EMERGENCY PROCEDURES

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 judgement 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.

AIRSPEEDS FOR EMERGENCY OPERATION

Engine Failure After Takeoff ---------- 70 MPH
Manoeuvring Speed
2300 Lbs ---------- 112 MPH
Maximum Glide ---------- 80MPH
Precautionary Landing With Engine Power ---55 KIAS
Landing Without Engine Power:
Wing Flaps Up ---------- 70 – 80 MPH
Wing Flaps Down ---------- 65 – 75 MPH

ELECTRICAL POWER SUPPLY SYSTEM MALFUNCTIONS

Malfunctions in the electrical power supply system can be detected by periodic monitoring of the ammeter and overt-voltage warning light; 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 dame aged or improperly adjusted voltage regulator can also cause malfunctions. 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 paragraphs below describe the recommended remedy for each situation.

EXCESSIVE RATE OF CHARGE

After 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 two needle widths of charging current. If the charging rate were to remain above this value on a long flight, the battery would overheat and evaporate the electrolyte at an excessive rate. Electronic Components in the electrical system could be adversely affected by higher than normal voltage if a faulty voltage regulator setting is causing the overcharging. To preclude these possibilities, an over-voltage sensor will automatically shut down the alternator and the over-voltage warning light will illuminate If the charge voltage reaches approximately 16 volts. Assuming that the malfunction was only momentary, an attempt should be made to reactivate the alternator system. To do this, turn both sides of the master switch off and then on again. If the problem no longer exists, normal alternator charging will resume and the warning light will go off. If the light comes on again, a malfunction Is confirmed. In this event, the flight should be terminated and/or the current drain on the battery minimized because the battery can supply the electrical system for only a limited period of time. If the emergency occurs at night, power must be conserved for later use of the lauding light and flaps during landing.

INSUFFICIENT RATE OF CHARGE

If the ammeter indicates a continuous discharge rate in flight, the alternator is not supplying 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

CARBURETOR ICING

A gradual loss of RPM and eventual engine roughness may result from the formation of carburetor ice. To clear the ice, apply full throttle and pull the carburetor heat knob full out until the engine runs smoothly; then remove carburetor heat and readjust the throttle. If conditions re quire the continued use of carburetor heat in cruise flight, use the minimum amount of heat necessary to prevent Ice from forming and lean the mixture slightly for smoothest engine operation.

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 power 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 the 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 of 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 necessarily cause for an immediate precautionary landing because an orifice in this line will prevent a sudden loss of oil from the engine sump. However, a landing at the nearest airport would be advisable to inspect the source of trouble.

If a total loss of oil pressure is accompanied by a 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 low power during the approach, using only the minimum power required to reach the desired touchdown spot.

OPERATIONAL CHECKLISTS
FORCED LANDINGS

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. Airspeed — 70 MPH
2. Wing Flaps — 20°
3. Selected Field — FLY OVER, noting terrain and obstructions, then retract flaps upon reaching a safe altitude and airspeed
4. Downwind – Radio and Electrical Switches — OFF
5. Airspeed — 70 MPH
6. Wing Flaps — 30° (on final approach)
7. Doors — UNLATCH PRIOR TO TOUCHDOWN
8. Master Switch — OFF
9. Ignition Switch — OFF
10. Touchdown — SLIGHTLY TAIL LOW
11. Brakes — APPLY HEAVILY

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 fall, and a forced landing Is imminent, select a suitable field and prepare for the landing as follows:

1. Mixture — IDLE CUT-OFF
2. Fuel Shutoff Valve — OFF
3. All Switches (except master) — OFF
4. Airspeed — 70 to 80 MPH (flaps UP)
5. Wing Flaps — AS REQUIRED (30° recommended within gliding distance of field)
6. Airspeed — 65 to 75 MPH (flaps DOWN)
7. Master Switch — OFF
8. Doors — UNLATCH PRIOR TO TOUCHDOWN
9. Touchdown — SLIGHTLY TAIL LOW
10. Brakes — APPLY HEAVILY
11. Elevator — HOLD FULL UP

ENGINE FAILURE DURING TAKEOFF RUN

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 IMMEDIATELY AFTER TAKEOFF

1. Airspeed — 70 MPH
2. Mixture — IDLE CUT-OFF
3. Fuel Shutoff Valve — OFF
4. Ignition Switch — OFF
5. Wing Flaps — AS REQUIRED
6. Master Switch — OFF

ENGINE FAILURE DURING FLIGHT

1. Airspeed — 70 MPH
2. Carburetor Heat — ON
3. Primer — IN and LOCKED
4. Fuel Shutoff Valve — ON
5. Mixture — RICH
6. Ignition Switch — BOTH (or START if propeller is stopped)

OPERATIONAL CHECKLISTS
FORCED LANDINGS

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. Cranking — CONTINUE, to get a start which would suck the flames and accumulated fuel through the carburetor and into the engine

If engine starts

2. Power — 1700 RPM for a few minutes
3. Engine — SHUTDOWN and inspect for damage

If engine fails to start

4. Throttle — FULL OPEN
5. Cranking — CONTINUE in an effort to obtain a start
6. Extinguisher — OBTAIN (have ground attendants obtain if not installed)
7. Engine — SECURE
   a. Starter — RELEASE
   b. Master Switch — OFF
   c. Ignition Switch — OFF
   d. Fuel Shutoff Valve — OFF
8. Fire — EXTINGUISH using fire extinguisher, wool blanket, or dirt
9. Fire Damage — INSPECT, repair damage or replace damaged components or wiring 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. Mixture — IDLE CUT-OFF
2. Fuel Shutoff Valve — OFF
3. Master Switch — OFF
4. Airspeed — 120 MPH
5. Cabin Heat and Air — OFF (except wing root vents)
6. Select a suitable field for a forced landing
7. If fire is not extinguished, increase glide speed to find an airspeed which will provide an incombustible mixture
8. Forced Landing — EXECUTE (as described in Emergency Landing Without Engine Power)
9. Do not attempt to restart engine

ELECTRICAL FIRE IN FLIGHT

The initial indication of an electrical fire is the odour of burning insulation. The immediate response should be to turn off the master switch. Then close off ventilating air as much as practicable to reduce the chances & 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. Vents/Cabin Air/Heat — CLOSED
4. Fire Extinguisher — ACTIVATE (if available)

Warning

After discharging an extinguisher within a closed cabin, ventilate the cabin.

If fire appears out and electrical power is necessary for continuance of flight:

5. Master Switch — ON
6. Circuit Breakers — CHECK for faulty circuit, do not reset
7. Radio/Electrical Switches — ON one at a time, with delay after each until short circuit is localized
8. Vents/Cabin Air/Heat — OPEN when it is ascertained that fire is completely extinguished

CABIN FIRE

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

Warning

After discharging an extinguisher within a closed cabin, ventilate the cabin.

4. Land the airplane as soon as possible to inspect for damage

WING FIRE

1. Navigation Light Switch — OFF
2. Strobe Light Switch (if installed) — OFF
3. Pitot Heat Switch (if installed) — OFF

Note

Perform a side slip to keep the flames away from the fuel tank and cabin, and land as soon as possible, with flaps retracted.

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 (if installed)
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 maximum defroster air temperature. For greater air flow at reduced temperatures, adjust the cabin air control as required
4. Open the throttle to increase engine speed and minimize ice build up on 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. Lean the mixture for maximum RPM, if carburetor heat is used continuously
6. Plan a landing at the nearest airport. With an extremely rapid ice build-up, select a suitable “off airport” landing site
7. With an ice accumulation of ¼ inch or more on the wing leading edges, be prepared for significantly higher stall speed
8. Leave wing flaps retracted. With a severe ice build-up on the horizontal tail, the change in wing wake airflow direction changed by wing flap extension could result in a loss of elevator effectiveness
9. Open left window and, if practical, scrape ice from a portion of the windshield for visibility in the landing approach
10. Perform a landing approach using a forward slip, if necessary, for improved visibility
11. Approach at 75 to 85 MPH depending upon the amount of ice accumulation
12. Perform a landing in level attitude

LANDING WITH A FLAT MAIN TIRE

1. Wing Flaps — AS DESIRED
2. Approach — NORMAL
3. Touchdown — GOOD TIRE FIRST, hold airplane off flat tire as long as possible with aileron control

DITCHING

1. Radio — TRANSMIT MAYDAY on 121.5 MHz, giving location and intentions and SQUAWK 7700 if transponder is installed
2. Heavy Objects (in baggage area) — SECURE OR JETTISON
3. Approach —
   a. High Winds, Heavy Seas — INTO THE WIND
   b. Light Winds, Heavy Swells — PARALLEL TO SWELLS
4. Wing Flaps — 30°
5. Power — ESTABLISH 300 FT/MIN DESCENT AT 55 KIAS
6. Cabin Doors — UNLATCH
7. Touchdown — LEVEL ATTITUDE AT 300 FT/MIN DESCENT
8. Face — CUSHION at touchdown with folded coat
9. Airplane — EVACUATE through cabin doors. If necessary, open windows and flood cabin to equalize pressure so doors can be opened
10. Life Vests and Raft — INFLATE

AMMETER SHOWS EXCESSIVE RATE OF CHARGE (Full Scale Deflection)

1. Alternator — OFF
2. Alternator Circuit Breaker — PULL
3. Master — ON
4. Nonessential Electrical Equipment - OFF
5. Flight — TERMINATE as soon as practical

LOW-VOLTAGE LIGHT ILLUMINATES DURING FLIGHT (Ammeter Indicates Discharge)

Note

Illumination of the low-voltage light may occur during low RPM conditions with an electrical load on the system such as during a low RPM taxi. Under these conditions, the light will go out at higher RPM. The master switch need not be recycled since an over-voltage condition has not occurred to de-activate the alternator system.

1. Radios — OFF
2. Alternator Circuit Breaker — CHECK IN
3. Master Switch — OFF (both sides)
4. Master Switch — ON
5. Low-Voltage Light — CHECK OFF
6. Radios — ON

If low-voltage light illuminates again:

7. Alternator — OFF
8. Nonessential Radio and Electrical Equipment — OFF
9. Flight — TERMINATE as soon as practical

Kawartha Lakes Flight Centre
705.324.8921
www.FlyKawarthaLakes.ca