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SECTION 4

NORMAL PROCEDURES

SECTION 4

NORMAL PROCEDURES

4.1 GENERAL

This section describes the recommended procedures for the conduct of normal operations for the Seneca II. All of the required (FAA regulations) procedures and those necessary for the safe operation of the airplane as determined by the operating and design features of the airplane are presented.

Normal procedures associated with those optional systems and equipment which require handbook supplements are provided by Section 9 (Supplements).

These procedures are provided to present a source of reference and review and to supply information on procedures which are not the same for all aircraft. Pilots should familiarize themselves with the procedures given in this section in order to become proficient in the normal operations of the airplane.

The first portion of this section consists of a short form check list which supplies an action sequence for normal operations with little emphasis on the operation of the systems.

The remainder of the section is devoted to amplified normal procedures which provide detailed information and explanations of the procedures and how to perform them. This portion of the section is not intended for use as an in-flight reference due to the lengthly explanations. The short form check list should be used for this purpose.

4.3 AIRSPEEDS FOR SAFE OPERATIONS

The following airspeeds are those which are significant to the safe operation of the airplane. These figures are for standard airplanes flown at gross weight under standard conditions at sea level.

Performance for a specific airplane may vary from published figures depending upon the equipment installed, the condition of the engine, airplane and equipment, atmospheric conditions and piloting technique.

(a)	Best Rate of Climb Speed	89 KIAS
(b)	Best Angle of Climb Speed	76 KIAS
(c)	Turbulent Air Operating Speed (See Subsection 2.3)	136 KIAS
(d)	Maximum Flap Speed	107 KIAS
(e)	Landing Final Approach Speed (Flaps 40°)	79 KIAS
(f)	Intentional One-Engine Inoperative Speed	76 KIAS
(g)	Maximum Demonstrated Crosswind Velocity	17 KTS

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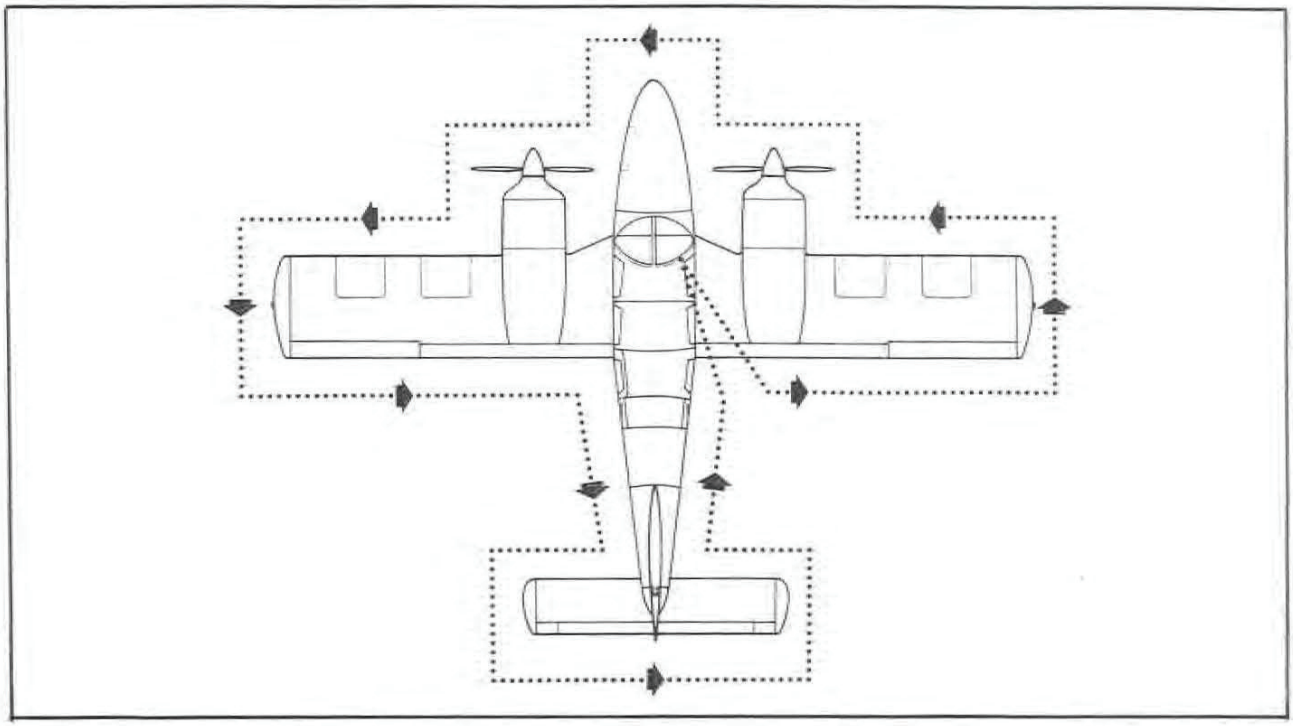

WALK AROUND

Figure 4-1

4.5 NORMAL PROCEDURES CHECK LIST

PREPARATION

Airplane status . . . . . airworthy, papers on board
Weather . . . . . suitable
Baggage . . . . . .weighed, stowed, tied
Weight and C.G. . . . . within limits
Navigation . . . . . planned
Charts and navigation equipment . . . . . on board
Performance and range . . . . . .computed and safe

PREFLIGHT CHECK

INSIDE CABIN

Landing gear control . . . . . DOWN position
Avionics . . . . . .OFF
Master switch . . . . . .ON
Landing gear lights . . . . . 3 GREEN, no red
Fuel quantity . . . . . .adequate plus reserve
Cowl flaps . . . . . .OPEN
Master switch . . . . . .OFF
Ignition switches . . . . . .OFF
Mixture controls . . . . . idle cut-off
Trim indicators . . . . . neutral
Flaps . . . . . check operation
Controls . . . . . free
Pitot and static systems . . . . . .drain
Empty seats . . . . . fasten belts
Crossfeed drains . . . . . .drain

OUTSIDE CABIN

Crossfeed drains . . . . . closed
Right wing, aileron
and flap . . . . . check, no ice
Right main gear . . . . . no leaks
Strut . . . . . proper inflation
Tire . . . . . check
Right wing tip . . . . . check
Right leading edge . . . . . check, no ice
Fuel cap . . . . . open, check quantity and color, secure
Right engine nacelle . . . . . check oil
Right propeller . . . . . check
Cowl flaps . . . . . OPEN and secure
Fuel drains . . . . . drain
Nose section . . . . . check
Nose gear . . . . . no leaks
Strut . . . . . proper inflation
Tire . . . . . check
Tow bar . . . . . removed and stowed
Landing light . . . . . check
Forward baggage door . . . . . secure and locked
Windshield . . . . . clean
Left wing, engine nacelle
and landing gear . . . . . check as on right side
Pitot tube . . . . . clear, checked
Stall warning vanes . . . . . check
Rear door . . . . . latched
Left static vent . . . . . clear
Dorsal fin air scoop . . . . . clear
Empennage . . . . . check, no ice
Stabilator . . . . . free
Right static vent . . . . . clear
Antennas . . . . . check
Navigation and landing lights . . . . . check

BEFORE STARTING ENGINES

Seats . . . . . adjusted
Seat belts and harness . . . . . fastened
Parking brake . . . . . set
Circuit breakers . . . . . in
Radios . . . . . OFF
Cowl flaps . . . . . OPEN
Alternate air . . . . . OFF
Alternators . . . . . ON

STARTING ENGINES (AIRPLANE EQUIPPED WITH STANDARD ENGINE PRIMER SYSTEM)

Fuel selector . . . . . ON
Mixture . . . . . RICH
Throttle . . . . . half travel
Propeller . . . . . FORWARD
Master switch . . . . . ON
Ignition switches . . . . . ON
Propeller . . . . . clear
Starter . . . . . engage
Primer button . . . . . ON as required
Throttle . . . . . retard when engine starts
Oil pressure . . . . . check
Repeat for opposite engine
Alternators . . . . . check
Gyro pressure . . . . . check

STARTING ENGINES (AIRPLANE EQUIPPED WITH OPTIONAL ENGINE PRIMER SYSTEM)

Fuel selector . . . . . ON
Mixture . . . . . FULL RICH
Throttle . . . . . FULL FORWARD
Prop control . . . . . FULL FORWARD
Master switch . . . . . ON
Ignition switch (mag) . . . . . ON
Auxiliary fuel pump . . . . . OFF
Primer . . . . . ON
See Figure 4-3 for Priming Time
Throttle . . . . . CLOSE
Starter . . . . . engage
At temperatures below +20°F continue priming while cranking until engine starts.

When engine starts & accelerates thru 500 RPM:
Starter . . . . . release
Throttle . . . . . advance slowly to obtain 1000 RPM
Primer . . . . . release
Auxiliary fuel pump . . . . . low only as necessary to obtain smooth engine operation (1-3 minutes will be required when temp. is below 20°F)
Oil pressure . . . . . check
Repeat for opposite engine.

Alternators . . . . . check
Gyro pressure . . . . . check

NOTE

When starting at ambient temperatures +20°F and below, operate first engine started with alternator ON (at max charging rate not to exceed 1500 RPM) for 5 minutes minimum before initiating start on second engine.

STARTING ENGINES WHEN FLOODED

Mixture . . . . . idle cut-off
Throttle . . . . . full FORWARD
Propeller . . . . . .FORWARD
Master switch . . . . . .ON
Ignition switches . . . . . .ON
Auxiliary fuel pump . . . . . .OFF
Propeller . . . . . clear
Starter . . . . . .engage

When engine fires:
Throttle . . . . . retard
Mixture . . . . . advance slowly

STARTING ENGINES IN COLD WEATHER (AIRPLANE EQUIPPED WITH STANDARD ENGINE PRIMER SYSTEM)

Props . . . . . turn through by hand (3 times)
Fuel selector . . . . . .ON
Mixture . . . . . full RICH
Throttle . . . . . full FORWARD
Prop control . . . . . full FORWARD
Master switch . . . . . .ON
Ignition switch (mag) . . . . . .ON
Auxiliary fuel pump . . . . . .ON LOW boost
Starter . . . . . .engage
Primer . . . . . On for 3 sec.
Throttle . . . . . full FORWARD to full AFT
Primer . . . . . .ON 3 sec., then OFF 3 sec., then ON 3 sec.

When engine fires:
Starter . . . . . .leave engaged
Primer button . . . . . .tap until rhythmic firing
Starter . . . . . .release
Throttle . . . . . .half travel
Oil pressure . . . . . check

If engine begins to falter:
Primer button . . . . . .tap
Throttle . . . . . 1000 RPM

Auxiliary fuel pump . . . . . .OFF after start complete

STARTING WITH EXTERNAL POWER SOURCE

Master switch . . . . . .OFF
All electrical equipment . . . . . .OFF
Terminals . . . . . connect
External power plug . . . . . .insert in fuselage
Proceed with normal start
Throttles . . . . . .lowest possible RPM
External power plug . . . . . disconnect from fuselage
Master switch . . . . . ON-check ammeter
Oil pressure . . . . . check

WARM-UP

Throttles . . . . . 1000 to 1200 RPM

TAXIING

Chocks . . . . . .removed
Taxi area . . . . . .clear
Throttle . . . . . apply slowly
Brakes . . . . . check
Steering . . . . . check
Instruments . . . . . check
Heater and defroster . . . . . check
Fuel selector . . . . . ON, check crossfeed
Autopilot . . . . . .OFF

BEFORE TAKEOFF - GROUND CHECK

Parking brake . . . . . .ON
Mixture controls . . . . . .FORWARD
Prop. controls . . . . . .FORWARD
Throttle control . . . . . 1000 RPM
Manifold pressure lines . . . . . .drain
Prop. controls . . . . . .check feathering, 300 RPM max. drop
Throttle controls 1900 RPM
Prop. controls . . . . . .check governor
Prop. controls . . . . . full FORWARD
Alternate air . . . . . ON then OFF
Magnetos . . . . . check, max. drop 150 RPM, max. diff. drop 50 RPM
Alternator output . . . . . check
Gyro pressure gauge . . . . . 4.5 to 5.2 in. Hg.
T ttles . . . . . .800-1000 RPM
Fuel selectors . . . . . .ON
Alternators . . . . . .ON
Engine gauges . . . . . .in the green
Annunciator panel . . . . . .press-to-test
Altimeter . . . . . .set
Attitude indicator . . . . . .set
D.G. . . . . .set
Clock . . . . . .wound and set
Mixtures . . . . . .set
Propellers . . . . . set in forward position
Quadrant friction . . . . . .adjusted
Alternate air . . . . . .OFF
Cowl flaps . . . . . .set
Seat backs . . . . . .erect
Wing flaps . . . . . .set
Trim . . . . . .set
Seat belts and harness . . . . . .fastened
S ty seats . . . . . .seat belts fastened
Controls . . . . . .free, full travel
Doors . . . . . .latched
Auxiliary fuel pumps . . . . . .OFF
Pitot heat . . . . . as required

TAKEOFF

CAUTIONS

Do not exceed 40 in. Hg. manifold pressure.

Fast taxi turns immediately prior to takeoff run can cause temporary malfunction of one engine during takeoff.

Normal sea level takeoff at 39 in. Hg. and 2575 RPM.

Adjust mixture prior to takeoff from high elevations. Do not over heat. Do not exceed 40 in. Hg. manifold pressure.

NORMAL TAKEOFF (Flaps up)

Flaps . . . . . .UP
Accelerate to 66 to 71 KIAS.
Control wheel . . . . . ease back to rotate to climb attitude
After breaking ground, accelerate to best rate of climb speed of 89 KIAS.
Gear . . . . . .UP

SHORT FIELD TAKEOFF (Flaps up)

Flaps . . . . . .UP
Stabilator trim . . . . . .takeoff range
Brakes . . . . . .set
Full power before brake release.
Accelerate to 66 KIAS.
Control wheel . . . . . rotate firmly to attain 71 KIAS through 50 ft.

Accelerate to best angle of climb speed of 76 KIAS for obstacle clearance or best rate of climb speed of 89 KIAS, no obstacle.
Gear . . . . . .UP

SHORT FIELD TAKEOFF (25° Flaps)

Flaps . . . . . .25° (second notch)
Stabilator trim . . . . . set
Brakes . . . . . set
Full power before brake release.
Accelerate to 61 KIAS.
Control wheel . . . . . rotate firmly to attain 69 KIAS through 50 ft.
Gear . . . . . UP

TAKEOFF CLIMB

Mixture . . . . . full RICH
Prop speed . . . . . 2575 RPM
Manifold pressure . . . . . DO NOT EXCEED 40 in. Hg.
Climb speed
Best angle . . . . . 76 KIAS
Best rate . . . . . 89 KIAS
Cowl flaps . . . . . as required

CRUISE CLIMB

Mixture . . . . . full RICH
Prop speed . . . . . 2450 RPM
Manifold pressure . . . . . .31.5 in. Hg.
Climb speed . . . . . .102 KIAS
Cowl flaps . . . . . as required

CRUISING

Reference performance charts, Teledyne Continental Operator's Manual and power setting table.
Power . . . . . set
Cowl flaps . . . . . as required
Mixture . . . . . adjust
Engine gauges . . . . . monitor

DESCENT

Mixtures . . . . . enrich with descent
Throttles . . . . . cruise setting
Cowl flaps . . . . . CLOSED

APPROACH AND LANDING

Gear warning horn . . . . . check
Airspeed . . . . . .98 KIAS on downwind leg
Seat backs . . . . . erect
Seat belts and harness . . . . . fastened
Fuel selectors . . . . . .ON
Cowl flaps . . . . . as required
Auxiliary fuel pumps . . . . . OFF
Mixture controls . . . . . set
Propellers . . . . . 2250 RPM
Landing gear . . . . . .DOWN, 129 KIAS max.
Flaps . . . . . set as required
Airspeed . . . . . .97 KIAS on base leg, 87 KIAS on final
On close final:
Power . . . . . reduced
Prop. controls . . . . . full FORWARD

GO-AROUND

Full takeoff power, both engines (40 in. Hg. max.)
Establish positive climb.
Flaps . . . . . retract
Gear . . . . . UP
Cowl flaps . . . . . adjust

AFTER LANDING

Clear of runway
Flaps . . . . . retract
Cowl flaps . . . . . fully OPEN
Alternate air . . . . . OFF

SHUTDOWN

Heater . . . . . .FAN 2 min. then OFF
Radio and electrical equipment . . . . . OFF
Mixture controls . . . . . idle cut-off
Magneto switches . . . . . OFF
Master switch . . . . . OFF
Parking brake . . . . . set ON

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4.7 AMPLIFIED NORMAL PROCEDURES (GENERAL)

The following paragraphs are provided to supply detailed information and explanations of the normal procedures necessary for the operation of the airplane.

4.9 PREPARATION

The airplane should be given a thorough preflight and walk-around check. The preflight should include a determination of the airplane's operational status, a check that necessary papers and charts are on board and in order, and a computation of weight and C.G. limits, takeoff distance and in-flight performance. Baggage should be weighed, stowed and tied down. Passengers should be briefed on the use of seat belts and shoulder harnesses, oxygen, and ventilation controls, advised when smoking is prohibited, and cautioned against handling or interfering with controls, equipment, door handles, etc. A weather briefing for the intended flight path should be obtained, and any other factors relating to a safe flight should be checked before takeoff.

4.11 PREFLIGHT CHECK

CAUTION

The flap position should be noted before boarding the airplane. The flaps must be placed in the "UP" position before they will lock and support weight on the step.

Upon entering the cockpit, check that the landing gear selector is in the DOWN position, turn OFF all avionics equipment (to save power and prevent wear on the units), and turn the master switch ON. Check the landing gear indicator lights to insure that the three green lights have illuminated and the red light has not illuminated. Check the fuel supply. Adequate fuel should be indicated for the flight plus reserve. The cowl flaps should be OPEN to facilitate inspection and ensure cooling after engine start. Return the master switch to OFF to save the battery.

Check that the ignition switches are OFF and move the mixture controls to idle cut-off to prevent an inadvertent start while checking the propellers. Move the trim controls to neutral so that the tabs can be checked for alignment. Extend and retract the flaps to check for proper operation. This check is performed prior to engine start so that you can hear any noise which might indicate binding. The controls should be free and move properly. Drain the pitot and static system lines through the drains located on the side panel next to the pilot's seat. Fasten the seat belts on the empty seats. Before leaving the cockpit, drain the two crossfeed drains on the forward side of the spar box.

The first item to check during the walk-around is to insure that the crossfeed drains are closed. Check the right wing, aileron and flap hinges and surfaces for damage and ice. Make a close check of the right landing gear for leaks, proper piston exposure under a static load (3-1/2 inches) and that the tires are properly inflated and not excessively worn. The right wing tip and leading edge should be free from ice and damage.

Open the fuel cap to check the quantity and color of the fuel and cap vent. The vent should be free of obstructions. Secure the fuel cap properly. Proceeding around to the engine nacelle, check the oil quantity (six to eight quarts). Make sure that the dipstick has properly seated after checking. Check and insure that the oil filler cap is securely tightened and secure the inspection door. Check the right propeller for nicks or leaks. The spinner should be secure and undamaged (check closely for cracks). The cowl flaps should be open and secure.

The right fuel drains should be opened to drain moisture and sediment. Drain the two fuel tank drains under the wing and the gascolator drain near the bottom of the engine nacelle (refer to Section 8 for more detailed draining procedure).

Check the nose section for damage and the nose landing gear for leaks and proper strut inflation. Under a normal static load, 2-1/2 inches of strut should be exposed. Check the tire for wear and proper inflation. If the tow bar was used, remove and stow. Before moving on to the forward baggage compartment, check the condition of the landing light. Open the forward baggage compartment and check to make sure that the baggage has been stowed properly. Close, secure and lock the baggage door.

At the front of the airplane, the windshield should be clean, secure and free from cracks or distortion. Moving around to the left wing, check the wing, engine nacelle and landing gear as described for the right s. Don't forget to check the fuel and oil.

If a pitot cover was installed, it should be removed before flight and the holes checked for obstructions. With the heated pitot switch on, check the heated pitot head and heated lift detector for proper heating. Check the stall warning vanes for freedom of movement and damage.

CAUTION

Care should be taken when an operational check of the heated pitot head and the heated lift detectors is being performed. Both units become very hot. Ground operation should be limited to 3 minutes maximum to avoid damaging the heating elements.

Latch the rear door securely and check the left static vent and dorsal fin air scoop for obstructions. The empennage should be free of ice and damage and all hinges should be secure. Check the stabilator for freedom of movement and ensure that the right static vent is unobstructed. Antennas should be secure and undamaged. After turning on the master switch and light switches in the cockpit, check the navigation and landing lights.

4.13 BEFORE STARTING ENGINES

Before starting the engines, adjust the seats and fasten the seat belts and shoulder harnesses. Set the parking brake and check to make sure all the circuit breakers are in and the radios are OFF. Cowl flaps should be OPEN and alternate air OFF. The alternators should now be switched ON.

4.15 STARTING ENGINES (AIRPLANE EQUIPPED WITH STANDARD ENGINE PRIMER SYSTEM)

The first step in starting is to move the fuel selector to the ON position. Advance the mixture control to full RICH, open the throttle half travel and move the propeller control full FORWARD. Turn the master switch and ignition switches ON. After ensuring that the propellers are clear, engage the starter. The primer button should be used (ON) as required. For cold weather starts, refer to paragraph 4.19 - Starting Engines in Cold Weather. When the engine starts, retard the throttle and monitor the oil pressure gauge. If no oil pressure is indicated within 30 seconds, shut down the engine and have it checked. In cold weather it may take somewhat longer for an oil pressure indication. Repeat the above procedure for the opposite engine. After the engines have started, check the alternators for sufficient output and the gyro pressure gauge for a reading between 4.5 and 5.2 in. Hg.

NOTE

To prevent starter damage, limit starter cranking to 30-second periods. If the engine does not start within that time, allow a cooling period of several minutes before engaging starter again. Do not engage the starter immediately after releasing it. This practice may damage the starter mechanism.

4.16 STARTING ENGINES (AIRPLANE EQUIPPED WITH OPTIONAL ENGINE PRIMER SYSTEM)

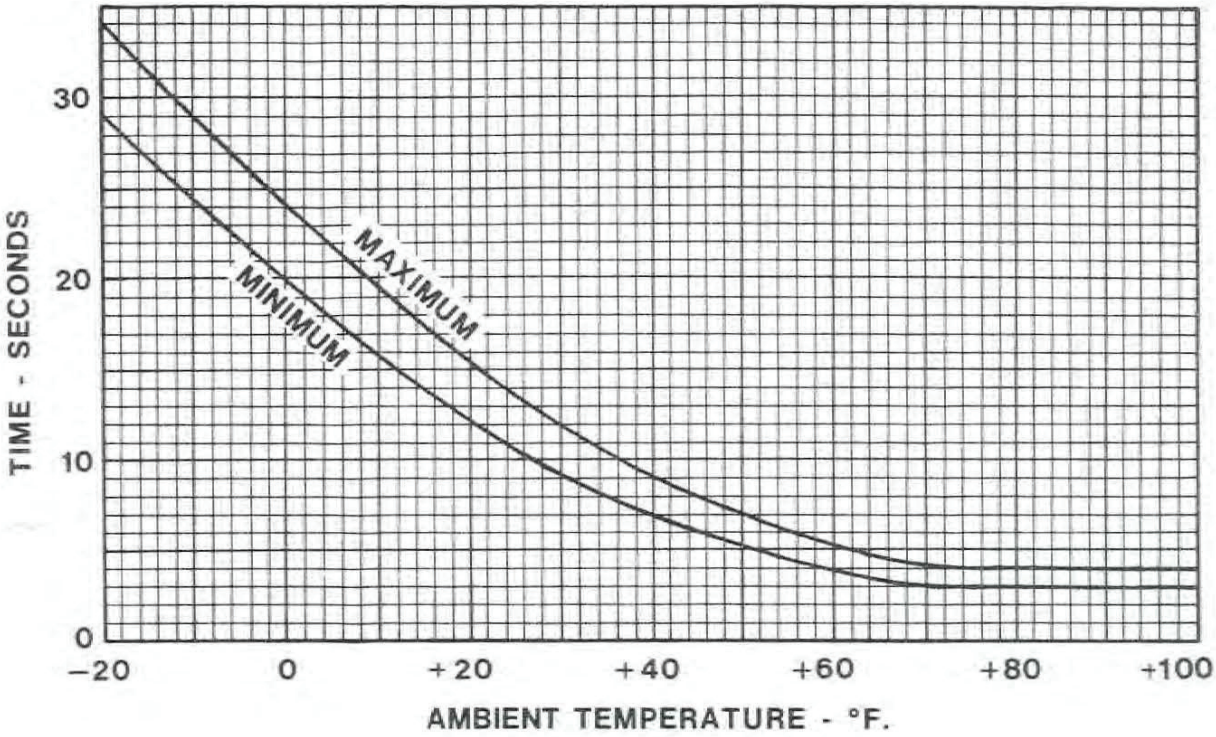
NOTE

Engine starts can be accomplished down to ambient temperatures of +20°F with engines equipped with standard (massive electrode) spark plugs. Below that temperature fine wire spark plugs are highly recommended to ensure engine starts, and are a necessity at +10°F and below. In addition, the use of external electrical power source is also recommended when ambient temperatures are below +20°F.

Upon entering the cockpit, begin starting procedure by moving the fuel selector to ON. Advance the mixture to full RICH and the throttle and prop controls to full FORWARD. Turn the master switch and the ignition switch (mag.) ON. The auxiliary fuel pump should be OFF. Push primer switch and hold for the required priming time (see Figure 4-3). Close throttle and immediately engage starter. With ambient temperatures above +20°F, starts may be made by discontinuing priming before engaging starter. With ambient temperatures below +20°F, starts should be made by continuing to prime during cranking period. Do not release starter until engine accelerates through 500 RPM, then SLOWLY advance throttle to obtain 1000 RPM. Release primer and immediately place auxiliary fuel pump switch to LO. Auxiliary fuel pump operation will be required for one to three minutes initial engine warm-up. When starting at ambient temperatures of +20°F and below, operate the first engine started with alternator ON (at maximum charging rate not to exceed 1500 RPM) for 5 minutes minimum before initiating start on second engine.

NOTE

When cold weather engine starts are made without the use of engine preheating (refer to TCM Operator's Manual), longer than normal elapsed time may be required before an oil pressure indication is observed.



OPTIONAL ENGINE PRIMER SYSTEM - PRIMING TIME VS. AMBIENT TEMPERATURE

Figure 4-3

17 STARTING ENGINES WHEN FLOODED

If an engine is flooded, move the mixture control to idle cut-off and advance the throttle and propeller ontrols full forward. Turn ON the master switch and ignition switches. The auxiliary fuel pump should be FF. After ensuring that the propeller is clear, engage the starter. When the engine fires, retard the throttle id advance the mixture slowly.

19 STARTING ENGINES IN COLD WEATHER (AIRPLANE EQUIPPED WITH STANDARD ENGINE RIMER SYSTEM)

NOTE

As cold weather engine operations are decidedly more demanding, it may become necessary to utilize the starting procedure listed below in low ambient temperatures. (See Continental Engine Operator's Manual for Cold Weather Operating Recommendations.)

NOTE

It may be necessary to apply an external power source to facilitate engine cranking if the aircraft's battery is deficient of charge.

Prior to attempting the start, turn the propellers through by hand three times after insuring that the magneto switches are off and mixture controls are in the full aft position. Upon entering the cockpit, begin the starting procedure by moving the fuel selector to ON. Advance the mixture to full RICH and the throttle and prop controls to full FORWARD. Turn ON the master switch and the ignition switches (mags). The auxiliary fuel pump should be ON in the LOW boost position. Push the primer button and engage the starter simultaneously. Begin moving the throttle control back and forth from full forward to full aft. Release the primer button after about 3 seconds of cranking. Leave the primer button off for 3 seconds of cranking and then reapply primer for about 3 seconds, repeat until the engine begins to fire.

When the engine begins firing, leave the starter engaged and tap the primer periodically until a rhythmic firing pattern is observed and then release the starter switch and position the throttle at half travel. Tap the primer button if the engine begins to falter during this period and adjust the throttle to a 1000 RPM idle speed.

The auxiliary fuel pump may be turned OFF as soon as it is determined that the engine will continue to run without it.

4.21 STARTING ENGINES WITH EXTERNAL POWER

An optional feature called the Piper External Power (PEP) allows the operator to use an external battery to crank the engines without having to gain access to the airplane's battery.

Turn the master switch OFF and turn all electrical equipment OFF. Connect the RED lead of the PEP kit jumper cable to the POSITIVE (+) terminal of an external 12-volt battery and the BLACK lead to the NEGATIVE (-) terminal. Insert the plug of the jumper cable into the socket located on the fuselage. Note that when the plug is inserted, the electrical system is ON. Proceed with the normal starting technique.

After the engines have started, reduce power to the lowest possible RPM, to reduce sparking, and disconnect the jumper cable from the aircraft. Turn the master switch ON and check the alternator ammeter for an indication of output. DO NOT ATTEMPT FLIGHT IF THERE IS NO INDICATION OF ALTERNATOR OUTPUT.

NOTE

For all normal operations using the PEP jumper cables, the master switch should be OFF, but it is possible to use the ships battery in parallel by turning the master switch ON. This will give longer cranking capabilities, but will not increase the amperage. CAUTION: Care should be exercised because if the ships battery has been depleted, the external power supply can be reduced to the level of the ships battery. This can be tested by turning the master switch ON momentarily while the starter is engaged. If cranking speed increases, the ships battery is at a higher level than the external power supply. If the battery has been depleted by excessive cranking, it must be recharged before the second engine is started. All the alternator current will go to the low battery until it receives sufficient charge, and it may not start the other engine immediately.

4.23 TAXIING

Remove chocks from the wheels and check to make sure the taxi area is clear. Always apply the throttles slowly.

Before taxiing, the brakes should be checked by moving forward a few feet, throttling back and applying pressure on the toe pedals. As much as possible, turns during taxiing should be made using rudder pedal motion and differential power (more power on the engine on the outside of the turn, less on the inside engine) rather than brakes.

During the taxi, check the instruments (turn indicator, directional gyro, coordination ball, compass) and the heater and defroster. Check the operation of the fuel management controls by moving each fuel selector to CROSSFEED for a short time, while the other selector is in the ON position. Return the selectors to the ON position. DO NOT attempt a takeoff with the fuel selector on CROSSFEED. The autopilot (if installed) should be off during taxi.

4.25 BEFORE TAKEOFF - GROUND CHECK

A thorough check should be made before takeoff, using a check list. Before advancing the throttle to check the magnetos and the propeller action, be sure that the engine oil temperature is 75° F or above.

During engine run-up, head the airplane into the wind if possible (see crosswind limits for propellers) and set the parking brake. Advance the mixture and propeller controls forward and the throttle controls to 1000 RPM. Drain the manifold pressure lines by depressing the drain valves located behind and below the dual manifold pressure gauge for 5 seconds. Do not depress the valves when the manifold pressure exceeds 25 inches Hg. Check the feather position of the propellers by bringing the controls fully aft and then full forward. Do not allow more than a 300 RPM drop during the feathering check. Move the throttles to 1900 RPM and exercise the propeller controls to check the function of the governor. Retard control until a 200 to 300 drop in RPM is indicated. This should be done three times on the first flight of the day. The governor can be checked by retarding the propeller control until a drop of 100 RPM to 200 RPM appears, then advancing the throttle to get a slight increase in manifold pressure. The propeller speed should stay the same when the throttle is advanced, thus indicating proper function of the governor.

Return the propeller controls to full forward and move the alternate air controls to ON then OFF. Check the magnetos. The normal drop on each magneto is 100 RPM and the maximum drop should not exceed 150 RPM. The maximum differential drop should not exceed 50 RPM. The alternator output should be approximately equal for both alternators. A 4.5 to 5.2 in. Hg. indication on the gyro pressure gauge signifies proper operation of the gyro pressure system.

CAUTION

Insure that the alternators are not indicating full charge prior to takeoff.

Set the throttles between 800 and 1000 RPM, check that the fuel selectors and alternator switches are ON and that all the engine gauges are within their normal operating ranges (green arc). Press-to-test the annunciator light to make sure they all illuminate. Set the altimeter, attitude indicator and directional gyro. Wind and set the clock. Set the mixtures and advance the propeller controls in the forward position. The friction lock on the right side of the control quadrant should be adjusted. Check to make sure the alternate air is OFF. Adjust the cowl flaps and set the wing flaps and trim (stabilator and rudder) tabs as required. The seat backs should be erect and seat belts and harnesses fastened. Fasten the seat belts on the empty seats.

All controls should be free with full travel, and all doors should be securely latched. Ensure that the auxiliary fuel pumps are OFF. Pitot heat should be used as required.

4.27 TAKEOFF

The normally recommended procedure for sea level takeoff is to advance the throttle until a manifold pressure of 39 in. Hg. is indicated at 2575 RPM. During pretakeoff check at a high elevation, lean the mixture to obtain maximum power. Apply 40 in. Hg. manifold pressure; then lean the mixture until the fuel flow pointer stabilizes at a fuel consumption mark consistent with the altitude as shown on the green takeoff range on the gauge. Leave the mixture in this position for takeoff. Do not overheat the engine when operating with mixture leaned. If overheating occurs, enrich the mixture enough that temperature returns to normal.

NOTE

The "overboost" indicator lights on the annunciator panel will illuminate at approximately 39.8 in. Hg. manifold pressure. Do not exceed 40 in. Hg. manifold pressure.

Illumination of the yellow overboost light on the annunciator panel does not indicate a malfunction. he overboost lights illuminate when manifold pressure approaches the maximum limit. The overboost ghts should be monitored during takeoff to insure that an overboost condition does not persist.

Takeoff should not be attempted with ice or frost on the wings. Takeoff distances and 50-foot bstacle clearance distances are shown on charts in the Performance Section of this Handbook. The rformance shown on charts will be reduced by uphill gradient, tailwind component, or soft, wet, rough or assy surface, or poor pilot technique.

Avoid fast turns onto the runway, followed by immediate takeoff, especially with a low fuel supply. ast taxi turns immediately prior to takeoff run can cause temporary malfunction of one engine on takeoff. s power is applied at the start of the takeoff roll, look at the engine instruments to see that the engines are perating properly and putting out normal power, and at the airspeed indicator to see that it is functioning. pply throttle smoothly until 40 in. Hg. manifold pressure is obtained. DO NOT APPLY ADDITIONAL HROTTLES.

NOTE

At altitudes below 12,000 feet, normal takeoffs are made with less than full throttle - use throttle only as required to obtain 40 in. Hg. manifold pressure. DO NOT EXCEED 40 IN. HG. MANIFOLD PRESSURE.

The flap setting for normal takeoff is 0°. In certain short field takeoff efforts when the shortest ossible ground roll and the greatest clearance distance over a 50 ft. obstacle is desired, a flap setting of 25° recommended.

When obstacle clearance is no problem, a normal flaps up (0°) takeoff may be used. Accelerate to 6-71 KIAS and ease back on the wheel enough to let the airplane lift off. After lift-off, accelerate to the est rate of climb speed, 89 KIAS, or higher if desired, retracting the landing gear when a gear-down landing s no longer possible on the runway.

When a short field effort is required but the situation presents a wide margin on obstacle clearance, the ifest short field technique to use is with the flaps up (0°). In the event of an engine failure, the airplane is n the best flight configuration to sustain altitude immediately after the gear is raised. Set the stabilator im indicator in the takeoff range. Set the brakes and bring the engines to full power before release. 'erate to 66 KIAS and rotate the airplane firmly so that the airspeed is approximately 71 KIAS when assing through the 50-foot height. The airplane should then be allowed to accelerate to the best angle of limb speed (76 KIAS at sea level) if obstacle clearance is necessary, or best rate of climb speed (89 KIAS) obstacles are not a problem. The landing gear should be retracted when a gear-down landing is no longer ossible on the runway. The distances for this takeoff procedure are given on a chart in the Performance ection of this Handbook.

When the shortest possible ground roll and the greatest clearance distance over a 50-foot obstacle is desired, use a 25-degree flap setting (second notch). Set the stabilator trim indicator slightly nose up from the takeoff range. Set the brakes and bring the engines to full power before release. Accelerate to 61 KIAS and rotate firmly so that when passing through the 50-foot height the airspeed is approximately 69 KIAS. Retract the gear when a gear down landing is no longer possible on the runway.

It should be noted that the airplane is momentarily below Vmc when using the above procedure. IN THE EVENT THAT AN ENGINE FAILURE SHOULD OCCUR WHILE THE AIRPLANE IS BELOW Vmc, IT IS MANDATORY THAT THE THROTTLE ON THE OPERATING ENGINE BE RETARDED AND THE NOSE LOWERED IMMEDIATELY TO MAINTAIN CONTROL OF THE AIRPLANE. It should also be noted that when a 25-degree flap setting is used on the takeoff roll, an effort to hold the airplane on the runway too long may result in a "wheelbarrowing" tendency. This should be avoided.

The distances required using this takeoff procedure are given on a chart in the Performance Section of this Handbook.

4.29 CLIMB

On climb-out after takeoff, it is recommended that the best angle of climb speed (76 KIAS) be maintained only if obstacle clearance is a consideration. The best rate of climb speed (89 KIAS) should be maintained with full power on the engines until adequate terrain clearance is obtained. At this point, engine power should be reduced to 31.5 inches manifold pressure and 2450 RPM (approximately 75% power) for cruise climb. A cruise climb speed of 102 KIAS or higher is also recommended. This combination of reduced power and increased climb speed provides better engine cooling, less engine wear, reduced fuel consumption, lower cabin noise level, and better forward visibility.

When reducing engine power the throttles should be retarded first, followed by the propeller controls. The mixture controls should remain at full rich during the climb. Cowl flaps should be adjusted to maintain cylinder head and oil temperatures within the normal ranges specified for the engine. During climbs under hot weather conditions, it may be necessary to use LO auxiliary fuel pump for vapor suppression.

Consistent operational use of cruise climb power settings is strongly recommended since this practice will make a substantial contribution to fuel economy and increased engine life, and will reduce the incidence of premature engine overhauls.

4.31 CRUISING

When leveling off at cruise altitude, the pilot may reduce to a cruise power setting in accordance with the Power Setting Table in this Handbook. The mixture should be leaned in accordance with the recommendations for the engine in the Teledyne Continental Operator's Manual which is provided with the aircraft. If cylinder head temperatures become too high during flight, reduce them by enriching the mixture, by opening cowl flaps, by reducing power, or by use of any combination of these methods.

Following level-off for cruise, the cowl flaps should be closed or adjusted as necessary to maintain proper cylinder head temperatures, and the airplane should be trimmed to fly hands off.

The pilot should monitor weather conditions while flying and should be alert to conditions which might lead to icing. If induction system icing is expected, place the alternate air control in the "ON" position.

WARNING

Flight in icing conditions is prohibited unless aircraft is equipped with the approved and complete Piper ice protection system (see paragraph 4.47). If icing is encountered, immediate action should be taken to fly out of icing conditions. Icing is hazardous due to greatly reduced performance, loss of forward visibility, possible longitudinal control difficulties due to increased control sensitivity, and impaired power plant and fuel system operation.

The ammeters for the electrical system should be monitored during flight, especially during night or instrument flight, so that corrective measures can be taken in case of malfunction. The procedures for dealing with electrical failures are contained in the Emergency Procedure Section of this Handbook. The sooner a problem is recognized and corrective action taken, the greater is the chance of avoiding total electrical failure. Both alternator switches should be ON for normal operation. The two ammeters continuously indicate the alternator outputs. Certain regulator failures can cause the alternator output voltage to increase uncontrollably. To prevent damage, overvoltage relays are installed to automatically shut off the alternator(s). The alternator light on the annunciator panel will illuminate to warn of the tripped condition. Alternator outputs will vary with the electrical equipment in use and the state of charge of the battery. Alternator outputs should not exceed 65 amperes.

It is not recommended to takeoff into IFR operation with a single alternator. During flight, electrical loads should be limited to 50 amperes for each alternator. Although the alternators are capable of 65 amperes output, limiting loads to 50 amperes will assure battery charging current.

Since the Seneca has one combined fuel tank per engine, it is advisable to feed the engines symmetrically during cruise so that approximately the same amount of fuel will be left in each side for the landing. A crossfeed is provided and can be used to even up the fuel, if necessary. After 30 minutes of flight, it is permissible to operate both engines from the same tank through the crossfeed. Monitor the fuel quantity for the tank not being used to avoid overflow due to vapor return.

During flight, keep account of time and fuel used in connection with power settings to determine how the fuel flow and fuel quantity gauging systems are operating. If the fuel flow indication is considerably higher than the fuel actually being consumed or if an asymmetric flow gauge indication is observed, a fuel nozzle may be clogged and require cleaning.

There are no mechanical uplocks in the landing gear system. In the event of a hydraulic system malfunction, the landing gear will free-fall to the gear down position. The true airspeed with gear down is approximately 75% of the gear retracted airspeed for any given power setting. Allowances for the reduction in airspeed and range should be made when planning extended flight between remote airfields or flight over water.

For flight above 12,500 feet see FAR 91.32 requirements for oxygen and Section 9 - Supplements in this Handbook.

4.33 DESCENT

When power is reduced for descent, the mixtures should be enriched as altitude decreases. The propellers may be left at cruise setting; however if the propeller speed is reduced, it should be done after the throttles have been retarded. Cowl flaps should normally be closed to keep the engines at the proper operating temperature.

.35 APPROACH AND LANDING

Sometime during the approach for a landing, the throttle controls should be retarded to check the gear warning horn. Flying the airplane with the horn inoperative is not advisable. Doing so can lead to a gear up landing as it is easy to forget the landing gear, especially when approaching for a single-engine landing, or when other equipment is inoperative, or when attention is drawn to events outside the cabin. The red landing gear unsafe light will illuminate when the landing gear is in transition between the full up position and the down and locked position. Additionally, the light will illuminate when the gear warning horn sounds. The gear warning horn will sound at low throttle settings if the gear is not down and locked.

The light is off when the landing gear is in either the full down and locked or full up positions.

Prior to entering the traffic pattern, the aircraft should be slowed to approximately 98 KIAS and this speed should be maintained on the downwind leg. The landing check should be made on the downwind leg. The seat backs should be erect and the seat belts and shoulder harnesses fastened. Both fuel selectors should be ON and the cowl flaps set as required. The auxiliary fuel pumps should be OFF. Set the mixture controls and adjust the propellers to 2250 RPM. Select landing gear DOWN and check for three green lights on the panel and look for the nose wheel in the nose wheel mirror. The landing gear should be lowered at speeds below 129 KIAS and the flaps at speeds as follow:

10° (first notch) 138 KIAS maximum
25° (second notch) 121 KIAS maximum
40° (third notch) 107 KIAS maximum

Maintain a traffic pattern speed of 98 KIAS and a final approach speed of 83 KIAS. If the aircraft is lightly loaded, the final approach speed may be reduced to 79 KIAS.

When the power is reduced on close final approach, the propeller controls should be advanced to the full forward position to provide maximum power in the event of a go-around.

The landing gear position should be checked on the downwind leg and again on final approach by checking the three green indicator lights on the instrument panel and looking at the external mirror to check that the nose gear is extended. Remember that when the navigation lights are on, the gear position lights are dimmed and are difficult to see in the daytime.

Flap position for landing will depend on runway length and surface wind. Full flaps will reduce stall speed during final approach and will permit contact with the runway at a slower speed. Good pattern management includes a smooth, gradual reduction of power on final approach, with the power fully off before the wheels touch the runway. This gives the gear warning horn a chance to blow if the gear is not locked down. If electric trim is available, it can be used to assist a smooth back pressure during flare-out.

Maximum braking after touch-down is achieved by retracting the flaps, applying back pressure to the wheel and applying pressure on the brakes. However, unless extra braking is needed or unless a strong crosswind or gusty air condition exists, it is best to wait until turning off the runway to retract the flaps. This will permit full attention to be given to the landing and landing roll, and will also prevent the pilot's accidentally reaching for the gear handle instead of the flap handle.

For a normal landing, approach with full flaps (40°) and partial power until shortly before touch-down. Hold the nose up as long as possible before and after contacting the ground with the main wheels.

Approach with full flaps at 78 KIAS for a short field landing. Immediately after touch-down, raise the flaps, apply back pressure to the wheel and apply brakes.

If a crosswind or high-wind landing is necessary, approach with higher than normal speed and with zero to 25 degrees of flaps. Immediately after touch-down, raise the flaps. During a crosswind approach hold a crab angle into the wind until ready to flare out for the landing. Then lower the wing that is into the wind, to eliminate the crab angle without drifting, and use the rudder to keep the wheels aligned with the runway. Avoid prolonged side slips with a low fuel indication.

The maximum demonstrated crosswind component for landing is 17 KTS.

4.37 GO-AROUND

If a go-around from a normal approach with the airplane in the landing configuration becomes necessary, apply takeoff power to both engines (not to exceed 40 in. Hg. manifold pressure). Establish a positive climb attitude, retract the flaps and landing gear and adjust the cowl flap for adequate engine cooling.

4.39 AFTER LANDING

After leaving the runway, retract the flaps and open the cowl flaps. Test the toe brakes, a spongy pedal is often an indication that the brake fluid needs replenished. The alternate air control should be OFF.

4.41 SHUTDOWN

Prior to shutdown, switch the heater (if on) to the FAN position for a few minutes for cooling and then turn it OFF. All radio and electrical equipment should be turned OFF.

Move the mixture controls to idle cut-off. Turn OFF the magneto and master switches and set the parking brake.

NOTE

The flaps must be placed in the "UP" position for the flap step to support weight. Passengers should be cautioned accordingly.

4.43 MOORING

The airplane can be moved on the ground with the aid of the optional nose wheel tow bar stowed aft of the fifth and sixth seats. Tie-down ropes may be attached to mooring rings under each wing and to the tail skid. The ailerons and stabilator should be secured by looping the seat belt through the control wheel and pulling it snug. The rudder need not be secured under normal conditions, as its connection to the nose wheel holds it in position. The flaps are locked when in the fully retracted position.

4.45 TURBULENT AIR OPERATION

In keeping with good operating practice used in all aircraft, it is recommended that when turbulent air is encountered or expected, the airspeed be reduced to maneuvering speed to reduce the structural loads caused by gusts and to allow for inadvertent speed build-ups which may occur as a result of the turbulence or of distractions caused by the conditions. (See Subsection 2.3)

Normal Procedures Section:

'THE FOLLOWING WEATHER CONDITIONS MAY BE CONDUCIVE TO SEVERE IN FLIGHT ICING:

* Visible rain at temperatures below 0 degrees Celsius ambient air temperature.

* Droplets that splash or splatter on impact at temperatures below 0 degrees Celsius ambient air temperature.

PROCEDURES FOR EXITING THE SEVERE ICING ENVIRONMENT:

These procedures are applicable to all flight phases from takeoff to landing. Monitor the ambient air temperature. While severe icing may form at temperatures as cold as -18 degrees Celsius, increased vigilance is warranted at temperatures around freezing with visible moisture present. If the visual cues specified in the Limitations Section of the AFM for identifying severe icing conditions are observed, accomplish the following:

* Immediately request priority handling from Air Traffic Control to facilitate a route or an altitude change to exit the severe icing conditions in order to avoid extended exposure to flight conditions more severe than those for which the airplane has been certificated.

* Avoid abrupt and excessive maneuvering that may exacerbate control difficulties.

* Do not engage the autopilot.

* If the autopilot is engaged, hold the control wheel firmly and disengage the autopilot.

* If an unusual roll response or uncommanded roll control movement is observed, reduce the angle-of-attack.

* Do not extend flaps when holding in icing conditions. Operation with flaps extended can result in a reduced wing angle-of-attack , with the possibility of ice forming on the upper surface further aft on the wing than normal, possibly aft of the protected area.

* If the flaps are extended, do not retract them until the airframe is clear of ice.

* Report these weather conditions to Air Traffic Control.'

Hinweis:
Eingesetztes Flugpersonal ist auf die neuen Betriebsbeschränkungen, für Flüge unter Vereisungsbedingungen, hinzuweisen.

Airworthiness Directives

Header Information

DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration
14 CFR Part 39 [64 FR 34530 No. 123 06/28/99]
Docket No. 98-CE-77-AD; Amendment 39-11209; AD
RIN 2120-AA64
Airworthiness Directives; The New Piper Aircraft, Inc. PA-23, PA-30, PA-31, PA-34, PA-39, PA-40, and PA-42 Series Airplanes

PDF Copy (If Available):

Preamble Information

Regulatory Information

THE NEW PIPER AIRCRAFT, INC.: Amendment 39-11209; Docket No. 98-CE-77-AD; Supersedes AD 98-04-27, Amendment 39-10339.

Applicability: Models PA-23, PA-23-160, PA-23-235, PA-23-250, PA-E23-250, PA-30, PA-39, PA-40, PA-31, PA-31-300, PA-31-325, PA-31-350, PA-31P, PA-31T, PA-31T1, PA- 31T2, PA-31P-350, PA-34-200, PA-34-200T, PA-34-220T, PA-42, PA-42-720, and PA-42-1000 airplanes, all serial numbers, certificated in any category.

NOTE 1: This AD applies to each airplane identified in the preceding applicability provision, regardless of whether it has been modified, altered, or repaired in the area subject to the requirements of this AD. For airplanes that have been modified, altered, or repaired so that the performance of the requirements of this AD is affected, the owner/operator must request approval for an alternative method of compliance in accordance with paragraph (d) of this AD. The request should include an assessment of the effect of the modification, alteration, or repair on the unsafe condition addressed by this AD; and, if the unsafe condition has not been eliminated, the request should include specific proposed actions to address it.

Compliance: Required as follows, unless already accomplished:

1. For all affected airplanes, except for Models PA-31P, PA-31T, PA-31T1, PA- 31T2, and PA-31P-350 airplanes: Within 30 days after March 13, 1997 (the effective date of AD 98-04-27).

2. For all Models PA-31P, PA-31T, PA-31T1, PA-31T2, and PA-31P-350 airplanes: Within the next 30 days after the effective date of this AD.

To minimize the potential hazards associated with operating the airplane in severe icing conditions by providing more clearly defined procedures and limitations associated with such conditions, accomplish the following:

) At the applicable compliance time presented in the Compliance section of this AD, accomplish ...e requirements of paragraphs (a)(1) and (a)(2) of this AD.

NOTE 2: Operators should initiate action to notify and ensure that flight crewmembers are apprised of this change.

(1) Revise the FAA-approved Airplane Flight Manual (AFM) by incorporating the following into the Limitations Section of the AFM. This may be accomplished by inserting a copy of this AD in the AFM.

"WARNING

Severe icing may result from environmental conditions outside of those for which the airplane is certificated. Flight in freezing rain, freezing drizzle, or mixed icing conditions (supercooled liquid water and ice crystals) may result in ice build-up on protected surfaces exceeding the capability of the ice protection system, or may result in ice forming aft of the protected surfaces. This ice may not be shed using the ice protection systems, and may seriously degrade the performance and controllability of the airplane.

- During flight, severe icing conditions that exceed those for which the airplane is certificated shall be determined by the following visual cues. If one or more of these visual cues exists, immediately request priority handling from Air Traffic Control to facilitate a route or an altitude change to exit the icing conditions.

- Unusually extensive ice accumulation on the airframe and windshield in areas not normally observed to collect ice.

- Accumulation of ice on the upper surface of the wing, aft of the protected area.

- Accumulation of ice on the engine nacelles and propeller spinners farther aft than normally observed.

- Since the autopilot, when installed and operating, may mask tactile cues that indicate adverse changes in handling characteristics, use of the autopilot is prohibited when any of the visual cues specified above exist, or when unusual lateral trim requirements or autopilot trim warnings are encountered while the airplane is in icing conditions.
- All wing icing inspection lights must be operative prior to flight into known or forecast icing conditions at night. [NOTE: This supersedes any relief provided

by the Master Minimum Equipment List (MMEL).]"

(2) Revise the FAA-approved AFM by incorporating the following into the Normal Procedures Section of the AFM. This may be accomplished by inserting a copy of this AD in the AFM.

"THE FOLLOWING WEATHER CONDITIONS MAY BE CONDUCIVE TO SEVERE IN-FLIGHT ICING:

- Visible rain at temperatures below 0 degrees Celsius ambient air temperature.
- Droplets that splash or splatter on impact at temperatures below 0 degrees Celsius ambient air temperature.

PROCEDURES FOR EXITING THE SEVERE ICING ENVIRONMENT:

These procedures are applicable to all flight phases from takeoff to landing. Monitor the ambient air temperature. While severe icing may form at temperatures as cold as -18 degrees Celsius, increased vigilance is warranted at temperatures around freezing with visible moisture present. If the visual cues specified in the Limitations Section of the AFM for identifying severe icing conditions are observed, accomplish the following:

- Immediately request priority handling from Air Traffic Control to facilitate a route or an altitude change to exit the severe icing conditions in order to avoid extended exposure to flight conditions more severe than those for which the airplane has been certificated.
- Avoid abrupt and excessive maneuvering that may exacerbate control difficulties.
- Do not engage the autopilot.
- If the autopilot is engaged, hold the control wheel firmly and disengage the autopilot.
- If an unusual roll response or uncommanded roll control movement is observed, reduce the angle-of-attack.
- Do not extend flaps when holding in icing conditions. Operation with flaps extended can result in a reduced wing angle-of-attack, with the possibility of ice forming on the upper surface further aft on the wing than normal, possibly aft of

the protected area.

- If the flaps are extended, do not retract them until the airframe is clear of ice.

- Report these weather conditions to Air Traffic Control."

(b) Incorporating the AFM revisions, as required by this AD, may be performed by the owner/operator holding at least a private pilot certificate as authorized by section 43.7 of the Federal Aviation Regulations (14 CFR 43.7), and must be entered into the aircraft records showing compliance with this AD in accordance with section 43.9 of the Federal Aviation Regulations (14 CFR 43.9).

(c) Special flight permits may be issued in accordance with sections 21.197 and 21.199 of the Federal Aviation Regulations (14 CFR 21.197 and 21.199) to operate the airplane to a location where the requirements of this AD can be accomplished.

(d) An alternative method of compliance or adjustment of the compliance time that provides an equivalent level of safety may be approved by the Manager, Small Airplane Directorate, FAA, 1201 Walnut, suite 900, Kansas City, Missouri 64106. The request shall be forwarded through an appropriate FAA Maintenance Inspector, who may add comments and then send it to the Manager, Small Airplane Directorate.

NOTE 3: Information concerning the existence of approved alternative methods of compliance with this AD, if any, may be obtained from the Small Airplane Directorate.

(e) All persons affected by this directive may examine information related to this AD at the FAA, Central Region, Office of the Regional Counsel, Room 1558, 601 E. 12th Street, Kansas City, Missouri 64106.

(f) This amendment supersedes AD 98-04-27, Amendment 39-10339.

(g) This amendment becomes effective on August 17, 1999.

4.47 FLIGHT INTO KNOWN ICING CONDITIONS

The Piper Seneca II is approved for flight into known icing conditions when equipped with the complete Piper Ice Protection System* Operating in icing conditions in excess of the Continuous Maximum and Intermittent Maximum as defined in FAR 25, Appendix C has been substantiated; however, there is no correlation between these conditions and forecast or reported "Light, Moderate and Severe" conditions. Therefore, on the basis of flight tests, the following guidelines should be observed:

(a) Flight into severe icing is prohibited.
(b) Moderate icing conditions above 10,000 ft. should be avoided whenever possible; if moderate icing conditions are encountered above 10,000 ft., a descent to a lower altitude should be initiated if practical.
(c) Operation in light icing is approved at all altitudes.

Icing conditions of any kind should be avoided wherever possible, since any minor malfunction which may occur is potentially more serious in icing conditions. Continuous attention of the pilot is required to monitor the rate of ice buildup in order to effect the boot cycle at the optimum time. Boots should be cycled when ice has built to between 1/4 and 1/2 inch thickness on the leading edge to assure proper ice removal. Repeated boot cycles at less than 1/4 inch can cause a cavity to form under the ice and prevent ice removal; boot cycles at thicknesses greater than 1/2 may also fail to remove ice.

Icing conditions can exist in any clouds when the temperature is below freezing; therefore it is necessary to closely monitor outside air temperature when flying in clouds or precipitation. Clouds which are dark and have sharply defined edges have high water content and should be avoided whenever possible. Freezing rain must always be avoided.

Prior to dispatch into forecast icing conditions all ice protection should be functionally checked for proper operation. Before entering probable icing conditions use the following procedures:

(a) Windshield defroster - on (immediately)
(b) Pitot heat - on (immediately)
(c) Windshield heat - on (when entering icing conditions)
(d) Propeller deice - on (when entering icing conditions)
(e) Wing deice - on (after 1/4 to 1/2 inch accumulation)
(f) Relieve propeller unbalance (if required) by increasing RPM briefly. Repeat as required.

WARNING

Do not cycle pneumatic boots with less than 1/4 inch of ice accumulation; operation of boots with less than 1/4 inch ice accumulation can result in failure to remove ice.

*Optional equipment

Heat for the lift detectors is activated by the pitot heat switch. When ice has accumulated on the unprotected surfaces of the airplane, aerodynamic buffet commences between 5 and 10 knots above the stall speed. A substantial margin of airspeed should be maintained above the normal stall speeds, since the stall speed may increase by up to 10 knots in prolonged icing encounters.

If ice is remaining on the unprotected surfaces of the airplane at the termination of the flight, the landing should be made using full flaps and carrying a slight amount of power whenever practical, and approach speeds should be increased by 10 to 15 knots.

Cruise speed may be significantly reduced in prolonged icing encounters. If icing conditions are encountered at altitudes above 10,000 feet, it may be necessary to descend in order to maintain airspeed above the best rate of climb speed (89 KIAS).

NOTE

Pneumatic boots must be regularly cleaned and waxed for proper operation in icing conditions. Pitot, windshield and lift detector heat should be checked on the ground before dispatch into icing conditions.

Installation of ice protection equipment results in a 30 FPM decrease in single engine climb rate and a reduction of 850 feet in single engine service ceiling.

4.49 FLIGHT WITH REAR CABIN AND CARGO DOORS REMOVED

The airplane is approved for flight with the rear cabin and cargo doors removed. Certain limitations must be observed in the operation of this airplane in this configuration.

The maximum speed with doors removed is 129 KIAS. The minimum single engine control speed is 67 KIAS. Smoking is not permitted and all loose articles must be tied down and stowed. The jumper's static lines must be kept free of pilot's controls and control surfaces. Operation is approved for VFR non-icing flight conditions only. It is recommended that all occupants wear parachutes when operating with the rear cabin and cargo doors removed.

All climb and cruise performance will be reduced by approximately five percent when the airplane is operated with the rear cabin and cargo doors removed.

4.51 VSSE - INTENTIONAL ONE ENGINE INOPERATIVE SPEED

Vsse is a speed selected by the aircraft manufacturer as a training aid for pilot's in the handling of multi-engine aircraft. It is the minimum speed for intentionally rendering one engine inoperative in flight. This minimum speed provides the margin the manufacturer recommends for use when intentionally performing engine inoperative maneuvers during training in the particular airplane.

The intentional one engine inoperative speed, Vsse, for the Seneca II is 76 KIAS.

53 VMC - MINIMUM SINGLE-ENGINE CONTROL SPEED

Vmc is airspeed below which a twin-engine aircraft cannot be controlled in flight with one engine perating at takeoff power and the other engine windmilling. Vmc for the Seneca II has been determined to e 66 KIAS. Under no circumstances should an attempt be made to fly at a speed below this Vmc with nly one engine operating. As a safety precaution, when operating under single-engine flight conditions ther in training or in emergency situations, maintain an indicated airspeed above 76 KIAS, Vsse. Reduce rspeed approximately 1 knot per second until Vmc is reached.

The Vmc demonstration required for the FAA flight test for the multi-engine rating approaches an ncontrolled flight condition with power reduced on one engine. The demonstration should not be erformed at an altitude of less than 3500 feet above the ground. Initiate recovery during the emonstration by immediately reducing power on the operating engine and promptly lowering the nose of ıe airplane to accelerate to Vsse.

In the Seneca II, more power is available on the operating engine at higher altitudes with the same ıanifold pressure; hence, there can be more asymmetric thrust. The Vmc in the Seneca II is lowest at low ı ıdes, and the airplane will approach a stall before reaching Vmc. The most critical situation occurs at ıe altitude where the stall speed and Vmc speed coincide. Care should be taken to avoid this flight ondition, because at this point loss of directional control occurs at the same time the airplane stalls, and pin could result.

NOTE

Single-engine stalls are not recommended.

.55 STALLS

The loss of altitude during a power off stall with the gear and flaps retracted may be as much as 400 eet. The loss of altitude with the gear down and 40° of flaps may also be as much as 400 feet.

A power on stall may result in as much as 150 feet of altitude loss.

The stall warning system is inoperative with the master switch OFF.