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SECTION 3

EMERGENCY PROCEDURES

3.1 GENERAL

The recommended procedures for coping with various types of emergencies and critical situations are provided in this section. All of the required (FAA regulations) emergency procedures and those necessary for the safe operation of the airplane as determined by the operating and design features of the airplane are presented.

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

The first portion of this section consists of an abbreviated emergency check list which supplies an action sequence for critical situations with little emphasis on the operation of systems.

The remainder of the section presents amplified emergency procedures containing additional information to provide the pilot with a more complete understanding of the procedures.

These procedures are suggested as a course of action for coping with the particular condition described, but are not a substitute for sound judgment and common sense. Pilots should familiarize themselves with the procedures given in this section and be prepared to take appropriate action should an emergency arise.

Most basic emergency procedures, such as power off landings, are a normal part of pilot training. Although these emergencies are discussed here, this information is not intended to replace such training, but only to provide a source of reference and review, and to provide information on procedures which are not the same for all aircraft. It is suggested that the pilot review standard emergency procedures periodically to remain proficient in them.

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3.3 EMERGENCY CHECK LIST

AIRSPEEDS FOR SAFE OPERATIONS

Minimum Single Engine Control . . . . . 66 KIAS
Best Single Engine Rate of Climb . . . . . 89 KIAS
Best Single Engine Angle of Climb . . . . . 78 KIAS
Maneuvering . . . . . .121 KIAS
Never Exceed . . . . . .195 KIAS

ENGINE INOPERATIVE PROCEDURES

DETECTING DEAD ENGINE

Loss of thrust.
Nose of aircraft will yaw in direction of dead engine (with coordinated controls).

ENGINE SECURING PROCEDURE (FEATHERING PROCEDURE)

To attempt to restore power prior to feathering:
Mixtures . . . . . as required
Fuel selector . . . . . .cross feed
Magnetos . . . . . .left or right only
Alternate air . . . . . .ON
Auxiliary fuel pump . . . . . .unlatch, on HI, if power is not immediately restored, OFF

Feather before RPM drops below 800.
Minimum control speed . . . . . 66 KIAS
Best S.E. R/C . . . . . 89 KIAS
Maintain direction and airspeed above 76 KIAS.
Mixture controls . . . . . .forward
Propeller controls . . . . . .forward
Throttle controls . . . . . .forward (40 in Hg max.)
Flaps . . . . . .retract
Gear . . . . . .retract
Identify inoperative engine.
Throttle of inop. engine . . . . . .retard to verify
Mixture of inop. engine . . . . . idle cut-off
Prop control of inop. engine . . . . . feather
Trim . . . . . as required
Auxiliary fuel pumps . . . . . .OFF (except in case of engine driven pump failure)
Magnetos of inop. engine . . . . . .OFF
Cowl flaps . . . . . close on inop. engine, as required on operative engine
Alternator of inop. engine . . . . . .OFF
Electrical load . . . . . .reduce
Fuel management . . . . . OFF inop. engine, consider crossfeed

ENGINE FAILURE DURING TAKEOFF (Below 85 KIAS)

If engine failure occurs during takeoff and 85 KIAS has not been attained:
Throttles . . . . . CLOSE both immediately
Stop straight ahead.

If inadequate runway remains to stop:
Throttles . . . . . CLOSED
Brakes . . . . . apply max. braking
Master switch . . . . . .OFF
Fuel selectors . . . . . .OFF
Continue straight ahead, turning to avoid obstacles.

ENGINE FAILURE DURING TAKEOFF (85 KIAS or above)

If engine failure occurs during takeoff ground roll or after lift-off with gear still down and 85 KIAS has been attained:
If adequate runway remains CLOSE both throttles immediately, land if airborne and stop straight ahead.
If runway remaining is inadequate for stopping, decide whether to abort or continue. If decision is made to continue, maintain heading and airspeed, retract landing gear when climb is established and feather inoperative engine prop (see Engine Securing Procedure).

ENGINE FAILURE DURING CLIMB

If engine failure occurs when airspeed is below 66 KIAS:

Rudder . . . . . apply towards operating engine
Throttles . . . . . reduce throttle settings as required to maintain directional control
Nose . . . . . lower nose to accelerate best single engine rate of climb speed (89 KIAS)
Operative eng. . . . . increase power as airspeed increases above 66 KIAS
Inoperative engine prop . . . . . FEATHER (see Engine Securing Procedure)

If engine failure occurs when airspeed is above 66 KIAS:

Maintain directional control.
Adjust airspeed toward the best single engine rate of climb speed (89 KIAS).
Inoperative engine prop . . . . . FEATHER (see Engine Securing Procedure)

ENGINE FAILURE DURING FLIGHT (Below 66 KIAS)

Rudder . . . . . apply towards operative engine
Throttles (both engines) . . . . . retard to stop turn
Pitch attitude . . . . . lower nose to accelerate above 66 KIAS
Operative eng . . . . . increase power as airspeed increases above 66 KIAS

If altitude permits, a restart may be attempted.

If restart fails or altitude does not permit:

Inop. eng. prop . . . . . FEATHER
Trim . . . . . adjust 5° bank toward operative eng.
Inop. eng. . . . . complete Engine Securing Procedure
Cowl flap (operative eng.) . . . . . as required

ENGINE FAILURE DURING FLIGHT (Above 66 KIAS)

Rudder . . . . . apply toward operative engine
Inop. eng. . . . . identify
Operative eng. . . . . adjust as required

Before securing inop. engine:

Fuel flow . . . . . check (if deficient-auxiliary fuel pump HI BOOST, if power is not restored, OFF
Fuel quantity . . . . . check
Fuel selector (inop. eng.) . . . . . cross feed
Alternate air . . . . . ON
Mixture . . . . . check
Oil pressure and temp . . . . . check
Magneto switches . . . . . check

If engine does not start, complete Engine Securing Procedure.

Power (operative eng.) . . . . . as required
Mixture (operative eng.) . . . . . adjust for power
Fuel quantity (operative eng. tank) . . . . . sufficient
Auxiliary fuel pump (operative eng.) . . . . . as required
Cowl flap (operative eng.) . . . . . as required
Trim (Rudder) . . . . . adjust 5° bank toward operative eng.
Electrical load . . . . . decrease to min. required

Land as soon as practical at nearest suitable airport.

SINGLE ENGINE LANDING

Inop. engine prop . . . . . feather

When certain of making field:

Landing gear . . . . . extend
Wing flaps . . . . . lower

Maintain additional altitude and speed during approach.

Final approach speed . . . . . 91 KIAS
Wing flaps . . . . . 25°

SINGLE ENGINE GO-AROUND (Avoid if at all possible.)

Mixture . . . . . forward
Propeller . . . . . forward
Throttle . . . . . .open slowly to 40 in Hg
Flaps . . . . . .retract
Landing gear . . . . . .retract
Airspeed . . . . . 89 KIAS
Trim . . . . . set
Cowl flap operating engine . . . . . as required

AIR START (UNFEATHERING PROCEDURE)

Fuel selector inop. engine . . . . . .ON
Aux. fuel pump inop. engine . . . . . .OFF
Throttle . . . . . open 1/4 inch
Prop control . . . . . forward to cruise RPM position
Mixture . . . . . RICH
Magneto switches . . . . . .ON
Starter . . . . . .engage until prop windmills
Throttle . . . . . .reduce power until engine is warm
If engine does not start, prime as required.
Alternator . . . . . .ON

ENGINE FIRE ON GROUND

If engine has not started:
Mixture . . . . . idle cut-off
Throttle . . . . . .open
Starter . . . . . crank engine

If engine has already started and is running, continue operating to try pulling the fire into the engine.

If fire continues, extinguish with best available means.
If external fire extinguishing is to be applied:
Fuel selector valves . . . . . .OFF
Mixture . . . . . idle cut-off

ENGINE FIRE IN FLIGHT

Affected engine:
Fuel selector . . . . . .OFF
Throttle . . . . . .close
Propeller . . . . . feather
Mixture . . . . . idle cut-off
Heater . . . . . .OFF
Defroster . . . . . .OFF

If terrain permits land immediately, if fire continues.

FUEL MANAGEMENT DURING SINGLE ENGINE OPERATION

CRUISING

When using fuel from tank on the same side as the operating engine:
Fuel selector operating engine . . . . . .ON
Fuel selector inop. engine . . . . . .OFF
Auxiliary fuel pumps . . . . . .OFF

When using fuel from tank on the side opposite the operating engine:
Fuel selector operating engine . . . .CROSSFEED
Fuel selector inop. engine . . . . . .OFF
Auxiliary fuel pumps . . . . . .OFF

Use crossfeed in level flight only.

NOTE

Do not crossfeed with full fuel on same side as operating engine since vapor return fuel flow will be lost through the vent system.

LANDING

Fuel selector operating engine . . . . . .ON
Fuel selector inop. engine . . . . . .OFF

ENGINE DRIVEN FUEL PUMP FAILURE

Throttle . . . . . retard
Auxiliary fuel pump . . . . . unlatch, on HI
Throttle . . . . . reset (75% power or below)

CAUTIONS

If normal engine operation and fuel flow is not immediately re-established, the auxiliary fuel pump should be turned off. The lack of a fuel flow indication while on the HI auxiliary fuel pump position could indicate a leak in the fuel system, or fuel exhaustion.

DO NOT actuate the auxiliary fuel pumps unless vapor suppression is required (LO position) or the engine driven fuel pump fails (HI position). The auxiliary pumps have no standby function. Actuation of the HI switch position when the engines are operating, normally may cause engine roughness and/or power loss.

LANDING GEAR UNSAFE WARNING

Red light indicates gear intransit.
Recycle gear if indication continues.
Light will illuminate when gear horn sounds at low throttle settings.

MANUAL EXTENSION OF LANDING GEAR

Check following before extending gear manually:
Circuit breakers . . . . . check
Master switch . . . . . ON
Alternators . . . . . check
Navigation lights . . . . . OFF (daytime)

To extend, reposition clip downward clear of knob and proceed as follows:
Airspeed . . . . . reduce (85 KIAS max.)
Gear selector . . . . . GEAR DOWN LOCKED position
Emerg. gear extend knob . . . . . pull
Indicator lights . . . . . 3 green
Leave emergency gear extension knob out.

ENGINE FAILURE IN ICING CONDITIONS

Select alternate air and attempt restart.
If unable to restart engine:
Inop. prop . . . . . feather
Airspeed . . . . . at or above 89 KIAS
Descend if necessary to maintain airspeed.
Electrical load . . . . . reduce
Avoid further icing conditions if possible.
Land as soon as practical.
Maintain at least 89 KIAS on final.
Do not extend gear or lower flaps until certain of making field.
Flaps . . . . . 25°

ALTERNATOR FAILURE IN ICING CONDITIONS

Overvoltage relay . . . . . reset
Circuit breakers . . . . . check and reset

If unable to restore alternator:
Avionics . . . . . all off except Nav Com and Transp.
Electric Windshield . . . . . OFF to maintain 65A load
If icing continues terminate flight as soon as practical.

Prior to landing:
Electric windshield . . . . . ON if necessary
Gear may require free fall extension.

ENGINE FAILURE WITH REAR CABIN AND CARGO DOORS REMOVED

S.E. min. control speed of 67 KIAS for this configuration.
If airspeed is below 67 KIAS reduce power on operating engine to maintain control.

ELECTRICAL FAILURES

ALT annunciator light illuminated.
Ammeters . . . . . .observe to determine inop. alt.
If both ammeters show zero output, reduce electrical load to a minimum.

Turn OFF both alt. switches; then turn them ON momentarily one at a time while observing ammeters.
Determine alt. showing LEAST (but not zero) amperes and turn its switch on.
Electrical loads . . . . . .re-establish up to 60A

If one ammeter shows zero output, cycle its switch off, then on.
If power is not restored check circuit breakers and reset once if required.
If alternator remains inoperative, reduce electrical loads and continue flight.

WARNING

Compass error may exceed 10° with both alternators inoperative.

GYRO PRESSURE FAILURES

Pressure below 4.5 in Hg.
RPM . . . . . .increase to 2575
Altitude . . . . . .descend to maintain 4.5 in Hg
Use electric turn indicator to monitor Directional Indicator and Attitude Indicator performance.

COMBUSTION HEATER OVERHEAT

Unit will automatically cut-off.
Do not attempt to restart.

SPINS

Throttles . . . . . .retard to idle
Rudder . . . . . .full opposite to direction of spin
Control wheel . . . . . release back pressure
Control wheel . . . . . full forward if nose does not drop
Ailerons . . . . . neutral
Rudder . . . . . neutralize when rotation stops
Control wheel . . . . . .smooth back pressure to recover from dive

EMERGENCY DESCENT

Throttles . . . . . .closed
Propellers . . . . . full forward
Mixture . . . . . as required for smooth operation
Landing gear . . . . . .extend
Airspeed . . . . . .129 KIAS

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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 INOPERATIVE PROCEDURES

DETECTING A DEAD ENGINE

A loss of thrust will be noted and with coordinated controls, the nose of the aircraft will yaw in the direction of the dead engine.

ENGINE SECURING PROCEDURE (FEATHERING PROCEDURE)

The propellers can be feathered only while the engine is rotating above 800 RPM. Loss of centrifugal force due to slowing RPM will actuate a stop pin that keeps the propeller from feathering each time the engine is stopped on the ground. Single engine performance will decrease if the propeller of the inoperative engine is not feathered.

NOTE

If circumstances permit, in the event of an actual engine failure, the pilot may elect to attempt to restore power prior to feathering.

If circumstances permit an attempt to restore power prior to feathering, adjust the mixture control as required, move the fuel selector control to Crossfeed and select either L (left) or R (right) magneto to check magneto grounding. Move the alternate air control to ON and unlatch the auxiliary fuel pump switch and turn it to the HI position. If power is not immediately restored turn off the auxiliary fuel pump.

Keep in mind that the minimum single engine control speed is 66 KIAS and the best single engine rate of climb speed is 89 KIAS when beginning the feathering procedure.

To feather a propeller, maintain direction and an airspeed above 76 KIAS. Move the mixture and propeller controls forward. The throttle controls should be moved forward while monitoring the manifold pressure gauge to ensure that the manifold pressure does not exceed 40 inches of Hg. Retract the flaps and landing gear and identify the inoperative engine. The airplane will yaw in the direction of the dead engine. Retard the throttle of the suspect engine to verify loss of power. The mixture control of the inoperative engine should be moved to idle cut-off position and the propeller control of the inoperative engine should be moved to the feather position.

Trim the aircraft as required and maintain a 5° bank toward the operating engine. The auxiliary fuel pumps should be off except in the case of an engine driven fuel pump failure. Turn OFF the magnetos and close the cowl flaps on the inoperative engine. Cowl flaps should be used as necessary on the operative engine. The alternator of the inoperative engine should be turned OFF and the electrical load reduced to prevent depletion of the battery. Move the fuel selector control for the inoperative engine to the OFF position. If necessary, consider the use of crossfeed (refer to Fuel Management During Single Engine Operation, paragraph 3.11).

NOTE

When an engine is feathered the alternator, gyro air, and oil annunciator warning lights will remain illuminated.

ENGINE FAILURE DURING TAKEOFF (Below 85 KIAS)

The single engine minimum control speed for this airplane is 66 KIAS under standard conditions.

If engine failure occurs during takeoff ground roll or 85 KIAS has not been attained, CLOSE both throttles immediately, land if airborne, and stop straight ahead. If inadequate runway remains to stop, close the throttles, land if airborne and apply maximum braking. The master switch and fuel selectors should be turned OFF. Continue path straight ahead turning to avoid obstacles as necessary.

ENGINE FAILURE DURING TAKEOFF (85 KIAS or above)

If engine failure during takeoff ground roll or after lift-off with the gear still down and 85 KIAS has been attained the course of action to be taken will depend on the runway remaining. If adequate runway remains, CLOSE both throttles immediately, land if airborne and stop straight ahead. If the runway remaining is inadequate for stopping, the pilot must decide whether to abort the takeoff or to continue. The decision must be based on the pilot's judgment considering loading, density altitude, obstructions, the weather, and the pilot's competence. If the decision is made to continue the takeoff, maintan heading and airspeed. Feather the inoperative engine and when climb is established RETRACT the landing gear. (Refer to Engine Securing Procedures, paragraph 3.7).

During a short field takeoff with 25° flaps, the airplane is momentarily below Vmc. 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.

ENGINE FAILURE DURING CLIMB

The single engine minimum control speed for this airplane is 66 KIAS under standard conditions.

If an engine failure occurs when airspeed is below 66 KIAS reduce the power on the operating engine as required to maintain directional control. The nose of the airplane should be lowered to accelerate toward the best single engine rate of climb speed of 89 KIAS. The next step is to feather the inoperative engine (refer to Engine Securing Procedure, paragraph 3.7).

If engine failure occurs when an airspeed of 66 KIAS has been attained, maintain directional control and adjust airspeed toward the best single engine rate of climb speed of 89 KIAS. The inoperative engine should now be feathered by following the Engine Securing Procedure provided by paragraph 3.7.

ENGINE FAILURE DURING FLIGHT (Below 66 KIAS)

Should an engine fail during flight at an airspeed below 66 KIAS, apply rudder towards the operative engine to maintain directional control. The throttles should be retarded to stop the yaw force produced by the assymetrical thrust. Lower the nose of the aircraft to accelerate above 66 KIAS and increase the power on the operative engine as the airspeed exceeds 66 KIAS.

After an airspeed above 76 KIAS has been established, an engine restart attempt may be made if altitude permits. If the restart has failed, or altitude does not permit, the engine should be secured. Move the propeller control of the inoperative engine to FEATHER and complete the "Engine Securing Procedure." Adjust the trim to 5° bank toward the operating engine. The cowl flap on the operative engine should be adjusted as required to maintain engine temperature within allowable limits.

ENGINE FAILURE DURING FLIGHT (Above 66 KIAS)

If an engine fails at an airspeed above 66 KIAS during flight, begin corrective response by identifying the inoperative engine. The operative engine should be adjusted as required after the loss of power has been verified. Once the inoperative engine has been identified and the operating engine adjusted properly, an engine restart may be attempted if altitude permits and the airspeed is maintained above 76 KIAS.

Prior to securing the inoperative engine, check to make sure the fuel flow to the engine is sufficient. If the fuel flow is deficient, turn ON the auxiliary fuel pump to the inoperative engine. Check the fuel quantity on the inoperative engine side for a sufficient supply, switch the alternate air "ON" and vary the mixture control position. Check the oil pressure and oil temperature and insure that the magneto switches are ON.

If the engine fails to start it should be secured using the Engine Securing Procedure.

After the inoperative engine has been secured, the operative engine can be adjusted. Power should be maintained as required and the mixture control should be adjusted for power. Check the fuel supply and turn ON the auxiliary fuel pump if necessary. The cowl flaps on the operative engine should be adjusted as required to maintain engine temperatures within allowable limits. Trim 5° bank toward the operating engine. The electrical load should be decreased to a required minimum. Land as soon as practical at the nearest suitable airport.

SINGLE ENGINE LANDING

Complete the Engine Securing Procedure (paragraph 3.7). The landing gear should not be extended and the wing flaps should not be lowered until certain of making the field.

Maintain additional altitude and speed during approach, keeping in mind that landing should be made right the first time and that a go-around should be avoided if at all possible.

A final approach speed of 91 KIAS and the use of 25° rather than full wing flaps will place the airplane in the best configuration for a go-around should this be necessary. **UNDER SOME CONDITIONS OF LOADING AND DENSITY ALTITUDE A GO-AROUND MAY BE IMPOSSIBLE, AND IN ANY EVENT THE SUDDEN APPLICATION OF POWER DURING SINGLE ENGINE OPERATION MAKES CONTROL OF THE AIRPLANE MORE DIFFICULT.**

SINGLE ENGINE GO-AROUND

A SINGLE ENGINE GO-AROUND SHOULD BE AVOIDED IF AT ALL POSSIBLE.

To execute a single engine go-around, advance the mixture and propeller levers forward. The throttle should be advanced slowly to 40 inches of manifold pressure. Retract the flaps and landing gear. Maintain airspeed at the best single engine rate of climb speed of 89 KIAS. Set the trim and cowl flaps as required.

AIR START (UNFEATHERING PROCEDURE)

Move the fuel selector for the inoperative engine to the ON position and check to make sure the auxiliary fuel pump for that engine is OFF. Open the throttle 1/4 inch and push the propeller control forward to the cruise RPM position. The mixture should be set RICH. Turn ON the magneto switches and engage the starter until the propeller windmills. The throttle should be set at reduced power until the engine is warm. If the engine does not start, prime as necessary. The alternator switch should then be turned ON.

ENGINE FIRE

IN-FLIGHT

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

If an engine fire occurs in flight, place the fuel selector of the affected engine in the OFF position and close its throttle. Feather the propeller on the faulty engine. Move the mixture control to idle cut-off. The heater and defroster (in all cases of fire) should be OFF. A landing should be made if terrain permits.

ON THE GROUND

The first attempt to extinguish the fire is to try to draw the fire back into the engine. If the engine has not started move the mixture control to idle cut-off and open the throttle. Begin to crank the engine with the starter in an attempt to pull the fire into the engine.

If the engine has already started and is running, continue operating to try to pull the fire into the engine.

In either case (above), if the fire continues longer than a few seconds the fire should be extinguished by the best available external means.

If an external fire extinguishing method is to be applied move the fuel selector valves to OFF and the mixture to idle cut-off.

3.11 FUEL MANAGEMENT DURING SINGLE ENGINE OPERATION

A crossfeed is provided to increase range during single engine operation. Use crossfeed in level flight only.

CRUISING

When using fuel from the fuel tank on the same side as the operating engine the fuel selector of the operating engine should be ON and the fuel selector for the inoperative engine should be OFF. The auxiliary fuel pumps should be OFF except in the case of an engine driven fuel pump failure. If an engine driven fuel pump has failed the auxiliary fuel pump on the operating engine side must be ON.

Increased range is available by using fuel from the tank on the opposite side of the operating engine. For this configuration the fuel selector of the operating engine should be on X-FEED (crossfeed) and the fuel selector of the inoperative engine should be OFF. The auxiliary fuel pumps should be OFF.

NOTE

A vapor return line from each engine will return a percentage of fuel back to the tank on the same side as that engine. Therefore, a minimum of 30 minutes of fuel should be used from this tank before selecting crossfeed. If the tank gauge approaches "FULL," go back to that tank and operate for 30 minutes to bring the fuel level down before returning to crossfeed or fuel may be pumped overboard through the fuel vent.

LANDING

During the landing sequence the fuel selector of the operating engine must be ON and the fuel selector of the inoperative engine OFF. The auxiliary fuel pump of the operating engine should be OFF except in the case of an engine driven fuel pump failure.

3.13 ENGINE DRIVEN FUEL PUMP FAILURE

Should a malfunction of the engine driven fuel pump occur, the auxiliary fuel pump system can supply sufficient fuel pressure for engine power up to approximately 75%. Any combination of RPM and Manifold Pressure defined on the Power Setting Table may be used, but leaning may be required for smooth operation at altitudes above 15,000 feet or for RPM's below 2300. Normal cruise, descent and approach procedures should be used.

Loss of fuel pressure and engine power can be an indication of failure of the engine driven fuel pump. Should these occur and engine driven fuel pump failure is suspected, retard the throttle and unlatch the auxiliary fuel pump and select the HI position. The throttle can then be reset at 75% power or below.

CAUTION

If normal engine operation and fuel flow is not immediately re-established, the auxiliary fuel pump should be turned off. The lack of a fuel flow indication while on the HI auxiliary fuel pump position could indicate a leak in the fuel system, or fuel exhaustion.

DO NOT actuate the auxiliary fuel pumps unless vapor suppression is required (LO position) or the engine driven fuel pump fails (HI position). The auxiliary pumps have no standby function. Actuation of the HI switch position when the engines are operating normally may cause engine roughness and/or power loss.

3.15 LANDING GEAR UNSAFE WARNINGS

The red landing gear light will illuminate when the landing gear is in transition between the full up position and the down and locked position. The pilot should recycle the landing gear if continued illumination of the light occurs. 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.

3.17 MANUAL EXTENSION OF THE LANDING GEAR

Several items should be checked prior to extending the landing gear manually. Check for popped circuit breakers and ensure the master switch is ON. Now check the alternators. If it is daytime, turn OFF the navigation lights.

To execute a manual extension of the landing gear, begin by repositioning the clip covering the emergency disengage control downward, clear of the knob. Power should be reduced to maintain airspeed below 85 KIAS. Place the landing gear selector switch in the GEAR DOWN LOCKED position and pull the emergency gear extension knob. Check for 3 green indicator lights.

WARNING

If the emergency gear extension knob has been pulled out to lower the gear due to a gear system malfunction, leave the control in its extended position until the airplane has been put on jacks to check the proper function of the landing gears hydraulic and electrical systems.

3.19 GEAR-UP EMERGENCY LANDING

An approach should be made with power at a normal airspeed with the flaps up. The flaps are left up to reduce wing and flap damage. Close the throttles just before touchdown. Turn OFF the master and ignition switches and move the fuel selector valve controls to OFF. Contact to the surface should be made at a minimum airspeed.

3.21 ENGINE FAILURE IN ICING CONDITIONS

If engine failure occurs during icing flight select ALTERNATE AIR and attempt to restart the engine. If the engine restart procedure fails, feather the inoperative propeller (refer to Engine Securing Procedure, paragraph 3.7). An airspeed at or above 89 KIAS must be maintained. It may be necessary to descend to maintain this airspeed. Reduce the electrical loads (refer to Alternator Failure in Icing Conditions, paragraph 3.23, for load reduction). Further icing conditions should be avoided if possible and a landing made as soon as practical.

Maintain an airspeed of at least 89 KIAS during final approach. Do not extend the landing gear or lower the wing flaps until certain of making the field. Use 25° flaps rather than full flaps for landing.

3.23 ALTERNATOR FAILURE IN ICING CONDITIONS

If an alternator fails during flight in icing conditions, an attempt should be made to reset the alternator overvoltage relay by cycling the corresponding alternator switch OFF and then ON. Check the circuit breakers and, if possible, reset any that have popped.

If these attempts to restore the alternator have failed, turn off all avionics except one NAV COM and TRANSPONDER. Turn off the electric windshield to maintain a load less than 65 amperes. If icing conditions continue terminate flight as soon as practical.

Prior to landing the electric windshield may be turned on if necessary. If the battery has been depleted the gear may require free-fall extension and the green gear lights may not illuminate.

3.25 ENGINE FAILURE WITH REAR CABIN AND CARGO DOORS REMOVED

The minimum single engine control speed for this configuration is 67 KIAS. If engine failure occurs at an airspeed below 67 KIAS, reduce power as necessary on the operating engine and apply rudder to maintain directional control.

3.27 ELECTRICAL FAILURES

If an ALT annunciator light illuminates observe the ammeters to determine which alternator is inoperative. If both ammeters show zero output, reduce electrical loads to the minimum. Turn OFF both alternator switches and then turn them momentarily ON one at a time while observing the ammeters. The alternator showing the LEAST (but not zero) current should be turned ON. The other alternator should be left OFF. Electrical loads may be reinstated as required to a maximum of 60 amperes.

If one ammeter shows zero output, cycle its switch OFF and then ON. If this fails to restore output check the circuit breakers. The breakers may be reset once if required. If the alternator remains inoperative reduce electrical loads if necessary and continue the flight.

Corrective maintenance actions should be performed prior to further flights.

WARNING

Compass error may exceed 10 ° with both alternators inoperative.

NOTE

The markings on the ammeters (loadmeters) require mental interpolations to estimate the ampere values noted. Operating the alternators at less than 65 amperes will assure that the battery will not be depleted.

3.29 GYRO PRESSURE FAILURES

A malfunction of the instrument pressure system will be indicated by a reduction of the pressure reading on the gauge. A red button annunciator will show in case of a feathered engine or pressure pump failure.

In the event of a pressure system malfunction, (pressure lower than 4.5 inches of mercury) increase engine RPM to 2575. Descend to an altitude at which 4.5 inches of mercury pressure can be maintained, if possible. The electric turn indicator should be used to monitor the performance of the directional and attitude indicators.

3.31 COMBUSTION HEATER OVERHEAT

In the event of an overheat condition, the fuel, air and ignition to the heater is automatically cut off. Do not attempt to restart the heater until it has been inspected and the cause of the malfunction has been determined and corrected.

3.33 SPIN RECOVERY

Intentional spins are prohibited in this airplane. In the event a spin is encountered unintentionally, immediate recovery actions must be taken.

To recover from an unintentional spin, immediately retard the throttles to the idle position. Apply full rudder opposite the direction of the spin rotation. Let up all back pressure on the control wheel. If the nose does not drop, immediately push the control wheel full forward. Keep the ailerons neutral. Maintain the controls in these positions until spin rotation stops, then neutralize the rudder. Recovery from the resultant dive should be with smooth back pressure on the control wheel. No abrupt control movement should be used during recovery from the dive, as the positive limit maneuvering load factor may be exceeded.

3.35 EMERGENCY DESCENT

A malfunction of the oxygen system requires an immediate descent to an altitude at or below 12,500 feet.

NOTE

Time of useful consciousness at 25,000 feet is approximately three minutes.

In the event an emergency descent becomes necessary, CLOSE the throttles and move the propeller controls full FORWARD. Adjust the mixture control as necessary to attain smooth operation. Extend the landing gear at 129 KIAS and maintain this airspeed.

3.37 DOOR OPEN ON TAKEOFF

If either the main or rear cabin door is inadvertently left open or partially open on takeoff, fly the airplane in a normal manner and return for a landing to close the door on the ground. If a landing cannot be made it may be possible to close a door in flight.

Maintain an airspeed between 85 and 94 KIAS and open the storm window. Pull the door closed, making certain the upper latch is properly positioned. Close the upper latch. It may be necessary to pull in on the upper portion of the door while the latch is being closed.

It is necessary to have someone in the airplane in addition to the pilot to carry out this procedure. If the door, either main or rear, cannot be closed in flight, it is possible to continue safely for an extended period. In this case, the airspeed should be kept below 107 KIAS and above 85 KIAS to prevent buffeting as a result of the open door.

3.39 DUAL ALTERNATOR FAILURE

In the event of a failure of both alternators, immediate action should be taken to reduce the overall electrical load on the system. Assuming the aircraft's battery and electrical system are in normal operating condition, the following approximate durations are probable.

Day VFR with (1) each Transponder, COMM, NAV, DME and ADF = 115 minutes. Night IFR with (1) each Transponder, COMM, NAV, DME, ADF and Instrument Panel and position lights = 35 minutes.