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SECTION 3

EMERGENCY PROCEDURES

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SECTION 3

EMERGENCY PROCEDURES

3.1 GENERAL

This section provides the recommended procedures for coping with various emergency or critical situations. All of the emergency procedures required by the FAA, as well as those necessary for operation of the airplane, as determined by the operating and design features of the airplane, are presented.

Emergency procedures associated with optional systems and equipment which require handbook supplements are presented in Section 9, Supplements.

This section is divided into two basic parts. The first part contains the emergency procedures checklists. These checklists supply an immediate action sequence to be followed during critical situations with little emphasis on the operation of the systems. The numbers located in parentheses after each checklist heading indicate where the corresponding paragraph in the amplified procedures can be found.

The second part of the section provides amplified emergency procedures corresponding to the emergency procedures checklist items. These amplified emergency procedures contain additional information to provide the pilot with a more complete description of the procedures so they may be more easily understood. The numbers located in parentheses after each paragraph heading indicates the corresponding checklist paragraph.

Pilots must familiarize themselves with the procedures given in this section and must be prepared to take the appropriate action should an emergency situation arise. The procedures are offered as a course of action for coping with the particular situation or condition described. They are not a substitute for sound judgment and common sense.

Most basic emergency procedures are a normal part of pilot training. The information presented in this section is not intended to replace the training. This information is intended to provide a source of reference for the procedures which are applicable to this airplane. The pilot should review standard emergency procedures periodically to remain proficient in them.

3.2 AIRSPEEDS FOR SAFE OPERATIONS

3.2a STALL SPEEDS

2325 lbs (0° Flap) ..... 50 KIAS
2325 lbs (Full Flap ..... 44 KIAS

3.2b MANEUVERING SPEEDS

2325 lbs..... 111 KIAS
1531 lbs..... 88 KIAS

3.2c NEVER EXCEED SPEED

Never Exceed Speed ..... 160 KIAS

3.2d POWER OFF GLIDE SPEED

2325 lbs (0° Flap) ..... 73 KIAS

3.3 EMERGENCY PROCEDURES CHECKLIST

3.3a ENGINE FIRE DURING START (3.7)

Starter ..... CRANK ENGINE
Mixture ..... IDLE CUT-OFF
Throttle ..... OPEN
Electric Fuel Pump ..... OFF
Fuel Selector ..... OFF
Abandon if fire continues

3.3b ENGINE POWER LOSS DURING TAKEOFF (3.9)

If sufficient runway remains for a normal landing, land straight ahead.

If insufficient runway remains:
Maintain safe airspeed
Make only shallow turn to avoid obstructions
Flaps as situation requires

If sufficient altitude has been gained to attempt a restart:
Maintain safe airspeed
Fuel Selector ..... SWITCH to tank containing fuel
Electric Fuel Pump ..... CHECK ON
Mixture ..... CHECK RICH
Carburetor Heat ..... ON
Primer ..... LOCKED
If power is not regained, proceed with power off landing (3.3d).

3.3c ENGINE POWER LOSS IN FLIGHT (3.11)

Fuel Selector ..... SWITCH to tank containing fuel
Electric Fuel Pump ..... ON
Mixture ..... RICH
Carburetor Heat ..... ON
Engine Gauges ..... CHECK for indication of cause of power loss

3.3c ENGINE POWER LOSS IN FLIGHT (3.11) (Continued)

Primer ..... CHECK LOCKED
If no fuel pressure is indicated, check tank selector position to be sure it is on a tank containing fuel.

When power is restored:
Carburetor Heat ..... OFF
Electric Fuel Pump ..... OFF

If power is not restored, prepare for power off landing (3.3d).
Trim for 73 KIAS

3.3d POWER OFF LANDING (3.13)

Locate suitable field.
Establish spiral pattern.
1000 ft. above field at downwind position for normal landing approach. When field can easily be reached slow to 63 KIAS for shortest landing.

Touchdowns should normally be made at lowest possible airspeed with full flaps extended.

When committed to landing:
Ignition ..... OFF
BATT MASTR Switch ..... OFF
ALTR Switch ..... OFF
Fuel Selector ..... OFF
Mixture ..... IDLE CUT-OFF
Seat Belts and Harnesses ..... TIGHT

3.3e FIRE IN FLIGHT (3.15)

Source of Fire ..... CHECK

Electrical fire (smoke in cabin):

BATT MASTR Switch ..... OFF
ALTR Switch ..... OFF
Vents ..... OPEN
Cabin Heat ..... OFF
Land as soon as practical.

3.3e FIRE IN FLIGHT (3.15) (Continued)

Engine fire:

Fuel Selector ..... OFF
Throttle ..... CLOSED
Mixture ..... IDLE CUT-OFF
Electric Fuel Pump ..... CHECK OFF
Heater ..... OFF
Defroster ..... OFF

Proceed with POWER OFF LANDING procedure (3.3d).

NOTE

The possibility of an engine fire in flight is extremely remote. The procedure given is general and pilot judgement should be the determining factor for action in such an emergency.

3.3f LOSS OF OIL PRESSURE (3.17)

Land as soon as possible and investigate cause.
Prepare for power off landing (3.3d).

3.3g LOSS OF FUEL PRESSURE (3.19)

Electric Fuel Pump ..... ON
Fuel Selector ..... CHECK on TANK CONTAINING FUEL

3.3h HIGH OIL TEMPERATURE (3.21)

Land at nearest airport and investigate the problem.
Prepare for power off landing (3.3d).

3.3i ELECTRICAL FAILURES (3.23)

NOTE

When operating with light electrical load and a fully charged battery, the Alternator Inop. light may illuminate due to minimal alternator output. If the alternator is functional a slight increase in electrical load should extinguish the Inop. indication.

ALT annunciator light illuminated:
Ammeter ..... CHECK to VERIFY inop. alt.

If ammeter shows zero:
ALTR switch ..... OFF

Reduce electrical loads to minimum:
ALTNTR. FIELD Circuit Breaker ..... CHECK and RESET as required
ALTR Switch ..... ON

3.3i ELECTRICAL FAILURES (3.23) (Continued)

If power not restored:
ALTR Switch .....OFF

If alternator output cannot be restored, reduce electrical loads and land as soon as practical. The battery is the only remaining source of electrical power.

3.3j ELECTRICAL OVERLOAD (Alternator over 20 amps above known electrical load) (3.25)

ALTR Switch.....ON
BATT MASTR Switch.....OFF

If alternator loads are reduced:
Electrical Load.....REDUCE to Minimum

Land as soon as practical.

NOTE

Due to increased system voltage and radio frequency noise, operation with ALT switch ON and BATT switch OFF should be made only when required by an electrical system failure.

If alternator loads are not reduced:
ALTR switch .....OFF
BATT MASTR Switch .....AS REQUIRED

Land as soon as possible. Anticipate complete electrical failure.

3.3k SPIN RECOVERY (3.27)

Throttle .....IDLE
Ailerons .....NEUTRAL
Rudder .....FULL OPPOSITE to DIRECTION of ROTATION
Control Wheel .....FULL FORWARD
Rudder .....NEUTRAL (when rotation stops)
Control Wheel .....AS REQUIRED to SMOOTHLY REGAIN LEVEL FLIGHT ATTITUDE

3.3m OPEN DOOR (3.29)

If both upper and lower latches are open, the door will trail slightly open and airspeeds will be reduced slightly.

To close the door in flight:
Slow airplane to 89 KIAS
Cabin Vents ..... CLOSE
Storm Window ..... OPEN

If upper latch is open ..... LATCH
If side latch if open ..... PULL on ARMREST while moving latch handle to LATCH position.

If both latches are open ..... LATCH SIDE LATCH then TOP LATCH.

3.3n ENGINE ROUGHNESS (3.31)

Carburetor Heat ..... ON

If roughness continues after one minute:
Carburetor Heat ..... OFF
Mixture ..... ADJUST for MAXIMUM SMOOTHNESS
Electric Fuel Pump ..... ON
Fuel Selector ..... SWITCH TANKS
Engine Gauges ..... CHECK
Magneto Switch ..... L then R then BOTH

If operation is satisfactory on either magneto, continue on that magneto at reduced power and full RICH mixture to first airport.

Prepare for power off landing (3.3d).

NOTE

Partial carburetor heat may be worse than no heat at all, since it may melt part of the ice which will refreeze in the intake system. Therefore, when using carburetor heat always use full heat; and, when ice is removed, return the control to the full cold position.

3.3o CARBURETOR ICING (3.33)

Carburetor Heat ..... ON
Mixture ..... ADJUST for MAXIMUM SMOOTHNESS

3.5 AMPLIFIED EMERGENCY PROCEDURES (GENERAL)

The following paragraphs are presented to supply additional information for the purpose of providing the pilot with a more complete understanding of the recommended course of action and probable cause of an emergency situation.

3.7 ENGINE FIRE DURING START (3.3a)

Engine fires during start are usually the result of overpriming. The first effort to extinguish the fire is to attempt an engine start in order to draw the excess fuel back into the induction system.

If a fire is present before the engine has started, try to draw the fire back into the engine by moving the mixture control to idle cut-off, opening the throttle, turning OFF the electric fuel pump and fuel selector, while cranking the engine.

If an external fire extinguishing method is used, set the mixture control to idle cut-off, and turn OFF the electric fuel pump and fuel selector.

3.9 ENGINE POWER LOSS DURING TAKEOFF (3.3b)

The proper action to be taken if loss of power occurs during takeoff will depend on the circumstances of the particular situation.

If sufficient runway remains to complete a normal landing, land straight ahead.

If insufficient runway remains, maintain a safe airspeed and make only a shallow turn if necessary to avoid obstructions. Use of flaps depends on the circumstances. Normally, flaps should be fully extended for touchdown.

If sufficient altitude has been gained to attempt a restart, maintain a safe airspeed and switch the fuel selector to another tank containing fuel. Check the electric fuel pump to ensure that it is ON and that the mixture is RICH. The carburetor heat should be ON and the primer locked.

If engine failure was caused by fuel exhaustion, power will not be regained after switching the fuel tanks until the empty fuel lines are filled. This may require up to ten seconds.

If power is not regained, proceed with the Power Off Landing procedure (refer to the emergency checklist (3.3d) and paragraph 3.13).

3.11 ENGINE POWER LOSS IN FLIGHT (3.3c)

Complete engine power loss is usually caused by fuel flow interruption, and power will be restored shortly after fuel flow is restored. If power loss occurs at a low altitude, the first step is to prepare for an emergency landing (refer to paragraph 3.13). Trim the airplane for best gliding angle (73 KIAS), and look for a field suitable for landing.

If altitude permits, switch the fuel selector to another tank containing fuel and turn the electric fuel pump ON. Move the mixture control to RICH and the carburetor heat to ON. Check the engine gauges for an indication of the cause of the power loss. Check to ensure the primer is locked. If no fuel pressure is indicated, check the tank selector position to be sure it is on a tank containing fuel.

When power is restored move the carburetor heat to the OFF position and turn OFF the electric fuel pump.

If the preceding steps do not restore power, prepare for an emergency landing.

If time permits, turn the ignition switch to L then to R then back to BOTH. Move the throttle and mixture control levers to different settings. This may restore power if the problem is too rich or too lean a mixture or if there is a partial fuel system restriction. Try other fuel tanks. Water in the fuel could take some time to be used up, and allowing the engine to windmill may restore power. If power loss is due to water, fuel pressure indications will be normal.

If engine failure was caused by fuel exhaustion, power will not be restored after switching fuel tanks until the empty fuel lines are filled. This may require up to ten seconds.

If power is not regained, proceed with the Power Off Landing procedure (refer to the emergency checklist (3.3d) and paragraph 3.13).

3.13 POWER OFF LANDING (3.3d)

If loss of power occurs at altitude, trim the aircraft for best gliding angle (73 KIAS) and look for a suitable field. If measures taken to restore power are not effective, and if time permits, check your charts for airports in the immediate vicinity; it may be possible to land at one if you have sufficient altitude. If possible, notify the FAA by radio of your difficulty and intentions. If another pilot or passenger is aboard, let him help.

3.13 POWER OFF LANDING (3.3d) (Continued)

When a suitable field has been located, establish a spiral pattern around it. To make a normal landing approach, try to be at 1000 feet above the field at the downwind position. When the field can easily be reached, slow to 63 KIAS for the shortest landing. Excess altitude may be lost by widening the pattern, using flaps, slipping, or a combination of these.

When committed to a landing, turn OFF the battery master (BATT MASTR), alternator (ALTR), and ignition switches. Flaps may be used as desired. Turn the fuel selector valve to OFF and move the mixture to idle cut-off. The seat belts and shoulder harnesses should be tightened. Touchdown should normally be made at the lowest possible airspeed with full flaps extended.

3.15 FIRE IN FLIGHT (3.3e)

Because the necessary course of action differs somewhat in each case, it is essential that the source of the fire be identified promptly through instrument readings, characteristics of the smoke, or other indications.

First check for the source of the fire.

If smoke in the cabin indicates an electrical fire, turn the battery master (BATT MASTR) and alternator (ALTR) switches OFF, open the cabin vents, and turn the cabin heat OFF. A landing should be made as soon as possible.

If an engine fire exists, switch the fuel selector OFF and close the throttle. Set the mixture to idle cut-off and turn the electric fuel pump OFF. In all cases, the heater and defroster should be OFF. If radio communication is not required, select the battery master and alternator switches OFF. Proceed with Power Off Landing procedure (refer to paragraph 3.13).

NOTE

The possibility of an engine fire in flight is extremely remote. The procedure given is general and pilot judgement should be the detemining factor for action in such an emergency.

3.17 LOSS OF OIL PRESSURE (3.3f)

Loss of oil pressure may be either partial or complete. A partial loss of oil pressure usually indicates a malfunction in the oil pressure regulating system, and a landing should be made as soon as possible to investigate the cause and prevent engine damage.

A complete loss of oil pressure indication may signify oil exhaustion or may be the result of a faulty gauge. In either case, proceed toward the nearest airport, and be prepared for a forced landing. Since the engine may stop suddenly, if the problem is ***not*** a pressure gauge malfunction, maintain altitude until such time as a dead stick landing can be accomplished. Don't change power settings unnecessarily, as this may hasten complete power loss.

Depending on the circumstances, it may be advisable to make an off airport landing while power is still available, particularly if other indications of actual oil pressure loss, such as sudden increases in temperatures, or oil smoke, are apparent, and an airport is not close.

If engine stoppage occurs, proceed with a power off landing (refer to paragraph 3.13).

33.19 LOSS OF FUEL PRESSURE (3.3g)

If loss of fuel pressure occurs, turn ON the electric fuel pump and check that the fuel selector is on a tank containing fuel.

If the problem is not an empty tank, land as soon as practical and have the engine-driven fuel pump and fuel system checked.

3.21 HIGH OIL TEMPERATURE (3.3h)

An abnormally high oil temperature indication may be caused by a low oil level, an obstruction in the oil cooler, damaged or improper baffle seals, a defective gauge, or other causes. Land as soon as practical at an appropriate airport and have the cause investigated.

A steady, rapid rise in oil temperature is a sign of trouble. Land at the nearest airport and let a mechanic investigate the problem. Watch the oil pressure gauge for an accompanying loss of pressure.

3.23 ELECTRICAL FAILURES (3.3i)

NOTE

When operating with light electrical load and a fully charged battery, the Alternator Inop. light may illuminate due to minimal alternator output. If the alternator is functional a slight increase in electrical load should extinguish the Inop. indication.

Loss of alternator output is detected through zero reading on the ammeter. Before executing the following procedure, ensure that the reading is zero, and not merely low, by actuating an electrically powered device, such as the landing light. If no increase in the ammeter reading is noted, alternator failure can be assumed.

The electrical load should be reduced as much as possible. Check for an open alternator field circuit breaker.

Next attempt to reset the overvoltage relay by moving the ALTR switch to OFF for one second and then to ON. If the trouble was caused by a momentary overvoltage condition (16.5 volts and up) this procedure should return the ammeter to a normal reading.

If the ammeter continues to indicate ZERO output, or if the alternator will not remain reset, turn off the ALTR switch, maintain minimum electrical load and land as soon as practical. All electrical load is being supplied by the battery.

3.25 ELECTRICAL OVERLOAD (Alternator over 20 amps above known electrical load) (3.3j)

If abnormally high alternator output is observed (more than 20 amps above known electrical load for the operating conditions), it may be caused by a low battery, a battery fault or other abnormal electrical load. If the cause is a low battery, the indication should begin to decrease toward normal within 5 minutes. If the overload condition persists, attempt to reduce the load by turning off non-essential equipment.

Turn the BATT MASTR switch OFF and the ammeter should decrease. Turn the BATT MASTR switch ON and continue to monitor the ammeter. If the alternator output does not decrease within 5 minutes, turn the BATT MASTR switch OFF and land as soon as possible. All electrical loads are being supplied by the alternator.

NOTE

Due to increased system voltage and radio frequency noise, operation with the ALTR switch ON and the BATT MASTR switch OFF should be made only when required by an electrical failure.

3.27 SPIN RECOVERY (3.3k)

Intentional spins are prohibited in this airplane. If a spin is inadvertently entered, immediately move the throttle to idle and the ailerons to neutral.

Full rudder should then be applied opposite to the direction of rotation followed by control wheel full forward. When the rotation stops, neutralize the rudder and ease back on the control wheel as required to smoothly regain a level flight attitude.

3.29 OPEN DOOR (3.3m)

The Cadet's cabin door is double latched, so the chance of it opening at both the top and bottom in flight are remote. However, should the upper latch not be closed, or the side latch not be fully engaged, the door may spring partially open at takeoff or soon afterward.

If both the upper and side latches have not been engaged, the door will trail slightly open, resulting in unpleasant air and propeller noise, and a slight reduction in airspeed. A partially open door will not affect normal flight characteristics, and a normal landing can be made.

To close the door in flight, slow the airplane to 89 KIAS, close the cabin vents and open the storm window. If the top latch is open, latch it. If the side latch is open, pull on the armrest while moving the latch handle to the latched position. If both latches are open, close the side latch first, and then the top latch.

3.31 ENGINE ROUGHNESS (3.3n)

Engine roughness is usually due to carburetor icing which is indicated by a drop in rpm, and may be accompanied by a slight loss of airspeed or altitude. If too much ice is allowed to accumulate, restoration of full power may not be possible; therefore, prompt action is required.

Turn carburetor heat on (see Note). Rpm will decrease slightly and roughness will increase. Wait for a decrease in engine roughness or an increase in rpm, indicating ice removal. If there is no change in approximately one minute, return the carburetor heat to OFF.

3.31 ENGINE ROUGHNESS (3.3n) (Continued)

If the engine is still rough, adjust the mixture for maximum smoothness. The engine will run rough if the mixture is too rich or too lean. The electric fuel pump should be switched to ON and the fuel selector switched to the other tank to see if fuel contamination is the problem. Check the engine gauges for abnormal readings. If any gauge readings are abnormal, proceed accordingly. Move the magneto switch to L then to R, then back to BOTH. If operation is satisfactory on either magneto, proceed on that magneto, at reduced power, with mixture full RICH, to a landing at the first available airport.

If roughness persists, prepare for a precautionary landing at pilot's discretion.

NOTE

Partial carburetor heat may be worse than no heat at all, since it may melt part of the ice which will refreeze in the intake system. Therefore, when using carburetor heat always use full heat; and, when ice is removed, return the control to the full cold position.

3.33 CARBURETOR ICING (3.3o)

Under certain moist atmospheric conditions at temperatures of -5°C to 20°C, it is possible for ice to form in the induction system, even in summer weather. This is due to the high air velocity through the carburetor venturi and absorption of heat from this air by vaporization of the fuel.

To avoid this, carburetor preheat is provided to replace the heat lost by vaporization. Carburetor heat should be full on when carburetor ice is encountered. Adjust mixture for maximum smoothness.

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