

EMERGENCY PROCEDURES

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 in the operation of your airplane. 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 were derived at 5300 lbs.

SINGLE-ENGINE OPERATION

Two major factors govern single-engine operation; airspeed and 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, 112 MPH/97 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, 107 MPH/93 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, 91 MPH/79 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 tachometers or the manifold pressure gages. These instruments often indicate near normal readings.

ENGINE FIRE (GROUND)

1. Mixture Controls - IDLE CUT-OFF.
2. Continue to crank affected engine.
3. Fuel Selector valves - OFF.
4. Battery and alternator switches - OFF.
5. Extinguish fire with extinguisher.

SINGLE ENGINE PROCEDURES

ENGINE FAILURE DURING GROUND ROLL

1. Throttles - CLOSED.
2. Braking - MAXIMUM
3. Fuel Selector Valves - OFF.
4. Battery, Alternator, and Magneto/Start Switches - OFF.

ENGINE FAILURE AFTER LIFT-OFF AND IN FLIGHT

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. If practicable an immediate landing should be made. The following procedures provide for minimum diversion of attention while flying the airplane.

NOTE

If airspeed is below 91 mph/79 kts, reduce power on operative engine as required to maintain lateral and directional control.

1. Landing Gear and Flaps - UP
2. Throttle (inoperative engine) - CLOSED
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 Control - IDLE CUT-OFF
 - b. Fuel Selector Valve - OFF
 - c. Auxiliary Fuel Pump - OFF
 - d. Magneto/Start Switch - OFF
 - e. Alternator 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. Follow the applicable single-engine procedures in this section.

1. Fuel Selector Valve - OFF
2. Mixture Control - IDLE CUT-OFF
3. Propeller - FEATHERED
4. Auxiliary Fuel Pump - OFF.
5. Magneto/Start Switch - OFF
6. Alternator Switch - OFF

EMERGENCY DESCENT

1. Propellers - 2700 RPM
2. Throttles - CLOSED
3. Airspeed - 175 MPH/152 KTS
4. Landing Gear - DOWN
5. Flaps - APPROACH

MAXIMUM GLIDE TO A FORCED LANDING

1. Propellers - FEATHER
2. Flaps - UP
3. Landing Gear - UP
4. Cowl Flaps - CLOSED

The glide ratio in this configuration is approximately 2-1/2 statute miles of gliding distance for each 1000 feet of altitude above the terrain at an airspeed of 123 mph/107 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 - MAINTAIN 112 MPH/97 KTS, MINIMUM.

LANDING GEAR MANUAL EXTENSION

Reduce airspeed before attempting manual extension of the landing gear.

1. LDG GR MOTOR Circuit Breaker - PULL
2. Landing Gear Handle - DOWN
3. Remove cover at rear of front seats. Engage handcrank and turn counterclockwise as far as possible (approximately 50 turns)
4. If electrical system is operative, check landing gear position lights and warning horn (check LDG GR RELAY circuit breaker engaged)
5. Disengage handcrank

WARNING

After landing 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

If possible, choose firm sod or foamed runway. When assured of reaching the landing site:

1. Throttles - CLOSED
2. Mixture Controls - IDLE CUT-OFF
3. Battery, Alternator, and Magneto/Start Switches - OFF
4. Fuel Selector Valves - OFF
5. Keep wings level during touchdown
6. Get clear of the airplane as soon as possible after it stops.

AIR START

CAUTION

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

1. Fuel Selector Valve - ON
2. Throttle - SET approximately 1/4 travel
3. Mixture Control - FULL RICH, below 5000 ft (1/2 travel above 5,000 ft)
4. Auxiliary Fuel Pump - LOW
5. Magnetos - CHECK ON
6. Propeller:

WITHOUT UNFEATHERING ACCUMULATORS:

- a. Move propeller control forward of the feathering detent to midrange
- b. Engage Starter to accomplish unfeathering
- c. If engine fails to run, clear engine by allowing it to windmill with mixture in IDLE CUT-OFF. When engine fires, advance mixture to FULL RICH

WITH UNFEATHERING ACCUMULATORS:

- a. Move propeller control full forward to accomplish unfeathering.
 - b. Return control to high pitch (low rpm) position, when windmilling starts, to avoid overspeed. Use starter momentarily if necessary.
7. When Engine Starts - ADJUST THROTTLE, PROPELLER and MIXTURE CONTROLS
 8. Auxiliary Fuel Pump - OFF (when reliable power has been regained)
 9. Alternator Switch - ON
 10. Oil Pressure - CHECK
 11. Warm Up Engine (approximately 2000 rpm and 15 in. Hg)
 12. Set power as required and trim.

SINGLE-ENGINE OPERATION ON CROSS-FEED

NOTE

The fuel crossfeed system is to be used only during emergency conditions in level flight only.

Left engine inoperative:

1. Right Auxiliary Fuel Pump - LOW
2. Left Fuel Selector Valve - OFF
3. Right Fuel Selector Valve - CROSSFEED
4. Right Auxiliary Fuel Pump - LOW or OFF as required.

Right engine inoperative:

1. Left Auxiliary Fuel Pump - LOW
2. Right Fuel Selector Valve - OFF
3. Left Fuel Selector Valve - CROSSFEED
4. Left Auxiliary Fuel Pump - LOW or OFF as required.

UNSCHEDULED PITCH TRIM

In the event of a malfunction of the electric trim system that causes the trim motor to continue to run, the prime concern of the pilot should be to maintain the attitude of the aircraft. This can be accomplished by overriding the control column pressure caused by the out-of-trim condition. In the event of an unscheduled pitch trim, utilize the following procedures:

1. Aircraft Attitude - MAINTAIN using elevator control.
2. Pitch Trim Switch - HOLD to oppose direction of trim movement
3. Pitch Trim ON-OFF Switch - OFF
4. Pitch Trim Circuit Breaker - PULL
5. Re-trim aircraft manually

NOTE

Do not attempt to operate the electric trim system until the cause of the malfunction has been determined and corrected.

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.

UNLATCHED DOOR IN FLIGHT

If the cabin door is not locked it can unlatch in flight. This can occur during or just after take-off. The door will trail in a position 3 to 4 inches open, but the flight characteristics

of the airplane will not be affected. Return to the field in a normal manner. If practicable, during the landing flare-out, have a passenger hold the door to prevent it from swinging open.

In an emergency it is possible to close the door in flight as follows:

1. Slow to approximately 120 mph/104 kts
2. Open the storm window to reduce cabin air pressure
3. Bank to the right
4. Simultaneously apply left rudder (which will result in a right slip) and close the door

ILLUMINATION OF ALTERNATOR OUT LIGHT

In the event of the illumination of a single ALTERNATOR OUT light:

1. Check the respective loadmeter for load indication
 - a. No Load - Turn off affected alternator
 - b. Regulate load

In the event of the illumination of both ALTERNATOR OUT lights:

1. Check loadmeters for load indication
 - a. No load indicates failure of regulator
 - (1) Switch regulators
 - (2) System should indicate normal
 - b. If condition recurs
 - (1) Switch to original regulator
 - (2) System returns to normal, indicates overload condition causing malfunction
 - (3) Reduce load
 - c. If condition indicates malfunction of both alternator circuits
 - (1) Both ALT Switches - OFF
 - (2) Minimize electrical load since only battery power will be available

ICING FLIGHT EMERGENCIES

EMERGENCY STATIC AIR SOURCE

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 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.

EMERGENCY STATIC AIR SOURCE CORRECTIONS

Emergency Static Air Selector - ON EMERGENCY - Subtract or add the tabulated correction to the appropriate airspeed from the manual to obtain the proper indicated airspeed.

FLAPS	GEAR	STORM WINDOW	CORRECTION	
			TO IAS (MPH)	ALTIMETER (FT)
UP	UP	CLOSED	-3	-50
UP	UP	OPEN	-17	-200
DOWN	DOWN	CLOSED	+7	+75
DOWN	DOWN	OPEN	-10	-100

EXAMPLE:

Static Air Selector - ON EMERGENCY

Gear and Flaps - DOWN

Storm Window - CLOSED

Weight - 5300 LBS

Approach Speed (Landing Graph) - 102 MPH

Field Pressure Altitude (Landing Graph) - 2000 FT

Tabulated Static Air Correction - + 7 MPH

Corrected Indicated Airspeed - 109 MPH

Tabulated Altimeter Correction - +75 FT

Corrected Indicated Field Pressure Altitude - 2075 FT

SURFACE DEICE SYSTEM

- a. Failure of AUTO Operation.
 - (1) Surface Deice Switch - MANUAL (Do not hold more than 8 seconds)

CAUTION

The boots will inflate only as long as the switch is held in the MANUAL position. When the switch is released the boots will deflate.

- b. Failure of boots to deflate
 - (1) Pull circuit breaker on pilot's side panel.

ELECTROTHERMAL PROPELLER DEICE SYSTEM

1. Loss of one alternator; turn off unnecessary electrical equipment. Turn the prop deice system off while operating the cabin heater blower or the landing gear motor. Monitor electrical loads so as not to exceed alternator capacity of 1.0 on the loadmeter.

An abnormal reading on the Propeller Deice Ammeter indicates need for the following action:

- a. Zero Amps, Check prop deice circuit breaker. If the circuit breaker has tripped, a wait of approximately 30 seconds is necessary before resetting. If ammeter reads 0 and the circuit breaker has not tripped or if the ammeter still reads 0 after the circuit breaker has been reset, turn the switch off and consider the prop deice system inoperative.
- b. Zero to 7 Amps, 2 Blade Propeller: Zero to 14 Amps, 3 Blade Propeller:

If the prop deicing system ammeter occasionally or regularly indicates more than 12 but less than 15 amps for 2 blade, or more than 18 but less than 23 amps for 3 blade, operation of the prop deice system can continue unless serious propeller imbalance results from irregular ice throw-offs.

- c. 12 to 15 Amps, 2 Blade Propeller; 18 to 23 Amps, 3 Blade Propeller:

If the prop deicing system ammeter occasionally or regularly indicates 11 to 15 amps for 2 blade or 18 to 23 amps for 3 blade, operation of the prop deice system can continue unless serious propeller imbalance results from irregular ice throw-offs.

- d. More than 15 Amps, 2 Blade Propeller: More than 23 amps, 3 Blade Propeller:

If the prop deice system ammeter occasionally or regularly indicates more than 15 amps for 2 blade, or more than 23 amps for 3 blade, the system should not be operated unless the need for prop deicing is urgent.

SIMULATED SINGLE-ENGINE

ZERO THRUST (Simulated Feather)

When establishing zero thrust operation, use the power setting 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 condition:

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

NOTE

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

LANDING GEAR RETRACTION AFTER PRACTICE MANUAL EXTENSION

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

1. Handcrank - CHECK, STOWED.
2. LDG GR MOTOR - Circuit Breaker - IN
3. Landing Gear Handle - UP

EMERGENCY EXIT

An emergency exit is provided by the openable window on the left side of the airplane as indicated by an emergency exit placard. The cabin door, the optional cargo door and/or the openable window on the right side of the cabin may be used for egress if required. The right openable window operates in the same manner as the emergency exit for egress. To open emergency exit:

1. Unlatch window
2. Pull pin and push window out

NOTE

On TE-1078 and after, for access past the 3rd and/or 4th seats, rotate the red handle, located on the lower inboard side of the seat back, and fold the seat back over.