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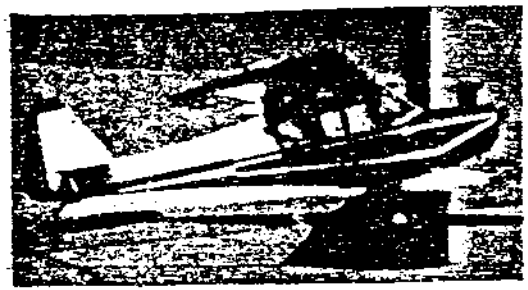
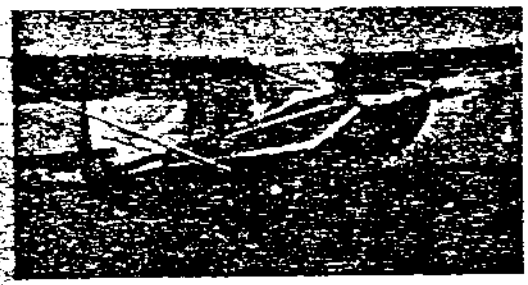
Fleet Canuck Manual





Edmonton Flying Club

efc

*EFC manual includes engine and propeller modifications on which changes to CF-DAM have been based.

PRE-STARTING CHECK

_) Belts fastened, controls free, correct movements
_) Doors closed, loose articles secure
_) Master ON, Radios OFF, other switches OFF
_) Fuel ON and sufficient, throttle set 1/4"
_) Prime 2-5 strokes if engine is cold, lock primer
_) Ignition switches on, set brakes, toe brakes ON
_) Control column back, all clear, operate starter
3) Check oil pressure, no pressure in 30 seconds- SHUT ENGINE OFF
9) Idle 700-1000 rpm
0) Radio switches and radio ON ground control
1) Mag. check left and right - dead cut (approx. 1000 rpm)
2) Altimeter set to current altimeter setting or field elevation - clock set
3) Test brakes and request taxi clearance
4) Beacon ON

RUN UP

1) Suitable run-up position
2) Minimum oil temperature - 90°F
3) Brakes set and/or guarded. Control column back
4) Run-up to 1700 rpm. Check.
5) Check oil pressure, temperature and alternator
6) a) Ignition - Max. 75 rpm difference
   b) Oil pressure - Min. 30 psi, temperature and alternator charging
   c) Carb heat - for operation
   d) Idle check - 500-700 rpm, Min. oil pressure 10 psi
7) Idle approximate 1000 rpm

PRE TAKE-OFF

1) Check oil temperature
2) Belts fastened - door shut
3) Trim set, controls free, throttle tension
4) Mags. ON, primer LOCKED, fuel ON

OPERATING CHECK-LIST

Pre-Flight (internal - general condition)

Radios	OFF
Switches	OFF
Controls	UNLOCKED
Brakes	CHECKED
Fuel	ON CHECKED
Trims	CHECKED NEUTRAL
Fire Extinguishers	CHECKED
Documents on Board	CHECKED

Pre-Flight (external - general condition)

Elevators, Rudder, Tension wires	CHECKED SECURE - FREE
Antennas	SECURE CHECKED
Right Wing	HINGES, AILERON PINS
Leading Edge	STRUTS, BRACES PINS
Fuselage	U/C, TIRES BRAKELINES BUNGIE CORD
Engine	OIL, FUEL, PROPELLOR
Left Wing	HINGES, AILERON PINS
Pitot/Venturi	CHECKED

MOORING YOUR PLANE

Proper tie-down is the best precaution against damage to your parked airplane by gusty or strong winds.

To tie down your airplane securely, proceed as follows:

1) Set parking brake and tie control column back
2) Install a surface control lock between each aileron
3) Tie sufficiently strong ropes or chains to wing and tail tie-down fittings, and secure each rope to ramp tie-down.
4) Install a surface control lock over the fin and rudder.
5) Install a pitot tube cover.
6) Tie a rope to tail wheel spring and secure the opposite end to a ramp tie-down.

AIRPLANE FILE

There are miscellaneous data, information and licences that are a part of the airplane file. The following is a check list for that file. In addition, a periodic check should be made of the latest M.O.T. regulations to insure that all data requirements are met.

The following are to be carried in the airplane at all times:

1) Aircraft Airworthiness Certificate
2) Aircraft Registration Certificate
3) Airplane Radio Station Licence
4) Pilot's Licence
5) Pilot's Restricted Radio Operators Licence
6) Weight & Balance, and associated papers
7) Airplane Equipment list
8) Journey Log Book

Pre-Take-Off Cont'd

5) Master ON, radio switches ON
6) Gauges CHECKED
7) Radios (tower control)
8) Carb heat COLD, compass CHECK
9) Request take-off clearance
10) Beacon ON - CHECK

NORMAL TAKE-OFF

1) Carburetor heat - COLD
2) Throttle - FULL OPEN
3) Elevator control - left tail as soon as possible, aircraft in level attitude
4) Climb speed 65-70 mph

PRE-LANDING

1) Seat belt - SECURE
2) Brakes - OFF
3) Mags. ON, primer LOCKED, fuel ON
4) Gauges NORMAL
5) Master and radios ON
6) Belts FASTENED
7) carb heat HOT, power OFF

SHUT DOWN

1) Stabilize engine temperature at idle rpm
2) Carb heat COLD
3) Radios OFF, switches OFF
4) Ignition switches OFF
5) Master switch OFF
6) Park brakes ON
7) Check belts crossed on seat, doors closed
8) Control LOCKED

The following conditions and limitations will apply:

A) Engine Operation

1) Engine - Continental O-200A Series equipped with a 60-amp alternator
2) Rated at 100 BHP at 2750 rpm
3) Engine maximum rpm 2750
4) Recommended cruising rpm 2300-2500 Max. continual operation
5) Oil Pressure on pre-flight check - 30 psi Min.
6) Oil temperature pre take-off - 90°F Min.
7) Oil temperature pre take-off - 225°F Max.
8) Oil Minimum 4 Imp. qts. - maximum 6 Imp. qts.
9) Use 80/87 Fuel - Red

B) Aircraft Frame

1) Licenced empty weight including 2.5 Imp. gals. unusable fuel, approximately 1000 lbs.
2) Maximum gross weight 1480 lbs.
3) Fuel capacity - 16.0 Imp. gals.
4) Cruising speed - 112 mph Max.
5) Stall speed - 50 mph
6) Maneouver speed - 97 mph
7) Never Exceed Speed of 144 mph
8) Normal approach speed - 70-75 mph
9) Maximum load factor
   Positive - 3.8 g's
   Negative - 1.9 g's

Aircraft is fitted with Continental O-200 A engine.

The following alternate conditions and limitations will apply:

A) Engine Operation

1)	Engine rpm Recommended Cruising rpm	2750 Max. 2300-2500
2)	Oil Pressure on pre-flight check	30 psi Min.
3)	Oil Temperature pre-take-off	90°F Min.
4)	Oil Temperature	225°F Max.

B) Aircraft Operation

1)	Maneouver speed	97 mph IAS Max.
2)	Structural Cruising Speed	112 mph IAS Max.
3)	Never Exceed Speed	144 mph IAS Max.
4)	Best Climb Speed	70 mph IAS
5)	Maximum Load Factor - Positive - Negative	 3.8 g's 1.9 g's

C) Cockpit Placard

The following placards must be displayed in clear view of the pilot:

1) DO NOT EXCEED 144 mph.
2) NO SMOKING
3) DO NOT EXCEED 2750 rpm
   CRUISE 2500 rpm
4) THE FUEL REMAINING IN THE TANK WHEN THE FUEL GUAGE READS ZERO CANNOT BE USED SAFELY IN FLIGHT.

uel System

Fuel is supplied to the engine from one tank, ocated inside firewall cockpit side. From this ank, fuel flows by gravity through a fuel shut-off alve and fuel strainer to the carburetor.

uel Strainer Drain Valve

Before first flight of the day and after each efueling, push fuel strainer drain valve up (locat- d just inside cowl access door) for about four sec- nds to clear fuel strainer of possible water and sedi- ent. Release drain valve, then check that strainer rain is closed after draining.

FUEL QUANTITY DATA (IMP. GALLONS)			
TANKS	USUABLE DUEL ALL FLIGHT CONDITONS	UNUSABLE FUEL	TOTAL FUEL VOLUME
One (16 gallons standard	13.5	2.5	16.0

lectrical System

Electrical energy is supplied by a 12-volt, direct urrent system powered by an engine-driven alternator. 12-volt storage battery is located on the left, orward side of the firewall just inside the cowl.

aster Switch

The master switch is a toggle type switch and is N in the up position and OFF in the down position which ontrols all electrical power to the airplane.

The operational data shown on the following pages are compiled from actual tests with airplane and engine in good condition and using average piloting techniques and best power mixture. You will find this data a valuable aid when planning your flights. However, inasmuch as the number of variables included precludes a great accuracy, an ample fuel reserve should be provided. The range performance shown makes no allowances for wind, navigational error, pilot techniques, warm-up, take-off, climb, etc., which may be different on each flight you make. All of these factors must be considered when estimating reserve fuel.

To realize the maximum usefulness from your Fleet, you should take advantage of its high cruising speeds. However, if range is of primary importance, it may pay you to fly at a low cruising rpm, thereby increasing your range and allowing you to make the trip non-stop with ample fuel reserve. The range table should be used to solve flight planning problems of this nature.

In the table, range and endurance are given for fixed mixture from 2500 to 7500 feet. All figures are based on zero wind and 13.5 gallons of fuel for cruise, McCauley 1A-101-DCM-6948 propeller, 1480 lbs. gross weight and standard atmospheric conditions. Mixture is fixed to maximum rpm. Allowances for fuel reserve, headwinds, take-offs, and climbs and variations should be made as no allowances are shown on the chart. Other indeterminate variables such as carburetor metering characteristics, engine and propeller conditions and turbulance of the atmosphere may account for variations of 10% or more in maximum range.

CABIN HEATING AND VENTILATING SYSTEM

For heated ventilation air, pull the cabin heat knob out the desired amount. Additional ventilating air is provided by turning plastic cups on side of window.

PARKING BRAKE SYSTEM

To set parking brake, apply pressure to pedals, pull out on the parking brake knob. To release brakes, push brake knob in.

STARTING ENGINE

Ordinarily the engine starts easily with one or two strokes of primer in warm temperatures, to six strokes in cold weather, with the throttle open approximately ¼ inch. In extremely cold temperatures, it may be necessary to continue priming while cranking.

If the engine is underprimed (most likely in cold weather with a cold engine), it will not fire at all, and additional priming will be necessary. As soon as the cylinders begin to fire, open the throttle slightly to keep it running.

After starting, if the oil guage does not begin to show pressure within 30 seconds in the summertime, and about twice that long in very cold weather, stop the engine and investigate. Lack of oil pressure can cause serious engine damage. In cold weather use carb heat full hot until engines run smoothly.

TAXIING

When taxiing, it is important that speed and use of brakes be held to a minimum and that all controls be utilized to maintain directional control and balance.

Taxiing over loose gravel or cinders should be

AMMETER

The ammeter indicates the flow of current, in amperes, from the alternator to the battery or from the battery to the aircraft electrical system. When the engine is operating and the master switch is ON, the ammeter indicates the charging rate applied to the battery. In the event the alternator is not functioning or the electrical load exceeds the output of the alternator, the ammeter indicates the discharge rate of the battery.

FUSES AND CIRCUIT BREAKERS

Fuses on the instrument panel protect most of the electrical circuits in your airplane. The circuits controlled by each fuse are indicated above each fuse retainer. Fuse capacity is indicated on each fuse retainer cap. Fuses are removed by pressing the fuse retainers inward and rotating them counterclockwise until they disengage. The faulty fuse may then be lifted out and replaced.

LANDING LIGHTS

A single toggle type switch controls the landing lights mounted in the leading edge of the left wing. To turn both lamps on for taxiing and landing, lift toggle switch up to ON position.

FLASHING BEACON (OPT.)

The flashing beacon should not be used when flying through clouds or overcast. The moving beams reflected from water droplets or particles in the atmosphere, particularly at night, can produce vertigo and loss of orientation. It is adviseable to operate the beacon in flight when within control zone in daylight.

done at low engine speed to avoid abrasion and stone damage to the propeller tips.

BEFORE TAKE-OFF

Warm-Up

Most of the warm-up will have been conducted during taxi and run-up. Additional warm-up before take-off should be restricted to 75% power. Since the engine is closely cowled for efficient in-flight cooling, precautions should be taken to avoid overheating on the ground.

Magneto Check

The magneto check should be made at 1700 rpm as follows:

Move the ignition switch to the RIGHT position and note rpm. Then move switch back to BOTH. Then move switch to LEFT position and note rpm and return switch to BOTH postion. The difference between the two magnetos operated individually should not be more than 75 rpm. If there is doubt concerning the operation of the ignition system, rpm checks at higher engine speeds will usually confirm whether a deficiency exists.

TAKE-OFF

Power Checks

It is important to check full throttle engine operation early in the take-off run. Any signs of rough engine operation or sluggish engine acceleration is good cause for discontinuing the take-off. If this occurs, you are justified in making a thorough full-throttle static run-up before another take-off is attempted. The engine should run

noothly and turn approximately 2375 to 2475 rpm with arburetor heat off.

Full throttle runups over loose gravel are espcially harmful to propeller tips. When take-offs ust be made over a gravel surface, it is very imporant that the throttle be advanced slowly. This alows the airplane to start rolling before high rpm s developed, and the gravel will be blown back of ne propeller rather than pulled into it. When unvoidable small dents appear in the propeller blades, hey should be immediately corrected.

NORMAL TAKE-OFF

1. Carburetor heat - COLD
2. Throttle - Full OPEN
3. Elevator control - lift tail as soon as possible, aircraft in level attitude
4. Climb speed - 65 - 70 mph

CROSSWIND TAKE-OFF

Take-offs into strong crosswinds normally are erformed applying aileron as necessary to counteract ffect of crosswind, the airplane is accelerated to speed slightly higher than normal, then pulled off bruptly to prevent possible settling back to the runay. When clear of the ground, make a co-ordinated urn into the wind to correct the drift.

CLIMB SPEEDS

Normal climbs are conducted at 65-70 mph and 00 rpm for best engine cooling. The best rate-of-imb speeds range from 65 mph at sea level to 60 mph at ,000 feet. If an obstruction dictates the use of a eep climb angle, the best angle-of-climb speed (60 h indicated airspeed) should be used with full throte.

The stalling speeds are shown for full gross weight conditions. They are presented as calibrated airspeeds because indicated airspeeds are unreliable near the stall. Other loadings result in slower stalling speeds.

APPROACH TO LANDING

Approaches can be made with power off or power on. Approaches are normally made at 65 to 75 mph, depending on turbulance and wind speeds.

At high density airports - higher initial approach speeds may be required to assist orderly movement of all types of aircraft - but in so doing, the final portion of the approach should be adjusted to normal approach speed.

SHORT FIELD LANDINGS

For short field landing, make a normal powered approach, taking into consideration winds and turbulance factors. Gradually begin to reduce the airspeed from 65 to 60 mph and by utilitizing power as necessary, control the descent to a landing safely beyond the threshold area. Aircraft should touch down in a 3-point attitude and keeping control column back and brakes as necessary.

CROSSWIND LANDINGS

When landing in a strong crosswind, use a wing low, crab or a combination method of drift correction and land in a 3-point attitude.

CRUISE

Normal cruising is done at 65% to 75% of METO power. The settings required to obtain these powers at various altitudes and outside air temperatures can be determined in the OPERATIONAL DATA.

NORMAL LANDINGS

1. Approach speed - 65 - 70 mph
2. Touch down should be made in a 3-point attitude
3. Braking - as required

OPTIMUM CRUISE PERFORMANCE

ALTITUDE	RPM	TRUE AIRSPEED
Sea Level	*2525	109
5000 Feet	*2650	113
7000 Feet	*Full Throttle	116

*70% Power

STALLS

The stall characteristics are conventional. Slight elevator buffeting may occur just before the stall.

COLD WEATHER OPERATION

Prior to starting on cold mornings, it is advisable to pull the propeller through several times by hand to "break loose" or "limber" the oil, thus conserving battery energy.

In extremely cold (0°F and lower) weather, the use of an external preheater is recommended whenever possible to reduce wear and abuse to the engine and the electrical system. Cold weather starting procedures are as follows:

With Preheat:

1. Clear propeller
2. Master switch "ON"
3. With magneto switch "OFF" and throttle closed, prime the engine four to ten strokes as the engine is being turned over.

(NOTE: Use heavy strokes of primer for best atomization of fuel. After priming, push primer all the way in and turn to locked position to avoid possibility of engine drawing fuel through the primer.)

4. Turn magneto switch to "BOTH" on
5. Open throttle ½" and engage starter

Without Preheat:

1. Prime the engine eight to ten heavy strokes while the propeller is being turned by hand
2. Clear propeller
3. Master switch "ON"
4. Turn magneto switch to "BOTH"
5. Open throttle ½"

6. Engage starter and continue to prime engine until it is running smoothly
7. Keep carburetor heat on until engine has warmed up.

NOTE

If the engine does not start the first time, it is probable that the spark plugs have been frosted over. Preheat must be used before another start is attempted.

During cold weather operations, no indication will be apparent on the oil temperature gauge prior to take-off if outside air temperatures are very cold.

After a suitable warm-up period (2 to 5 minutes at 1000 rpm), accelerate the engine several times to higher engine rmp. If the engine accelerates smoothly and the oil pressure remains normal and steady, the airplane is ready for take-off.

When operating in sub-zero temperature, avoid using partial carburetor heat. Partial heat may increase the carburetor air temperature to the 32° to 70° range, where icing is critical under certain atmospheric conditions.

OPERATING LIMITATIONS

Operations Authorized

Your Fleet 80, with standard equipment as certificated, is approved for day and night operations under VFR conditions.

Your airplane must be operated in accordance with all M.O.T. approved markings, placards and check lists in the airplane. If there is any information in this section which contradicts the M.O.T. approved markings, placards and check lists, it is to be disregarded.

MANEUVERS - NORMAL CATEGORY

This airplane is not designed for aerobatic flight. However, in the acquisition of various certificates such as commercial pilot, instrument pilot and flight instructor, certain maneuvers are required by the M.O.T. All of these maneuvers are permitted in the Fleet 80. In connection with the foregoing, the following gross weights and flight load factors apply, with recommended entry speeds for maneuvers as shown.

Maximum Design Weight . . . . . 1480 lbs.

Maximum Load Factor - Positive . . 3.8 g's

Maximum Load Factor - Negative . . 1.9 g's

No aerobatic maneuvers are approved except those listed below:

MANEUVER	RECOMMENDED ENTRY SPEED
Chandelles	97 mph (91 knots)
Lazy Eights	97 mph (91 knots)
Steep Turns	97 mph (91 knots)
Spins	Use slow deceleration
Stalls	Use slow deceleration

During prolonged spins, the aircraft engine may stop; however, spin recovery is not adversely affected by engine stoppage. Intentional spins are prohibited.

Aerobatics that may impose high inverted loads should not be attempted. The important thing to bear in mind in flight maneuvers is that the Fleet 80 is clean in aerodynamic design and will build up speed quickly with the nose down. Proper speed control is an essential requirement for execution of any maneuver, and care should always be exercised to avoid excessive speed which in turn can impose excessive loads. In the execution of all maneuvers, avoid abrupt use of controls.

AIRSPEED LIMITATIONS

The following are the certified calibrated airspeed limits for Fleet Canuck 80:

Maximum (Glide, dive in smooth air)	144 mph (Red Line)
Caution Range	112-144 mph (Yellow Arc)
Normal Range	50-112 mph (Green Arc)
Maneuvering Speed*	97 mph
Stall Speed	49 mph

*The maximum speed at which you can use abrupt control travel without exceeding the design load factor.

ENGINE OPERATION LIMITATIONS

Rated at sea level . . . . . 100 BHP at 2750 rpm
Equipped with alternator

ENGINE INSTRUMENT MARKINGS

Oil capacity	4 qts. min. 6 qts. max.
Oil Temperature Guage	
Normal Operating Range . . .	Green Arc
Maximum Allowable	225°F Red Line
Oil Pressure Guage	
Minimum Idling	10 psi (Red Line)
Normal Operating Range . . .	30–60 psi (Green Arc)
Maximum	100 psi (Red Line)
Fuel capacity	16.0 Imp. Gal. 13.5 Useable

Fuel Quantity Indicators - the fuel remaining in the tank when fuel guage reads zero.

Fuel Type - 80/87 Red

Tachometer	
Normal Operating Range . . .	2000–2500 rpm
Maximum Allowable.	2750 (Red Line)
Normal Range	2100–2500 (Green Arc)
Caution Range	2500–2750 (Yellow Arc)

WEIGHT AND BALANCE

For loading computation, refer to Current Weight and Balance Data Sheet.

GROUND HANDLING

The airplane is most easily and safely maneuvered by hand with handle attached to the fuselage near the elevator and rudder.

INSTRUMENT MARKINGS

1. A.S.I. - Red Line - 144 mph
   Yellow Arc - 112–144 mph
   Green Arc - 50–112 mph

2. Tachometer - Red Line - 2750 rpm
   Green Arc - 2100–2500 rpm
   Yellow Arc - 2500–2750 rpm

3. Oil Temperature - Red Line - 225°C

SPINS

Spins are approved in this airplane. For recovery from an inadvertant or intentional spin, the following procedures should be used:

1. Retard throttle to idle positon
2. Apply full rudder opposite to the direction of rotation
3. After ¼ turn, move the control wheel forward of neutral in a brisk motion
4. As rotation stops, neutralize rudder and make a smooth recovery from the resulting dive.

Application of aileron in the direction of the spin will greatly increase the rotation rate and delay the recovery. Ailerons should be held in a neutral positon throughout the spin and the recovery.

EMERGENCY PROCEDURES:

Emergencies caused by aircraft or engine malfunctions are extrememly 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 unexpected weather be encountered guidelines described in this section should be considered and applied as necessary to correct the problem.

ELECTRICAL POWER SUPPLY SYSTEM MALFUNCTIONS

Malfunctions in the electrical power supply system can be detected by periodic monitoring of the ammeter; however, the cause of this malfunction is usually difficult to determine. Broken or loose alternator wiring is most likely the cause of alternator failures, although other factors could cause the problem. A damaged 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 useage 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

CRUISE PERFORMANCE AT 2500 MSL

RPM	% BHP	TAS MPH	IMP GAL /HR	ENDURANCE HRS	RANGE MILES
2600	77%	113	5.2	2.2	248
2500	68%	105	4.6	2.5	256
2400	60%	100	4.2	2.7	260
2300	53%	95	3.8	3.0	285
2200	46%	89	3.3	3.5	312

CRUISE PERFORMANCE AT 5000 MSL

RPM	% BHP	TAS MPH	IMP GAL /HR	ENDURANCE HRS	RANGE MILES
2600	71%	112	4.7	2.4	260
2500	63%	104	4.3	2.7	275
2400	56%	98	3.9	2.9	285
2300	49%	92	3.5	3.3	295
2200	43%	84	3.1	3.7	305

CRUISE PERFORMANCE AT 7500 MSL

RPM	% BHP	TAS MPH	IMP GAL /HR	ENDURANCE HRS.	RANGE MILES
2600	66%	110	4.4	2.6	240
2500	58%	101	4.0	2.9	296
2400	52%	95	3.6	3.2	305
2300	45%	88	3.3	3.5	310
2200	40%	77	3.0	3.8	295

NOTE

In the above calculations of endurance in hour and range in miles, no allowances were made for reserve.

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. 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 landing light and radios 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 re-adjust the throttle. If conditions require the continued use of carburetor heat in cruise flight, use the minimum amount of heat necessary to prevent ice from forming.

SPARK PLUG FOULING

A slight 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 monentarily from BOTH to OFF 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. 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 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 gauge or relief valve is malfunctioning. A leak in the line to the guage 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.

Low Oil Pressure Cont'd.

If a total loss of oil pressure is accompanied by a rise in oil temperature, there is good 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.

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) Drag over selected field approximately 70 mph airspeed, noting the preferred area for touchdown for the next landing approach.
2) On downwind leg, turn off all switches except the ignition and master switches.
3) Approach at 65 mph.
4) Unlatch cabin doors prior to final approach
5) Before touchdown, turn ignition and master switches "OFF".
6) Touchdown should be made in a three-point attitude.

Emergency Landing Without Engine Power

If an engine stoppage occurs, establish a glide at 70 mph. If time permits, attempt to restart the engine by checking for fuel quantity, proper fuel shutoff valve position. Also check that engine primer is full in and locked and ignition switch is properly positioned.

Emergency Landing Without Engine Power Cont'd.

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) Turn fuel shutoff valve to "OFF:
2) Turn all switches "OFF"
3) Approach at 70 mph
4) Unlatch cabin doors prior to final approach
5) Land in a three point attitude
6) Apply braking as necessary

Recovery from a Spiral Dive

If a spiral is encountered, proceed as follows:

1) Close the throttle/carb heat full hot
2) Stop the turn by using co-ordinated aileron and rudder control to level the wings with reference to the horizon line
3) Cautiously apply elevator back pressure to slowly reduce the indicated airspeed to 80 mph
4) Apply carburetor heat as required
5) Upon recovery, adjust power and attitude and trim for level flight

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) Continued cranking in an attempt to get a start which would suck the 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 fuel shutoff valve.
5) Smother flames with fire extinguisher, seat cushion, wool blanket, or loose dirt. If practical, try to remove curburetor air filter if it is ablaze.
6) 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) Turn fuel shutoff valve "OFF"
2) Turn master switch "OFF"
3) Establish a 100 mph glide or slipslip away from fire
4) Close cabin heat control
5) Select a field suitable for a forced landing

Engine Fire in Flight Cont'd

6) If fire is not extinguished, increase glide speed in an attempt to find an airspeed that will provide an incombustible mixture.
7) Execute a forced landing as described in Paragraph "Emergency Landing without Engine Power". Do not attempt to restart the engine.

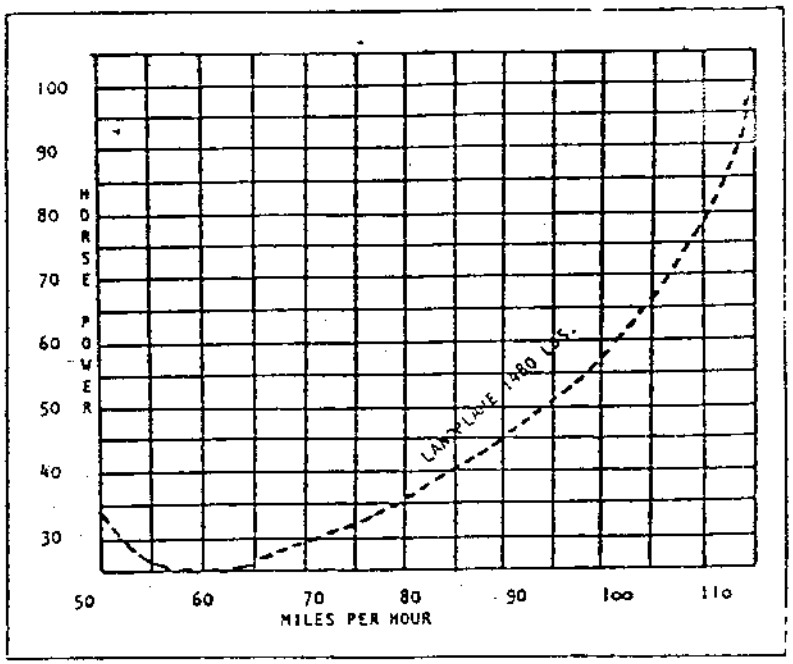
Electrical Fire in Flight

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.

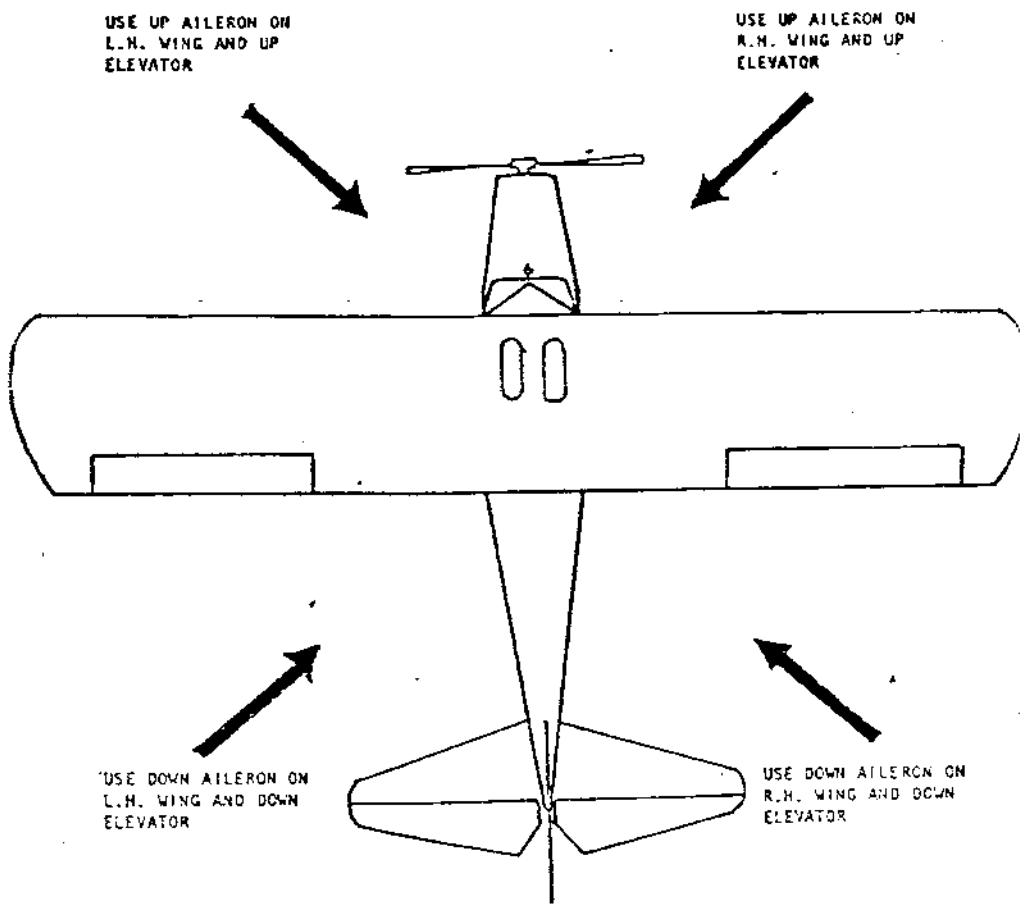
If electrical power is indispensable for the flight, an attempt may be made to identify and cut off the defective circuit as follows:

1) Master switch OFF.
2) All other switches (except ignition switch) OFF.
3) Check condition of fuses and circuit breaker to identify faulty circuit if possible. Leave faulty circuit de-activated.
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 vents.

RATED HORSEPOWER AT SEA LEVEL FLIGHT



CROSS WIND TAXING DIAGRAM

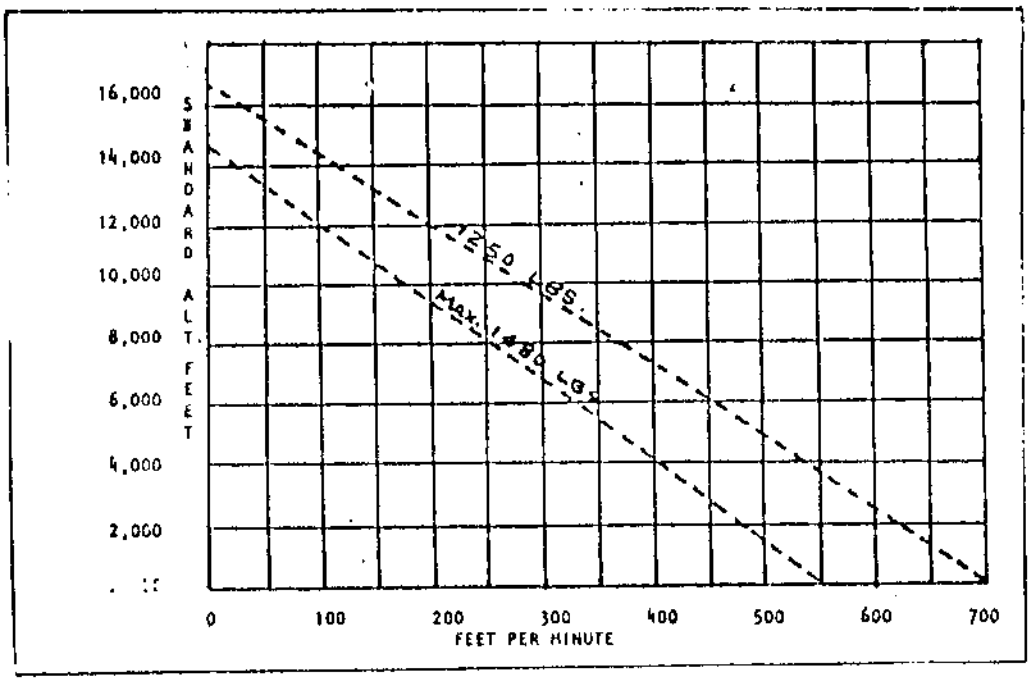


NOTE:
Strong quartering tail winds require CAUTION. Avoid sudden burst of the throttle and sharp braking.

CODE:

→ WIND DIRECTION

RATE OF CLIMB



INTERIOR LAY-OUT