SECTION II

NORMAL PROCEDURES

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INTRODUCTION

Visual inspection of the aircraft is a very important part of each mission. Start your preflight inspection as you approach the aircraft. Look at the overall aircraft condition, chocks, tiedowns, and any unusual wet spots under the aircraft which may indicate leaks. Look at the proposed taxiing routes for any possible obstruction such as ground repair work, fire extinguishers on the ramp, or other equipment that could cause a taxi accident.

The checklist outlines procedures but never takes the place of good judgment. Checklist items preceded by an asterisk (*) are challenge response items.

INTERIOR INSPECTION

1. AFTO Form 781 - CHECK

   The AFTO Form 781 is the official log of aircraft operation, refueling, and maintenance. Do not accept an aircraft unless the Form 781 properly indicates the aircraft status and that the aircraft has been cleared for flight.

2. Required Publications- ON BOARD.
3. Parking Brake - SET.
4. Control Lock - REMOVE.

CAUTION

Allowing the control wheel to slam forward when removing the control lock could cause damage to the controls and/or instrument panel.

5. Master Switch - OFF.
6. Ignition Switch - OFF.

   A worn switch may appear to be off when it is not. Physically ensure the switch is in the off detent.

7. Auxiliary Fuel Pump Switch - GUARDED.
8. Primer- LOCKED.
9. Fuel Shutoff Knob - IN.

10. Circuit Breakers - IN.
11. Carbon Monoxide Detector - CHECK.
12. Trim - SET at TAKEOFF.
13. Fuel Selector - BOTH.
14. Master Switch - ON.

WARNING

Clear the propeller area prior to turning the master switch ON in case of a starter malfunction.

15. Fuel Quantity - CHECK gauge readings. The fuel quantity should agree with the AFTO Form 781.
16. Lights and Pitot Heat - CHECK (except strobe).
17. Master Switch - OFF.
18. Fuel Strainer Knob (1968 models) - CHECK (pull out for 4 seconds, cross-country only; ensure knob is all the way in).
19. Loose Articles - SECURE.

EXTERIOR INSPECTION

During the exterior inspection, note the condition of all aircraft surfaces, antennas, and the security of all access panels. In addition, control surfaces should be checked for clearance, security of attachment and actuator bolts, and the condition of hinges, rollers, slides, actuator cables, counter weights, etc.

A. Tiedowns, gust locks, grounding wire, pitot tube cover- REMOVE.

B. Left Main Landing Gear Section.

1. Chock - REMOVE.
2. Tire - CHECK inflation, cuts, or blisters and that the hub cap is secure. If any cord is showing, the tire is worn beyond limits and should be changed.
3. Brake Assembly - CHECK brake pucks for thickness (minimum 3/32 inches) and brake lines for security and leakage.

C. Left Wing Section.

1. Flap - CHECK.
2. Aileron - CHECK.

WARNING

If placing fingers within the slot between the aileron and wing, be sure aileron is physically held against wind gust pressure.

3. Strobe/Navigation lights - CHECK condition.
4. Landing/Taxi Lights - CHECK casing and security
5. Stall Warning Horn - CHECK for obstructions.
6. Fuel Vent - CHECK for obstruction and excessive leakage.
7. Pitot Tube - CHECK inlet and drain holes for obstructions.

CAUTION

The pitot tube should be visually inspected only. Improper handling may misalign the pitot tube, causing incorrect airspeed indications.

D. Engine Section.

1. Oil Quantity CHECK. Secure Dipstick.

CAUTION

Do not operate the engine with less than 6 quarts of oil. Minimum oil quantity for normal flights of less than 3 hours is 7 quarts, and 8 quarts for flights of 3 hours or greater.

2. Oil Cap - SECURE.
3. Fuel Strainer Knob (1969 models) - CHECK (pull out for 4 seconds, cross-country only; ensure knob is all the way in).

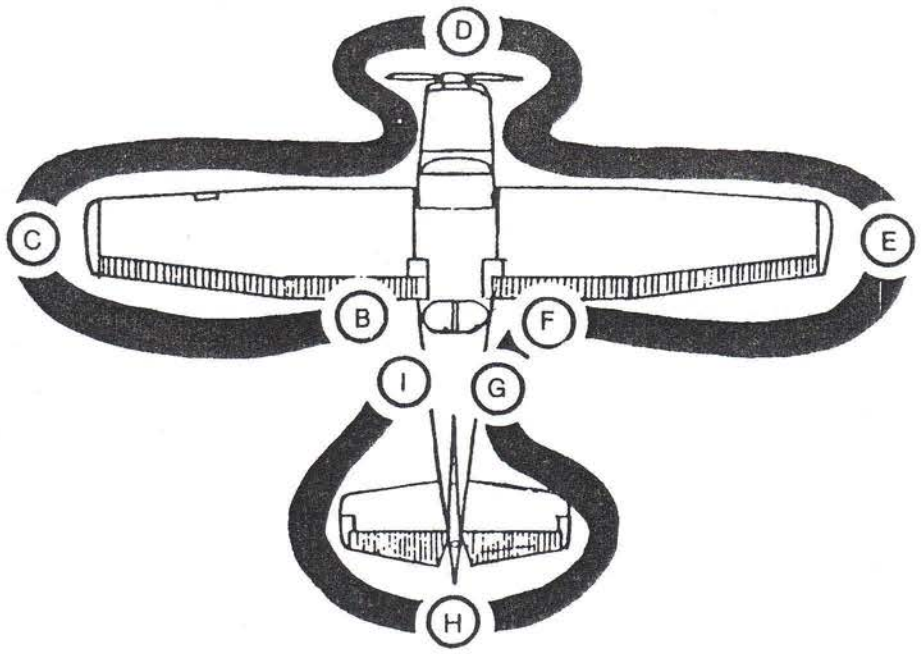


Figure 2-1. Exterior Inspection

4. Access Door - SECURE.
5. Nose Strut - CHECK. Nose gear strut extension should be 1 inch minimum to approximately 3 inches. Excessive strut extension can normally be corrected by lifting slightly on the fuselage near the horizontal stabilizer. The nose gear strut should be clean and free of hydraulic leaks. The shiny machined surfaces should be free of dust and dirt.
6. Nose Tire - CHECK.
7. Propeller - CHECK for nicks (1/8 inch maximum) or damage.

WARNING

Stay clear of propeller danger area and do not hand turn the propeller

8. Propeller Seal Plug - CHECK for evidence of oil leakage.
9. Nosewheel Compartment - CHECK for leakage from the fuel strainer valve or excessive oil/fuel leakage from other lines.

E. Right Wing Section.
   1. Strobe/Navigation Lights - CHECK.
   2. Aileron - CHECK.
   3. Flap - CHECK.

F. Right Main Landing Gear Section.
   1. Chock - REMOVE.
   2. Tire - CHECK.
   3. Brake Assembly - CHECK.

G. Right Fuselage Section.
   1. Static Port - CLEAR.

CAUTION

Check visually only. Rubbing your finger across the static port may introduce dirt into the static pressure system resulting in erroneous flight instrument indications.

H. Tail Section.
   1. Trim Tab Alignment - CHECK within 1/4 inch of the elevator with the bottom of the

elevator horn flush with the bottom of the horizontal stabilizer.

2. Right Elevator - CHECK.
3. Rudder - CHECK.
4. Rudder and Elevator Cables - CHECK.

   Control cable bolts for the rudder and elevator should be checked to ensure they are properly installed and are not binding or rubbing when these control surfaces are moved. Avoid moving control surfaces using trim tabs.

5. Navigation Light - CHECK.
6. Fuel Caps - CHECK.
7. Left Elevator - CHECK.

I. Left Fuselage Section.

1. Static Port - CLEAR.
2. Battery Drain - CHECK visually for leakage.
3. Baggage Door - SECURE, closed and locked.

BEFORE STARTING ENGINE

1. Parking Brake - SET.

*2. Seat - ADJUST AND LOCK.

WARNING

Be sure seats are locked in position prior to flight, or they may inadvertently move in flight.

*3. Seat Belt and Shoulder Harness - FASTEN.

WARNING

Seat belts should be checked for proper routing to ensure you are secure. The seat belt could hang up on the seat back reclining lever and appear secure, but not hold the pilot securely. The shoulder harness inertia reel should also be checked for binding and proper operation.

4. Heading Indicator - CAGE (1968 models).
5. Attitude Indicator - CAGE (1968 models).
6. Cockpit Air and Heat Knobs - CLOSED.
7. Flight Controls - CHECK for free and proper movement.

STARTING ENGINE

1. Mixture - RICH.
2. **D** Propeller - Full Increase
3. Master Switch - ON.

WARNING

Clear the propeller area prior to turning the master switch on in case of a starter malfunction.

4. Navigation Lights - ON.
5. Auxiliary Fuel Pump Switch - HIGH.
6. Throttle - SET for 8-10 gal/hr fuel flow.
7. Auxiliary Fuel Pump Switch - RELEASE.
8. Throttle - IDLE, then IN, 1/4 to 1/2 inch.
9. Clear the area around the aircraft 360 degrees. - CALL "CLEAR".
10. Auxiliary Fuel Pump Switch - AS REQUIRED. Usually OFF. However, LOW may facilitate starting a hard to start engine.
11. Ignition Switch - START, release when engine starts.

NOTE

The engine should start in two to three revolutions. If it does not, one of the following situations most likely exists:

I. Excessively lean Mixture:

   a. Symptom - engine starts, but quits in 3 to 5 revolutions.

b. Cause - Insufficient priming.

c. Corrective action - apply additional primer strokes and/or switch auxiliary fuel pump on LOW or HIGH as required before cranking is started.

CAUTION

Limit use of the auxiliary fuel pump to prevent overpriming and flooding. Excessive cranking will rapidly drain a cold-soaked battery.

II. Excessively Rich Mixture:

a. Symptom - Engine mis-starts characterized by intermittent explosions and puffs of black smoke.

b. Causes - Overpriming or flooding. More apt to occur in hot weather.

c. Corrective Action:

1) Crank engine with throttle approximately halfway in, the mixture at FULL LEAN, and the auxiliary fuel pump OFF.

2) Push mixture to RICH as engine starts.

III. Fuel Line Vapor Locked:

a. Symptom - Engine will not start.

b. Causes - Vaporized fuel in engine-driven pump or fuel lines. More apt to occur in hot weather with hot engine.

c. Corrective Action:

1) Mixture - FULL LEAN.

2) Throttle - IDLE.

3) Aux Fuel Pump - HIGH for 5-10 seconds.

4) Attempt normal start.

NOTE

If the engine does not start during the first few attempts, turn the ignition and master switch OFF to prevent excessive drain on the battery. Call for maintenance assistance.

12. Auxiliary Fuel Pump Switch - OFF and GUARDED.

13. Throttle - 1000 RPM minimum.

CAUTION

Excessive RPM during ground operations may result in FOD damage to the propeller, stabilizer, or other aircraft.

NOTE

A throttle setting of at least 1,000 RPM while stopped on the ground aids in engine cooling, lubrication, and prevents spark plug fouling.

14. Engine Instruments - CHECK.

NOTE

- The oil pressure gauge should show a positive indication within 30 seconds of engine start.
- **D** It may take several seconds longer than the T-41C for an oil pressure indication due to the increased routing and demand for engine oil through the governor. However, the oil pressure gauge should show a positive indication within 30 seconds of engine start (1 minute when the temperature is below 0°F).

BEFORE TAXIING

1. Radio - ON.
2. Transponder - STANDBY.
3. VOR - AS REQUIRED (On for navigation sorties only).
4. Clock - SET.
5. Flight Instruments- CHECK.
   a. Altimeter. CHECK and SET. Set current altimeter setting and check within 75 feet of known elevation.
   b. Airspeed Indicator. CHECK pointer for proper indication.
   c. Magnetic Compass. CHECK for accuracy of the heading information, cracks in the glass, bubbles in the fluid, and that the compass is free floating.
   d. Heading Indicator. SET (and UNCAGE if applicable).
   e. Attitude Indicator. UNCAGE (if applicable). Set the miniature aircraft on the artificial horizon and check the bank pointer aligned with the 0-degree bank index.
   f. Vertical Velocity. CHECK pointer for proper indication.
6. Flaps - CHECK, for proper operation of both flaps and the indicator.
7. Radio - CHECK.

   The call to ground for taxi serves as the radio CHECK.
8. Parking Brake - RELEASE.

WARNING

Prior to and during all taxi operations, flight control should be positioned for winds (see figure 2-2).

TAXIING

1. Brakes - CHECK proper operation when pulling out of the chocks. The aircraft need not be brought lo a complete stop to adequately check the brakes.
2. Turn-and-Slip Indicator - CHECK the turn needle and ball for proper indication.

BEFORE TAKEOFF

1. Throttle - 1800 RPM.

CAUTION

Use caution for aircraft "creeping" during the check. Ensure proper clearance on aircraft beside, in front of, and behind you.

2. Engine Instruments and Suction Gauge - CHECK.
3. Ignition System - CHECK:
   a. Ignition Switch - RIGHT. Check the amount of RPM drop, then return to BOTH. Ensure RPM returns to 1800.
   b. Ignition Switch - LEFT. Check the amount of RPM drop, then return to BOTH, ensure RPM returns to 1800.

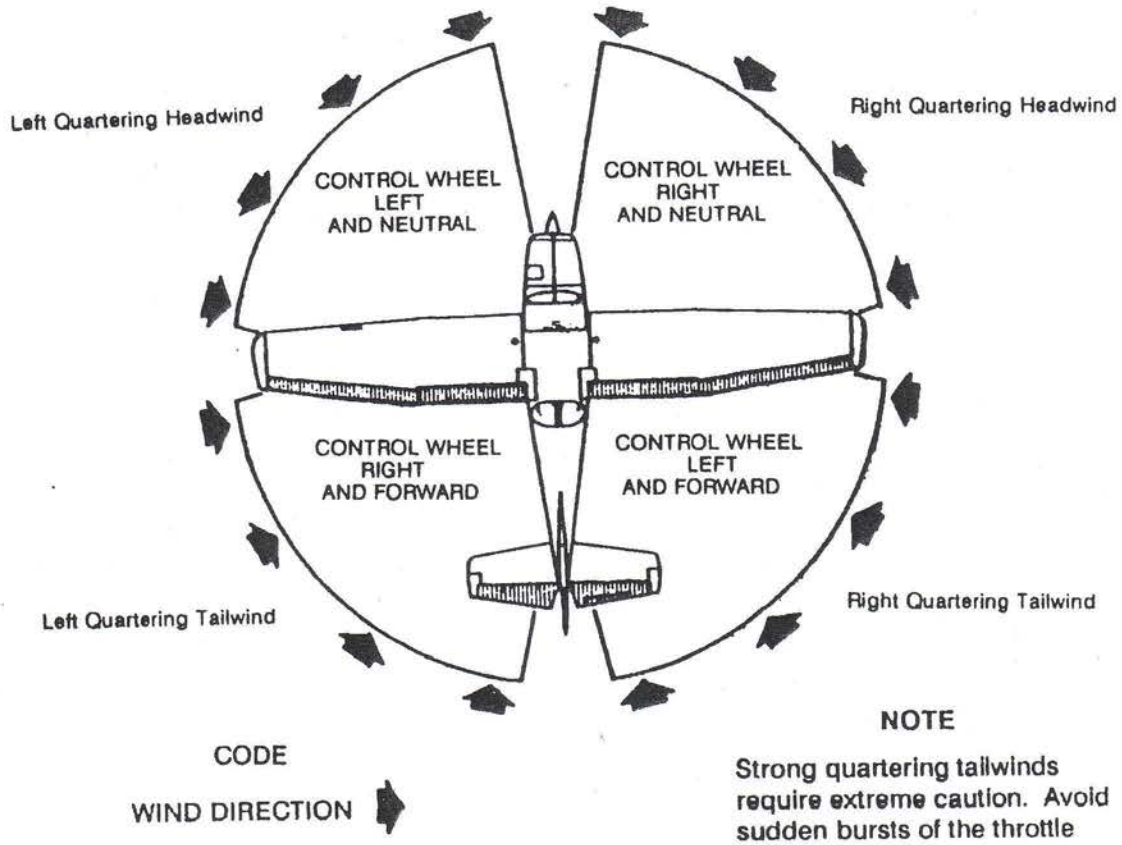
CAUTION

If the ignition switch is accidently turned to the off position, leave it in the off position and retard the throttle to idle. Once the propeller has stopped restart the engine.

NOTE

Maximum allowable RPM drop is 150, with a maximum difference between magneto drops of 50 RPM. If no RPM drop or an excessive RPM drop is noted, the aircraft should be aborted.

4. **D** Propeller - Cycle and SET FULL INCREASE. With the power set at 1800 RPM and propeller control at FULL INCREASE, pull the propeller to DECREASE RPM by depressing the lock button on the control knob and check for an RPM drop. Return the propeller control to FULL INCREASE as soon as RPM begins to drop.



NOTE

Strong quartering tailwinds require extreme caution. Avoid sudden bursts of the throttle or sharp braking. Use full control deflection when positioning the control.

Figure 2-2. Wind Direction

CAUTION

- A large drop is not necessary. Allowing RPM to cycle to FULL DECREASE before returning the propeller control to FULL INCREASE unnecessarily places a high load on the system and can damage the governor.
- To ensure smooth oil circulation and proper operation of the governor, cycle the propeller three times during cold weather operations or if propeller response appears to be sluggish.

5. Throttle - 1000 RPM.

NOTE

D Do not retard throttle until RPM has returned to 1800 with the propeller control set at FULL INCREASE.

6. VHF Radio - SET.
7. TRANSPONDER - AS REQUIRED.
8. TRIM - SET for takeoff.
9. Doors and Windows - CLOSE and LOCK.
10. Lights and Pitot Heat - AS REQUIRED.
    a. Strobe Light - ON.

CAUTION

Do not use the strobe lights until just prior to takeoff if an excessive delay is expected.

TAKEOFF

Refer to Appendix I for the takeoff chart showing distances required at varying gross weights, temperatures, field elevations, winds, and runway conditions.

WARNING

D Abort the takeoff if RPM does not indicate 2650 minimum or stabilizes above 2800.

Maintain directional control by use of nosewheel steering. Hold the elevator slightly aft of neutral to keep weight off the nose gear and hold aileron into the wind.

At 50 to 60 mph, raise the nose smoothly to takeoff altitude. Maintain this attitude and allow the aircraft to fly off the ground, which will normally occur between 70 and 80 mph.

WARNING

- Avoid wake turbulence. The T-41 is particularly susceptible to wake turbulence because of its short wingspan and light gross weight. The vortex-produced rolling movement can exceed the aileron authority of the aircraft. Allow a minimum of two minutes before takeoff behind a heavier aircraft or helicopter. This time should be extended behind heavy and jumbo category aircraft. With a crosswind of over 5 knots, the spacing requirement may be reduced, but attempt to remain upwind of the preceding aircraft's flightpath.
- **D** At low pressure altitude manifold pressure may exceed 25 inches during full throttle operations. Do not reduce throttle (manifold pressure) until called for in the After Takeoff Checklist.

CAUTION

To prevent RPM from momentarily surging beyond 2800, apply throttle smoothly and slowly. Momentarily stopping at half throttle and then continuing to full throttle will help ensure smooth acceleration and governor operation.

NOTE

- If a significant crosswind exists delay rotation to takeoff attitude until 70 mph.
- Apply full throttle for all takeoffs and check engine instruments early on takeoff roll.

Short Field Takeoff

For obstacle clearance, perform the takeoff with 10-degree flaps at the best angle-of-climb speed (70 mph). If no obstructions are ahead, a best flaps up rate-of-climb speed (95 mph) will be more efficient. The use of 10-degree flaps will shorten the ground run approximately 10 percent and will shorten the total distance to clear a 50-foot obstacle by approximately 5 percent. Once safely airborne, clear of obstacles, and at a minimum of 85 mph, raise the flaps.

Soft Field Takeoff

Soft field takeoffs are performed with 10-degree flaps by lifting the nosewheel off the ground as soon as practical and leaving the ground in a slightly higher than normal attitude. However, the aircraft should be leveled off immediately to accelerate to a safe climb speed. Once safely airborne and at a minimum of 85 mph, raise the flaps.

AFTER TAKEOFF

1. Engine Instruments- CHECK.
2. Flaps - UP.
3. D Throttle - 25" Manifold Pressure MAXIMUM.
4. D Propeller - 2600 RPM.

NOTE

Rotate the propeller control knob slowly counter-clockwise until RPM reduces to 2600. Use of the propeller control lock button for this operation may result in erratic control of RPM.

CLIMBS

Normal climbs are accomplished with full power and at a constant airspeed of 95 mph.

CAUTION

When initiating a climb from level flight, control the rate of power increase to avoid overspeeding the engine.

LEVEL OFF

1. Fuel Quantity - CHECK.

   Check total and balance.
2. Engine Instruments - CHECK.
3. D Throttle - SET FOR CRUISE.

WARNING

Do not allow manifold pressure (throttle setting) to exceed RPM as this can cause severe engine damage.

4. D Propeller - SET FOR CRUISE.

CAUTION

Do not cruise above 2600 RPM as this will result in premature wear of the engine and governor.

5. D Mixture - SET FOR CRUISE.

Using the cruise performance chart for the appropriate altitude, select the desired MANIFOLD PRESSURE, RPM, and lean the mixture to the specified fuel flow by rotating the mixture control knob counter-clockwise. When selecting cruise power, consider the following:

- The higher the manifold pressure and RPM, the faster the cruise speed and the higher the fuel flow.

- The lower the RPM, the quieter the engine noise.

WARNING

Failure to lean the mixture to the specified fuel flow may result in very high fuel consumption rates, particularly at low pressure altitudes. This situation could result in fuel exhaustion in less than 3.5 hours of flight.

CAUTION

Monitor cylinder head temperature and engine operation after leaning the mixture. While the normal operating range for the cylinder head temperature is the green arc, it is unusual for it to indicate higher than the "H" in "Head" on the gauge. If the cylinder temperature indicates higher than usual or the engine seems to be running roughly, enrich the mixture as necessary.

NOTE

Be aware that the Cylinder Head Temperature gauge indicates number 3 cylinder head temperature only. High temperatures in the other cylinders may be indicated by engine roughness or an oil temperature rise.

6. TRANSPONDER - CHECK ALT.
7. NAV - AS REQUIRED

   (Navigation sorties only). To perform the check, proceed as follows:

   a. Tune and identify the station.

   b. Center the course deviation indicator needle with a TO indication.

   c. Check that the course under the upper vertical index, if flown, would take the aircraft to the VOR station.

BEFORE DESCENT

Before making a descent from cruise altitude, proceed as follows:

1. Fuel Quantity - CHECK.

   Check total and balance.

2. D Mixture - RICH.

WARNING

Descending to low altitude without enriching the mixture may cause engine damage or possible fuel starvation and engine failure.

3. Flight Instruments - AS REQUIRED.

   a. Crosscheck the heading indicator with the magnetic compass and reset if necessary.

   b. Check that the proper altimeter setting is being used.

WARNING

D Do not allow manifold pressure to exceed RPM as this can cause severe engine damage. Reduce throttle (manifold pressure) as necessary to adjust speed during the descent.

APPROACH TO FIELD

Before entering the traffic pattern, complete the following:

1. Altimeter - SET to local barometric pressure.
2. TRANSPONDER - AS REQUIRED.

BEFORE LANDING

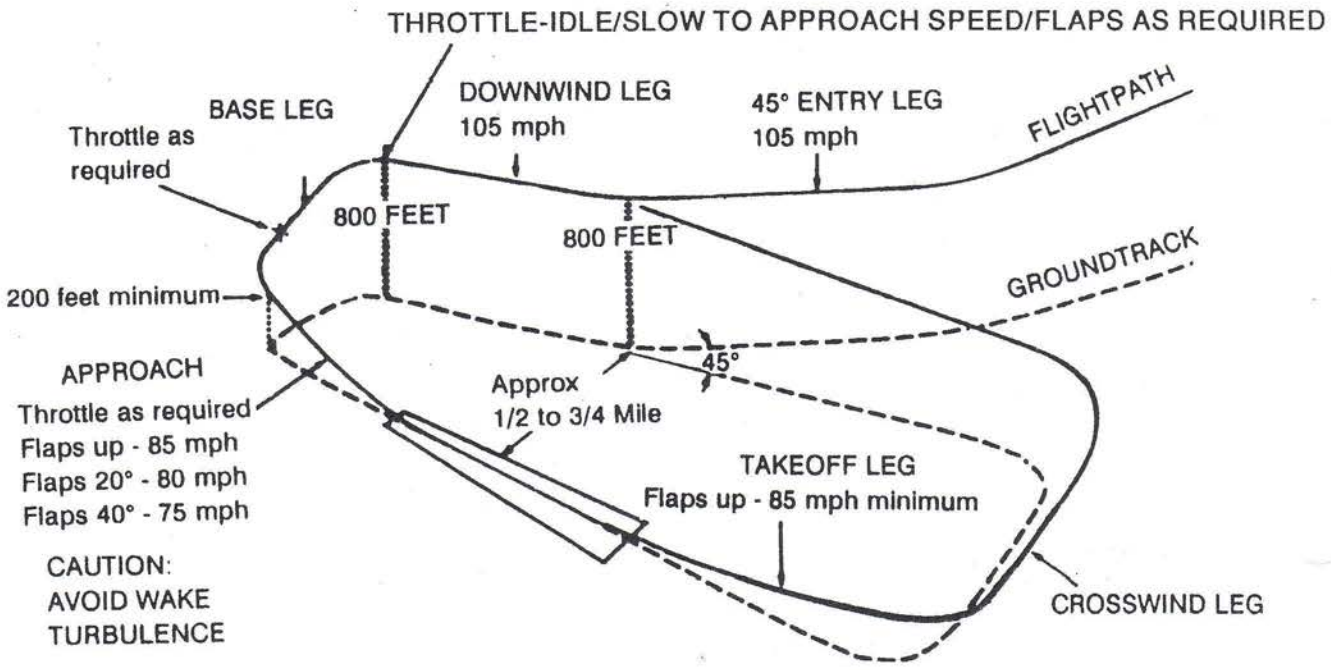
The following steps will be accomplished before each landing:

1. Landing/Taxi Light - AS REQUIRED.
2. Flaps - AS REQUIRED.

   (On base or final).

WARNING

Because of wake turbulence, allow a minimum of 2 minutes before landing behind a heavier aircraft or helicopter. This time should be extended behind heavy and jumbo category aircraft. With a crosswind component of over 5 knots, the spacing requirement may be reduced, but attempt to remain above and upwind of the preceding aircraft's flightpath.



Throttle - Idle/slow to approach speed/Flaps as required.

Figure 2-3. Traffic Pattern

3. D Propeller - FULL INCREASE.

CAUTION

Advance the propeller to FULL INCREASE after power has been reduced to descend to base leg. Placing the propeller control to FULL INCREASE at high power unnecessarily places a high load on the system and will result in premature wear of the engine and governor.

D Throttle Application

Applying throttle when transitioning from a low to a high power setting (as during takeoff, touch-and-go landings, level off from a glide, or go-arounds) must be done smoothly to avoid placing undue stress on the governor.

CAUTION

If done properly, RPM will never increase beyond 2800. If RPM momentarily surges beyond 2800, this may indicate that throttle application has been too abrupt.

LANDING

Normal Landing

The normal landing is accomplished from a rectangular pattern. Downwind should be 3/4 of a mile from the runway and flown at 800 feet AGL and 105 mph. Reduce power to idle on downwind abeam the 1/2 mile point on final and slow to approach speed in level flight. Normal configuration is 20 degrees of flaps, lowered (below 100 mph) on downwind. Turn base leg immediately after establishing the 80 mph approach speed. Maintain 80 mph throughout base and final. Power should be added at any time that it is required to maintain a normal glidepath for the flap setting. Under most conditions, this is a power-on approach.

WARNING

Retracting the flaps on final approach combined with low airspeed may cause the aircraft to stall.

During the final approach, adjust the aimpoint to arrive over the runway threshold at an altitude and airspeed which may permit a smooth reduction in power and gradual increase in pitch attitude for touchdown on the main wheels. Attempting to touchdown at an excessive airspeed may result in a three-point or nosewheel first landing, which may cause porpoising or wheelbarrowing. After touchdown, continue to hold sufficient back pressure to keep the nosewheel off the runway. Maintain directional control using nosewheel steering and differential braking as necessary.

As forward airspeed decreases, control effectiveness is reduced. Therefore, it may be necessary to increase aileron and rudder inputs to keep the aircraft on centerline and prevent landing in a crab. Upon rollout from a full stop, use nosewheel steering to keep the aircraft on centerline and aileron into the wind to keep the upwind wing down.

No-Flap Landing

Traffic pattern procedures are similar to the normal landing except that flaps are not used. Approach speed is 85 mph. If wind conditions (i.e., tailwinds) result in a need to slip, during subsequent no-flap patterns reduce bank angle during turn from downwind to base to allow for a longer final.

Full Flap Landing

The full flap landing permits a slightly steeper final approach and a slower approach speed. The full flap pattern should be flown as the normal pattern except that downwind is displaced 1/2 mile from the runway. Power is reduced to idle abeam the 1/4 mile point on final, and flaps are lowered to full on final. Maintain 80 mph while the flaps are at 20 degrees and 75 mph once flaps are lowered to full. Additional spacing must be obtained on takeoff leg when planning a full flap landing.

WARNING

Do not slip when using over 30 degrees of flaps due to a possible downward pitch under certain combinations of airspeed and sideslip angles.

Crosswind Landing

Use the wing-low method, crab, or a combination of both to maintain runway alignment on final approach.

Touchdown using the wing-low method. Use aileron throughout the landing roll to counteract the effect of the crosswind. After touchdown, lower the nose smoothly to the runway as soon as possible and maintain directional control by using nosewheel steering. To preclude wheelbarrowing, avoid using excessive forward control wheel pressures at high speeds. In strong or gusty crosswinds, fly a no-flap approach and add 5 to 10 mph to the no-flap approach speed.

Straight-In Approach

If it is necessary to land from a straight-in approach, the aircraft should normally be positioned for at least a 2-mile final. Flap setting, appropriate final approach airspeed, and interception of an extended glidepath should be attained prior to 3/4 of a mile from the runway.

CAUTION

If a hard landing occurs, full stop the aircraft. Contact maintenance for a landing gear/tire check prior to takeoff, if possible.

Short Field Landing

For a short field landing, fly a full flap approach at 65 mph (utility category) or 75 mph (normal category), using enough power to clear any obstacles. Immediately after touchdown, lower the nose and apply maximum braking.

Soft Field Landing

For landing on a soft or unprepared surface, fly a full flap approach as for a short field landing. Plan to touchdown with the minimum descent rate practical. After touchdown, hold the nosewheel off the ground as long as possible.

Braking Procedure

Braking effectiveness increases as forward speed decreases. Use the brakes as necessary to decelerate the aircraft to a safe taxi speed before turning off the runway.

NOTE

Holding the control wheel aft of neutral will decrease aircraft weight on the nosewheel and increase braking effectiveness.

If maximum braking is required, lower the nosewheel to the runway, raise the flaps (if used), and apply the brakes, constantly increasing pedal pressure as the aircraft's speed decreases.

CAUTION

Applying heavy braking immediately after touchdown may result in a skid and possible blown tire.

Landing On Slippery Runways

Aerobrake as long as possible by maintaining the landing attitude with back pressure until the nosewheel can no longer be kept off the runway. Then use nosewheel steering for directional control. Continue to hold full nose-up elevator, retract the flaps, and use brakes lightly. If brakes are applied suddenly, or too hard, a skid may result. If skidding occurs, reduce or release pressure on both brakes, use nosewheel steering to regain directional control, and cautiously reapply the brakes.

GO-AROUND

If conditions make a landing or approach unsafe, make a go-around. Make the decision lo go around as soon as possible. If touchdown is unavoidable, do not try to hold the aircraft off the runway, but continue to fly the aircraft to touchdown. If a touchdown is made, lower the nose slightly to a normal takeoff attitude and allow the aircraft to accelerate to takeoff.

When a go-around is required at low altitude, proceed as follows:

1. Throttle - FULL IN.
2. Flaps - UP.

   Raise the flaps to 20 degrees as soon as conditions permit. Raise the flaps to 0 degrees after attaining a minimum of 85 mph.

WARNING

Avoid using excessive bank angles at low altitudes because stall speed increases as bank angle increases and sufficient attitude may not be available for recovery.

TOUCH-AND-GO PROCEDURES

1. Establish takeoff attitude and apply full power.

NOTE

The nosewheel should normally not be lowered to the runway during normal or no-flap touch-and-go landings.

WARNING

If a full flap landing was accomplished, raise the flaps to approximately 20 degrees prior to applying power for the touch-and-go.

NOTE

Engine instruments should be checked as soon as practical after applying full power to confirm that the engine is operating normally.

2. When safely airborne and at a minimum of 85 mph, raise the flaps.

AFTER LANDING

After completing the landing roll and clearing the runway, proceed as follows:

1. VHF Radio - SET.
2. Lights/Pitot Heat - AS REQUIRED.
   a. Landing/Taxi Light - OFF.
   b. Pitot Heat - OFF.
   c. Strobe Lights - OFF.
3. Flaps - UP.
4. VOR - OFF.
5. Transponder - OFF.

ENGINE SHUTDOWN

1. Parking Brake - SET.
2. Radio - OFF.
3. Throttle - IDLE (Check IDLE RPM).

NOTE

If idle RPM is outside the range of 850 ± 25, enter as a discrepancy in the AFTO Form 781, noting idle RPM.

4. Magneto Grounding- CHECK. (Ensure the engine will run on each magneto and will quit when the ignition switch is momentarily turned to OFF.)
5. Throttle - 1,000 to 1,200 RPM.
6. Mixture - FULL LEAN.

CAUTION

Run the engine at least five minutes prior to shutdown to reduce condensation in the crankcase.

7. Propeller - CHECK STOPPED.
8. Ignition Switch - OFF.

WARNING

Turning the ignition switch past the OFF detent may result in an ungrounded magneto.

9. Navigation Lights - OFF.
10. Master Switch - OFF.
11. Flight Instruments - CAGE (if applicable).
12. Control Lock - INSTALL.

CAUTION

Ensure proper positioning of control wheel prior to installing the control lock. On 1969 models, remove the control lock prior to installation of gust locks.

13. Cabin Vents, Air and Heat Knobs - CLOSE.
14. Trim - SET to TAKEOFF.

BEFORE LEAVING AIRCRAFT

1. ~~AFTO Form 781 - COMPLETE.~~
2. Seat Belts- FASTEN.
3. Headsets - PLACE ON SEATS.
4. Chocks - INSTALL.
5. Tiedowns, Grounding Wire, Pitot Tube Cover- INSTALL.
6. Gust Locks - AS REQUIRED. Gust locks are normally not required unless strong, gusty winds are anticipated.
7. Doors and Window - CLOSE AND LOCK.

SECTION III

EMERGENCY PROCEDURES

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INTRODUCTION

This section contains the recommended procedures for various emergency conditions. No attempt has been made to cover every conceivable malfunction or emergency. A sound knowledge of these procedures and the basic aircraft systems will, however, provide the necessary background to evaluate and cope with most emergencies. The procedures presented in **BOLD FACE TYPE** are considered critical action.

CRITICAL ACTION PROCEDURES

Those actions which must be performed immediately if the emergency is not to be aggravated, and injury or damage is to be avoided. These critical steps will be committed to memory.

NONCRITICAL ACTION PROCEDURES

Those actions which contribute to an orderly sequence of events ensure that all supporting preparations are made after initiating the critical emergency actions, improve the chances for the emergency actions to be successful, and serve as cleanup items.

To assist the pilot when an emergency occurs, three basic rules are established which apply to all emergencies:

1. Maintain aircraft control.

2. Analyze the situation and take proper action.
3. Land as soon as conditions permit.

During an emergency, contact the controlling agency for assistance as soon as practical. Do not hesitate to declare an emergency. Crewmembers should take whatever action is required to safely recover the aircraft. Turn the transponder to the emergency code 7700 if warranted. Other aircraft: stay clear of the aircraft in distress and maintain radio silence; do not attempt to land at the scene of the accident; chase aircraft fly no closer than 500 feet from the disabled aircraft.

GROUND OPERATION EMERGENCIES

Emergency Engine Shutdown on the Ground

If an immediate engine shutdown becomes necessary while on the ground, proceed as follows:

1. MIXTURE - FULL LEAN .
2. FUEL SHUTOFF KNOB - PULL OUT.
3. IGNITION SWITCH - OFF.
4. MASTER SWITCH - OFF.

Emergency Ground Egress

During most ground emergencies, you will normally want to egress the aircraft as soon as conditions permit. Perform the Emergency Engine Shutdown on the Ground procedures. Rapid egress is best accomplished by following an orderly sequence: Set the parking brake, remove the headset, disconnect the seat belt and shoulder harnesses, slide the seat full aft, and open the door. If the door(s) cannot be opened, kick out the windowscreen, side window, or baggage door. Varying circumstances will dictate how many of the above actions can be accomplished before leaving the aircraft.

WARNING

While abandoning the aircraft, use caution for other aircraft, spinning propellers, and any other obstructions.

NOTE

Since the right seat can be slid further aft than the left seat, exit from the aircraft may be easier through the right door.

Departing a Prepared Surface

Any time the aircraft departs the prepared surface, accomplish immediate engine shutdown by pulling the mixture to full lean (to minimize damage to the engine should the propeller strike the ground). Maintain back pressure on the yoke to maximize the distance between the propeller and the ground. After the aircraft stops, complete the Emergency Engine Shutdown on the Ground procedures and egress the aircraft.

TAKEOFF EMERGENCIES

Abort

If an abort is necessary for any reason, accomplish the following:

1. THROTTLE - IDLE.
2. BRAKES - AS REQUIRED.

CAUTION

Avoid heavy braking at high speeds as a skid and (or) blown tire is possible.

If running off the runway is imminent, shut down the engine using the mixture control.

Unless the condition causing the abort requires stopping the aircraft immediately, use as much of the remaining runway as needed to safely bring the aircraft to a stop or to slow the aircraft sufficiently to turn off the runway.

Engine Failure Immediately After Takeoff

If the engine should fail immediately after becoming airborne and altitude precludes the possibility of aborting on the runway or restarting the engine, land straight ahead, turning only as necessary to avoid obstructions. Apply the following procedures as time and conditions permit:

1. GLIDE - ESTABLISH.

a. Flaps UP - 85 mph.

b. Up to 20 degrees flaps - 80 mph.

c. Over 20 degrees flaps - 75 mph.

NOTE

- The proper glide speed provides the optimum glide distance. See figure 3-1 for glide distances.
- D If oil pressure is available the propeller pitch may still be controllable. In such an event, moving the propeller control knob to FULL DECREASE will provide the optimum glide distance.

2. **MIXTURE - FULL LEAN.**
3. **FUEL SHUTOFF KNOB - PULL OUT.**
4. **IGNITION SWITCH - OFF.**
5. **FLAPS - AS REQUIRED.**
6. **MASTER SWITCH - OFF.**

WARNING

- Do not attempt to turn back to the runway, or spend excessive time trying to accomplish the checklist. A stall or loss of aircraft control may result.
- If time permits, each crewmember should ensure that seat belts are tightened and shoulder harnesses are locked. The cabin doors should be unlocked open, especially if landing in rough terrain.

IN-FLIGHT EMERGENCIES

Engine Restart During Flight

An engine failure may or may not give you prior warning. Prior warning is normally in the form of a rough running engine, loss of oil pressure, sudden or uncontrollable rise in oil temperature, sudden rise in oil pressure, or fluctuating RPM.

WARNING

If complete engine failure is accompanied by fuel fumes in the cockpit, a restart should not be attempted due to the possibility of fire.

NOTE

If engine internal damage is suspected, do not attempt a restart. Accomplish forced landing procedures. However, if the engine fails for no apparent reason and time and conditions permit, a restart should be attempted.

If a restart is warranted:

1. Glide - ESTABLISH.

   a. Flaps Up - 85 mph.

   b. Up to 20 degrees flaps - 80 mph.

   c. Over 20 degrees flaps - 75 mph.

NOTE

D Moving the propeller control knob to FULL DECREASE will provide the optimum glide distance.

2. Mixture - RICH.
3. Throttle - IN HALFWAY.
4. Fuel Selector - BOTH.
5. Fuel Shutoff Knob - IN.
6. Ignition Switch- BOTH.
7. Master Switch - ON.
8. Aux Fuel Pump Switch - LOW.

NOTE

- Engine failure may occur because of a faulty engine-driven fuel pump. Selecting LOW on the auxiliary fuel pump, accompanied with manual leaning, should alleviate the malfunction.
- Engine failure may also occur due to a clog in one of the fuel lines. Selecting HIGH on the auxiliary fuel pump may provide enough pressure to remove the clog. However, in most cases, the engine won't run continuously in the HIGH positio because this can flood out the engine.

9. Ignition Switch - START, if the propeller is stopped or is rotating intermittently.
10. D Propeller - AS REQUIRED.
11. Mixture - Adjust to maintain smooth engine operation.
12. If restart is unsuccessful - Refer to Forced Landing.

WARNING

If the engine does not start, do not waste time in futile attempts to restart the engine. Maintain the glide and make a forced landing.

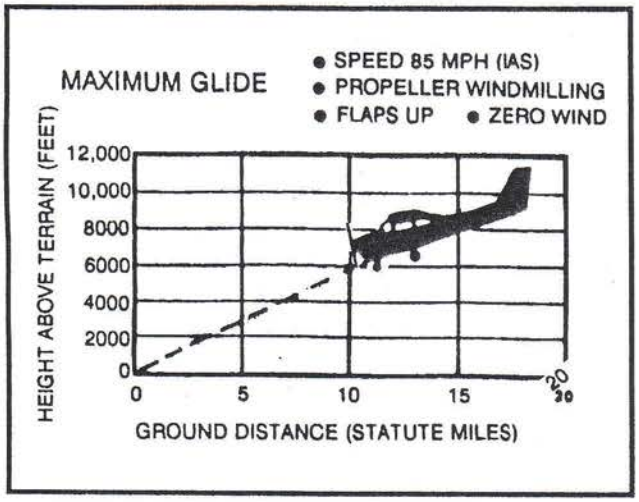

Figure 3-1. Maximum Glide

Partial Engine Failure During Flight

Partial engine failure may occur for several reasons, including such malfunctions as an erratic engine-driven fuel pump, a fuel leak, abnormal combustion, faulty timing, or improper positioning of a switch or knob. Several indications usually accompany a partial power loss: fluctuating RPM, possible high oil temperature or a rough, vibrating engine. A check of the engine instruments may provide you with valuable information for regaining power. If level flight cannot be maintained, proper glide speeds will provide optimum glide performance under partial power. Apply the following procedures if a partial engine failure is suspected:

D Partial engine failure may occur in the T-41D for similar reasons as the T-41C. In addition, the governor may fail in the high pitch (low RPM) mode. Although very rare, this situation could result in a significant loss of thrust. Use power as required to maintain flight and proceed as follows for any partial loss of engine power:

1. Mixture - Rich.
2. D Propeller - FULL INCREASE.
3. Fuel Selector - BOTH.
4. Fuel Shutoff Knob - IN.
5. Manual Primer - IN AND LOCKED.

CAUTION

Failure to ensure manual primer is in and locked could result in fuel enrichment and a rougher running engine.

6. Master Switch - ON.
7. Ignition Switch - AS REQUIRED.

NOTE

- If the fuel flow indicated normal, the problem may be abnormal combustion or faulty timing.
- The engine may perform better with the ignition switch in either the LEFT or RIGHT position rather than BOTH.

8. Auxiliary Fuel Pump Switch - AS REQUIRED.

WARNING

The power loss may be the result of a fuel leak in the fuel injection system or fuel flow indicating system. With raw fuel spraying on the engine block, cooling airflow over the engine will probably prevent the fuel from igniting. Using the auxiliary fuel pump will also probably improve the engine performance. However, as the throttle is reduced during landing, the cooling airflow may not be sufficient to prevent an engine fire. Therefore, in the event of a partial power failure during flight accompanied by fuel fumes in the cockpit, fly to the nearest suitable field. Make a forced landing, shutting down the engine prior to touchdown.

NOTE

Partial engine failure may be caused by a malfunctioning engine-driven fuel pump. The indication will be either a drop in fuel flow or fluctuating fuel flow. The auxiliary fuel pump switch should be placed to LOW. If the LOW position does not improve engine operation, hold the switch to the HIGH position. Use the auxiliary fuel pump in the position where best performance is obtained.

9. D Propeller - AS REQUIRED. Cycle through full range of travel and adjust for maximum RPM if power loss is a result of governor failure.

WARNING

If the loss of power is a result of governor failure and control of the propeller is regained, proceed to the nearest suitable airfield and land as soon as conditions permit. Limiting maneuvering to that required for the approach will minimize possibility of another failure.

10. Mixture - Adjust to maintain smooth engine operation.

WARNING

If unable to maintain level flight, make a forced landing using partial power as necessary to ensure a safe approach and increased glide distance.

CAUTION

If a partial engine failure is encountered that allows level flight to be maintained, fly to the nearest suitable field and land. Extended flight under this condition may result in engine damage.

Engine Fire During Flight

Apply the following procedures in the event of an engine fire during flight:

1. **MIXTURE - FULL LEAN.**
2. **FUEL SHUTOFF KNOB - PULL OUT.**
3. **IGNITION SWITCH - OFF.**

WARNING

Do not attempt to restart an engine that has been shut down due to an engine fire. Pick a suitable field and continue with a forced landing.

4. **GLIDE - ESTABLISH.**
   a. Flaps UP - 85 mph.
   b. Up to 20 degrees flaps - 80 mph.
   c. Over 20 degrees of flaps - 75 mph.

D NOTE

Moving the propeller control knob to FULL DECREASE will provide the optimum glide distance.

5. **FLAPS - AS REQUIRED.**
6. **MASTER SWITCH - OFF.**

Electrical Fire

If an electrical fire is detected by the presence of fumes or smoke, proceed as follows:

1. **MASTER SWITCH - OFF.**

WARNING

If turning off the master switch eliminates the fire situation, leave the master switch off. Do not attempt to isolate the source of the fire by checking each individual electrical component with the master switch on.

NOTE

Circuit breakers protect most of the aircraft electrical systems and will automatically isolate the system if a short circuit occurs within the system.

Smoke and Fume Elimination

Accomplish this procedure any time smoke or toxic odors are detected in the cabin.

1. Cabin Heat Knob - In.
2. Cabin Air Knob - In.
3. Upper Air Vents - Open.
4. Pilot's Window - As Required. If necessary, the window may be opened to assist in clearing the smoke or fumes from the cabin.

WARNING

- Any time a crewmember or passenger experiences dizziness or a sudden headache, immediately accomplish this procedure.
- If any occupant of the aircraft is suspected of suffering physical impairment, a landing will be accomplished at the nearest suitable airport where medical assistance can be obtained.

Forced Landing

In the event of an engine failure, and airstarts are unsuccessful or not deemed advisable, proceed as follows: (See figure 3-2, Typical Forced Landing Pattern)

1. **GLIDE - ESTABLISH.**
   a. Flaps UP - 85 mph.
   b. Up to 20 degrees flaps - 80 mph.
   c. Over 20 degrees flaps - 75 mph.

WARNING

A suitable field should be picked as early as possible so that maximum time will be available to plan and execute the forced landing.

NOTE

- Proper glide speed provides the optimum glide distance.
- D Glide distance with the propeller windmilling at FULL INCREASE will be significantly less than the T-41C. If oil pressure is available the propeller may still be controllable. In such an event, moving the propeller control to FULL DECREASE will provide the optimum glide distance.

2. **MIXTURE - FULL LEAN.**
3. **FUEL SHUTOFF KNOB - PULL OUT.**
4. **IGNITION SWITCH - OFF.**
5. **FLAPS - AS REQUIRED.**

NOTE

Maximum glide distance is obtained with flaps up and 85 mph. Lowering flaps will increase the angle and rate of descent.

6. **MASTER SWITCH - OFF.**

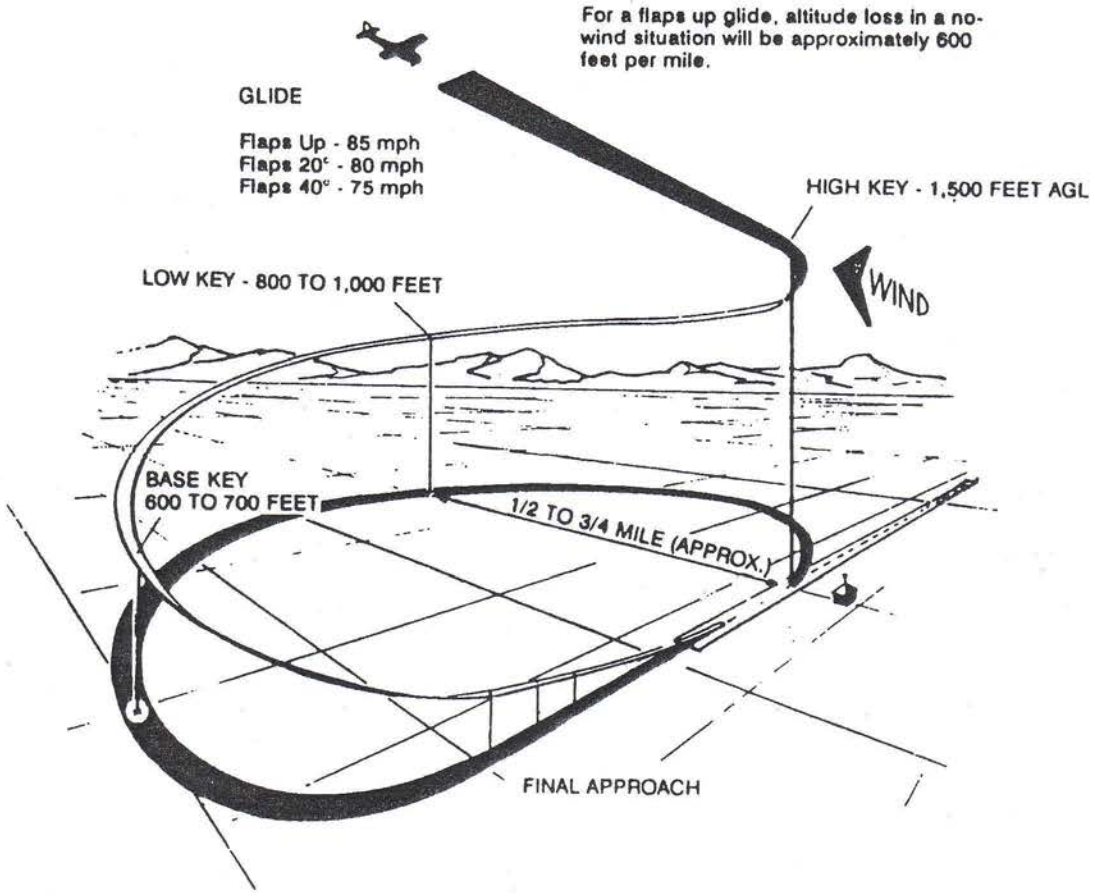

Figure 3-2. Typical Forced Landing Pattern

WARNING

If time permits, each crewmember should ensure that seat belts are tightened and shoulder harnesses locked. The cabin doors should be locked open, especially if landing in rough terrain.

NOTE

- For forced landings on unprepared surfaces, if possible, use full flaps and a 75 mph glide. Land on the main gear, holding the nosewheel off the ground as long as possible.
- Full flap glides are very sleep, and require an aggressive flare just prior to touchdown in order to prevent a nosewheel first landing. Control wheel forces will be heavier than normal and up to full aft control will be required.

High Ammeter Reading

A high ammeter reading normally results from a malfunction in battery, regulator or alternator circuitry. If the ammeter indicates full scale rate of charge or the positive deflection is more than 2 needle widths, apply the following procedure:

1. MASTER SWITCH - OFF.

WARNING

Continued operation of the battery, regulator or alternator circuitry with a high ammeter reading may cause the battery to burn, boil over or explode.

CAUTION

If ammeter deflection follows throttle movement, a faulty regulator is usually the cause. Aircraft should be aborted if deflection is out of normal operating range.

NOTE

Turning the master switch off removes all electrical power to aircraft components. If electrical power is essential, the circuit malfunction may be isolated (only in 1969 model aircraft) by using only the battery side of the split master switch. If only the battery side is on, a negative ammeter will result.

Negative Ammeter Reading

1. Electrical Load - Reduce.

If the ammeter is showing a discharge, the alternator is not producing enough electrical power and the battery is supplying current to the electrical systems. If this occurs, turn off all lights, the pitot heat, VOR, and transponder. The Comm radio uses very little power when receiving and may be left on. Do not turn off the Master Switch. If the battery voltage is too low, you will not be able to reactivate the battery contactor relay to supply further electrical power. Plan for the possibility of complete electrical failure.

NOTE

If practical, make a short radio call to advise the controlling agency of your situation and intentions.

Oil System Malfunction

Any type of oil system malfunction is serious since it may result in engine failure. In the event of an oil system malfunction, apply the following procedures and land as soon as conditions permit:

1. Throttle - As Required. If possible, adjust the throttle to maintain the oil pressure within normal limits.

NOTE

D With total loss of oil pressure the propeller will go to low pitch (high RPM) and will not be controllable by the propeller control knob.

2. Mixture - Rich. A rich running engine runs cooler than a lean running engine.

WARNING

- A zero indication on the tachometer accompanied by zero oil pressure indicates an oil pump shaft shear.
- Zero oil pressure and rising oil temperature indicate the oil system has failed and engine failure is imminent - approximately 4 to 6 minutes after oil system failure.

A leaking propeller seal may greatly restrict forward visibility because of the oil on the windscreen and require a slip on final to ensure adequate visibility. A leaking propeller seal will result in depletion of the oil supply, but will probably permit enough time (approximately 15 minutes) to fly to the nearest suitable field and land.

CAUTION

Do not operate the engine on the ground with the oil pressure above 100 psi or below 10 psi as engine damage may result.

NOTE

Oil pressure relief valve failure - valve open, oil pressure will be zero; valve closed, pressure will follow throttle movements and may read higher than normal.

D RUNAWAY PROPELLER

WARNING

Prompt corrective action is essential to prevent engine failure due to excessive RPM.

If a failure of the governor occurs and the propeller goes into low pitch (high RPM) resulting in a runaway propeller, proceed as follows:

1. Throttle - REDUCE to maintain RPM within limits.
2. Airspeed - REDUCE

NOTE

Placing the aircraft into a climb to decrease airspeed will increase the load on the propeller and may help reduce RPM.

3. Propeller - CYCLE through full range of travel.

NOTE

If, after cycling the propeller control through the full range of travel, control is not regained, continue with this checklist and land as soon as conditions permit. If control is regained, carefully monitor RPM and terminate the mission.

4. Propeller - FULL INCREASE if control not regained.
5. Throttle - Adjust to maintain RPM within limits.

Structural Damage or Controllability Check

CAUTION

Do not reset the flaps if significant structural damage is located in the wings.

1. Climb to at least 1,500 feet above the terrain (if practical) at a controllable airspeed.
2. Simulate a landing approach and determine the airspeed at which the aircraft becomes difficult to control (minimum controllable airspeed).

WARNING

Do not allow the aircraft to stall. If the aircraft becomes difficult to control or approaches a stall, lower the nose and increase power to recover. Rudder will assist the ailerons lo counter roll.

3. Plan to fly a straight-in approach. Fly the normal approach airspeed for your

setting, or 5 to 10 mph above minimum controllable airspeed, whichever is higher. For asymmetrical flaps, use your minimum flap setting for approach airspeed.

4. Plan to touch down at no less than minimum controllable airspeed. Do not begin to reduce final approach airspeed until the aircraft is very close to the runway.

Asymmetrical Flaps

If an asymmetrical flap condition occurs, use aileron and rudder as necessary to maintain aircraft control. Do not attempt to correct the situation by reversing the flaps. Do a controllability check and land as soon as conditions permit.

CAUTION

Further movement of the flaps may cause flap buckling and aileron damage.

Throttle Linkage Failure

If the throttle linkage fails in-flight, the engine may remain at that power setting. Use power available and flaps as required to safely land the aircraft. If the engine is running near full power, initiate a climb in order to lower flaps below 100 mph. Flaps (full down) may be required to prevent engine overspeed. If it fails near idle, and straight and level flight cannot be maintained, use no flaps and fly at 85 mph and set up for a forced landing.

NOTE

- If may be possible to add additional power by pushing in the throttle, but you will not be able to pull the throttle back.
- If you must shut the engine down to land. Do so by pulling the mixture full lean. If power is needed again, mixture rich should start the engine quickly.
- The throttle may fail at any position. Use judgment to determine the best course of action.

Pitot Static Malfunction

If the airspeed indicator is unreliable, fly known power setting and pitch pictures. Fly a pattern, maintaining 2400 RPM on downwind, 1500 RPM on base of final. Reduce the power to idle in the roundout. Do not exceed 20° of bank, and if a stall warning indication occurs prior to the roundout, go around.

1. If icing is suspected, turn on pitot heat.

NOTE

If icing is suspected, use of the pitot heat may fix the problem given enough time.

2. If the airspeed indicator proves unreliable, notify RSU/SOF.
3. Fly a wider than normal pattern maintaining 2400 RPM on downwind, maintain 1500 RPM on base and final. Close the throttle in roundout.
4. Do not exceed 20 degrees of bank.
5. If you receive a stall warning indication prior to roundout, go-around.

LANDING EMERGENCIES

Landing With a Flat Tire

If a flat tire or tread separation occurs during takeoff and conditions do not permit an abort, land as soon as conditions permit.

If a main tire is flat, land on the side of the runway corresponding to the good tire. Maintain directional control with differential braking and nosewheel steering. If the nose tire is flat, land in the center of the runway and hold the nosewheel off the ground as long as possible. Stop the aircraft and accomplish a normal engine shutdown.

1. Main Gear: Land on the side of the runway corresponding to the good tire.
2. Nose Gear: Land in the center of the runway, hold nosewheel off the ground as long as possible.
3. Stop the aircraft on the runway. Shut aircraft down and call maintenance.

Brake Failure

If an inoperative brake is suspected, land on the side of the runway corresponding to the inoperative brake. Use a combination of nosewheel steering and the good brake to maintain directional control. If both brakes are inoperative, land in the center of the runway. Shut down the engine and use nosewheel steering to avoid any obstacles.

SECTION V
OPERATING LIMITATIONS

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OPERATING LIMITATIONS

This section includes aircraft and engine limitations which must be observed during normal operation. These limitations are derived from extensive wind tunnel and flight testing to ensure your safety and to help obtain maximum utility of the equipment.

MINIMUM CREW REQUIREMENTS

The minimum crew required for this aircraft is one pilot. When the aircraft is flown solo by a student pilot, the student must occupy the left seat.

The minimum crew required for this aircraft is one fully qualified T-41D pilot. When occupied by two squadron pilots, both must be qualified in the T-41D. Only designated IPs may qualify another pilot.

INSTRUMENT MARKINGS
Airspeed Limitations

The following are the calibrated airspeed limits for the aircraft:

Maximum .....182 mph
(glide, dive, or smooth air)

Caution Range .....145-182 mph

Normal Operating Range 64-145

Flaps (maximum) .....100 mph
(Top of the White Arc)

Maneuvering speed .....127 mph*

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

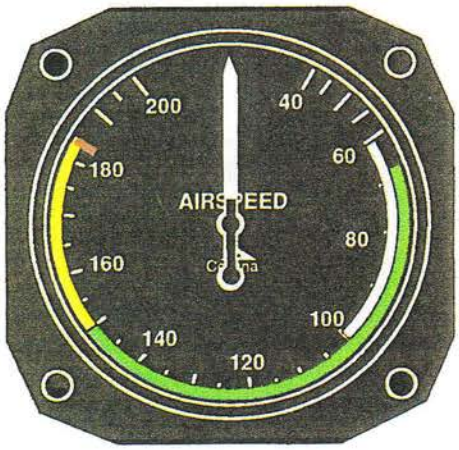

Figure 5-1. Airspeed Limitations Gauge

Cylinder Head Temperature Gauge

Normal Operating Range ..(Green Arc)

Maximum Allowable .....460°F

Oil Temperature Gauge

Normal Operating Range .....

Maximum Allowable .....(240°)

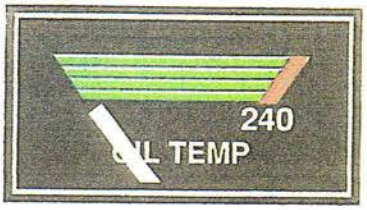

Figure 5-2. Oil Temperature Gauge

Oil Pressure Gauge

Minimum Idling .....10 psi

Normal Operating Range ....30-75 psi*

Maximum .....100 psi

*Green Arc may indicate 30-60 psi.

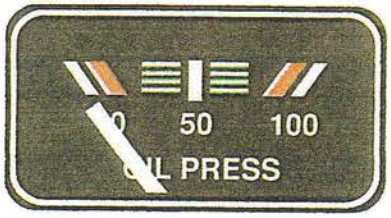

Figure 5-3. Oil Pressure Gauge

Tachometer

Normal operating Range:

At Sea Level .....2200-2650 RPM (Inner Green Arc)

At 3,000 feet MSL .....2200-2725 RPM (Middle Green Arc)

At 6,000 feet MSL .....2200-2800 RPM (Outer Green Arc)

Maximum .....2800 RPM ( ) (engine rated speed)

nimum for Takeoff .....2270 RPM

Idle RPM .....850 ± 25

Figure 5-4. Tachometer

NOTE

If RPM exceeds 2800, adjust throttle to maintain 2800 RPM or less. Make an entry in the AFTO 781 indicating highest RPM and duration (in seconds).

D Manifold Pressure Gauge

Normal Operating Range .....15" - 25" Hg (Green Arc)

WARNING

Except during full throttle/prop FULL INCREASE operations such as takeoffs and go-arounds, never allow manifold pressure to exceed engine RPM.

WARNING

At low pressure altitudes manifold pressure may exceed 25" during takeoffs or go-arounds. Do not reduce throttle (manifold pressure) until called for in the After Takeoff checklist.

D Propeller

Normal Operating Range .....2200-2600 RPM

Maximum Allowable .....2800 RPM

Minimum for Takeoff .....2650 RPM

WARNING

If RPM stabilizes above 2800 RPM refer to checklist for Runaway Propeller and terminate the mission.

CAUTION

Do not cruise above 2600 RPM as this will result in premature wear of the engine and governor.

NOTE

If RPM momentarily surges beyond 2800 when applying throttle, then stabilizes below 2800, this may indicate abrupt throttle application.

Fuel Flow Indicator

Normal Operating Range .....4.5-11.5 gph

Minimum .....

Maximum .....

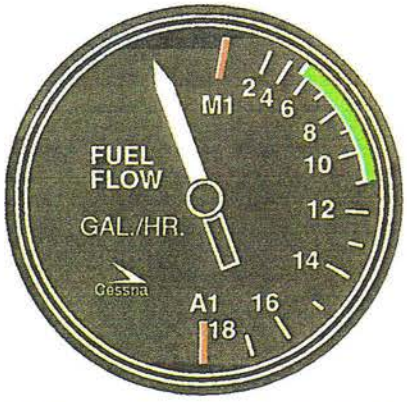

Figure 5-5. Fuel Flow Indicator

Fuel Quantity Indicators

Full Mark .....52 gal
(26 gal each tank)

Usable Fuel .....51 gal
(25.5 gal each tank)
(level flight)

Usable Fuel .....46 gal
(23 gal each tank)
(all flight conditions)

Empty .....E
(3 gal unusable, each tank)

Figure 5-6. Fuel Quantity Indicator

Suction Gauge

At 1800 RPM or Above .....4.6-5.4 inches Hg

CAUTION

If the suction gauge reads less than 4.6 inches Hg with 1800 RPM or above, the attitude and heading indicators should be caged (1968 models). If the gauge reads less than 1 inch, the mission should be terminated.

Figure 5-7. Suction Gauge

Ammeter

Normal	0 to +2 needle widths
Maximum (for flight)	+2 needle widths

Landing/Taxi Lights

On Ground:	Taxi Light 15 minutes Landing Light 5 minutes

PROHIBITED MANEUVERS

1. Spins.
2. Whip stalls.
3. IMC flight
4. Formation flight.
5. Touchdowns from SFLs (except on prepared surfaces at authorized airfields).
6. Night flight.
7. Aerobatic maneuvers.
8. Maneuvers requiring zero or negative G flight.
9. Engine shutdowns in-flight for practice.
10. Slips with over 30° flaps extended.

WEIGHT LIMITATIONS

Normal Category (Gross Weight - 2,500 lbs)

This aircraft is certified in both the normal and utility category. The normal category is applicable to aircraft intended for nonaerobatic operations, these include any maneuvers incidental to normal flying, stalls (except whip stalls), and turns in which the angle of bank is not more than 60 degrees.

D Weight Limitations

Normal Category - Gross Weight .....2,550 lbs

Utility Category - Gross Weight .....2,250 lbs

Utility Category (Gross Weight - 2,200 lbs)

This aircraft is not designed for purely aerobatic flight. However, certain maneuvers are allowed when the aircraft is operated in the utility category. In the utility category, the area behind the pilot's and instructor's seats must not be occupied.

For center of gravity and weight and balance computations, refer to the Appendix.

5-4

SECTION VI

FLIGHT CHARACTERISTICS

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Cruise Peformance 6-2
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GENERAL FLIGHT CHARACTERISTICS

Control forces are light. Adequate stability and control are available throughout the operating speed range. When properly trimmed, in the clean configuration, the aircraft will remain in straight-and-level flight with little attention from the pilot.

D The pilot may notice the T-41D has a heavier nose during rotation for takeoff and in the flare. It is more difficult to hold the nosewheel off the runway during a touch-and-go.

STALLS

The stall characteristics of the aircraft are conventional in all configurations. Stall warning is provided by a stall warning horn between 5 and 10 mph above the stall, and in some instances, by a noticeable aircraft buffeting. In a power-on situation the aircraft may or may not buffet prior to stalling. If recovery is not initiated at this point, the nose will fall abruptly even if full aft elevator is held. One wing may drop before the other if the aircraft is in uncoordinated flight when it stalls. The factors that affect the stalling characteristics are: weight, load factor, airspeed, flap setting, power setting, and coordination (slips or skids). Refer to figures 6-1 and 6-2 for stall speeds.

When the aircraft approaches a stall, the control surfaces lose some, if not all, of their effectiveness. As the angle of attack increases, the order in which the loss of control surface effectiveness occurs is: ailerons, elevator, and rudder. During the recovery from a stall, the control surfaces will regain their effectiveness in the reverse order. The aircraft is constructed so that the wing will stall progressively outward from the wing root to the wingtip. This is called "washout" and provides aileron control effectiveness as long as possible.

STALLING SPEEDS
POWER OFF MPH, CAS
2200 POUNDS GROSS WEIGHT

Condition	Angle of Bank			
	0°	20°	40°	60°
Flaps Up	60	61	68	80
Flaps 20°	55	57	63	78
Flaps 40°	49	51	56	70

Figure 6-1

STALLING SPEEDS
POWER OFF MPH, CAS
2500 POUNDS GROSS WEIGHT

Condition	Angle of Bank			
	0°	20°	40°	60°
Flaps Up	64	66	73	90
Flaps 20°	58	60	67	83
Flaps 40°	53	55	60	75

Figure 6-2

D The stall characteristics of the aircraft are conventional in all configurations and are identical to the T-41C.

SPINS

The T-41 is inherently resistant to spins; however, an inadvertent spin may occur if the aircraft is mishandled during a stall or stall recovery. Normally neutralizing all controls will recover the aircraft.

If the aircraft continues to spin, use the following recovery technique:

1. Check the throttle in idle and the ailerons are neutral.

2. Apply and hold full rudder opposite to the direction of rotation.

NOTE

If disorientation precludes a visual determination of the direction of rotation, refer to the turn needle. The needle deflects in the direction of rotation.

3. After the rudder reaches the stop, briskly move the control wheel far enough forward to break the stall.

NOTE

Full down elevator may be required at aft center of gravity loadings to ensure optimum recovery.

4. Hold these controls until rotation stops.

WARNING

Premature relaxation of the control inputs may delay the recovery, resulting in additional altitude loss.

5. As the rotation stops, neutralize the rudder and make a smooth recovery from the resulting dive.

Application of this recovery technique will produce prompt recoveries (within 1/4 turn).

FLIGHT CONTROLS

Elevator control forces are relatively light in cruising flight at all aircraft weights and CGs.

Aileron control forces are light. The ailerons are effective at all speeds up to the actual stall. Rudder forces are comparatively light and only slight rudder pressure is required when rolling into and out of turns.

Elevator trim is effective throughout most of the speed range of the aircraft. At very low airspeeds, sufficient trim may not be available to relieve all control pressures.

TAKEOFF RUN

D The T-41D accelerates faster and becomes airborne in less distance than the T-41C. At sea level this amounts to a 16% shorter take-off roll while at 10,000 feet it would result in a 6% reduction. Refer to the appendix for specific climb performance.

CLIMB PERFORMANCE

The best rate-of-climb airspeed has been determined to vary with altitude. At sea level, the best rate-of-climb airspeed is 100 mph, while at 10,000 feet MSL the airspeed is 91 mph. (These airspeeds apply at 2500 lbs gross weight. Refer to Appendix for airspeeds at lighter weights.) The best angle-of-climb can be achieved with either a clean configuration and 85 mph, or 10 degrees of flaps and 70 mph. (The latter configuration and airspeed is the recommended procedure for obstacle-clearance takeoffs.)

These airspeeds apply at 2500 lbs gross weight. Refer to Appendix for airspeeds at other weights

D Climb performance for any given set of conditions is improved over the T-41C. The pilot can expect an average of 6% higher rate of climb in the T-41D. Refer to the appendix for specific climb performance.

CRUISE PERFORMANCE

D The T-41D generally cruises faster than the T-41C, particularly at low pressure altitudes. It is also slightly more fuel efficient at high altitude, but not significantly so. Refer to the cruise performance charts in the appendix for specific information.

CAUTION

Failure to lean the mixture to the appropriate fuel flow setting as specified in the appropriate cruise performance chart may result in very high fuel consumption and exhaustion in less than 3.5 hours of flight.

D IDLE DESCENT

Due to a significant increase in parasite drag during idle operations with the propeller at FULL INCREASE low blade angle (such as the descent from downwind to touchdown in the pattern), the T-41D can develop a very high sink at approach speeds. This makes it possible to fly a much tighter pattern at idle. For the same reason, the T-41D will decelerate much faster than the T-41C.

SECTION VII

ALL-WEATHER OPERATION

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INTRODUCTION

This section discusses special all-weather procedures and techniques which either emphasize or add to procedures and techniques presented in Sections II and III.

INSTRUMENT FLIGHT

IMC flight in the T-41C is prohibited.

ICE AND RAIN

Ice

WARNING

Do not take off with any ice, snow or frost on the wings, windows or tail (including all control surfaces). Ice, snow or frost may reduce forward visibility, change the lift and stall characteristics of the aircraft, and cause possible binding of the control surfaces.

CAUTION

Taxiing through snow drifts or over accumulation of ice may result in propeller damage.

Rain

A full flap landing is recommended. Raising the flaps on landing roll will increase the aircraft weight on the main landing gear and decrease the possibility of hydroplaning. When landing on a wet runway, expect a longer landing roll as braking effectiveness is reduced. Use caution as the possibility of hydroplaning exists on a wet runway.

WARNING

Crosswinds present more directional control difficulty on a wet runway than on a dry runway. Maintain proper crosswind control inputs throughout the landing roll to aid in directional control.

TURBULENCE AND THUNDERSTORMS

WARNING

Flights through thunderstorms or areas of severe turbulence must be avoided. Particularly at low pressure altitudes, the T-41D may cruise at airspeeds well above maneuvering speed. If unexpected turbulence or vertical air currents are encountered, reduce throttle (manifold pressure) and then RPM if necessary to slow to a maximum of 127 MPH (maneuvering speed). The combination of very high airspeed and severe turbulence may result in overstressing the aircraft and possible structural failure.

Penetrating a thunderstorm is not recommended under any circumstances. Remain VFR and land at a suitable field where a safe landing can be made.

If unexpected turbulence is encountered, use smooth, positive control inputs. Extreme up and down drafts can cause large attitude, airspeed,

and altitude deviations. Do not chase airspeed or altitude; maintain aircraft attitude and attempt to exit the area of turbulence as soon as possible.

COLD WEATHER OPERATIONS

The T-41 engine is considered cold soaked when the ambient temperature is below 35°F and the engine has not been operated for an extended period.

Engine Start

1. Mixture - RICH.
2. **D** PROPELLER - FULL INCREASE.
3. Throttle - IDLE.
4. Manual Primer - 2 to 6 strokes. Leave primer charged and ready for stroke.

NOTE

After pulling the primer out, wait a few seconds to allow sufficient fuel to enter the primer. If properly primed, some resistance will be felt when pushing the primer in.

5. Master Switch - ON.
6. Navigation Lights - ON.
7. Throttle - IN (1/4 to 1/2 inch).
8. Auxiliary Fuel Pump Switch - LOW (if required).

CAUTION

Limit use of the auxiliary fuel pump to prevent overpriming and flooding. Excessive cranking will rapidly drain battery power.

9. Propeller Danger Area - CLEAR.
10. Ignition Switch - START (release when engine starts).
11. Auxiliary Fuel Pump Switch - OFF and GUARDED.
12. Throttle - 1000 RPM minimum.
13. Manual Primer - IN and LOCKED.
14. Engine Instruments - CHECK.

NOTE

Below 0°F the oil pressure gauge should show a positive indication within 1 minute of engine start.

Engine Warmup

If the engine is cold soaked, no indication will be apparent on the oil temperature gauge and the oil pressure gauge will read low. Engine warmup may require up to 10 minutes for the oil pressure to indicate in the normal operating range. Takeoff will be delayed until normal oil pressure, 30 to 75 psi, is indicated. If no oil temperature is noted, accelerate the engine several times to higher engine RPM. If the engine accelerates smoothly and the oil pressure remains normal and steady, the aircraft is ready for takeoff.

HOT WEATHER OPERATIONS

For hot weather operations; use normal procedures and note the following: Avoid prolonged engine operation on the ground as the heat from the engine may cause vapor lock to develop in the fuel lines. If the engine quits or will not start and vapor lock is suspected, the system may be purged by checking the mixture control knob at full lean, throttle at idle, and holding the auxiliary fuel pump switch in HIGH for 5 to 10 seconds or more to flush the vapor through the fuel lines. Turn the pump off and proceed with the normal starting procedures.