N29655 EMERGENCY PROCEDURES

There are no emergency procedures specified in the 1968 C-177 POM. Basic emergency procedures and recommendations are added as a supplemental, derived from subsequent Cessna POM's to similar airplanes. Emergencies caused by aircraft or engine malfunctions are extremely rare if proper pre-flight inspections and maintenance are practiced. Enroute weather emergencies can be minimized or eliminated by careful flight planning and good judgment when unexpected weather is encountered. However, should an emergency arise the basic guidelines described in this section should be considered and applied as necessary to correct the problem.

ENGINE FAILURE

ENGINE FAILURE DURING TAKEOFF ROLL

(1) Throttle – IDLE.
(2) Brakes – APPLY.
(3) Wing Flaps – RETRACT.
(4) Mixture – IDLE CUT-OFF.
(5) Ignition Switch – OFF.
(6) Master Switch – OFF.

ENGINE FAILURE AFTER TAKE-OFF

Prompt lowering of the nose to maintain airspeed and establish a glide attitude is the first response to an engine failure after take-off. In most cases, the landing should be planned straight ahead with only small changes in direction to avoid obstructions. Altitude and airspeed are seldom sufficient to execute a 180° gliding turn necessary to return to the runway. The following procedures assume that adequate time exists to secure the fuel and ignition systems prior to touchdown.
Airspeed – 80 MPH (flaps UP), 75 MPH (flaps DOWN).

(1) Mixture – IDLE CUT-OFF.
(2) Fuel Shut Off Valve – OFF.
(3) Ignition Switch – OFF.
(4) Wing Flaps – AS REQUIRED (Full Flaps recommended)
(5) Master Switch – OFF.

ENGINE FAILURE DURING FLIGHT

When gliding toward a suitable landing area, an effort should be made to identify the cause of the failure. If time permits, and an engine restart is feasible, proceed as follows:

(1) Airspeed -- 80 MPH.
(2) Carburetor Heat – ON.
(3) Fuel Shutoff Valve – ON.
(4) Fuel Selector Valve – BOTH.

(5) Mixture – RICH.
(6) Auxiliary Fuel Pump – ON.
(7) Ignition Switch – BOTH (or START if propeller is not windmilling).
(8) Primer – IN and LOCKED.

If the engine can not be restarted, a forced landing without power must be executed. A recommended procedure for this is given in the following paragraph.

FORCED LANDINGS

EMERGENCY LANDING WITHOUT ENGINE POWER

If an engine stoppage occurs, establish a flaps up glide at 80 MPH. If time permits, attempt to restart the engine by checking for fuel quantity, proper fuel selector valve position, and mixture control setting. Also check that engine primer is full in and locked and ignition switch is properly positioned.

If all attempts to restart the engine fail, and a forced landing is imminent, select a suitable field and prepare for the landing as follows:

(1) Airspeed – 80 MPH (flaps UP).
(2) Pull mixture control to idle cut-off position.
(3) Pull fuel selector valve handle to "OFF"
(4) Ignition switch – OFF.
(5) Turn all remaining switches "OFF" except master switch.
(6) Extend wing flaps as necessary within gliding distance of field.
(7) Airspeed -- 65 to 75 MPH (flaps down).
(8) Turn master switch "OFF".
(9) Unlatch cabin doors prior to touchdown.
(10) Land in a slightly tail-low attitude.
(11) Apply heavy braking while holding full up elevator.

PRECAUTIONARY LANDING WITH ENGINE POWER

Before attempting an "off airport" landing, one should drag the landing area at a safe but low altitude to inspect the terrain for obstructions and surface conditions, proceeding as follows:

(1) Drag over selected field with 1/2 flaps and 70 MPH airspeed, noting the preferred area for touchdown for the next landing approach. Then retract flaps after well clear of all obstacles.
(2) On downwind leg, turn off all switches except the ignition and master switches.
(3) Approach with full flaps at 70 MPH.
(4) Unlatch cabin doors prior touchdown.
(5) Before touchdown, turn ignition and master switches "OFF."
(6) Land in a slightly tail-low attitude.
(7) Brakes -- APPLY HEAVILY.

DITCHING

Prepare for ditching by securing or jettisoning heavy objects located in the baggage area, and collect folded coats or cushions for protection of occupants' face sat touchdown. Transmit Mayday message on 121.5 MHz., giving locations and intentions. Plan approach into wind if winds are high and seas are heavy. With heavy swells and light wind, land parallel to swells.

(1) Approach with full flaps and sufficient power for a 300 ft./min. rate of descent at 70 MPH.
(2) Unlatch the cabin doors.
(3) Maintain a continuos decent until touchdown in level attitude. Avoid a landing flare because of difficulty in judging airplane height over a water surface.
(4) Place folded coat or cushion in front of occupants' faces at time of touchdown. Expect a second impact for the airplane may skip after touchdown.
(5) Evacuate airplane through cabin doors. If necessary, open window to flood cabin compartment for equalizing pressure so that door can be opened.
(6) Inflate life vests and raft (if available) after evacuation of cabin. The aircraft can not be depended on for floatation for more than a few minutes.

FIRES

ENGINE FIRE DURING START ON GROUND.

Improper starting procedures such as pumping the throttle during a difficult cold weather start can cause a backfire which could ignite fuel that has accumulated in the intake duct. In this event, proceed as follows:

(1) Continue cranking in an attempt to get a start which would suck in flames and accumulated fuel through the carburetor and into the engine.
(2) If the start is successful, run the engine at 1700 RPM for a few minutes before shutting it down to inspect the damage.
(3) If engine start is unsuccessful, continue cranking for two or three minutes with throttle full open while ground attendants obtain fire extinguishers.
(4) When ready to extinguish fire, release the starter switch and turn off master switch, ignition switch, and pull the fuel selector valve to "OFF".
(5) Smother flames with fire extinguisher, seat cushion, wool blanket, or loose dirt.
(6) If practical try to remove carburetor air filter if it is ablaze.
(7) Make a thorough inspection of fire damage, and repair or replace damaged components before conducting another flight.

ENGINE FIRE IN FLIGHT.

Although engine fires are extremely rare in flight, the following steps should be taken if one is encountered:

(1) Pull mixture control to idle cut-off.
(2) Turn fuel selector valve handle "OFF."
(3) Turn master switch "OFF."
(4) Establish a 120 MPH glide.
(5) Close cabin heat control.
(6) Select a field suitable for a forced landing.
(7) If fire is not extinguished, increase glide speed in an attempt to find an airspeed that will provide an incombustible mixture.
(8) Execute a forced landing as described in paragraph Emergency Landing Without Engine Power. Do not attempt to restart the engine.

ELECTRICAL FIRE IN FLIGHT.

The initial indication of an electrical fire is the odor of burning insulation. The immediate response should be to turn the master switch "OFF." Then close off ventilating air as much as practicable to reduce the chances of a sustained fire. If electrical power is indispensable for the flight, an attempt may be made to identify and cut off the defective circuit as follows:

(1) Master Switch -- "OFF."
(2) All other switches (except ignition switch) -- "OFF."
(3) Check condition of circuit breakers to identify faulty circuit if possible. Leave faulty circuit deactivated.
(4) Master Switch -- "ON."
(5) Select switches "ON" successively, permitting a short time delay to elapse after each switch is turned on until the short circuit is localized.
(6) Make sure fire is completely extinguished before opening ventilators.

CABIN FIRE

(1) Master Switch – OFF.
(2) Vents/Cabin Air/Heat – CLOSED (to avoid drafts).
(3) Fire Extinguisher – ACTIVATE.

WING FIRE

(1) Landing/Taxi Light Switches – OFF.
(2) Pitot Heat Switch – OFF.
(3) Navigation Light Switch – OFF.
(4) Strobe Light Switch – Off.
(5) Perform a sideslip to keep the flames away from the fuel tank and vents.
(6) Land as soon as practicable
(7) Use flaps only as required for final approach and touchdown.

ELECTRICAL POWER SUPPLY SYSTEM MALFUNCTIONS

Malfunctions in the electrical power supply system can be detected by periodic monitoring of the volt-ammeter; however, the cause of these malfunctions is usually difficult to determine. A broken alternator drive belt or wiring is most likely the cause of alternator failures, although other factors could cause the problem. A damaged voltage regulator can also cause malfunctions. All electrical problems of this nature constitute an electrical emergency and should be dealt with immediately. Electrical power malfunctions usually fall into two categories, excessive rate of charge and insufficient rate of charge. The following paragraphs describe the recommended remedy for each situation.

EXCESSIVE RATE OF CHARGE

After periods of engine starting and heavy electrical usage at low engine speeds (such as extended taxiing) the battery condition will be low enough to accept above normal charging during the initial part of a flight. However, after thirty minutes of cruising flight, the ammeter should be indicating less than 10 amps of charging current. If the charging current remains above this value on a long flight, it is possible that the battery will overheat and evaporate the electrolyte at an excessive rate. In addition, electronic components in the electrical system could be adversely affected by the higher than normal voltage (14v) if a faulty voltage regulator is causing the overcharging.

To preclude these possibilities, the an over-voltage sensor in the regulator will automatically shut down the alternator. An over-voltage warning light will illuminate on the volt-ammeter when the aircraft bus voltage exceeds 17 volts. If this occurs the alternator field side of the split master switch should be turned "OFF". The flight should be terminated and/or the current drain on the battery minimized as soon as practical because the battery can supply the electrical system for only a limited period of time. If it becomes apparent that the battery voltage is getting too low to operate the electrical system, the alternator switch can be turned back on for several minutes at a time until the battery is partially recharged. If the emergency occurs at night, the alternator switch should be returned to the "ON" position just before landing lights and flaps will be required for landing.

INSUFFICIENT RATE OF CHARGE

If the volt-ammeter indicates a continuos discharge rate in flight and/or the aircraft bus voltage is less than 13 volts, the alternator is not supplying sufficient power to the system and should be shut down since the alternator field circuit may be placing an unnecessary load on the system. All non-essential equipment should be turned "OFF" and the flight terminated as soon as practical.

ROUGH ENGINE OPERATION OR LOSS OF POWER

SPARK PLUG FOULING

An engine roughness in flight may be caused by one or more spark plugs becoming fouled by carbon or lead deposits. This may be verified by turning the ignition switch momentarily from "BOTH" to either "LEFT" or "RIGHT" position. An obvious

loss in single ignition operation is evidence of spark plug or magneto trouble. Assuming that spark plugs are the more likely cause, lean the mixture to the normal lean setting for cruising flight. If this problem does not clear up in several minutes, determine if a richer mixture setting will produce smoother operation. If not, proceed to the nearest airport for repairs using the "BOTH" position of the ignition switch unless extreme roughness dictates the use if a single ignition position.

MAGNETO MALFUNCTION

A sudden engine roughness or misfiring is usually evidence of magneto problems. Switching from "BOTH" to either "LEFT" or "RIGHT" ignition switch position will identify which magneto is malfunctioning. Select different power settings and enrichen the mixture to determine if continued operation on "BOTH" magnetos is practicable. If not, switch to the good magneto and proceed to the nearest airport for repairs.

LOW OIL PRESSURE

If low oil pressure is accompanied by normal oil temperature, there is a possibility the oil pressure gage or relief valve is malfunctioning. A leak in the line to the gage is not cause for immediate concern because an orifice in this line will prevent a sudden loss of oil from the engine sump. However, a landing at the nearest airport is advisable.

If total loss of oil pressure is accompanied by a sudden rise in oil temperature, there is reason to suspect an engine failure is imminent. Reduce engine power immediately and select a suitable forced landing field. Leave the engine running at lower power during the approach, using only the minimum power required to reach the desired touchdown spot.

DISORIENTATION IN CLOUDS.

This airplane is not equipped with an autopilot. The pilot must rely on the six basic flight instruments; airspeed, attitude indicator, altimeter, turn coordinator, directional gyro and vertical speed indicator to maintain situational awareness and use them to recover from spatial disorientation/vertigo when necessary. If the vacuum system pump has failed, emergency vacuum can be supplied by activating the Precise Flight backup system cable installed on the lower left corner of the instrument panel. Engine RPM must be reduced to approximately 1800 RPM or lower to provide 3.5" Hg for gyro operation. The airplane must descend to a density altitude of approximately 5,000 ft. or lower to maintain level flight and sufficient vacuum to divert to the nearest suitable airport for landing. (See POM supplemental on Backup Vacuum System)

EXECUTING A 180° TURN IN CLOUDS.

Upon entering the clouds, an immediate plan should be made to turn back as follows:

(1) Note the time of the minute hand and observe the position of the sweep second hand on the clock.

(2) When the sweep second hand indicates the nearest half-minute, initiate a standard rate left turn, holding the turn coordinator symbolic airplane wing opposite the lower left index mark for 60 seconds. Then roll back to level flight

by leveling the miniature airplane.
(3) Check accuracy of the turn by observing the compass heading which should be the reciprocal of the original heading.
(4) If necessary, adjust heading primarily with skidding motions rather than rolling motions so that the compass will read more accurately.
(5) Maintain altitude and airspeed by cautious application of elevator control.
(6) Avoid over controlling by keeping the hands off the control wheel and steering only with rudder.

EMERGENCY LET-DOWNS THROUGH CLOUDS.

If possible, obtain ATC clearance for an emergency descent through clouds. To guard against a spiral dive, choose an easterly or westerly heading to minimize compass cards swings due to changing bank angles. In addition, keep hands off the control wheel and steer a straight course with rudder control monitoring the turn coordinator. Occasionally check the compass heading and make minor corrections to hold an approximate course. Before descending into the clouds, set up a stabilized let down condition as follows:

(1) Apply full rich mixture.
(2) Use full carburetor heat.
(3) Reduce power to set up a 500 to 800 ft./min. rate of descent.
(4) Adjust the elevator trim tab for a stabilized descent at 80 MPH.
(5) Keep hands off the control wheel.
(6) Monitor turn coordinator and make corrections by rudder alone.
(7) Check trend of compass card movement and make cautious corrections with rudder to stop the turn.
(8) Upon breaking out clouds resume normal cruising flight.

RECOVERY FROM A SPIRAL DIVE.

If a spiral dive is encountered, proceed as follows:

(1) Close the throttle.
(2) Stop the turn by using coordinated aileron and rudder control to align the symbolic airplane in the turn coordinator with the horizon reference line.
(3) Cautiously apply elevator back pressure to slowly reduce the indicated airspeed to 80 MPH.
(4) Adjust the elevator trim control to maintain a 80 MPH glide.
(5) Keep hands off the control wheel, using rudder control to hold a straight heading.
(6) Apply carburetor heat.
(7) Clear engine occasionally, but avoid using enough power to disturb the trimmed glide.
(8) Upon breaking out of clouds, apply normal cruising power and resume flight.

SPINS.

Intentional spins are prohibited in this airplane. Should an inadvertent spin occur, the following recovery technique may be used.

(1) Retard throttle to idle position.
(2) Apply full rudder opposite to the direction of rotation.
(3) After one-fourth turn, move the control wheel forward of neutral in a brisk motion.
(4) As rotations stops neutralize rudder, and make a smooth recovery from the resulting dive.

EMERGENCY LOCATOR TRANSMITTER (ELT)

The ELT consists of a self-contained dual-frequency radio transmitter powered by six D-cell batteries. The ELT is activated by an impact of 5g or more as may be experienced in a crash landing. The ELT emits an omni-directional signal on the international distress frequencies of 121.5 and 243.0 MHz. General aviation and commercial aircraft, the FAA, and CAP monitor 121.5 MHz, and 243.0 MHz is monitored by the military.

The ELT is readily identified as a bright orange unit mounted on a shelf in the aft fuselage compartment (See Figure 1). A flat bladed screwdriver is required to remove the aft fuselage tunnel cover to gain access to the ELT. The ELT is operated by a three position ON-OFF-ARM switch on the forward facing end of the unit (See Figure 2).

ELT OPERATION

NORMAL OPERATION: As long as the function selector switch remains in the ARM position, the ELT automatically activates following an impact of 5g or more over a short period of time.

ELT FAILURE: If "g" switch actuation is questioned following a minor crash landing, gain access to the ELT and place the function selector switch in the ON position.

PRIOR TO SIGHTING RESCUE AIRCRAFT: Conserve aircraft battery. Do not activate transceiver.

AFTER SIGHTING RESCUE AIRCRAFT: Place ELT function selector switch in the OFF position, preventing radio interference. Attempt contact with rescue aircraft with the radio transceiver set to a frequency of 121.5 MHz. If no contact is established, return the function selector switch to ON immediately.

FOLLOWING RESCUE: Place ELT function selector switch in the OFF position, terminating emergency transmissions.

INADVERTENT ACTIVATION: Following a lightning strike or an exceptionally hard landing, the ELT may activate although no emergency exists. Select 121.5 MHz on your radio transceiver. If the ELT can be heard transmitting, place the function selector switch in the OFF position; then immediately return the switch to ARM.

FLIGHT IN ICING CONDITIONS.

Although flying in known icing conditions is prohibited, an unexpected icing encounter should be handled as follows:

(1) Turn pitot heat switch "ON".
(2) Turn back or change altitude to obtain an outside air temperature that is less conducive to icing.
(3) Pull cabin heat control full out to obtain windshield defroster airflow. Adjust cabin air control to get maximum defroster heat and airflow.
(4) Open throttle to increase engine speed and determine if ice is soft enough to be thrown off the propeller blades.
(5) Watch for signs of carburetor air filter ice and apply carburetor heat as required. An unexplained loss in engine speed could be caused by carburetor ice or air intake filter ice.
(6) Plan a landing at the nearest airport. With an extremely rapid ice build-up, select a suitable an "immediate off airport" landing site.
(7) With an ice accumulation of one inch or more on the wing leading edges, be prepared for significantly higher stall speed.
(8) Leave wing flaps retracted. With a sever ice build-up on the horizontal tail, the change in wing wake airflow direction caused by wing flap extension could result in a loss of elevator effectiveness.
(9) Perform a landing approach using a forward slip, if necessary, for improved visibility.
(10) Approach at 75 to 85 MPH, depending upon the amount of ice accumulation.
(11)Avoid steep turns during the landing approach.
(12) Perform a landing in level attitude.

STATIC SOURCE BLOCKAGE

(1) Static Pressure Alternate Source Valve -- ON