SECTION 3 - EMERGENCY PROCEDURES

PA-30 * 3600 LBS GROSS WEIGHT

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EMERGENCY PROCEDURES

PA-30 * 3600 LBS GROSS WEIGHT

DETERMINING INOPERATIVE ENGINE

1.) **Dead foot, dead engine** - The airplane will yaw in the direction of the dead engine. Rudder pressure required to maintain directional control will be on the side of the good engine.

2.) **Verify by throttle** - Manifold pressure gauges and tachometers will indicate near normal readings, and should not be used to determine an inoperative engine. Partially retard the throttle on the engine that is believed to be inoperative. There should be no change in control pressures or engine sound if the correct throttle has been selected.

ENGINE FAILURE DURING TAKEOFF

1.) If 90 MPH IAS (78 KT) Has Not Been Attained:

Throttles ..... Both Closed
Braking ..... Maximum

If insufficient runway remains for stopping:

Fuel Selector ..... Off
Master Switch ..... Off

Continue straight ahead, turning to avoid obstacles.

**** WARNING ****

Runway length should be greater than the accelerate/stop distance required.

A check should be made early in the takeoff roll for proper engine operation. Any indication of a sluggish or rough running engine is reason to discontinue the takeoff.

2.) If Between 90 and 105 MPH IAS (78 and 91 KT):

The pilot must decide whether to abort the takeoff or continue on a single engine. Consideration must be given to runway remaining, weight, density altitude, obstacles, weather and pilot capability.

3.) If 105 MPH IAS (91 KT) Has Been Attained:

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

If insufficient runway remains:

Landing Gear ..... Retract
Wing Flaps ..... Retract
Airspeed ..... Maintain V_{YSE} (105 mph or 91 kt)

Initiate **Engine Power Loss During Climb** procedure. (Page 3-3)

ENGINE POWER LOSS DURING CLIMB

Airspeed ..... Establish V_{YSE} (105 mph or 91 kt)
Inoperative Engine ..... Identify and Verify
Rudder ..... Apply Towards Operating Engine
Aileron ..... Bank Into Operating Engine
Turn-and-Bank Indicator ..... Displace Ball Toward Operating Engine
Operative Engine ..... Full Power

Initiate **Engine Securing Procedure**. (Below)

ENGINE POWER LOSS DURING FLIGHT

The most important aspect of engine failure is the necessity to maintain lateral and directional control. If airspeed is below V_{MCA} (90 mph) reduce power on both engines and lower nose of aircraft as required to maintain control and increase speed to 105 mph.

Inoperative Engine ..... Identify and Verify
Rudder ..... Apply Towards Operating Engine
Aileron ..... Bank Into Operating Engine
Turn-and-Bank Indicator ..... Displace Ball Toward Operating Engine
Operative Engine ..... Adjust Power as Required

Initiate **Engine Securing Procedure.** (Below)

ENGINE SECURING PROCEDURE (FEATHERING PROCEDURE)

Before securing inoperative engine:

Fuel Selector ..... Switch to Tank Containing Fuel
Crossfeed ..... As Required
Electric Fuel Pump ..... On
Ignition Switch ..... Check On
Mixture ..... Full Rich
Alternate Air ..... On
Engine Gauges ..... Check For Indication of Cause of Power Loss

If power is restored:

Electric Fuel Pump ..... Off
Alternate Air ..... Off

If power cannot be restored:

Mixture ..... Idle Cut Off
Fuel Selector ..... Off
Electric Fuel Pump ..... Off
Magneto Switch ..... Off
Cowl Flap ..... Closed
Propeller Control ..... Feather Position
Generator or Alternator ..... Off
Electrical Load ..... Reduce if Necessary

Land as soon as practical at nearest suitable airport.

Initiate **Single Engine Operation On Crossfeed** procedure if necessary. (Page 3-4)

SINGLE ENGINE OPERATION ON CROSSFEED

The fuel crossfeed system should be used only during emergency conditions and only in level flight.

Inoperative Engine Side ..... Fuel Valve on "MAIN" or "AUX"
Operative Engine Side ..... Crossfeed On

** **NOTE** ** - Do Not Put **BOTH** Fuel Selector Valves on Crossfeed.

Before landing the fuel system should be taken off crossfeed by the following procedure.

Operative Engine Side ..... Fuel Valve on Inboard Main Tank
Inoperative Engine Side ..... Fuel Valve Off
Operative Engine Side ..... Electric Fuel Pump On

AIR START (UNFEATHERING PROCEDURE)

Magneto Switch ..... On
Mixture ..... Rich
Fuel Selector ..... On
Electric Fuel Pump ..... On
Throttle ..... 1/4 in. Open
Propeller Control ..... Forward to Cruise Setting
Starter ..... Engage Until Propeller Windmills

When engine starts, adjust throttle, propeller and mixture controls.

Oil Pressure ..... Check
Electric Fuel Pump ..... Off
Cowl Flap ..... As Required
Generator or Alternator ..... On

Warm engine at approximately 2000 rpm and 15 in. Hg.

ENGINE ROUGHNESS IN FLIGHT

Affected engine:

Alternate Air ..... On

If roughness continues after one minute:

Alternate Air ..... Off

In the interim:

Mixture ..... Adjust for Maximum Smoothness
Electric Fuel Pump ..... On
Fuel Selector ..... Switch Tanks
Engine Gauges ..... Check for Indication of Cause of Power Loss
Magnetos ..... Check Left Then Right Then Both

If operation is satisfactory on one magneto, continue at reduced power and standard mixture to the nearest airport.

Prepare for **Engine Power Loss During Flight** Procedure. (Page 3-3)

ENGINE FIRE DURING START

Affected engine:

Starter ..... Continue Cranking Engine
Mixture ..... Idle Cut-Off
Throttle ..... Open
Electric Fuel Pump ..... Off
Fuel Selector ..... Off
If Fire Continues ..... Extinguish With Best Available Means

** **NOTE** ** - Use radio if necessary to call for fire fighting assistance.

FIRE IN FLIGHT

Determine Source of Fire ..... Electrical or Engine

1.) Electrical Fire: (Or Smoke In Cabin)

Master Switch ..... Off
Vents ..... Open
Door ..... Open (If Necessary) as an Exhaust
Cabin Heater ..... Off
Oxygen (If Equipped) ..... As Required

Land as soon as possible without flaps. (V_{APP} = 100 mph or 87 kt)

Initiate **Manual Gear Extension** procedure @ Part 3. (Page 3-12)

2.) Engine Fire:

Affected engine:

Throttle ..... Full Aft - Closed
Mixture ..... Idle Cut-Off
Fuel Selector ..... Off
Electric Fuel Pump ..... Check Off

Initiate **Engine Power Loss During Flight** procedure. (Page 3-3)

POWER OFF LANDING (BOTH ENGINES OUT)

Locate suitable field, preferably with an alternate.

Determine wind direction.

Establish Best Glide and Spiral Pattern ..... 110 mph (96 kt) @ Full Gross Weight
Propellers ..... Feather

Tune radio to 121.5, tune transponder to 7700.

While at altitude - if time allows:

Broadcast ..... Mayday

**** Aircraft Identification - Location - Number On Board ****

1.) Gear Down Emergency Landing Procedure:

When committed to landing:

ELT ..... Activate Manually
Throttles ..... Full Aft - Closed
Fuel Selectors ..... Off
Mixture Controls ..... Idle Cut-Off
Ignition Switches ..... Off
Seat Belt and Harness ..... Tight
Door ..... (Pilot's Discretion) ..... Block Open
Wing Flaps ..... As Required

**** WARNING ****

Glide ratio is reduced radically when gear is lowered. Landing gear down operation time is approximately 7 seconds.

Landing Gear ..... Lower Just Before Touchdown
Master Switch ..... Off

Touchdown should normally be made at the slowest possible airspeed.

2.) Gear Up Emergency Landing Procedure:

A gear up landing should only be made during an emergency when:

A.) The surface is too soft or rough for a gear down landing.
B.) A field is too short. (Pilot's discretion)
C.) Ditching (a forced water landing) is necessary.

Wing Flaps ..... Up
Throttles ..... Full Aft - Closed
Fuel Selectors ..... Off
Mixture Controls ..... Idle Cut-Off
Ignition Switches ..... Off
Seat Belt and Harness ..... Tight
Door ..... (Pilot's Discretion) ..... Block Open
Master Switch ..... Off

SINGLE ENGINE LANDING

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

Landing Gear ..... Extend
Wing Flaps ..... Extend 15 Degrees
Airspeed ..... Blue Line (105 mph or 91 kt)

SINGLE ENGINE GO-AROUND

Power ..... Full Power
Rudder ..... Apply Towards Operating Engine as Required
Aileron ..... Bank Into Operating Engine
Turn-and-Bank Indicator ..... Displace Ball Toward Operating Engine
Landing Gear ..... Retract
Wing Flaps ..... Retract
Airspeed ..... Establish V_{YSE} (105 mph or 91 kt)

** **NOTE** ** - Aircraft will not climb with gear and flaps extended.

SIMULATED SINGLE ENGINE OPERATION

Simulated engine failure of a multi-engine aircraft is the most dangerous form of training a pilot is likely to experience. It is recommended that in order to remain proficient, the pilot should practice single-engine operation periodically, and only with an experienced multi-engine instructor. Simulated engine failure should be performed at an altitude that will allow enough room for safe recovery (5000 ft min. terrain clearance is recommended) should control of the airplane be lost.

Airspeed ..... Less Than 125 mph (109 kt)
Left Engine Throttle ..... Retard
Right Engine ..... Full Power
Rudder ..... Toward Operating Engine
Aileron ..... Bank Into Operating Engine
Turn-and-Bank Indicator ..... Displace Ball Toward Operating Engine
Left Engine Propeller ..... Feather
Maintain Airspeed Above V_{SSE} ..... 97 mph (84 kt)

** **NOTE** **

While V_{SSE} is the accepted airspeed below which an engine should never be intentionally failed, it is recommended that the airspeed never be allowed to fall below the blue line (105 mph) when operating on a single engine.

Due to asymmetrical thrust, the airplane will yaw and roll toward the dead engine. Maintaining wings level and holding the ball of the turn-and-bank indicator in the center can increase V_{MCA} as much as 20 knots. In addition, the high drag caused by the wings level, ball centered configuration can reduce single-engine climb performance by as much as 300 ft./min.

To overcome the yaw and roll moments induced by an engine failure, bank approximately 5 degrees into the operating engine, and displace the ball of the turn-and-bank indicator approximately 1/2 ball width toward the operating engine.

ELECTRICAL FAILURES

(For an Aircraft Equipped With Dual Generators)

1.) Excessive Discharge:

**** NOTE ****

Generators produce no charging output when engines are operated below 1200 rpm.

An excessive rate of discharge at normal operating rpm indicates a defective generator or voltage regulator.

Ammeter ..... Indicates Battery Discharge
Generator Circuit Breakers ..... Check and Reset as Required

**** NOTE ****

Before attempting to reset any circuit breaker, allow for a two to five minute cooling off period. Reset only once.

If circuit breaker is reset (closed):

Electrical Load ..... Reduce to a Minimum

If at least one generator output cannot be maintained with electrical load reduced to a minimum:

Generator Circuit Breaker (Defective Generator) ..... Pull

Maintain minimum electrical load and land as soon as practical.

**** NOTE ****

With both generators inoperative, the battery is the only remaining source of power. If the battery is depleted:

Land without wing flaps. (V_{APP} = 100 mph or 87 kt)

Initiate **Manual Gear Extension** Procedure @ Part 3. (Page 3-12)

2.) Battery Overcharge:

**** NOTE ****

A high rate of charge is normal for the first few minutes of flight.

An excessive rate of charge after several minutes at normal operating rpm indicates a defective battery or voltage regulator.

Ammeter ..... Indicates Excessive Charge
Generator Circuit Breaker (Defective Generator) ..... Pull
Electrical Load ..... Reduce to a Minimum

Anticipate complete electrical failure. Land as soon as practical.

**** NOTE ****

The battery (which may be defective) is the only remaining source of power.

ELECTRICAL FAILURES

(For an Aircraft Equipped With Non-Paralleling Dual Alternators)

**** NOTE ****

The ammeter normally indicates battery charge or discharge. Depressing and holding the alternator "LEFT" or "RIGHT" press-to-test switch will indicate the output of the corresponding alternator. The outputs of the two alternators should be approximately equal.

Ammeter ..... Indicates Battery Discharge

Check press-to-test switches. If output of one alternator is zero, reduce non-essential electrical load until ammeter indicates charging, and proceed with flight. Check circuit breaker of the defective alternator. If tripped, reduce load to a minimum and attempt to reset. Allow for a two to five minute cooling off period before attempting to reset any circuit breaker. Reset only once.

**** CAUTION ****

The alternator circuit breakers and voltage regulator selector switch should never be operated when the engine is running except in an emergency.

If both alternators read zero, reduce electrical load to a minimum.

Voltage Regulator Selector Switch ..... "AUX" Position
Voltage Regulator Circuit Breakers ..... Reset if Necessary

If one or both alternators return on line (ammeter indicates battery charging) reinstate electrical load (as ammeter indication permits).

If output is not restored:

Voltage Regulator Selector Switch ..... Return to "MAIN" Position
Both Alternator Circuit Breakers ..... Off

A defective alternator will trip the system's overvoltage relay. Reset the overvoltage relay by turning the master switch "OFF", waiting a minimum of 6 seconds for the overvoltage relay to reset, and then returning the master switch to the "ON" position. Activate alternators one at a time by resetting the respective alternator circuit breaker and then resetting the overvoltage relay again if necessary. When the defective alternator is identified, continue flight on the remaining alternator. Operate with only essential load if necessary.

If both alternators are defective, or for any other reason the electrical system cannot be restored, maintain minimum electrical load and land as soon as practical.

With both alternators inoperative, the battery is the only remaining source of power. If the battery is depleted:

Land without wing flaps. (V_{APP} = 100 mph or 87 kt)

Initiate **Manual Gear Extension** Procedure @ Part 3. (Page 3-12)

HIGH OIL TEMPERATURE

Cowl Flaps ..... Open
Mixture ..... Enrich
Power ..... Reduce if Necessary
Airspeed ..... Maintain Above 130 mph (113 kt)

Land as soon as possible and investigate cause.

Prepare for **Engine Power Loss During Flight** Procedure. (Page 3-3)

HIGH CYLINDER HEAD TEMPERATURE

Excessive cylinder head temperature may parallel high oil temperature, and the procedure for handling it is the same. Refer to **High Oil Temperature** procedure. (above)

LOSS OF OIL PRESSURE

Land as soon as possible and investigate cause.

Prepare for **Engine Power Loss During Flight** procedure. (Page 3-3)

LOSS OF FUEL PRESSURE

**** NOTE ****

The most common cause of fuel pressure loss is fuel exhaustion due to improper fuel management. In the event of fuel pressure loss:

Fuel Selector ..... Switch to a Tank Containing Fuel
Electric Fuel Pump ..... On
Mixture ..... Enrich

If pressure is not regained:

Electric Fuel Pump ..... Off

Initiate **Engine Power Loss During Flight** procedure. (Page 3-3)

INDUCTION SYSTEM ICING

It is very rare but possible for ice to form in the engine's induction system. The first indication of induction system icing is usually a drop in fuel flow, followed by engine roughness.

Alternate Air ..... Full On
Throttle ..... Full Open
Mixture ..... Adjust for Maximum Smoothness

When ice is cleared:

Alternate Air ..... Full Off
Throttle ..... Normal Cruise Setting
Mixture ..... Adjust to EGT Gauge
Fuel Flow Gauge ..... Monitor for Recurrence

GYRO SUCTION FAILURE

The Twin Comanche is equipped with dual vacuum pumps. If one of the vacuum pumps should fail, a mechanical indicator will identify "left" or "right" and the remaining pump will take over the load.

If a problem should arise where suction is lost:

Suction Below 4.8 in. Hg.

RPM ..... Increase to 2700
Altitude ..... Descend to Maintain 4.8 in. Hg.

Use electric turn coordinator and magnetic compass to monitor artificial horizon and directional gyro.

If adequate gyro suction can not be maintained, initiate VFR or partial panel IFR procedures as appropriate.

Land as soon as practical and investigate cause.

PROPELLER OVERSPEED

Affected engine:

Propeller Control ..... Aft - Decrease rpm.
Throttle ..... Retard
Airspeed ..... Reduce
Throttle ..... As Required to Remain Below 2700 rpm.

Feather propeller if necessary.

Land as soon as possible and investigate cause.

**** NOTE ****

If an overspeed condition should occur, refer to Lycoming Service Bulletin 369F for appropriate corrective action.

OPEN DOOR IN FLIGHT

If latches are not secure, the door will trail slightly open and airspeed will be slightly reduced. Buffeting may be experienced.

To close door in flight:

Airspeed ..... Below 100 mph (87 kt)
Cabin Vents ..... Close
Storm Window ..... Open
Slip Airplane ..... Facing Door Into Wind
Latch ..... Secure

An open door in flight presents no real danger. However, the high level of noise caused by an open door can give concern to passengers and be distracting to the pilot. If unable to close the door in flight, land as soon as practical with approximately a 10 mph increase over normal landing speed.

LANDING GEAR FAILURE AND MANUAL GEAR EXTENSION

1.) Prior To Executing Emergency Procedure:

Master Switch ..... Check On
Landing Gear Circuit Breakers ..... Check and Reset as Required

If breakers are reset (closed), continue with emergency procedure:

2.) If Landing Gear Operates, But Green (Gear Down - Locked) Lamp Fails To Illuminate:

Navigation Lights ..... Check Off
Landing Gear Indicator Light ..... Replace as Required

**** NOTE ****

If this procedure is due to an electrical failure, landing gear position lights and warning horn will be inoperative.

3.) If Landing Gear Fails To Operate, Initiate Manual Gear Extension Procedure:

Airspeed ..... Below 100 mph (87 kt)
Landing Gear Switch ..... Gear "DOWN LOCKED" Position
Landing Gear Switch (Three Position Type) ..... Center "OFF" Position
Motor Release Arm ..... Disengage and Push Forward. Through Full Travel

Allow landing gear to fall.

Gear Extension Handle ..... Remove From Stowage

If left socket is not in clear position, place handle in right socket.

Gear Extension Handle ..... Engage Slot and Twist Clockwise to Secure

Extend handle and rotate forward until left socket is in clear position.

Gear Extension Handle ..... Place in Left Socket and Secure

Extend handle and rotate **FULL** forward to extend landing gear and (if installed) emergency safety lock will engage.

Handle locked in full forward position indicates landing gear is down and (if installed) emergency safety lock engaged. Gear "DOWN LOCKED" indicator light should be on.

Do not retract landing gear with handle in socket.

**** CAUTION ****

Do not re-engage landing gear operating motor in flight. To reduce landing gear side loads to a minimum, avoid a crosswind landing and high speed turns while taxiing.

SPIN RECOVERY

**** WARNING ****

The Twin Comanche is certified as a Normal category airplane. Intentional spins are prohibited.

Throttles ..... Idle
Ailerons ..... Neutral
Rudder ..... Full Opposite to Direction of Rotation
Control Wheel ..... Briskly Forward Full Travel
Rudder ..... Neutral When Rotation Stops
Control Wheel ..... Back Pressure to Recover From Dive

**** NOTE ****

Application of the ailerons opposite the direction of rotation can expedite recovery of the Twin Comanche.

EMERGENCY DESCENT

1.) Oxygen System Failure:

**** WARNING ****

Time of useful consciousness in the event of oxygen system failure while operating an aircraft at 20,000 ft. is ten minutes.

Seat Belt and Harness ..... Secure
Throttles ..... Retard
Propeller Controls ..... Full Forward - Increase rpm.
Landing Gear ..... Down Under 150 mph (130 kt)
Airspeed ..... Maintain Below 150 mph (130 kt)

**** CAUTION ****

A 2,000 to 3,000 ft./minute descent is adequate to answer the emergency with minimal risk of damage to the engines, and discomfort to the passengers.

Consider elevation of terrain on descent. Initiate recovery procedure at 10,000 ft. MSL. or 2,000 ft. AGL. as appropriate.

Landing Gear ..... Retract
Mixture ..... Enrich
Throttles ..... Increase Slowly
Propeller Controls ..... Cruise Setting

Adjust altitude and power setting as appropriate and continue flight to destination airport.

2.) Other Emergency:

In the event of an emergency where thermal shock to the engines and passenger discomfort are overridden by other factors (such as a fire that cannot be extinguished) which require getting the airplane on the ground as quickly as possible, the additional action of rolling the aircraft to a 40 to 45 degree bank and descending in a spiral destroys a large portion of lift and increases rate of descent substantially.