's orderly preflight inspection habit pattern and use of checklist.
- Observe the pilot obtaining fuel samples from wing fuel sumps and (Bonanza/Debonair) fuel selector valve sump.
- Check the following:
  - Rear cabin and baggage compartment for excessive weight and a potential CG problem.
  - Baron/Travel Air/Duke: Rudder trim for proper direction of travel.
  - No cracks at and forward of stabilizer spars.
  - No deformation of fuselage forward of tail surfaces.
  - Stall warning horn operative.
  - Landing gear strut extensions and tire inflations.
  - Landing gear uplock springs condition and secure.
  - Uplock and downlock cables condition.
  - Apply a bump force to landing gear downlock braces with emphasis on the nose, gear downlock brace. They should not move easily.
  - No deformation of upper inboard wing skin.
  - Door hinges for vertical play (Apply up and down forces at the rear of the door.) If vertical play is evident, do not introduce the cabin door unlatched in-flight emergency.
  - Landing gear handcrank is not trapped by the spar cover.
  - Proper position of instructor rudder pedals, i.e., not in the stowed position.
  - Controls for free and full travel.
  - Instrument and radio configurations, including interphone and right seat radio communications capability.
  - Bonanza/Debonair: The pilot should check the operation of Firewall Shutoff control (red knob).
  - With an Initial pilot, before starting engine(s), review the pilot's preparation of weight and balance and Speed Sheet speeds.
  - The pilot should close and check the door for proper closure. Emphasize that this is always the pilot's responsibility.

ENGINE START

- Observe the pilot's habit pattern and use of checklists.
- Ensure that the pilot visually clears the area and verbally clears the propeller in a sufficiently loud voice, and allows time for an outside response before engine start.
- Observe the pilot lean the engine for smooth running and to prevent spark plug fouling.
- After engine start, taxi on the fuel tank to be used for takeoff.
- For other than normal starting, including a hot start, refer to the POH.

CAUTION
Before conducting a hot start with the throttle closed, the mixture at idle cutoff and boost pump on, observe the fuel pressure indication. If any fuel pressure is observed, turn the boost pump off to avoid flooding the engine and creating a possible fire hazard. Note the condition for post flight briefing.

If the engine is flooded, crank the engine with the throttle fully open and mixture in idle cutoff. If the engine starts, throttle idle and mixture rich. Avoid intentionally flooding the engine.

TAXI

- During taxi, keep an airport diagram available for ready reference.
- The pilot should check the brakes promptly after the airplane begins to move. If installed, check the brakes on the right side also.
- Check flight instruments for no flags and proper operation left and right.
- Minimize distractions during taxi. Set radios, GPS etc. either before or after taxi.
- Observe the pilot's taxi technique, including centerline discipline and, in a strong wind, proper aileron position.
- Pilots frequently taxi with both power and brakes. Discourage this practice.

BEFORE TAKEOFF

- For run-up, if practical, turn into the wind. Stop with the nosewheel straight.
- Engine run-up per POH, Normal Procedures.
- Observe the pilot's proper checklist use and complete the Before Takeoff Instructor Silent Checklist.

DEPARTURE BRIEFING

Emphasize the importance of a departure briefing before every takeoff. Consider weather, day/night, terrain, airplane performance, plan for engine failure, passenger information. Review resources and limitations.

TAKEOFF

- The initial takeoff is an opportunity to observe the pilot's usual takeoff habits and technique and provides the basis for later instruction.
- Correct unsafe practices.
- For details including engine takeoff power monitoring, see the TAKEOFF portion of SECTION 5.

CLIMB

- Lean in climb to EGT no higher than the EGT observed during takeoff. With a turbocharged (TC), a turbonormalized (TN) engine or with an altitude compensating fuel pump, mixture full rich.

CRUISE

- Suggest 65% power maximum.
- Discuss engine leaning technique. Determine the pilot's preference for ROP / LOP engine operation.
- If the pilot prefers ROP, ask permission to demonstrate LOP.
- Demonstrating LOP: Before leaning, note airspeed, fuel flow and CHT. After leaning, compare LOP values with ROP values.
- If the engine does not run smoothly LOP, operate ROP.
- In the pilot's normal cruise configuration and at cruise airspeed, the attitude indicator airplane symbol should indicate 0° pitch. If the capability exists and with the pilot's permission, adjust the airplane symbol to 0° pitch. This provides the basis for the exercises in Section 5, By-the-Numbers. Do not use a 0° pitch attitude set on the ground.

MANEUVERS

LIMITATIONS
Except as further limited in this section below, the minimum recovery altitude for conducting maneuvers is 1500' AGL.

BEST PRACTICES

- While conducting air work, periodically make clearing turns to assure no traffic conflicts.
- Demonstrate a conservative approach to the operation of the pilot's engine. Avoid rapid acceleration or deceleration between idle and takeoff power. Whenever possible, allow sufficient time at intermediate power settings to allow engine temperatures to stabilize.

STEEP TURNS

- Enter at or below VA.
- 45° bank suggested (or greater at instructor option, not to exceed 60° at any time). 360° in each direction.

SLOW FLIGHT

- Cowl flaps open.
- Gear down and full flaps (for subsequent landing airspeeds comparison).
- Slow to an airspeed between POH approach speed -5 KIAS and an airspeed just above pre-stall buffet.
- Emphasize coordinated flight (ball centered).
- Maintain altitude.
- Turns left and right.

SPIRAL DEMONSTRATION

TRAINING OBJECTIVE
The spiral demonstration and recovery is conducted to assure that the pilot is aware of the airplane's slight negative stability in the roll axis, the consequences of inattention to airplane roll control and the flying techniques required to safely recover from a well developed spiral. Although the pilot may think that the airplane is trimmed for level flight or for a pitch attitude, it actually is trimmed for an airspeed. This maneuver demonstrates that, at a constant power setting, the airplane is trimmed for an airspeed.

LIMITATIONS

- Do not exceed VA.
- Do not exceed a 60° bank.

BEST PRACTICES

- With the airplane at a constant power setting, precede the spiral demonstration with a discussion and demonstration of positive pitch and yaw stability.
- Displace the airplane in yaw and then in pitch. Note in both instances that the airplane returns closely to the original condition.
- Point out that, at a constant power setting, the airplane is trimmed for an airspeed.
- Discuss slight negative roll stability and probable spiral entry with pilot distraction.
- It may be helpful to demonstrate this maneuver first.

- Describe the spiral recoveries and brief the pilot to initiate recovery approaching VA or 60° bank maximum, whichever occurs first.
- Be attentive to airplane response and the pilot's input while managing pitch. The goal is to limit G force while allowing the nose to attain a shallow climb pitch attitude.

INSTRUCTION

Entry airspeed:

- Bonanza/Debonair: 90-100 KIAS (95-115 MPH)
- Baron/Travel Air: 100-120 KIAS (115-135 MPH)

From level flight, allow the airplane to fall off on one wing and develop a spiral. The spiral entry may be facilitated with slight rudder application. Initiate recoveries as described below.

Recovery without Power Reduction
This recovery demonstrates airplane positive pitch stability.

- Without reducing power, level the wings and apply forward elevator control force to limit G force and prevent excessively pitch up as the airplane seeks the trim airspeed.
- Note altimeter and airspeed indications reverse as the nose goes through the horizon.
- This demonstration is important to overcome the pilot's natural reaction to apply aft elevator control force, thus imposing additional G force when recovering from an extreme nose down attitude.

Recovery with Power Change and Climb
This recovery technique is identical to recovery from a nose low, increasing airspeed unusual attitude.

- Simultaneously, level the wings and reduce power to idle.
- Note pitch behavior. In most cases pitch up occurs without pilot input as the airplane seeks trim airspeed.
- Pitch up is less dramatic with power reduction than without. Expect to add forward elevator control force to prevent an excessively nose high pitch attitude.
- Establish and maintain a 10o pitch up attitude, add power as the nose comes up through the horizon and climb to recover lost altitude.

NOTE: Aft elevator control force is not required for spiral recovery.

Following a spiral recovery, discuss entry from cruise airspeed and the resulting very high airspeed, G force and the relatively high forward elevator control force required for a successful outcome.

LAZY RUDDER
If the pilot exhibits improper use of the rudder control during flight to this point, demonstrate proper rudder use. Practice turns and climbs with high power and low airspeed with proper use of rudder. This is essential for proper control during a high power low airspeed condition and for proper stall recovery.

STALLS

TRAINING OBJECTIVE
The objective of training stall maneuvers is to re-familiarize the pilot with the airplane flight characteristics approaching or coincident with an aerodynamic stall so that if a stall or an approach to stall were to occur, the pilot can recognize the condition readily and take prompt and effective corrective action. Stall scenarios assume the airplane is close to the ground during takeoff or approach to landing, thus requiring the pilot's prompt recognition of the approaching stall or stall and recovery with minimum loss of altitude.

Accelerated stalls demonstrates that a stall may occur at airspeeds well above normal one G stall airspeeds.

LIMITATIONS

- One rear seat passenger maximum. No rear seat passenger is preferred.
- Tip tanks must be empty. If tip tanks are not empty, do not do any stall.
- No full power stall in the landing configuration.
- Plan to recover from stalls at least 3000' AGL or 3000' above a lower cloud deck.
- If the landing gear or stall warning is inoperative, return to the clinic base for maintenance evaluation.
- Grip the control wheel during stalls and be prepared to limit immediately the pilot's inappropriate control wheel input.

BEST PRACTICES

- Explain to the pilot that it is BPPP policy that the instructor grip the control wheel during stalls to prevent a pilot's natural tendency to control roll or yaw at low airspeed with excessive aileron.
- RPM 2500.
- Cowl flaps open.
- Maintaining coordinated flight at all times is critical to spin prevention. Proper rudder control is essential.
- Reduce the throttle to idle. Check landing gear and stall warnings.
- Do the first stall with throttle, idle gear down and flaps up to check for unusual stall characteristics.
- At the instructor's option, initiate stall recovery at the stall warning, at the first indication of aerodynamic buffet or at the stall itself.
- If stall characteristics are unusual, discontinue the stall series.
- Ailerons should be neutral at stall. If necessary, block inappropriate aileron control movement .
- The first step in recovery from any stall is to reduce the angle of attack. The change of elevator control force (forward) when reducing angle of attack should be positive but not be so great as to lead to a subsequent accelerated stall.
- Emphasize the use of rudder to control wing drop.
- Allow the nose to drop only slightly below the horizon.
- Do not allow excessive airspeed build-up.
- Discuss a skidding turn to base leg or final. This may occur if the pilot wants to increase the turn rate but is reluctant to increase the bank angle. In this condition it is possible the airplane will stall as much as 15 knots above the normal one G stall airspeed.

! WARNING !

Intentional spins are prohibited. If a spin is entered inadvertently:

- With the ailerons neutral, immediately, move the control column full forward and simultaneously apply full rudder opposite to the direction of the spin, throttle(s) idle.
- Hold these control positions until rotation stops, then neutralize all controls and execute a smooth pullout. If the ailerons are not neutral during recovery, the spin may become unrecoverable.

Baron/Travel Air: See SECTION 10 MULTIENGINE for power on and power off stalls and airspeeds comparison.

POWER ON STALL

- Gear and flaps up.
- 18-20” MP.
- Trim to Vy, not below.
- Wings level and turning left and right.
- To recover, simultaneously move the elevator control forward to reduce the angle of attack and level the wings.
- Emphasize the proper use of rudder to counteract the left turning tendency.

POWER OFF STALL

- Gear and flaps down.
- Throttle idle.
- Trim to final approach airspeed, not below.
- Wings level and turning left and right (as from base to final).
- Maintain coordinated flight before, during and after the stall.
- Use rudder in recovery for directional control and to control wing drop.
- To recover, simultaneously add power, move the elevator control forward to reduce the angle of attack and level the wings.
- Allow the nose to drop only 5-8° below the horizon.

ACCELERATED STALLS

LIMITATIONS
Airspeed less than VA.

BEST PRACTICES
If this maneuver it is new to the pilot, plan to demonstrate it.

INSTRUCTION

- Gear and flaps up.
- Note the higher airspeed at the pre-stall buffet.
- 45° Bank, Level Turn, 15” MP
- Entry airspeed:
  - Bonanza/Debonair: 85 KIAS (100 MPH)
  - Baron/Travel Air: 100 KIAS (115 MPH)
- Accelerated stall requires significant aft elevator control force. Smoothly and rapidly apply aft elevator force.
- To recover, ease the elevator control forward slightly and roll level. Do not add power.

WINGS LEVEL, POWER OFF

- Entry airspeed:
  - Bonanza/Debonair: 80 KIAS (90 MPH)
  - Baron/Travel Air: 90 KIAS (105 MPH)
- Smoothly and rapid apply aft elevator force.
- To recover, ease the elevator control forward and add power.

TAKEOFFS AND LANDINGS

LIMITATIONS

- Maximum wind speed for all takeoffs and landing is 35 knots, including gusts.
- Except as further limited in this section below, the limiting crosswind component is at the instructor's discretion, considering the pilot's capabilities and the POH maximum demonstrated crosswind component.
- Operations on grass, gravel and dirt runway surfaces are not permitted.

BEST PRACTICES

Encourage the pilot to track taxiway and runway centerlines.

TAKEOFF

LIMITATIONS

- Minimum runway length available for takeoff:
  - Bonanza: 200% of POH takeoff distance
  - Baron/Travel Air: 4000'. Consider POH Accelerate - Stop Distance
  - Use only a flap setting that is supported by POH takeoff performance data.
  - Do not takeoff on an auxiliary tank.

BEST PRACTICES

- Bonanza/Debonair: Takeoff on the fuller main tank. If necessary to change fuel tanks before takeoff, allow at least 2 minutes after changing tanks before takeoff.
- Use the pilot's POH or Speed Sheet to determine the correct speed for each type of takeoff.
- For IFR departures before takeoff, discuss takeoff minimums, any applicable Obstacle Departure Procedure and the importance of compliance for safe terrain and obstacle clearance in the absence of a SID, radar vector or other departure procedure assigned by ATC.
- Before each takeoff, complete the Instructor Silent Checklist unobtrusively so as not to distract the pilot unnecessarily.
- For any checklist item or items that cannot be checked visually, ask the pilot to state the status of the item(s), e.g., Bonanza fuel selector position.
- At the Before Takeoff checklist "Flaps" item, observe that both flaps are properly positioned and symmetrical.
- For TC or TN engines or with altitude compensating fuel pump, mixture full rich for takeoff.
- For normally aspirated engines without an altitude compensating fuel pump, mixture full rich or properly leaned 150-200° F (65-95° C) ROP above 3000' density altitude.
- Avoid a sharp rolling turn onto the runway to preclude unporting the fuel pick-up.
- Be alert to the pilot's feet up on the brakes, especially at the start of an intentionally aborted takeoff.
- Suggest heels on the floor.
- Check the final approach path for traffic before taking the runway for takeoff.
- Bonanza/Debonair with vernier throttle: Override the vernier to apply takeoff power smoothly in 3-5 seconds. Do not screw the vernier past the full throttle stop.
- During the takeoff roll at sea level, observe takeoff power settings (RPM, MP, full red line fuel flow and EGT or TIT). For adequate engine cooling with red line fuel flow, expect these takeoff EGT / TIT values:
  - Normally aspirated engine, EGT should less than 1375° F (745° C)
  - TC and TN engine, TIT should be less than 1450° F (790° C)
  - On takeoff, use the auxiliary fuel pump per the POH.

- With a Shadin fuel flow, there is no red line. For normally aspirated engines, these are the nominal full power fuel flow values at sea level:

ENGINE	FUEL FLOW (GPH) PRESSURE (PSI)
IO-470	22-25 gph/17 psi
IO-520	24-27 gph
IO-550	29+ gph
TSIO-520	33.2-34.2 gph

- If the fuel flow is low, at a safe altitude, discuss the condition with the pilot and suggest that maintenance action may be required.
- If fuel flow is too low, select low boost or high boost. After selecting boost, it may be necessary to lean the engine.

The following data are provided by Advanced Pilot Seminars (APS). These EGTs and TITs are cooler than some engines run and are suggested for engine longevity. F to C conversions are approximate.

- Recommend minimum CHT for takeoff: 200° F (95° C).
- During the takeoff roll, observe takeoff power settings: Full throttle with maximum RPM and MP. At sea level, fuel flow above factory red line with EGT or TIT at the target.
- For adequate engine cooling with fuel flow above factory red line, expect these takeoff target EGT / TIT values:

IO-520, IO-550 and O-470-C, -G, -L and -N:	EGTs ~ 1275-1300°F (690-705°C)
O-470-J and -K:	EGTs ~ 1350-1375°F (730-745° C)
TC:	TIT less than 1400°F (760°C)
TN:	TIT less than 1250°F (675°C)

- CHTs (all listed engines): ~ low 300s°F (150s°C)
- Above ~ 3000' density altitude, lean a normally aspirated engine without ACFP to the takeoff target EGT.

ALL TAKEOFFS

- Track the runway centerline during the takeoff roll and after liftoff.
- Due to the weathervane effect, a left crosswind during the takeoff roll increases the normal left turning tendency.
- During rotation, do not allow the nose to rise excessively and obscure the end of the runway (8-10° nose up).
- For traffic pattern operations, refer to AIM 4-3-3.
- In IMC, the first turn after takeoff should be no lower than 400' AFE.
- On every takeoff, apply and maintain full power throughout takeoff roll and initial climb to 800-1000' AFE.
- After liftoff, except as required briefly for performance (e.g., Vx climb), adjust pitch attitude to maintain Vy to 1000' AFE and for adequate forward visibility.
- Control the left turning tendency during climb out with right rudder. Insufficient right rudder on climb out is indicated with the slip indicator out to the right, right wing low and a constant heading or wings level and a slow, constant turn to the left.

The following climb data provided by Advanced Pilot Seminars (APS): F to C conversions are approximate.

- Climb condition: Full throttle. Maximum RPM and MP.
- Normally aspirated engine without an altitude compensating fuel pump (ACFP):
  - Lean in climb to the target EGT observed shortly after takeoff.
  - CHTs should be no more than ~ 350°F (175°C). If CHTs are higher, either the mixture is not rich enough or engine baffling is inadequate.
- Normally aspirated engine with an ACFP:
  - Do not lean in climb. Mixture full rich.
  - If the ACFP is properly adjusted (many are not), EGTs and CHTs should be similar to those shown above for an engine without an ACFP.
- TC or TN engine:
  - Do not lean in climb. Mixture full rich.
  - TIT should be maintained during climb at the target observed shortly after takeoff.
  - CHTs ~ 350°F (175°C) increasing to ~ 380°F (195°C) with increasing altitude.
  - CHTs should be kept under 380°F (195°C), increasing airspeed if necessary for cooling.

NORMAL TAKEOFF

- Flaps up.
- Accelerate with neutral elevator.
- 5 knots below the recommended liftoff airspeed, rotate smoothly to achieve liftoff at the recommended airspeed.
- Maintain 8-10° nose up until reaching Vy.
- When positive climb is established, raise the gear.
- Climb at minimum airspeed Vy to traffic pattern altitude.

CAUTION
The pilot of an airplane with a maximum takeoff gross weight increase resulting from a tip tank or turbo normalized engine conversion should be aware that the normal rotation speed and speed at 50 feet for the increased gross weights may be considerably higher than the numbers shown in the POH Performance section.

CROSSWIND TAKEOFF

- Nearly every takeoff has at least some crosswind component.
- Start the takeoff roll with full aileron into the wind.
- Decrease aileron input as aileron response increases with increasing airspeed. Too much aileron is better than not enough.
- Make a positive rotation at slightly higher than normal airspeed for a clean break from the runway.
- After liftoff with proper aileron input, the airplane will bank and turn (crab) into the wind.
- After liftoff, correct drift immediately to track the runway centerline. With ATC instructions to fly runway heading after takeoff, do not apply drift correction.

SHORT FIELD TAKEOFF

LIMITATIONS
The maximum crosswind component is 10 knots.

INSTRUCTION

- Flaps set per POH takeoff performance data.

- See the POH Performance section for the recommended liftoff airspeed.
- From the very beginning of the takeoff distance available, takeoff from a standing start.
- Hold the brakes initially as power is advanced.
- To minimize drag during the takeoff roll, hold the elevator neutral until rotation.
- 5 knots before the recommended liftoff airspeed, rotate smoothly to 10° pitch to lift off at the recommended airspeed.

CAUTION
Be prepared to limit pitch up and correct departure from centerline if necessary.

- When airborne, adjust the pitch attitude as required to maintain Vx (approximately 12°).
- Maintain Vx until clear of obstacles (50' AFE minimum for training).
- When clear of obstacles and terrain, lower the nose, raise the gear and flaps if used.
- Accelerate to Vy minimum.

NOTE
Changing configuration before clearing a close-in obstacle reduces climb performance.

SOFT FIELD TAKEOFF

LIMITATIONS

- Maximum crosswind component is 10 knots.
- Minimum runway width is 100 feet.

BEST PRACTICES

- Brief the pilot that pitch up must be limited during the takeoff roll so the end of the runway is not obscured. Be prepared to limit pitch up.
- Soft field technique applies with any takeoff surface not hard and dry, including a grass or contaminated runway.
- Be mindful that there is no POH runway performance data for a soft or contaminated runway. The runway length required for takeoff may be significantly increased.

INSTRUCTION

- Accomplish as much of the takeoff checklist as possible before leaving the parking spot.
- Once in motion, do not stop.
- Make a smooth rolling turn onto the runway. Do not stop. Make this turn slowly, especially in an airplane with unbaffled fuel cells.
- Maintain full aft elevator through the start of the takeoff roll.
- As the elevator becomes effective, maintain 8-10° pitch attitude (10° maximum). The airplane will lift off as the airspeed approaches the white arc.
- Do not allow the nose to rise so as to obscure the end of the runway.
- With a left crosswind, be alert to possible loss of directional control with a lightly loaded nosewheel. See CROSSWIND TAKEOFF, above.

CAUTION
- Do not exceed 10° pitch up and do not attempt to lift off at an airspeed below the white arc.
- Be prepared to limit pitch up and correct excursions from centerline if necessary.
- With a soft field, there should be no attempt to achieve maximum takeoff performance, nor should there be an attempt to lift off at minimum controllable airspeed.

CAUTION
The B36TC airplane is most prone to problems associated with early rotation on takeoff. The longer wing span and high takeoff power allow the airplane to become airborne at an airspeed below which the airplane is fully controllable.

- After lift off, remain in ground effect and accelerate to Vy minimum. The procedure is complete at Vy.

LANDING

CAUTION
If the pilot's landing habits are safe and predictable, don't change them. This is particularly important regarding landing gear extension.

LIMITATIONS

- Full stop landings only. No touch and go landings.
- Stop and go landings are permitted with obviously sufficient runway length remaining for a safe takeoff.
- Bonanza/Debonair: Land on the fuller main tank.
- Do not land on an auxiliary tank.
- If the landing gear cannot be confirmed down by 500' AFE, a go-around is mandatory.

BEST PRACTICES
Well before entering the traffic pattern or before starting an instrument approach:

- Bonanza/Debonair: Select the fuller main tank for landing
- Baron/Travel Air: Select the main tanks for landing.
- For clarity when communicating on CTAF, report distances to the airport or the runway rather than instrument approach fixes.
- Encourage the practice of leaving one's hand on the landing gear switch until safe landing gear indications are observed.
- Encourage the pilot to use a landing checklist. The GUMP check is satisfactory.
- Before each landing, complete the Before Landing portion of the Instructor Silent Checklist as unobtrusively as possible so as not to distract the pilot unnecessarily.
- For any item or items that the instructor cannot check visually, ask the pilot to state the status of the item(s), e.g., Bonanza fuel selector position.
- Make a positive gear down check at 500' AFE.
- Select a touchdown target and adjust the flight path to that target as required.
- Fly approach airspeed to cross 50' AFE at the POH Landing Distance "Speed at 50 Ft" airspeed.
- Do not permit an airspeed below POH airspeed for the present gross weight.
- In strong gusty conditions, add ½ the gust value to the final approach airspeed.
- Track the runway centerline before and after landing.
- Retract the flaps only after coming to a complete stop.
- It is preferable not to reposition anything until coming to a complete stop.

DESCENT PLANNING

- For passenger comfort, plan a descent rate not greater than 500 fpm. In a pressurized airplane, change cabin pressure at a rate not greater than 500 fpm.
- Plan top-of-descent, e.g., a 6000' descent at 500 fpm requires 12 minutes.

- Discuss power setting for descent: ~ 20” MP and minimum governing RPM as a useful descent technique. This power setting in descent at 500 fpm results in airspeed below the airspeed caution range and close to cruise.
- Plan to be at traffic pattern or FAF altitude approximately 3 miles early.

NORMAL LANDING

BEST PRACTICES

If the pilot does not have an established and safe procedure for configuring the airplane for landing, suggest and practice either of the following:

- “Gear down to go down”
  - Gear down and checked abeam the end of the runway.
  - Landing checklist.
  - Approach flaps on base leg.
  - Landing flaps on final.

- “Gear down to slow down”
  - Gear down and checked mid-field downwind.
  - Landing checklist.
  - Approach flaps abeam the runway end.
  - Landing flaps on final.

INSTRUCTION

- Bonanza/Debonair: Power on or power off approach. Fly a stable approach at a constant airspeed in trim.
- Baron/Travel Air: Fly blue line airspeed minimum until landing is assured. When landing is assured, full flaps, reduce power and trim for near neutral elevator control force.
- Turning final, confirm gear down.
- Power off and land at minimum controllable airspeed.

CROSSWIND LANDING

- See the POH for maximum demonstrated crosswind. This crosswind value is demonstrated at maximum takeoff weight with no crosswind correction applied at touchdown.
- Power on approach.
- Compensate for the crosswind using the crab technique down to the flare (ball centered).
- At or shortly before flare, enter a slip.
- Simultaneously, align the longitudinal axis with the runway centerline with rudder and control drift across the centerline with aileron.
- Increase aileron into the wind with decreasing airspeed during rollout. Too much aileron is better than not enough.
- In a moderate crosswind, touch down at minimum controllable airspeed.
- In a strong crosswind, increase approach speed marginally and touchdown slightly faster than normal to assure adequate control to touchdown.

SHORT FIELD LANDING

TRAINING OBJECTIVE

The objective of a short field landing is to land in a short distance with or without an obstacle at the approach end of the runway.

LIMITATIONS
Maximum crosswind component is 10 knots.

BEST PRACTICES

- Brief the pilot: For training, no maximum braking.
- Discuss maximum braking may be required for stopping on a real world short runway.

INSTRUCTION

- Select a touchdown target.
- Consider a wider than normal traffic pattern if needed to allow time for proper configuration and flight path control.
- From 500' AFE, fly a stabilized approach with gear down and full flaps, on profile, on POH airspeed for the gross weight, in trim and descending at 800 fpm.
- Make minor pitch and power adjustments to keep the projected flight path on the touchdown target. With an obstacle, do not allow the obstacle to obscure the touchdown target.
- Simultaneously, flare and reduce power to idle.
- Anticipate touchdown without floating.
- Touch down at minimum controllable airspeed.
- At touchdown, lower the nose to the runway and apply braking as required. For training purposes, less than maximum braking is sufficient but maximum braking may be verbally acknowledged.
- Do not raise the flaps during the landing rollout.

SOFT FIELD LANDING

TRAINING OBJECTIVE
The objective of a soft field landing is to land safely on a landing surface that is not hard and dry, including a contaminated or grass runway. The landing should be as smooth as possible under full control. There should be enough energy (speed and engine power) after landing to prevent excessive deceleration and to keep the airplane moving, if necessary, to the final stopping point.

LIMITATIONS
Maximum crosswind component is 10 knots.

BEST PRACTICES
Achieving minimum landing distance should not be an objective.

INSTRUCTION

- Fly a normal approach profile.
- Keep some power on during touchdown and rollout.
- Touchdown smoothly.
- After touchdown, use enough power to keep the airplane moving.
- Use aft elevator control to keep only enough weight on the nosewheel to maintain positive directional control.
- Brake judiciously to avoid locking the brakes and skidding on a slippery surface.
- If possible, do not stop short of the final stopping point. Under extreme conditions, it may not be possible to resume taxiing after coming to a stop.

AFTER LANDING

As a minimum after landing and after coming to a complete stop, accomplish the following:

- Visually identify the flap switch and raise the flaps.
- Open the cowl flaps.
- Reset the elevator trim to the takeoff setting.
- Lean the engine for smooth running.

BY-THE-NUMBERS

There is a Power/Attitude/Configuration (PAC) performance combination for every phase of flight. Although BPPP flight training concentrates on the takeoff, approach and go-around phases, encourage the pilot to apply BPPP ground school knowledge to develop and use PAC combinations for operations in other phases of flight.

BEST PRACTICES

- Determine that the AI airplane symbol indicates 0° pitch in normal cruise flight.
- Use the pilot's power setting and airspeed preferences if they appear reasonable. Otherwise, suggest the power settings and airspeeds shown below.
- Conduct the approach with no more than approach flaps until landing is assured.
- Use a single RPM (e.g., 2300 RPM) except for missed approach/balked landing.
- Practice initially without a view limiting device to develop the pilot's confidence in success.
- The power settings and pitch attitudes that follow are approximations. Determine the specific power settings and attitudes that work for the pilot's airplane.
- Rule of 5 (at a constant airspeed):
  - 5" MP change = 500 fpm change.
  - Gear up / down = 500 fpm change.
- To fine tune: 1" MP = 100 fpm change.

APPROACH LEVEL - GEAR UP

- Power:
  - Normally aspirated engine: 15-17" MP.
  - TC / TN engine: ~ 17-18" MP. With approach flaps: ~ 22" MP (Determine for each airplane.)
  - Attitude: Flaps up, +2° nose up. With approach flaps, 0°.
  - Configuration: Gear up.
- Bonanza/Debonair: Flaps up or, with flap pre-select, approach flaps optional.
- Baron/Travel Air: Approach flaps or, without flaps pre-select, flaps up.
- Target airspeed in stable level flight, trimmed hands off:
  - Bonanza/Debonair: 105-120 KIAS (120-130 MPH), with or without approach flaps
  - Baron/Travel Air: 120 KIAS (130 MPH)

APPROACH DESCENT - GEAR DOWN

- Transition from the Approach Level - Gear Up configuration.
- Power: Same as Approach Level - Gear Up.
- Attitude/Configuration: Flaps as in Approach Level
- Gear Up.
- ILS/VNAV approach:
  - At glide slope/VNAV path intercept - gear down.
- Non-precision approach:
  - At the FAF (typical) - gear down.
- Attitude: Adjust -3° from Approach Level - Gear Up attitude.
- Observe 500 fpm descent rate at slightly increased airspeed.
- The goal is to not require re-trimming.
- The airplane may stabilize at a slightly higher airspeed. Accept the higher airspeed.

- This configuration is well suited for tracking the ILS glide slope, GPS VNAV and most non-precision approaches.
- After glide slope intercept, to correct for a significant headwind or tailwind, adjust MP 1” for each 100 fpm change required to track the glide slope.

APPROACH LEVEL - GEAR DOWN

- Transition from the Approach Descent - Gear Down configuration to level flight.
- Power: Add 5” MP to the Approach Descent - Gear Down power setting. (TC/TN, > 5” MP)
- Attitude: Raise the nose to +2° with flaps up, to 0° with approach flaps. (Determine for each airplane.)
- Configuration: No change.
- Descent is stopped. Airspeed is unchanged.
- No trim change should be required.

MISSED APPROACH

- Transition from the Approach Descent - Gear Down or Approach Level - Gear Down configuration, for a missed approach from DA or MDA.
- Power/Attitude:
- Simultaneously, add full power (mixture, prop, throttle) and pitch up to:
  - Bonanza/Debonair: +8°
  - Baron/Travel Air: +10-15°
- Resulting airspeed will be slightly greater than Vy.
- No trim change should be required.
- Configuration: With positive climb, raise the gear.
- No hurry to raise the flaps. If approach flaps are used, a trim change will be required when the flaps are raised.

BALKED LANDING

- Transition from short final with full flaps and airspeed close to touchdown airspeed.
- Power/Attitude: Simultaneously add full power (mixture, prop, throttle), apply right rudder to keep the ball centered and pitch up to +10°.
- Configuration: With positive climb, raise the flaps to approach position. (Without flap preselect, flaps up.)
- Raise the gear.
- Maintain positive climb, flaps up.
- Accelerate to Vy minimum (Vx with an obstacle).

PAC charts for the major variants of ABS-type airplanes appear on the following pages.

E-Series Bonanzas

CONDITION	MP	RPM	ATTITUDE	GEAR	FLAPS	MPH	VSI	TRIM
Initial climb	FT	2050	+10°	UP upon positive rate	UP	Per POH	↑XXX	Per POH
Cruise climb	FT	2050	+5°	UP	UP	120-130	↑XXX	As req'd
Cruise	As desired	As desired	Level	UP	UP	XXX	0	0 to 2 down
En route descent	As desired	As desired	-2°	UP	UP	Green arc	As desired	As needed
Approach (level)	15" 17"	2050	+0° +2°	UP	UP 0°	105	0	+3° to +5°
Precision descent	15" 17"	2050	+0° +2°	DOWN	UP 0°	105	↓500 - 600 fpm	+0° to -3°
Nonprecision descent	13" 15"	2050	+0° +2°	DOWN	UP 0°	105	↓800 - 1000 fpm	+3° to +5°
MDA level	20" 22"	2050	+0° +2°	DOWN	UP 0°	105	0	+3° to +5°
Missed approach	FT	2050	+7°	UP	UP	105	↑XXX	+3° to +5°

Reducing manifold pressure by one inch results in a roughly 100-fpm descent.
A 5-inch reduction in MP results in a 500 fpm descent.

Modification to an oil-controlled propeller does not change propeller rpm limitations.

O-470/IO-470 Bonanzas and Debonairs

CONDITION	MP	RPM	ATTITUDE	GEAR	FLAPS	KIAS	VSI	TRIM
Initial climb	FT	MAX	+10°	UP upon positive rate	UP	Per POH	↑XXX	Per POH
Cruise climb	FT	2500	+5°	UP	UP	110-120	↑XXX	As req'd
Cruise	As desired	As desired	Level	UP	UP	XXX	0	0 to 2 down
En route descent	As desired	As desired	-2°	UP	UP	Green arc	As desired	As needed
Approach (level)	15" 17"	2300 - 2500	+0° +2°	UP	UP 0°	105	0	+3° to +5°
Precision descent	15" 17"	2300 - 2500	+0° +2°	DOWN	UP 0°	105	↓500 - 600 fpm	+0° to -3°
Nonprecision descent	13" 15"	2300 - 2500	+0° +2°	DOWN	UP 0°	105	↓800 - 1000 fpm	+3° to +5°
MDA level	20" 22"	2300 - 2500	+0° +2°	DOWN	UP 0°	105	0	+3° to +5°
Missed approach	FT	2500	+7°	UP	UP	105	↑XXX	+3° to +5°
Reducing manifold pressure by one inch results in a roughly 100-fpm descent. A 5-inch reduction in MP results in a 500 fpm descent.								

IO-520/IO-550 Bonanzas and Debonairs

CONDITION	MP	RPM	ATTITUDE	GEAR	FLAPS	KIAS	VSI	TRIM
Initial climb	FT	MAX	+10°	UP upon positive rate	UP	Per POH	↑XXX	Per POH
Cruise climb	FT	2500	+7°	UP	UP	110-120	↑XXX	As req'd
Cruise	As desired	As desired	Level	UP	UP	XXX	0	0 to 2 down
En route descent	As desired	As desired	-2°	UP	UP	Green arc	As desired	As needed
Approach (level)	15" 17"	2300 - 2500	+0° +2°	UP	UP APPROACH	105-110	0	+3° to +5°
Precision descent	15" 17"	2300 - 2500	+0° +2°	DOWN	UP APPROACH	105-110	↓500 - 600 fpm	+0° to -3°
Nonprecision descent	13" 15"	2300 - 2500	+0° +2°	DOWN	UP APPROACH	105-110	↓800 - 1000 fpm	+3° to +5°
MDA level	20" 22"	2300 - 2500	+0° +2°	DOWN	UP APPROACH	105-110	0	+3° to +5°
Missed approach	FT	2500	+7°	UP	UP	105-110	↑XXX	+3° to +5°
Reducing manifold pressure by one inch results in a roughly 100-fpm descent. A 5-inch reduction in MP results in a 500 fpm descent.								

V35TC/V35A-TC/V35B-TC Turbo Bonanzas

CONDITION	MP	RPM	ATTITUDE	GEAR	FLAPS	KIAS	VSI	TRIM
Initial climb	FT	MAX	+10°	UP upon positive rate	UP	Per POH	↑XXX	Per POH
Cruise climb	32"	2500	+7°	UP	UP	110-120	↑XXX	As req'd
Cruise	As desired	As desired	Level	UP	UP	XXX	0	0 to 2 down
En route descent	As desired	As desired	-2°	UP	UP	Green arc	As desired	As needed
Approach (level)	17" 19"	2300 - 2500	+0° +2°	UP	UP APPROACH	105-110	0	+3° to +5°
Precision descent	17" 19"	2300 - 2500	+0° +2°	DOWN	UP APPROACH	105-110	↓500 - 600 fpm	+0° to -3°
Nonprecision descent	15" 17"	2300 - 2500	+0° +2°	DOWN	UP APPROACH	105-110	↓800 - 1000 fpm	+3° to +5°
MDA level	22" 24"	2300 - 2500	+0° +2°	DOWN	UP APPROACH	105-110	0	+3° to +5°
Missed approach	32"	2500	+7°	UP	UP	105-110	↑XXX	+3° to +5°

Reducing manifold pressure by one inch results in a roughly 100-fpm descent.
A 5-inch reduction in MP results in a 500 fpm descent.

A36TC/B36TC Turbocharged Bonanzas

CONDITION	MP	RPM	ATTITUDE	GEAR	FLAPS	KIAS	VSI	TRIM
Initial climb	FT	MAX	+10°	UP upon positive rate	UP	Per POH	↑XXX	Per POH
Cruise climb	34"	2600	+7°	UP	UP	120-130	↑XXX	As req'd
Cruise	As desired	As desired	Level	UP	UP	XXX	0	0 to 2 down
En route descent	As desired	As desired	-2°	UP	UP	Green arc	As desired	As needed
Approach (level)	20"	2600	+2°	UP	APPROACH	110	0	+3° to +5°
Precision descent	20"	2600	+2°	DOWN	APPROACH	110	↓500 - 600 fpm	+3° to +5°
Nonprecision descent	18"	2600	+2°	DOWN	APPROACH	110	↓800 - 1000 fpm	+3° to +5°
MDA level	24"	2600	+2°	DOWN	APPROACH	110	0	+3° to +5°
Missed approach	34"	2600	+7°	UP	UP	110	↑XXX	+3° to +5°
Reducing manifold pressure by one inch results in a roughly 100-fpm descent. A 5-inch reduction in MP results in a 500 fpm descent.								

Travel Airs

CONDITION	MP	RPM	ATTITUDE	GEAR	FLAPS	KIAS	VSI	TRIM
Initial climb	FT	MAX	+7°	UP upon positive rate	UP	Per POH	↑XXX	Per POH
Cruise climb	FT	2500	+7°	UP	UP	120	↑XXX	As req'd
Cruise	As desired	As desired	Level	UP	UP	XXX	0	0 to 2 down
En route descent	As desired	As desired	-2°	UP	UP	Green arc	As desired	As needed
Approach (level)	15" 17"	2300 - 2500	+0° +2°	UP	UP APPROACH	120	0	+3° to +5°
Precision descent	15" 17"	2300 - 2500	+0° +2°	DOWN	UP APPROACH	120	↓500 - 600 fpm	+0° to -3°
Nonprecision descent	13" 15"	2300 - 2500	+0° +2°	DOWN	UP APPROACH	120	↓800 - 1000 fpm	+3° to +5°
MDA level	20" 22"	2300 - 2500	+0° +2°	DOWN	UP APPROACH	120	0	+3° to +5°
Missed approach	FT	2500	+7°	UP	UP	120	↑XXX	+3° to +5°
Reducing manifold pressure by one inch results in a roughly 100-fpm descent. A 5-inch reduction in MP results in a 500 fpm descent.								

Normally Aspirated Barons

CONDITION	MP	RPM	ATTITUDE	GEAR	FLAPS	KIAS	VSI	TRIM
Initial climb	FT	MAX	+7°	UP upon positive rate	UP	Per POH	↑XXX	Per POH
Cruise climb	FT	2500	+7°	UP	UP	120	↑XXX	As req'd
Cruise	As desired	As desired	Level	UP	UP	XXX	0	0 to 2 down
En route descent	As desired	As desired	-2°	UP	UP	Green arc	As desired	As needed
Approach (level)	15" 17"	2300 - 2500	+0° +2°	UP	UP APPROACH	120	0	+3° to +5°
Precision descent	15" 17"	2300 - 2500	+0° +2°	DOWN	UP APPROACH	120	↓500 - 600 fpm	+0° to -3°
Nonprecision descent	13" 15"	2300 - 2500	+0° +2°	DOWN	UP APPROACH	120	↓800 - 1000 fpm	+3° to +5°
MDA level	20" 22"	2300 - 2500	+0° +2°	DOWN	UP APPROACH	120	0	+3° to +5°
Missed approach	FT	2500	+7°	UP	UP	120	↑XXX	+3° to +5°
Reducing manifold pressure by one inch results in a roughly 100-fpm descent. A 5-inch reduction in MP results in a 500 fpm descent.								

58P/58TC Pressurized/Turbocharged Barons

CONDITION	MP	RPM	ATTITUDE	GEAR	FLAPS	KIAS	VSI	TRIM
Initial climb	FT	MAX	+7°	UP upon positive rate	UP	Per POH	↑XXX	Per POH
Cruise climb	34"	2400	+7°	UP	UP	130	↑XXX	As req'd
Cruise	As desired	As desired	Level	UP	UP	XXX	0	0 to 2 down
En route descent	As desired	As desired	-2°	UP	UP	Green arc	As desired	As needed
Approach (level)	22"	2400	+2°	UP	APPROACH	120	0	+3° to +5°
Precision descent	22"	2400	+2°	DOWN	APPROACH	120	↓500 - 600 fpm	+0° to -3°
Nonprecision descent	20"	2400	+2°	DOWN	APPROACH	120	↓800 - 1000 fpm	+3° to +5°
MDA level	27"	2400	+2°	DOWN	APPROACH	120	0	+3° to +5°
Missed approach	34"	2400	+7°	UP	UP	130	↑XXX	+3° to +5°
Reducing manifold pressure by one inch results in a roughly 100-fpm descent. A 5-inch reduction in MP results in a 500 fpm descent.								

56TC Turbo Baron

CONDITION	MP	RPM	ATTITUDE	GEAR	FLAPS	KIAS	VSI	TRIM
Initial climb	41.5"	2900	+7°	UP upon positive rate	UP	Per POH	↑XXX	Per POH
Cruise climb	33.5"	2750	+7°	UP	UP	130	↑XXX	As req'd
Cruise	As desired	As desired	Level	UP	UP	XXX	0	0 to 2 down
En route descent	As desired	As desired	-2°	UP	UP	Green arc	As desired	As needed
Approach (level)	22"	2750	+2°	UP	APPROACH	120	0	+3° to +5°
Precision descent	22"	2750	+2°	DOWN	APPROACH	120	↓500 - 600 fpm	+0° to -3°
Nonprecision descent	20"	2750	+2°	DOWN	APPROACH	120	↓800 - 1000 fpm	+3° to +5°
MDA level	27"	2750	+2°	DOWN	APPROACH	120	0	+3° to +5°
Missed approach	33.5"	2750	+7°	UP	UP	130	↑XXX	+3° to +5°
Reducing manifold pressure by one inch results in a roughly 100-fpm descent. A 5-inch reduction in MP results in a 500 fpm descent.								

GLOBAL POSITIONING SYSTEM (GPS) / MULTIFUNCTION DISPLAY (MFD) / AUTOPILOT / FLIGHT DIRECTOR

CAUTION
Modern avionics represent significant potential for pilot distraction from essential flying duties. While programming and using these devices in VMC, maintain a vigilant look-out for traffic.

GLOBAL POSITIONING SYSTEM (GPS)

Demonstrate and practice the following GPS functions:

- Direct to.
- Load a flight plan. Confirm proper entry, if possible, from a current chart.
- Modify a flight plan. Add and delete a waypoint.
- Select procedures (departure, transition and approach).
- Activate a course between waypoints.
- Use the OBS function to establish a track to or from a waypoint or runway extended centerline.
- Fly a missed approach procedure.

MULTIFUNCTION DISPLAY (MFD)
Demonstrate display of available graphics and text information.

- Maps (IFR, VFR, custom).
- Select/de-select features including airport/IFR charts.
- Weather data (NEXRAD, METARs, TAFs, winds aloft, lightning etc.).

AUTOPILOT / FLIGHT DIRECTOR
Demonstrate and practice the following autopilot/flight director functions. When using the flight director alone, instructor be alert to customer focusing on the flight director to the exclusion of other essential instrumentation (flight director fascination).

- Autopilot and electric trim preflight per the POH Supplement.
- Flight mode annunciator follow-up to mode selection.
- Commit to follow the flight director or turn it off.
- Heading select/control.
- Altitude hold/capture.
- Climb/descent.
- Control wheel steering (CWS).
- GPS steering (GPSS).
- Without GPSS, Approach arm/capture preferred over Nav mode.
- Glide slope/GPS VNAV capture.
- Consider flight director Go-Around mode for takeoff.

INSTRUMENT PROFICIENCY TRAINING/IPC

For requirements to maintain and re-establish instrument currency, refer to 14 CFR §61.57(c) and (d). For additional details and tolerances, refer to the current Instrument Rating, Practical Test Standards (PTS). References in the PTS to equipment not installed in the airplane should be disregarded.

If a pilot initially is unable to meet the standard in one or more areas, training should be accomplished until the standard is met. The goal is to meet all IPC standards by the end of the flight. The IPC cannot be failed. If, as a result of training, there is insufficient time to complete the IPC, make a recommendation for completion, preferably with a BPPP instructor.

The IPC must be conducted under either simulated or actual IMC.

BEST PRACTICES
Encourage the use of by-the-numbers (PAC) procedures and review as necessary. See SECTION 6 – BY-THE-NUMBERS.

FLIGHT BY REFERENCE TO INSTRUMENTS

RECOVERY FROM UNUSUAL ATTITUDES
Although the PTS requires only recovery from unusual attitudes, for the purpose of an IPC other exercises such as straight and level flight, standard rate turns (with and without changing airspeed) and vertical Ss may improve the pilot's instrument scan rate and serve as a helpful warm-up for the required IPC maneuvers.

Nose High

- Recognize decreasing airspeed and increasing altitude.
- Simultaneously, add power, lower the nose to the horizon and roll the wings to level.
- Reset power.

Nose Low

- Recognize increasing airspeed and decreasing altitude.
- Set the throttle to idle.
- Roll to wings level.
- Use elevator control force only as necessary to trend the nose toward the horizon.
- Reset power.

Partial Panel

- AI should be covered. Other simulated failures at the instructor's option.
- With heading inoperative, point out the use of GPS track information.
- For glass panel displays, follow the manufacturer's guidance to simulate a primary flight instrument failure mode, e.g., reversionary mode primary flight instrument indicators.
- Use the turn coordinator to determine bank.
- Note that when the altimeter and airspeed trends stop, the nose is on the horizon.

Spiral Recovery

- Discuss inadvertent entry due to pilot distraction. (No autopilot, radios, charts etc.)

- Do not exceed VA adjusted for present gross weight or 60° of bank.
- Reinforce previous learning during VMC spiral demonstration.

TRACK BEARING / RADIAL / DME ARC

- Required tracking is accomplished during instrument approaches.
- Maintain a DME arc.

APPROACHES

APPROACH TERMINATIONS

- One circling approach with more than 90° change of direction.
- One landing from either a straight-in or circling approach.
- One missed approach.

PRECISION

- One precision approach to DA with no more than ¾ scale deflection of either localizer or glide slope deflections and airspeed +/- 10 knots.

NON-PRECISION

- Two non-precision approaches to MDA.
- Two different types of navaids, e.g., GPS/RNAV, localizer, VOR, LDA, SDF, NDB.
- One procedure turn or RNAV TAA procedure.
- One without autopilot and without radar vectors.
- One partial panel (AI covered).
- MDA altitude tolerance -0 / +100'and airspeed +/- 10 knots to the MAP.

CIRCLE-TO-LAND

- More than 90o change of direction.
- MDA altitude tolerance -0 / +100' until in position for a normal descent to a normal landing or to a missed approach.

MISSED APPROACH

- Unless otherwise required, initiate missed approach at DA, or at MDA and MAP if visual contact has not been established.
- Establish positive climb, transition to airplane climb configuration and missed approach procedure with positive airplane control.

HOLDING

- Describe recommended holding entry.
- Reduce to holding speed within 3 minutes before crossing the holding fix.
- Enter a holding pattern.
- In the holding pattern, apply proper wind corrections.

MULTIENGINE (Baron/Travel Air)

SINGLE ENGINE FAILURE IN STRAIGHT AND LEVEL FLIGHT

- Simulate an engine failure during straight and level flight.
- Blue line minimum airspeed.
- Identify, verify and verbally accomplish engine shutdown procedure.
- Set a zero thrust condition (minimum governing RPM and typically 10-12” MP).
- Complete the emergency checklist.
- Maintain heading.
- Maintain altitude or descend at minimum sink.

SINGLE ENGINE APPROACH

- Blue line minimum airspeed until committed to land.
- Precision or non-precision approach. May be combined with any required approach.
- Meet all altitude requirements.
- Maintain positive control of the airplane.
- Complete a safe landing.

EMERGENCIES

CAUTION
A simulated emergency in a training environment carries with it potential for significant distraction from established operational routines, not the least of which may be lowering the landing gear. The instructor and pilot both must be extremely diligent to assure the gear is down before landing following a simulated emergency.

LIMITATIONS
Introduce only one emergency at a time. This is intended to prevent unforeseen consequences possibly resulting from a multiple failure scenario and to facilitate recognition of a real emergency if one were to develop.

BEST PRACTICES

- Brief every emergency thoroughly before the event is introduced.
- Assure that the pilot understands the associated procedure and the expected outcome.
- Emergency procedures should be consistent with POH
- Emergency section guidance, as applicable.
- Avoid conducting simulated emergencies in congested airspace and at busy airports.
- Because of increased potential for distraction when conducting a simulated emergency, make a special effort to maintain a vigilant watch for traffic.

SIMULATED ENGINE FAILURE (Bonanza/Debonair)

LIMITATIONS

- A simulated engine failure may be introduced during the takeoff roll before, but not after liftoff.
- Other simulated engine failures may be accomplished only at or above traffic pattern altitude but not in the traffic pattern crosswind leg after takeoff.

! WARNING !
Conducting a simulated engine failure after takeoff with immediate return to the airport (the “turn back” maneuver) is prohibited. Make every effort to discourage the pilot’s willingness to attempt this maneuver.

- A simulated engine failure is not to be continued below 500’ AGL unless conducting a simulated forced landing to an airport runway and the event has been planned and thoroughly briefed, the landing gear is down and landing is assured. See SIMULATED FORCED LANDING, below.

BEST PRACTICES
Set power at 15-18” MP for a few minutes before initiating a simulated engine failure to allow engine temperatures to stabilize.

INSTRUCTION

- Close the throttle to simulate an engine failure. Do not use the mixture.
- Trim the airplane for the POH glide airspeed. Be alert to reductions below glide airspeed.
- Determine the surface wind and select a forced landing site.
- Position the propeller to full low RPM to demonstrate the effect on descent rate (reduced by approximately ½).
- Following this demonstration, set 10” MP and 2300 RPM to simulate a windmilling engine at full low RPM for ~ 700 fpm descent.

- Simulate an engine air start attempt using the POH Emergency section, Air Start procedure.

CAUTION
Except for the throttle and propeller controls, do not move any other engine-related control from the configuration in which the engine was running normally. The pilot should verbalize the engine failure procedure and only touch but not move the controls.

If maneuvering to a forced landing, below 3000' AFE abandon the air start attempt and concentrate on maneuvering to a landing.

SIMULATED FORCED LANDING

LIMITATIONS

- A simulated forced landing must be thoroughly briefed and very carefully managed.
- A simulated forced landing, may be continued below 500' AGL only to an airport with a minimum 4000' landing runway.
- If any doubt develops as to the success of the maneuver, including safely reaching the runway, initiate a go-around without delay.

BEST PRACTICES

- Do not allow an air start attempt to detract from maneuvering safely to a landing.
- For the minimum airspeed for adequate control on final approach with landing assured, see the POH Emergency section, Landing Without Power.
- Continuously evaluate the airport traffic situation.
- Coordinate with the tower or announce intentions on CTAF before beginning the event. Announce position and altitude periodically during the event.
- Introduce the forced landing at a high enough altitude to meet the training objective.
- If a potential traffic conflict develops, terminate the procedure and resolve the conflict.

INSTRUCTION

- Plan touchdown at the end of the first third of the available runway.
- Plan turns and drag to be upwind over the landing spot at 2500' AFE and downwind abeam the landing spot at 1500'AFE with the gear down.
- Complete the before landing checklist.
- Turn onto final intentionally high.
- Set high RPM on short final.
- If necessary to increase descent angle, use additional drag and increased airspeed (to the flap limit airspeed).
- Also consider a slip or S-turn on final.
- With landing assured, consider airspeed transition from POH glide airspeed to POH Landing Without Power airspeed. Plan to cross the threshold at not less than the Landing Without Power airspeed.

! WARNING !
To increase descent angle, do not reduce airspeed below POH Landing without Power airspeed.

- To simulate an off-airport minimum energy landing, touchdown with wings level at minimum controllable airspeed.

LANDING GEAR MANUAL EXTENSION

BEST PRACTICES

- The pilot should use a printed checklist, e.g., POH Emergency section, Landing Gear Manual Extension.
- Consider engaging the autopilot.
- For better leverage when cranking the gear, slide the pilot seat fully aft or as far back as possible while retaining rudder control and recline the pilot seat back. Slide the passenger seat forward if possible.
- Baron/Travel Air: Discuss exposure to single engine flight and the inability to raise the landing gear following manual gear extension. Suggest remaining close to a suitable airport.

INSTRUCTION

- Slow to:
  - Bonanza/Debonair: 100-110 KIAS (115-125 MPH)
  - Baron/Travel Air: Not below blue line
- Before doing anything, review the POH, Emergency (or Abnormal Procedures) section, Landing Gear Manual Extension procedure, then accomplish the procedure by reference to the checklist.
- Before using the handcrank, verify that the landing gear motor circuit breaker is pulled and that the landing gear switch is down.
- Handcrank 10 turns, stop, monitor airspeed, adjust power, look for traffic.
- Repeat until the handcrank cannot be turned further (50-52 turns) and landing gear down indications are observed. This normally requires 4-5 minutes.
- When the emergency procedure is complete, confirm that the handcrank has been properly stowed.
- Accomplish the POH Emergency section, Landing Gear Retraction after Practice Manual Extension procedure.

UNLATCHED DOOR IN FLIGHT

LIMITATIONS

- Baron/Travel Air: Do not intentionally unlatch the door on takeoff below 400’ AFE. With a subsequent engine failure, return to the airport may be doubtful.
- Baron/Travel Air: If the airplane is equipped with vortex generators (VGs), do not intentionally unlatch the door.

BEST PRACTICES

- Discuss air noise and potential distraction from positive airplane control, passenger(s) concern and loss of loose papers, charts etc.
- Review POH Emergency section, Unlatched Door in Flight procedure.
- Advise the tower in advance of this event.

INSTRUCTION

- With an initial pilot, unlatch the door sometime after liftoff.
- Do not allow the unlatched door to be a distraction. Fly the airplane.
- If introduced before liftoff, discontinue the takeoff.
- If introduced after liftoff, continue the takeoff, fly a normal traffic pattern and land before reclosing the door.

CAUTION
Due to distraction from positive airplane control and the very limited likelihood of success, caution the pilot not to attempt closing the door in flight.

- During approach and landing, be aware of increased drag and likely elevator buffet at or near touchdown airspeed.
- Increase final approach airspeed 5 knots.

CAUTION
Due to significant distraction resulting from air noise, check, check and re-check that the landing gear is down.

SIMULATED ELECTRICAL FAILURE (LOSS OF ALTERNATOR / GENERATOR)

- Introduce this failure by turning off the alternator. The pilot should identify the failure.
- The pilot should attempt to re-energize the alternator by reference to the POH. (Typically, 14 volt airplane, cycle the battery switch. 28 volt airplane, cycle the alternator switch.) Note that this procedure does not work in Barons and Travel Airs with two manually selected voltage regulators. Follow the POH checklist for the specific airplane being flown.
- Turn off all non-essential electrical components.
- Conserve battery power to provide sufficient energy to lower landing gear or consider manual gear extension.

CAUTION
With an IO-520 or IO-550 series engine and a front mounted alternator, if the alternator failure is the result of a gear drive failure, continued operation risks serious engine damage.

- Develop a plan for the safe continuation of the flight with the alternator / generator inoperative. Consider limited electrical power available from the battery, flight time remaining and good weather options.
- Execute the POH Emergency section, Alternator-Out Procedure (or similar).
- If installed, demonstrate the proper use of the standby alternator/generator, using the POH Supplement.

CAUTION
Do not permit the battery to become fully discharged. Battery power from the main buss generally is required to excite the alternator field when the alternator is turned back on.

CAUTION
When lowering the landing gear using only battery power, the gear may not be fully down even though gear down indications are normal. Follow up with the POH Emergency section, Landing Gear Manual Extension procedure to assure the gear is fully down and locked.

SIMULATED ELECTRICAL SMOKE OR FIRE

BEST PRACTICES

- Introduce a simulated electrical smoke or fire verbally.
- Impress on the pilot the need to land without delay. An emergency descent may be required.

INSTRUCTION
If electrical smoke or fire occurs when activating an electrical component, that component may be the source.

! WARNING !
It can be very difficult to judge the severity of a smoke or fire condition which can be a serious and progressive emergency. Landing is recommended without delay. In an extreme instance, an off-airport landing may be required before control of the airplane is compromised.

- Turn off the battery and alternator/generators switches immediately.
- Identify the nearest suitable landing site and turn towards it.

NOTE
Electrical flight instruments, radios, landing gear and flaps will be inoperative. The interphone may be inoperative. Manual landing gear extension will be required.

- Locate the portable fire extinguisher and prepare for its use.
- If an emergency descent is required, execute the POH Emergency section, Emergency Descent procedure.
- If extended flight is required beyond the nearest landing site:
    - Execute the POH, Emergency section Electrical Smoke or Fire procedure, if available. Note that most Beechcraft POHs do not have a checklist for this scenario.
    - If unable to restore electrical power to the landing gear, execute the POH, Emergency section, Landing Gear Manual Extension procedure.

EMERGENCY DESCENT

- Advise ATC and be alert for conflicting traffic.
- Execute the POH Emergency section, Emergency Descent procedure.
- Observe VLE, landing gear extended limit speed.
- In turbulence, observe VA, maneuvering speed.

ESCAPE FROM IMC (for Non-Instrument Rated Pilot or pilot not wishing to exercise IFR privileges)

- Lower the landing gear.
- Set 2500 RPM and 22” MP. TC/TN: 25-27” MP.
- Elevator trim for approximately 100 KIAS (115 MPH).
- Engage the autopilot (if equipped).
- Monitor airspeed.
- Keep the ball centered.
- If able, call ATC on the active frequency or 121.5 MHz and request assistance.
- To execute a 180o turn, slowly turn the heading bug to the opposite direction.
- If no autopilot, using rudder only, turn gradually to the opposite direction. Do not exceed a standard rate turn.
- To descend, consider use of the autopilot in the vertical speed mode.

MULTIENGINE

PREFLIGHT
The number and location of fuel drains vary with the airplane serial number.

ENGINE START

- Start the left engine first. The pilot has a better view of the left engine. Starting the left engine should warn anyone in proximity to the right engine.
- On a subsequent engine start, start the right engine first to check pressure (vacuum) pump output and indicators. On airplanes with red dot indicators, if both are missing after the first engine start, the shuttle valve is not functioning properly.

STALLS

- In a Pressurized Baron, depressurize before stalls, e.g., by slow flying at low MP.

! WARNING !
Conduct stalls only with symmetric thrust.

- In the landing configuration, do at least one power on and one power off stall.
- Trim to normal approach airspeed, not below.
- Assure that engine power is symmetrical before reducing airspeed.
- Compare the airspeed at stall (initial buffet) with both engines at idle and the airspeed at stall with both engines at 15" MP. The difference reflects the additional lift developed as a result of prop wash over the wing at 15" MP.
- During stall recovery, initially apply only partial power and determine that both engines accelerate symmetrically before applying full power.

TAKEOFF

- Rotate at red line or VMCA plus 5 knots.
- After liftoff and correcting for wind drift, accelerate in ground effect to Vyse (blue line), positive climb, gear up, pitch up to maintain Vy. With a long runway, consider leaving the gear down until landing on the remaining runway is not possible.
- For short field and soft field takeoff, do not rotate below Vmca or 5 knots below the published liftoff airspeed.
- For short field takeoff, climb initially at Vx. After clearing obstacles and/or terrain, raise the gear and accelerate to Vy minimum.

LANDING

- Fly final approach with the gear down and approach flaps at or slightly above blue line until landing is assured.
- With landing assured, select full flaps, reduce power, trim to reduce elevator control forces and decelerate to cross 50' AFE at the normal landing approach speed. See the POH, Performance section.

OPERATION WITH ASYMMETRIC POWER

! WARNING !
Except for demonstration purposes, it is good operating practice when airborne never to allow asymmetric power below blue line airspeed, until landing is assured. During single engine operations, it is imperative to maintain an awareness of airspeed relative to blue line and not permit an unintentional airspeed less than blue line, except when landing is assured. Words to live by: "Blue line forever."

- Demonstrate proper rudder application required to center the yaw string.
- Emphasize proper flight control input to optimize single engine performance. (Yaw string centered). Note bank angle and ball position.
- Emphasize heading control. Use the heading bug.

SIMULATED ENGINE FAILURE

! WARNING !
As one experienced instructor put it, multiengine pilots often are looking for new and innovative ways to kill their instructor. This strikes at the heart of the fact that multiengine flight training can be dangerous. It is essential that the following guidelines be closely adhered to.

LIMITATIONS

- All BPPP multiengine training with a simulated engine failure is to be accomplished with a yaw string attached to the windshield.
- If a simulated engine failure is to be introduced on the runway, the minimum takeoff runway width is 100 feet.
- A simulated engine failure may be introduced on the runway before liftoff only at an airspeed less than 40 KIAS and with more than 50% of the POH accelerate - stop distance remaining.
- The minimum height to introduce a simulated engine failure after takeoff, is 500' AFE.
- No simulated engine failure is to be introduced below Vyse (blue line) below 5000' AGL
- The minimum runway length for landing with a simulated engine inoperative is 4000'.

BEST PRACTICES

- To prevent the pilot from applying the wrong rudder when introducing a simulated engine failure, guard the rudder on the side of the operating engine.
- To simulate zero thrust, set the throttle to 10-12" MP, minimum governing RPM and mixture for ~ 6-7 GPH.
- As one technique, allow the pilot to pull the propeller control into feather and, before going into feather, reset the propeller to minimum governing RMP and the MP to 10-12".

INSTRUCTION

- When a simulated engine failure is introduced at relatively low airspeeds, accomplish the following:
    - Lower the nose.
    - Level the wings.
    - Use coordinated rudder and aileron to return to the original heading.
    - Mixtures rich (or set for altitude), propellers forward, throttles forward.
    - Gear and flaps up.
    - Identify the failed engine. (Dead foot, dead engine)
    - Verify the failed engine (retard the throttle).
    - Feather the propeller. (Instructor simulate feather.)

- To demonstrate the effect of airplane control on climb/descent performance while maintaining heading:
  - trim the airplane for zero side slip (yaw string centered). Note the climb/descent performance.
  - Then find a bank angle into the operating engine that requires no rudder input. Note the deterioration in climb or descent performance.
  - Increase bank angle further and observe that opposite rudder is required. Maximum bank angle 20°. Again, note the change in performance.

NOTE
Less than optimum performance is the price paid for less than optimum control.

- Fail an engine in a turn. The pilot often identifies the wrong engine.
- To simulate an engine power loss during the takeoff roll, place a chart between the pilot and the mixture controls. Pull an engine on some takeoffs but not on others and not on the first takeoff.
- If simulating an engine power loss during the takeoff roll by pulling one mixture, promptly pull the other mixture to prevent a loss of directional control if the pilot does not respond properly.
- As an alternative to simulating an engine power loss on takeoff using a mixture control, apply rudder to induce yaw similar to yaw resulting from an engine failure.

FAA VMC DEMONSTRATION PROHIBITED

The simulated engine inoperative maneuver referred to by the FAA in the PTS as the VMC Demonstration and in the AFH as Engine Inoperative - Loss of Directional Control requires flight well below blue line and close to stall. This demonstration is prohibited in BPPP clinic operations.

BPPP ASYMMETRY ROLL DEMONSTRATION

TRAINING OBJECTIVE
This maneuver demonstrates airplane roll response with one engine inoperative, improper control input and the proper recovery. It may be conducted in lieu of the FAA VMC demonstration.

LIMITATIONS
The BPPP asymmetry roll demonstration must be done in VMC.

! WARNING !
Recovery from any VMC demonstration must be accomplished without delay at the first indication of uncontrollable yaw or any flight characteristic associated with a stall.

BEST PRACTICES

- Brief this maneuver thoroughly.
- This demonstration simulates a non-precision, step-down instrument approach with the left engine inoperative. It is accomplished in a series of three step-down, 500 fpm descents (200 or 300 feet) with level offs, all on a constant heading at or above Vyse (blue line).

INSTRUCTION

- Entry configuration:
  - gear down
  - approach flaps
  - left propeller feathered or simulated feathered
  - Vyse (blue line) plus 10 knots
  - constant heading

  - 500 fpm descent.
- The first two level offs are conducted by adding power on the right engine and applying the proper control inputs to keep the yaw string centered while maintaining target altitude and heading.
- The third level off is conducted with the instructor blocking both the rudder and aileron controls so that a roll is induced when adding power on the right engine for level off.
- At the first indication of wing roll, reduce power on the operating engine to regain control to the target heading.

MODIFIED FAA VMC DEMONSTRATION

LIMITATIONS
This demonstration may be conducted only at the pilot's request and only in VMC.

INSTRUCTION

- Entry configuration:
  - gear up
  - flaps up
  - wings level
  - cowl flaps open
- Begin in level flight at Vyse (blue line) plus 10 knots on a constant heading with the elevator trimmed for zero control force.
- Do not change the pitch trim setting.
- Set high RPM on both propellers.
- Reduce power on the left engine to idle (the landing gear warning will sound) and increase power on the right engine to takeoff power. .
- Control left yaw and roll with right rudder while maintaining the entry heading. Rudder trim may be applied.
- Block aileron control movement to maintain wings level.
- Slowly increase the pitch attitude to decelerate.
- Be alert to the first indications of a stall.
- At the first indication of uncontrollable yaw or any symptom associated with a stall, retard the right throttle sufficiently to stop the yaw and reduce the angle of attack (pitch attitude).
- Recover with minimum altitude loss to straight flight on the entry heading at Vyse.

SPIN RECOVERY

The following is quoted from a Baron POH:

> "If a spin is entered inadvertently: Immediately, move the control column full forward, apply full rudder opposite to the direction of the spin and reduce power on both engines to idle. These three actions should be done as nearly simultaneously as possible. Continue to hold this control column position until rotation stops, then neutralize all controls and execute a smooth pullout. Ailerons should be neutral during recovery."

! WARNING !
After one turn, spin recovery may be impossible.

PROPELLER FEATHER

LIMITATIONS

- Minimum altitude for training with a propeller feathered is 5000' AGL in close proximity to a suitable airport.
- In IMC, training with a propeller feathered must be in close proximity to a suitable airport with a usable instrument approach and weather 1500-5 or better.

CAUTION
Operate below 5000' AGL and land with a feathered propeller only if a propeller fails to unfeather.

BEST PRACTICES

- During engine start before initial departure, observe any difficulty in starting engines. Consider this when determining whether or not to feather or which propeller not to feather.
- If the airplane is not equipped with unfeathering accumulators, conduct propeller feathering close to the clinic base and be prepared to land there with a propeller feathered.
- Discuss with the pilot that with adequate altitude/margins and in the absence of a engine fire or catastrophic engine failure, there should be no need for a very aggressive response to an engine failure.
- Basic troubleshooting may resolve the matter before shutting down the engine.
- Discuss a partial engine failure with the engine producing thrust. Feathering the propeller in this instance may result in a loss of performance.
- On the operating engine, open the cowl flap for adequate cooling. The POH may be silent on this step.
- With an initial multiengine pilot, conditions permitting, feather each propeller (one at a time) to provide the pilot with assurance that both propellers will feather and unfeather.

ENGINE AIR START
Air start an engine in flight by reference to the POH Emergency section, Air Start procedure. Note the following caution:

CAUTION
Do not turn the boost pump on until the engine is turning. This is to prevent a cylinder hydraulic lock and a fire hazard that may result from introducing fuel into an engine that is not running.

- Following an engine air start, set low power (zero thrust minimum) and keep the cowl flap closed to allow oil and cylinder head temperatures to warm slowly to the normal operating range.

SINGLE ENGINE INSTRUMENT APPROACH

- Conduct the approach in the normal approach configuration or with flaps up for drag reduction.
- Lower the landing gear normally at glide slope intercept or at the final approach fix.

CAUTION
Unless no better option is available, attempting a single engine circle-to-land maneuver in IMC does not demonstrate good judgment. It is most likely that altitude cannot be maintained on one engine with gear down and approach flaps.

- To demonstrate poor performance with a simulated engine inoperative, gear down and approach flaps, fly a non-precision approach with an MDA that can be reached well before the MAP and

attempt to maintain level flight. This demonstration is safer than a circle- to-land maneuver and may make a case for conducting the approach with flaps up to minimize drag.
- Select landing flaps when committed to land, i.e., when a go-around is no longer prudent or possible.

SINGLE ENGINE MISSED APPROACH

TRAINING OBJECTIVE
Although conducting a single engine missed approach is strongly discouraged, this maneuver is presented so that the pilot understands the limited airplane performance available during and after transition from approach configuration to missed approach configuration. Point out the adverse effects of higher airplane gross weights and higher density altitudes.

INSTRUCTION

- Practice at Altitude
  - Introduce the single engine missed approach above 5000' AGL for practice and to evaluate the pilot's single engine skills.
  - In approach configuration (gear down, approach flaps) with a propeller feathered or simulated feathered, initiate the missed approach at a specific altitude.
  - As soon as power is set for a single engine missed approach, select gear up and flaps up.
  - Minimize altitude loss during transition to climb at Vyse and note the altitude lost.
  - Apply this lesson with a conservative margin to determine the minimum height at which a single engine go-around should be attempted. Below this height, the pilot is committed to landing.
- Practice at an Airport
  - A practice single engine missed approach at an airport may be conducted only with a propeller simulated feathered.
  - Airport weather must be 1500-5 or better.
  - Bearing in mind the lessons learned with practice at altitude, the minimum height to initiate a single engine go around is 400' AFE.
  - As soon as power is set for a single engine missed approach, select gear up and flaps up.
  - Minimize altitude loss during transition to climb at Vyse.
  - If things are not going well, recover bringing power up on the simulated failed engine for go-around with symmetrical power.

! WARNING !
With a propeller feathered and after selecting full flaps, do not attempt a single engine go-around even if that means landing on a taxiway or in the grass. The pilot should be thoroughly briefed.

SINGLE ENGINE LANDING

LIMITATIONS
Airport weather 1500-5 or better.

INSTRUCTION

- Zero the rudder trim for landing, preferably downwind or before the final approach fix.
- Select landing flaps only when landing is assured.
- After selecting landing flaps, the flight is committed to landing.

- Emphasize the inadvisability of attempting a single engine go-around after landing flaps have been selected. See the Warning, above.

CAUTION
On a single engine approach to landing, it is a common tendency to cross the threshold high and fast. To prevent the consequences of a long landing or an ill-advised decision to go around, cross the threshold on a normal flight path and at the normal landing approach airspeed. See the POH, Emergency section.

- When reducing power for landing, be alert to reversal in yaw moment. As power on the operating engine is reduced to idle, drag developed from the windmilling propeller must be offset with opposite rudder and bank angle.
- If required to land with a feathered propeller, notify the tower or announce on CTAF: “Single engine landing and unable to go-around.”
- A landing with one propeller simulated feathered or feathered requires more runway than a landing with both engines windmilling.
- With a significant crosswind, if at all possible, land with the crosswind from the side of the operating engine. This permits the use of asymmetric engine power, if needed, for directional control during the landing roll out.
- Check and re-check that the landing gear is down.
- Attempt to clear the runway before coming to a stop. After coming to a stop following a single engine landing, directional control may be impossible. Be prepared to call for assistance.

AFTER LANDING

At the end of the training flight with the airplane stopped and by reference to the POH Emergency procedure, check fuel crossfeed to each engine. When these checks have been completed, verify that both fuel selectors are on the main tank.