SECTION III

EMERGENCY PROCEDURES

All airspeeds quoted in this section are indicated airspeeds (IAS)

The following information is presented to enable you to form, in advance, a definite plan of action for coping with the most probable emergency situations which could occur. Where practicable, the emergencies requiring immediate corrective action are treated in check list form for easy reference and familiarization. Other situations, in which more time is usually permitted to decide on and execute a plan of action, are discussed at some length. In order to supply one safe speed for each type of emergency situation the airspeeds presented are derived at 6775 lbs.

SINGLE-ENGINE OPERATION

Two major factors govern single-engine operation; airspeed and lateral/directional control. The airplane can be safely maneuvered or trimmed for normal hands-off operation and sustained in this configuration by the operative engine AS LONG AS SUFFICIENT AIRSPEED IS MAINTAINED.

SINGLE-ENGINE BEST RATE-OF-CLIMB SPEED, 127 MPH/110 KTS

The single-engine best rate-of-climb speed is the airspeed which delivers the greatest gain in altitude in the shortest possible time with gear up, flaps up, and inoperative propeller feathered.

SINGLE-ENGINE BEST ANGLE-OF-CLIMB SPEED, 115 MPH/100 KTS

The single-engine best angle-of-climb speed is the airspeed which delivers the greatest gain in altitude in the shortest possible horizontal distance with gear up, flaps up, and inoperative propeller feathered.

MINIMUM SINGLE-ENGINE CONTROL SPEED, 98 MPH/85 KTS

The minimum single-engine control speed is the airspeed below which the airplane cannot be controlled laterally and directionally in flight with one engine operating at take-off power and the other engine with its propeller windmilling.

DETERMINING INOPERATIVE ENGINE

The following checks will help determine which engine has failed.

1. DEAD FOOT - DEAD ENGINE. The rudder pressure required to maintain directional control will be on the side of the good engine.
2. THROTTLE. Partially retard the throttle for the engine that is believed to be inoperative; there should be no change in control pressures or in the sound of the engine if the correct throttle has been selected. AT LOW ALTITUDE AND AIRSPEED THIS CHECK MUST BE ACCOMPLISHED WITH EXTREME CAUTION.

Do not attempt to determine the inoperative engine by means of the tachometer or the manifold pressure. These indicators often indicate near normal readings.

ENGINE FIRE ON GROUND

1. Mixture Controls - IDLE CUT-OFF
2. Continue to crank affected engine
3. Fuel Selector Valves - OFF
4. Throttle - FULL OPEN
5. Battery and Generator Switches - OFF
6. Shut-down other engine
7. Extinguish with fire extinguisher

ENGINE FAILURE DURING GROUND ROLL

1. Throttle - CLOSED
2. Braking - MAXIMUM
3. Fuel Selector Valves - OFF
4. Battery and Generator Switches - OFF

NOTE

Braking effectivity is improved if the brakes are not locked.

ENGINE FAILURE AFTER LIFT-OFF

The most important aspect of engine failure is the necessity to maintain lateral and directional control, and to achieve and maintain normal take-off airspeed or above. The following procedures provide for minimum diversion of attention while flying the airplane.

NOTE

If airspeed is below 98 mph/85 kts reduce power on operative engine as required to maintain lateral and directional control.

1. Landing Gear and Flaps - UP
2. Throttle (inoperative engine) - CLOSE
3. Propeller (inoperative engine) - FEATHER
4. Power (operative engine) - AS REQUIRED
5. Airspeed - AT OR ABOVE NORMAL TAKE-OFF SPEED

After positive control of the airplane is established:

6. Secure inoperative engine:
   a. Mixture - IDLE CUT-OFF
   b. Fuel Selector - OFF
   c. Fuel Boost Pump - OFF
   d. Magneto/Start Switch - OFF
   e. Generator Switch - OFF
   f. Cowl Flap - CLOSED
7. Electrical Load - MONITOR (Maximum load of 1.0 on remaining engine)

ENGINE FIRE IN FLIGHT

Shut down the affected engine according to the following procedure and land immediately.

1. Mixture - IDLE CUT-OFF
2. Fuel Selector Valve - OFF
3. Propeller - FEATHERED
4. Pressurization Air Shutoff Control - PULL
5. Fuel Boost Pump - CHECK OFF
6. Magneto/Start Switch - OFF
7. Generator Switch - OFF
8. Oxygen - AS REQUIRED

EMERGENCY DESCENT

1. Propeller Controls - 2900 RPM
2. Throttles - CLOSED
3. Airspeed - 200 MPH/174 KTS
4. Landing Gear - DOWN
5. Flaps - APPROACH (15°)
6. Oxygen - AS REQUIRED

MAXIMUM GLIDE (FORCED LANDING)

Feather propellers, retract the wing flaps, landing gear, and cowl flaps. The glide ratio in this configuration is slightly over 2 nautical miles of gliding distance for each 1000 feet of altitude at an airspeed of 127 mph/110 kts.

SINGLE-ENGINE LANDING

On final approach and when it is certain that the field can be reached:

1. Landing Gear - DOWN
2. Flaps - APPROACH
3. Airspeed NORMAL LANDING APPROACH SPEED
4. Power - AS REQUIRED to maintain 800 ft/min rate of descent

When it is certain there is no possibility of go-around:

5. Flaps - DOWN
6. Execute Normal Landing

SINGLE ENGINE GO-AROUND

WARNING

Level flight might not be possible for certain combinations of weight, temperature and altitude. In any event, DO NOT attempt a single engine go-around after flaps have been fully extended.

1. Power - MAXIMUM ALLOWABLE
2. Flaps - UP
3. Landing Gear - UP
4. Airspeed - AT OR ABOVE TAKE-OFF SPEED

LANDING GEAR SAFETY SYSTEM

In the event of an emergency, automatic extension of the landing gear may be prevented by placing the landing gear safety system ON-OFF-TEST switch in the OFF position, thus inactivating the safety system.

LANDING GEAR MANUAL EXTENSION

1. Airspeed - BELOW 200 MPH/174 KTS (Lower airspeeds make landing gear extension easier)
2. Landing Gear Relay Circuit Breaker (Right Upper Side Panel) - PULL
3. Landing Gear Position Handle - DOWN
4. Remove safety boot from handcrank handle at rear of front seats. Engage handcrank and turn clockwise as far as possible (approximately 50 turns).
5. If electrical system is operative, check landing gear position lights and warning horn.
6. Disengage Handcrank.

CAUTION

The manual extension system is designed only to lower the landing gear; do not attempt to retract the gear manually.

WARNING

After emergency landing gear extension do not move any landing gear controls or reset any switches or circuit breakers until aircraft is on jacks as failure may have been in the gear up circuit and gear might retract on ground.

GEAR UP LANDING

Make a normal approach and when the landing spot is assured:

1. Cowl Flaps - CLOSED
2. Wing Flaps - DOWN
3. Throttle(s) - CLOSED
4. Mixture(s) - IDLE CUT-OFF
5. Fuel Selector Valves - OFF
6. Battery, Generator and Magneto Switches - OFF
7. Keep wings level during touch-down
8. Evacuate airplane as soon as it stops

EMERGENCY EXIT

The emergency exit door is located at the forward right cabin window with the handle behind the curtain and may be opened as follows:

1. Lift cover and release latch.
2. Pull handle fully down.
3. Pull door into the cabin.

AIR START

CAUTION

The pilot should determine the reason for the engine failure before attempting an air start.

Do not use engine starter above 20,000 feet.

NOTE

The oil cooler may be damaged during an air start after a prolonged shut down, if the temperature is 0°C or below.

For the engine to be started:

1. Mixture - IDLE CUT-OFF
2. Fuel Selector Valve - ON
3. Fuel Boost Pump - ON
4. Magneto/Start Switch - ON
5. Throttle - NORMAL START POSITION (1/2 inch open)
6. Prime - MIXTURE FULL RICH THEN IDLE CUT-OFF
7. Propeller

   a. WITHOUT UNFEATHERING ACCUMULATORS:

      (1) Propeller Control - MOVE FORWARD OF THE FEATHERING DETENT TO MID-RANGE
      (2) Magneto/Start Switch - START

   b. WITH UNFEATHERING ACCUMULATORS:

      (1) Propeller Control - FORWARD OF FEATHERING DETENT UNTIL ENGINE ATTAINS 600 RPM; THEN BACK TO DETENT
      (2) Oil Pressure - STABILIZED

NOTE

If propeller does not unfeather or the engine does not turn, return the propeller control to the feather position and secure the engine.

8. Mixture - FULL RICH AT 1000 RPM
9. Throttle - AS NECESSARY TO PREVENT OVERSPEED; warm up at 15 inches Hg manifold pressure
10. Oil Pressure, Oil and Cylinder Head Temperatures - NORMAL INDICATION
11. Generator Switch - ON
12. Power - AS REQUIRED

SINGLE-ENGINE OPERATION ON CROSSFEED

Left engine inoperative and fuel being supplied from left side.

1. Left Fuel Boost Pump - ON
2. Left Fuel Selector - OFF
3. Right Fuel Selector - CROSSFEED
4. Left Fuel Boost Pump - OFF

Right engine inoperative and fuel being supplied from right side.

1. Right Fuel Boost Pump - ON
2. Right Fuel Selector - OFF
3. Left Fuel Selector - CROSSFEED
4. Right Fuel Boost Pump - OFF

CAUTION

Continuous operation of Fuel Boost Pump may be required if excessive fuel flow fluxuations are encountered.

EMERGENCY STATIC AIR SOURCE *(Those airplanes that do not have Kit 60-5019-1 installed)*

THE EMERGENCY STATIC AIR SOURCE SHOULD BE USED FOR CONDITIONS WHERE THE NORMAL STATIC SOURCE HAS BEEN OBSTRUCTED. When the aircraft has been exposed to moisture and/or icing conditions (especially on the ground), the possiblity of obstructed static ports should be considered. Partial obstructions will result in the rate of climb indication being sluggish during a climb or descent. Verification of suspected obstruction is possible by switching to the alternate system and noting a sudden sustained change in rate of climb. This may be accompanied by abnormal indicated airspeed and altitude changes beyond normal calibration differences.

Whenever any obstruction exists in the normal static air system or, the emergency static air source is desired for use:

1. Alternate Static Air Valve (Red knob) - ROTATE COUNTER CLOCKWISE APPROXIMATELY 9 TURNS TO STOP
2. For Airspeed Calibration and Altimeter Correction, refer to FAA Performance Section

CAUTION

Be certain the Alternate Static Air Valve is in the CLOSED position when system is not needed.

ALTERNATE STATIC AIR SOURCE *(Those airplanes that have Kit 60-5019-1 installed)*

THE ALTERNATE STATIC AIR SOURCE SHOULD BE USED FOR CONDITIONS WHERE THE NORMAL STATIC SOURCE HAS BEEN OBSTRUCTED' When the aircraft has been exposed to moisture and/or icing conditions (especially on the ground), the possibility of obstructed static ports should be considered. Partial obstructions will result in the rate of climb indication being sluggish during a climb or descent. Verification of suspected obstruction is possible by switching to the alternate system and noting a sudden sustained change in rate of climb. This may be accompanied by abnormal indicated airspeed and altitude changes beyond normal calibration differences.

Whenever any obstruction exists in the normal static air system or, the alternate static air source is desired for use:

1. Alternate Static Air Switch - ON.
2. For Airspeed Calibration and Altimeter Correction, refer to FAA Performance Section

UNSCHEDULED ELECTRIC ELEVATOR TRIM (Without Autopilot)

1. Aircraft Attitude - MAINTAIN using elevator control.
2. Actuate Thumb Switch in the opposite direction to open circuit breaker.
3. ON-OFF Switch (On Instrument Panel) - OFF.
4. Retrim with manual trim wheel.

PRESSURIZATION SYSTEM

Any time the differential pressure goes into the red arc, either reschedule the cabin altitude selector or dump all pressure with the DUMP switch.

CAUTION

Idle power on both engines will cause a loss of pressurization. Don oxygen masks as required.

The following table sets forth the average time of Useful Consciousness (time from onset of hypoxia until loss of effective performance at various altitudes).

30,000 ft MSL	1 to 2 minutes
28,000 ft MSL	2-1/2 to 3 minutes
25,000 ft MSL	3 to 5 minutes
22,000 ft MSL	5 to 10 minutes
12-18,000 ft MSL	30 min. or more

LANDING GEAR RETRACTION AFTER PRACTICE MANUAL EXTENSION

After a practice manual extension of the landing gear, the gear may be retracted electrically, as follows:

1. Handcrank - CHECK STOWED
2. Landing Gear Relay Circuit Breaker - IN
3. Landing Gear Handle - UP

SIMULATED SINGLE-ENGINE PROCEDURE

ZERO THRUST (Simulated Feather)

When establishing zero thrust operation, use the power settings listed below. By using this power setting to establish zero thrust, you avoid the inherent difficulties of restarting a shut down engine and preserve almost instant power to counter any attendant hazard. To set up a zero thrust conditions:

1. Propeller Lever - RETARD TO FEATHER DETENT
2. Throttle Lever - SET 12 in. Hg MANIFOLD PRESSURE

NOTE

This setting will approximate Zero Thrust at low altitudes using recommended Single-Engine Climb speeds.

SPINS

If a spin is entered inadvertently:

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

NOTE

Federal Aviation Administration Regulations do not require spin demonstration of airplanes of this weight; therefore, no spin tests have been conducted. The recovery technique is based on the best available information.