



**TWIN COMANCHE
OWNER'S HANDBOOK**

SECTION I

SPECIFICATIONS

PERFORMANCE

Performance figures are for airplanes equipped for cross-country transportation and flown at gross weight under standard conditions at sea level or stated altitude. Any changes in equipment may result in changes in performance.

Take-off Run (short field, ft)	1250
Take-off Distance Over 50-ft Barrier (ft)	2160
V _{mc} (mph) (as determined by the F.A.A.)	90
Stalling Speed (gear and flaps down, power off, mph)	69
Stalling Speed (gear and flaps up, power off, mph)	76
Best Rate of Climb (ft per min)	1460
Best Rate of Climb Speed (mph)	112
Best Angle of Climb Speed (mph)	90
Single Engine Rate of Climb (ft per min)	260
Best Single Engine Rate of Climb Speed (mph)	105
Absolute Ceiling (ft)	20,000
Service Ceiling (ft)	18,600
Single Engine Absolute Ceiling (ft)	7,100
Single Engine Service Ceiling (ft)	5,800
Top Speed (mph)	205
Optimum Cruising Speed (75% power at 8,000) (mph)	194
Cruising Speed (65% power at 12,000 ft) (mph)	186
Sea Level Cruise Speed (75% power) (mph)	181
Fuel Consumption (75% power) (gph) (both engines)	17.2
Fuel Consumption (65% power) (gph) (both engines)	15.2

and stopped in any desired position. The airfoil shaped flap control is to the right of the power control quadrant. Located on the instrument panel is a flap position indicator marked to show the position of the flap relative to the wing. A range for take-off operation is also shown.

Located in the inboard end of the right flap is a lock which holds the flap in the UP position so that it can be used as a step for entry or exit. A second lock is incorporated to prevent the flap from going full down in case a step load is applied and the up lock is not fully engaged.

FUEL SYSTEM

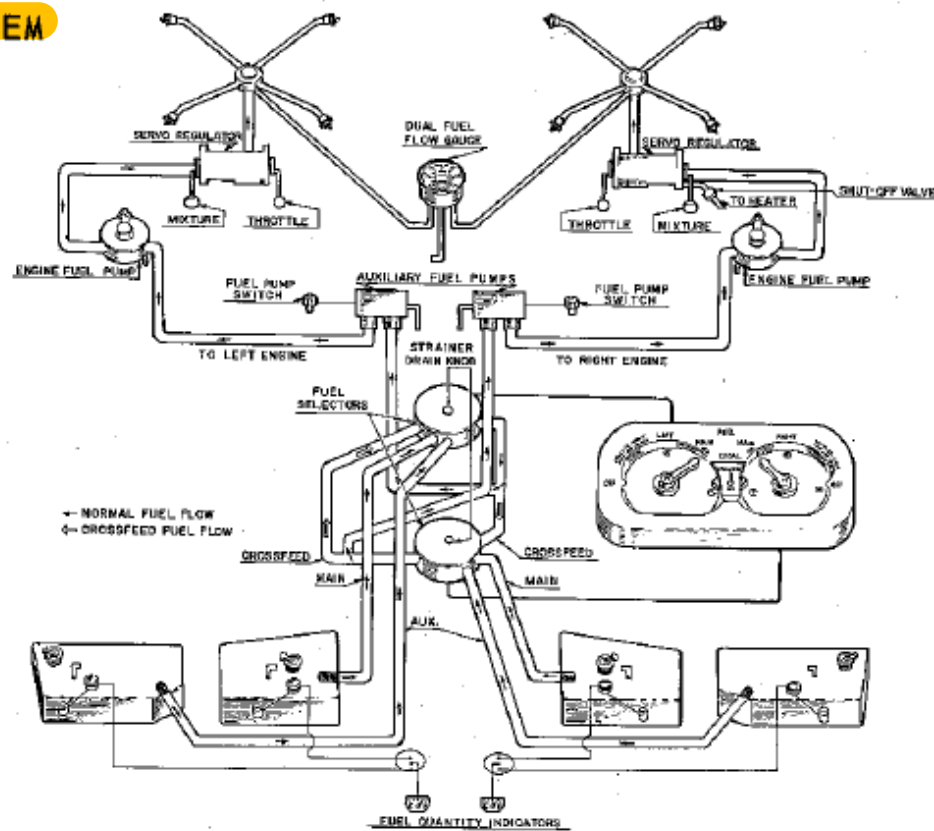
The fuel is carried in four integral fuel cells located in the leading edge sections of the wings. Capacity of the two main fuel cells is 30 gallons each, of which 27 gallons is usable.

The auxiliary fuel system consists of two 15 gallon cells (all usable) installed in the wings just outboard of the main fuel cells. Wing tip tanks are available as optional equipment. Auxiliary fuel and tip tank fuel is to be used in level flight only.

The cells should be kept full of fuel during storage of the airplane to prevent accumulation of moisture and deterioration of the cells. For storage of more than ten days without fuel, the cells should be coated with light engine oil to prevent excessive drying.

During normal operation use the engine driven fuel pump to draw fuel from the cell directly adjacent to that engine. However, fuel can be drawn from any cell to both engines through use of the engine driven fuel pump or the electric auxiliary fuel pump.

For emergency single engine operation a crossfeed is provided to increase the range. When using fuel from tanks on the same side as the operating engine, the position of the fuel selector will remain the same as for normal operation with the

FUEL SYSTEM

auxiliary fuel pump off unless the engine driven pump is inoperative.

NOTE

Do not put both fuel selectors in the crossfeed position at the same time.

When using fuel from cells on the opposite side of the operating engine, move the fuel selector for the inoperative engine to the main or auxiliary position; then move the fuel selector for the operating engine to the crossfeed position.

For single engine landing, fuel must be pumped from the main cell on the same side as the operating engine.

The fuel strainers for the system are located beneath the floor panel in the center section of the fuselage. Daily draining of the strainers may be accomplished in the cockpit by opening the hinged access door located in the floor panel just aft of the fuel selector handles and pulling up on the knob located in the center of the selector valve. The general procedure for draining the fuel system is to open the strainer quick drain for several seconds with the fuel cell selector on the main cell, then to change the selector to the auxiliary cell and repeat the process. Allow enough fuel flow to clear the lines as well as the strainer. Positive fuel flow shut-off can be observed through the clear plastic tube that carries the fuel overboard. Located inside the fuel valves is a by-pass valve which will open at 1/2 psi differential pressure if the strainer screen becomes blocked.

Fuel quantity is indicated by two electric gauges located at the top of the instrument cluster. The instruments are connected to a transmitter unit located in each fuel cell. The gauges will indicate the amount of fuel available in the cells that are selected.

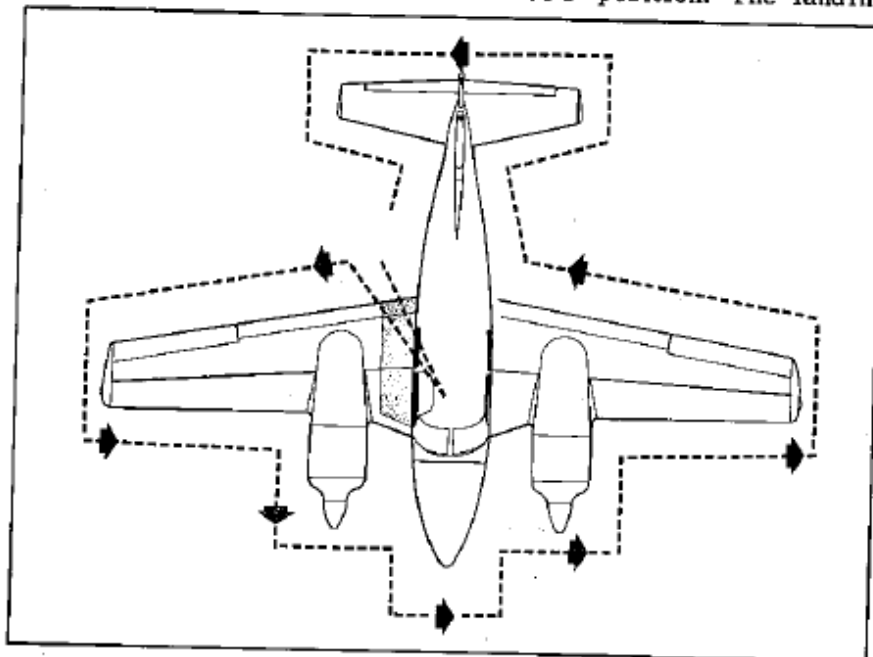
SECTION III

OPERATING INSTRUCTIONS

PREFLIGHT

The following safety procedure instructions must become an integral part of the pilot's operational routine and preflight inspection.

Begin the preflight inspection in the cockpit. Check that the landing gear selector switch is in the down position. Turn master switch on and check that the green landing gear indicator light is on. If the green light is not on, make sure that the instrument panel light switch is turned to the OFF position. The landing



gear indicator light is automatically dimmed and is difficult to see in the daytime if the instrument lights are on.

Drain about a quarter of a pint of fuel from each tank with the cockpit drains before doing the external preflight check. During the external check, determine that the fuel has stopped draining.

During the external preflight check see that the baggage door is properly secured. Prior to flight, passengers should be briefed about seat belts, the use of oxygen when applicable, how to evacuate the airplane, and advised not to smoke during take-off or landing. They should be cautioned against handling or interfering with essential equipment and flight controls, fuel valves, switches, circuit breakers, trim knobs or cranks, radios etc.

1. Ignition and master switches - OFF.
2. Fuel strainer sump - drained and not leaking.
3. Fuel selectors on main cells.
4. Control surfaces, wing, fuselage - no damage or operational interference.
5. Control surface - free of obstructions, ice and snow.
6. Fuel supply - adequate.
7. Fuel cell caps - secure.
8. Fuel system vents - open.
9. Landing gear struts - 2-3/4" piston exposed under static load.
10. Tires - inflated and not excessively worn.
11. Cowling, landing gear doors, oil and inspection covers - secure.
12. Propellers - check.
13. Oil supply - adequate.
14. Leaks - absent.
15. Windshield - clean and secure.
16. Dorsal fin air scoop - free of obstruction.
17. Control locks - detached.
18. Baggage door - secure.
19. Tow bar - stowed.
20. Cabin controls - operative.

21. Gear selector switch - down.
22. Required papers - in order.
23. Turn master switch on - check stall warning system.
24. Check navigation lights.
25. Fasten safety belts.

STARTING ENGINES

1. Master switch - on.
2. Gear lights - check green.
3. Fuel quantity - check gauge reading.
4. Cowl flaps - open.
5. Trim tabs - set.
6. Throttles - open 1/2 inch.
7. Propeller controls - forward.
8. Mixtures - rich.
9. Electric fuel pumps - on till indication on fuel flow gauge.
10. Mixtures - idle cut-off.
11. Magneto switches - on.
12. Propellers - clear.
13. Starters - engage.
14. Mixtures - advance.
15. Oil, fuel pressure - check.

FLOODED START

1. Magneto switches - on.
2. Throttles - open.
3. Mixtures - idle cut-off.
4. Electric fuel pumps - off.
5. Starters - engage.

(When engine fires, retard throttle and advance mixture.)

Cranking periods should be limited to 30 seconds with a two minute interval. Longer cranking periods shorten the life of the starter. Do not engage the starter immediately after releasing it as the starter mechanism may be damaged.

The normally recommended setting for sea level take-off is full throttle at 2700 RPM. The slightly rich mixture for this setting aids in cooling the engine.

TAKE-OFF AND CLIMB

- | | |
|--|--|
| 1. Parking brake - off | 8. Flaps - retracted |
| 2. Mixtures - forward | 9. Climb power - set
(At approx. 400 AGL) |
| 3. Propellers - forward | 10. Cowl flaps - set
(Maintain cyl. hd. temp.
at or below max) |
| 4. Throttles - forward | 11. Oxygen - no smoking - on
(10,000 ft & above) |
| 5. Accelerate to - 90 MPH
(Prior to climb) | |
| 6. Landing gear - retract | |
| 7. Accelerate to - 112 MPH
(Best R/C speed) | |

During take-off roll apply light back pressure to the control wheel to avoid porpoising during the take-off run. Accelerate to single engine minimum control speed (V_{mc}) before applying stronger back pressure for rotation.

During normal conditions, retraction of the landing gear should occur when a gear down landing is no longer possible on the runway. Attain the best rate of climb speed and at least 400 feet above ground level before reducing power.

WING FLAPS

Wing flaps are not necessary for take-off except when operating from a short or soft field. The use of wing flaps during take-off in a lightly loaded airplane may cause the airplane to lift-off the runway before V_{mc} is attained. An effort to hold the airplane on the runway too

long may result in a "wheelbarrowing tendency" with most of the weight on the nose wheel.

Wing flaps are not normally used during a crosswind take-off. After lift-off set up the required crab angle, retract the gear at a safe altitude and continue climb out.

An en route climbing speed of 130 miles per hour is recommended for increased forward visibility during continuous climb.

SHORT AND SOFT FIELD TAKE-OFFS

If it is necessary to get the airplane off the runway in the shortest possible distance, set take-off wing flaps (with the flap position needle at the bottom of the white arc on the flap indicator). With brakes set, run up engines to maximum power and check instruments. If the airplane is off the runway at less than 90 miles per hour, it is essential to fly level a few feet off the runway immediately after lift-off until reaching 90 mph. After airspeed has increased, initiate a climb at the best angle of climb speed (90 mph at sea level) if an obstacle is to be cleared, or at the best rate of climb speed (112 mph at sea level) if a normal climb out is desired. Since the airplane cannot be controlled in flight below V_{mc} in the event of the sudden power loss in one engine, be ready to reduce power promptly.

NOTE

Take-off at high altitude (density altitude), from a soft, wet, rough or grassy field, or with an uphill gradient or tail wind component results in greatly reduced take-off performance.

During take-off roll, check to be sure the airspeed indicator is operating properly. The needle should indicate zero when the airplane is at rest.

LANDING GEAR RETRACTION

Make sure the aircraft has sufficient altitude and airspeed with no chance of settling back on the runway before retracting the gear. When taking off from a long runway, retract the landing gear when it would no longer be possible to land straight ahead.

DEICER BOOTS

If your Twin Comanche is equipped with deicer boots, they should not be operating during take-off since inflated boots can change the stall characteristics of the airplane.

V_{MC}

V_{mc} (Velocity minimum control) is the calibrated airspeed, determined by FAA test pilots, below which a twin engine aircraft cannot be controlled in flight with one engine operating at take-off power and the other engine windmilling. The V_{mc} which the FAA has determined for the Twin Comanche is 90 mph CAS.

Calibrated airspeed is equal to the airspeed indicator reading corrected for position and instrument error. Since calibrated airspeed and density altitude and pilot flight techniques vary, it is best, especially when heavily loaded or on a cold day, to fly the aircraft as though V_{mc} were slightly higher.

Under no circumstances should the aircraft be flown below the V_{mc} of the aircraft with one engine operating at maximum power and the other engine windmilling. When operating under single engine flight conditions, either in training or in emergency situations, maintain indicated airspeed above 97 mph.

APPROACH V_{MC} WITH CAUTION

On take-off the aircraft should be kept either on, or near the runway, until reaching V_{mc}. After V_{mc} has been reached the air-

craft should be accelerated as rapidly as possible to the best rate of climb speed (112 mph) if there are no obstacles ahead. If there are obstacles ahead maintain the best angle of climb speed (90 mph). The applicable speed should be maintained until all obstacles are cleared and the airplane gains sufficient altitude.

STALLS

WARNING

When practicing stalls maintain minimum terrain clearance of 5000 feet. Single engine or asymmetric power stalls prohibited. Power on stalls above 2100 RPM prohibited. Do not practice stalls when carrying passengers, when the airplane is heavily loaded or with the center of gravity near the aft limit.

The left wing on the Twin Comanche with clockwise rotating propellers will, generally speaking, under conditions of moderate symmetrical power, stall more rapidly than the right wing, and if recovery is not promptly initiated, the airplane will have a tendency to roll to the left.

As in any multi-engine aircraft, stall recovery in the Twin Comanche should be initiated at the first indication of a pre-stall buffet or warning light. The aircraft should not be permitted to develop into a full stall.

The Lycoming engines on the Twin Comanche can be cruised at any percent of power from 75% down. 2400 RPM is recommended for maximum cruise performance and lower RPM's, down to 1800, for more economical cruising conditions. Ordinarily an RPM setting should be selected which will give maximum smoothness. To avoid undesirable stresses on the propellers and the possibility of detonation in the engine, no manifold pressure settings over 25" should be used with an RPM of less than 2000.

To obtain the desired power, set the manifold pressure and RPM according to the power setting table in this manual. After the desired power settings have been set up, adjust the mixture control for corresponding best power setting as indicated by the fuel flow meter. The low side of the power setting, as shown on the fuel flow meter, indicates best economy for that percent of power while the high side indicates best power.

During climbing operation the servo regulator will sense the change in altitude and will automatically lean the mixture. For better economy, manual leaning with the mixture control can also be accomplished if desired.

FUEL MANAGEMENT

Fuel should be used from the main fuel cells during take-off, landing, climb and descent. Auxiliary fuel and tip tank fuel is to be used in level flight only.

The electric fuel pumps should be on during take-off, landing and while switching tanks in order to prevent loss of power at critical times.

In turning off the electric fuel pumps allow a time delay of approximately 20 seconds between switching each of the fuel pumps off in order to insure that the engine driven pumps are operating properly.

Since a fuel injected engine such as is used on the Twin Comanche takes an appreciable length of time to start after fuel starvation, it is recommended that you avoid emptying a fuel cell to depletion. If the engine should stop because a fuel cell is

depleted of fuel be prepared to wait a while for the engine to start after changing to a fuel cell with fuel in it. If it is necessary to use all the fuel in a fuel cell, carefully monitor the fuel flow meter and quickly change the fuel valve position at the first indication of a decrease in fuel flow. This will enable you to keep the engine operating while using all of the fuel in the fuel cell.

CAUTION

If tip tanks are installed on the airplane and if the tip tanks have been run completely dry in flight, air may be trapped in the line from tip tank to solenoid valve when tip tanks are subsequently filled. The air pocket in the line may prevent immediate feeding of fuel from tip tanks. To avoid this condition, purge air from lines prior to starting of aircraft.

1. Turn fuel selector valve to "AUX" position.

2. Turn on aircraft master switch and place tip tank fuel selector switch to tip tank position. Ascertain that tip tank solenoid switch, under fuel console, is operating by listening for a slight click when switch is operated.

3. Lift up appropriate fuel drain valve and allow fuel to drain. Observe for flow in clear plastic tube, followed by interrupted flow of no fuel for a few seconds, further followed by a bubbling flow then full flow. Total drain time should not be less than 30 seconds.

4. Procedure shall be accomplished for each tip tank separately.

5. In addition to above procedure operate the power plant from each wing tip separately until steady fuel flow is assured during ground runup prior to flight.

Landing check list:

1. Mixtures - rich.
2. Electric fuel pumps - on.
3. Fuel selectors on proper tanks.
4. Propellers at high cruising rpm.
5. Landing gear - down (under 150 mph) - check green.
6. Flaps (under 125 mph) - set.
7. Safety belts - fastened.

POST LANDING

Check list:

- | | |
|----------------------|-----------------------------|
| 1. Flaps - retract | 3. Electric fuel pump - off |
| 2. Cowl flaps - open | 4. Prop controls - forward |

When completely stopped in a parking spot, check the following items for shut down:

- | | |
|-------------------------------|------------------------|
| 1. Radio & elec. equip. - off | 5. Master switch - off |
| 2. Heater (if used) fan - off | 6. Parking brake - on |
| 3. Mixtures - idle cut-off | 7. Generators - on |
| 4. Magneto switches - off | |

If control locks are not available and the airplane is to be left for more than a few minutes, secure the control wheel with the safety belt strap. Chock the wheels and secure tie downs at appropriate places.

EMERGENCY PROCEDURES

1. Engine Failure:

- (a) During Take-off Or After Lift-off:

If an engine failure occurs during take-off run prior to lift-off with adequate stopping distance remaining, reduce the power on both engines and stop the airplane straight ahead.

If an engine failure occurs after lift-off with adequate landing distance ahead, immediately reduce the power on both engines and effect a landing.

If engine failure occurs during climb out after take-off, maintain directional control with rudder and ailerons, and establish the best single engine rate of climb airspeed (105 mph at sea level). Speeds below or above the best rate of climb speed will result in lower than optimum rate of climb. Check that mixture, propeller and throttle controls are full forward and landing gear and wing flaps are up. If enough altitude has been reached before the failure occurred, or if performance is satisfactory for reaching the airport with landing gear extended, leave the landing gear in the down position.

Make positive identification of inoperative engine by gently throttling back on suspected engine. If no effective power is being delivered by that engine, feather the propeller, and trim directionally with rudder trim.

Climb straight ahead to traffic pattern altitude and return to airport for landing.

Do not try to turn or climb too sharply. Turns, however, can be made toward the inoperative engine if necessary.

NOTE

A climbing turn toward an inoperative engine is more critical than a gliding turn toward an inoperative engine because there is more asymmetric thrust with the power setting used for climb. Trim directionally with rudder trim.

(b) During Cruise Flight:

If engine failure occurs during cruise flight, maintain airspeed and directional control of airplane; immediately advance mixture, propeller and throttle controls. The airplane will yaw in the direction of the inoperative engine. It will rarely be possible to immediately locate the inoperative engine by viewing the manifold pressure gauge. This yaw in the direction of the inoperative engine can be corrected with rudder and rudder trim.

Carefully retard the throttle control of the suspected inoperative engine in order to identify the malfunctioning engine and verify that it is not producing power. Turn on fuel pumps, check ignition switches, fuel gauges and fuel cell selectors and try to determine cause of the engine failure. If power cannot be regained, the propeller on the inoperative engine should be feathered by retarding the throttle to the idle position and moving the propeller pitch control into the feather position. The mixture should then be moved to idle cut-off and ignition turned off.

Reduce power on the operating engine if altitude and loading are such that adequate performance can be maintained on one engine and then reduce the electrical load.

Best single engine performance will be obtained with the wing on the side having the inoperative engine held about three to five degrees higher than level to help counteract the tendency to turn in that direction. Rudder trim may be used to correct for additional control pressure needed in single engine flight.

(c) Single Engine Approach:

As the airport is approached for landing, reduce power on the operative engine and gradually retrim the rudder. When it is obvious that the airport can be reached, lower the landing gear and check the indicators to make sure landing gear is down and locked.

During a single engine approach the landing gear should not be lowered until landing is assured. It is important, however, to extend the landing gear soon enough that there will be time to lower it manually in the event of a landing gear malfunction, and also so there will be no great change in airplane configuration just prior to landing.

Maintain additional altitude and speed during approach, keeping in mind that landing should be made right the first time and that a go-around may require the use of full power on the operating engine, making control more difficult.

A final approach speed of 105 miles per hour and the use of half rather than full wing flaps will place the airplane in the best configuration for a go-around should this be necessary, but it should be avoided if at all possible. It is essential to land

the airplane the first time on a single engine approach in order to avoid the need for a go-around. Under some conditions of loading or density altitude a go-around may be impossible, and in any event the sudden application of power during single engine operation may cause control difficulties.

If single engine go-around cannot be avoided, the landing gear and wing flaps should be retracted as soon as possible after application of full power, since under most conditions, climb, or even level flight, is impossible during single engine operation with landing gear and wing flaps extended.

CAUTION

If rudder trim has been used to ease single engine control pressures, the trim should be adjusted as the throttle control is retarded for final approach and landing.

RECOMMENDED PRACTICE

When operating single engine maintain speed above 97 mph. This speed, 97 mph, will not provide optimum single engine climb performance. Optimum single engine climb is obtained at the best single engine rate of climb speed, 105 mph, with the operating engine at full throttle, 2700 rpm and the inoperative engine propeller feathered and cowl flap closed. The gear and flaps must be retracted.

2. Feathering:

The Hartzell HC-E2YL-2 feathering propellers can be feathered only while the engine is rotating above 1000 RPM. Loss of centrifugal force due to slowing RPM will actuate a stop pin that keeps the propeller from feathering each time the engine is stopped on the ground. If an engine freezes up, it will be impossible to feather its propeller. Single engine flight with the propeller of the inoperative engine unfeathered will decrease single engine performance.

3. Unfeathering:

It is not recommended that propeller feathering and unfeathering be practiced on the ground because of the excessive vibration that occurs in the engine installation. In flight, feathering should be practiced only to familiarize the pilot with the proper procedures. To unfeather a propeller in flight, the following technique is recommended:

- a. Ignition switches ON.
- b. Mixture RICH.
- c. Throttle open about 1/2 inch.
- d. Prop control at cruise setting.
- e. Engage starter until engine starts.
- f. Allow engine to idle at 1000 to 1500 RPM until oil temperature begins to rise. Adjust to cruising power when engine warms.

The Twin Comanche, operating under optimum conditions of turbulence and pilot technique, and under standard conditions of temperature and pressure, has a single engine service ceiling of 5800 feet at 3600 pounds gross weight and maximum continuous power.

During initial multi-engine training and in order to maintain subsequent proficiency, it is desirable to practice single-engine flight. Such practice is not advisable with passengers aboard the airplane, with a heavy load, or with extreme rearward center of gravity. In no case should single-engine operation be practiced without having in one of the pilot's seats a well-qualified twin-

engine rated pilot who is familiar with the Twin Comanche characteristics and procedures.

For most single-engine practice it is recommended that the reduction of drag accomplished by feathering a propeller be simulated by a power setting of 10 inches of manifold pressure and 2200RPM. This will accomplish a zero thrust on the selected engine.

Under the proper conditions, actual propeller feathering may be practiced. The following precautions should be exercised when an engine is feathered for practice.

- a. Do not feather a propeller for practice if you think the engine may be difficult to restart.
- b. Do not feather a propeller for practice at a low altitude above the ground.
- c. Do not feather a propeller for practice with a low charged battery, as it takes electrical power to get the engine started.
- d. Do not feather a propeller for practice unless you are within reasonable distance of an airport.
- e. Do not feather a propeller for practice in conditions of temperature, altitude, weight or turbulence which may prevent single-engine flight at altitudes well above the ground elevations.

4. Manual Gear Extension:

Manual landing gear extension is accomplished with the mechanism located under the floorboard directly aft of the nose wheel housing. This system is used only to extend the gear if the electrical actuating system has failed and not to retract the gear manually without the use of the electric motor. With the electric motor disengaged from the gear torque tube, as required in extending the gear manually, there is no mechanism for holding the gear in the "UP" position so that the gear will not stay up if retracted manually.

Before proceeding with emergency gear extension, check the following:

- a. Master and gear circuit breakers are in.
- b. Master switch is on.
- c. Navigation lights are off (daytime).

To extend the gear, remove the cover over the emergency

V_{MC} AND STALL SPEED

More power is available on the operating engine at lower altitudes (if the engine is normally aspirated) and hence there can be more asymmetric thrust. The V_{MC} is highest at low altitudes. The V_{MC} decreases with altitude and at higher altitudes the airplane will approach a stall speed before reaching V_{MC} . The most critical situation occurs at the altitude where the stall speed and V_{MC} speed coincide. Care should be taken to avoid this flight condition because at this point loss of directional control could lead to a spin.

MOORING

The airplane should be moved on the ground with the aid of the nose wheel towing bar provided with each plane. The tow bar is stowed in the baggage compartment.

Tie down ropes for mooring the airplane can be fastened to the wing tie down rings and tail skid.

The aileron and stabilator controls should be secured by means of a safety belt or control locks to prevent control surface damage. The rudder is held in position by its connections with the steerable nose wheel and does not need to be secured except under unusually high wind conditions.

LOADING AND WEIGHT AND BALANCE**CAUTION**

It is the responsibility of the owner and pilot to determine that the gross weight of the airplane is not exceeded and to determine that the airplane

OPERATING TIPS

1. Trim for takeoff so that a light back pressure on the control wheel allows the airplane to lift from the runway.

2. When checking the propeller feathering action, it is necessary to move the propeller control rapidly in and out of feathered position to prevent a drop of more than 500 RPM. Excessive manifold pressure will occur if the RPM count falls below 1000 during this check.

3. Do not retract the landing gear prematurely on takeoff.

4. To reduce wing flap operating loads, lower the wing flaps at airspeeds well below 125 miles per hour.

5. Determine the position of the landing gear by checking the gear position lights.

6. During landing, allow the main wheels to contact the ground while centering the rudder pedals. Apply additional back pressure to the control wheel and retract the wing flaps for good directional control and maximum effectiveness of brakes during landing roll.

7. When the instrument lights are on, the gear position lights are dimmed for night flight.

8. Be sure that all radio switches, light switches and pitot heat switch are in the off position before starting engines.

9. Due to the responsive trim tab controls, a small adjustment in trim gives a rapid change in attitude.

10. Engine shut down by use of the mixture controls may cause a rough stop during high ambient temperature conditions. A spring loaded device on the throttle will shut down the engines by closing the throttle valves and shutting off air to the engines. As this mechanism is connected to and operated by the last 1/8 inch travel of the throttles, a stop on the quadrant prevents the throttles from being pulled fully aft and closing the throttle valves.

This throttle cut-off is not intended to be used in lieu of the mixture control for engine shut down; it is to be used only when the mixture control is placed in idle cut-off and there is indication of a rough stop.

11. During single engine flights be sure that the gear and flaps are fully retracted when climbing at the best single engine climb speed. Speeds above or below the best single engine climb speed will decrease climb performance. Close the cowl flap on the inoperative engine and trim the airplane to reduce drag.

12. Fuel from auxiliary cells and from optional wing tip tanks is to be used in level flight only. Takeoffs should not be made using fuel from the auxiliary cells or tip tanks or with the main cells less than one-quarter full.

Certain maneuvers should be avoided. These maneuvers could cause fuel to move away from fuel cell outlets. If the outlet is uncovered, the flow of fuel will be interrupted and a temporary loss of power may result.

Running turning takeoffs, prolonged slips or skids in any pitch attitude, or any unusual or abrupt maneuvers which could cause uncovering of the fuel outlet should be avoided.

13. The rudder pedals are suspended from a torque tube which extends across the fuselage. The pilot should become familiar with the proper positioning of his feet on the rudder pedals so as to avoid interference with the torque tube when moving the rudder pedals or operating the toe brakes.

14. Anti-collision lights should not be operated in heavy haze or clouds, since reflected light can produce spacial disorientation. Show courtesy for other pilots by not operating strobe lights while taxiing in the vicinity of other aircraft.

FLIGHT CONDITIONS

Do not fly into marginal or deteriorating weather unless you are equipped and qualified to fly as an instrument rated pilot under instrument conditions. Before taking off on an instrument flight, or a flight at night or in marginal conditions, make sure all instruments and equipment are operating properly.

In mountainous terrain, maintain proper distance from the mountains, especially in strong winds, which may cause extreme downdrafts and turbulence.

Flight should be planned to avoid thunderstorm areas. In conditions of extreme turbulence, reduce power to slow the airplane below the design maneuvering speed of 162 miles per hour.

A further reduction of power will ease the stress to which the airplane is subjected by virtue of turbulence. When flying in extreme turbulence or strong vertical currents, using the autopilot, the altitude-hold mode should not be used.