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SECTION 4

NORMAL PROCEDURES

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SECTION 4

NORMAL PROCEDURES

4.1 GENERAL

This section clearly describes the recommended procedures for the conduct of normal operations for the Cherokee Archer II. All of the required (FAA regulations) procedures and those necessary for the safe operation of the airplane as determined by the operating and design features of the airplane are presented.

Normal procedures associated with those optional systems and equipment which require handbook supplements are provided by Section 9 (Supplements).

These procedures are provided to present a source of reference and review and to supply information on procedures which are not the same for all aircraft. Pilots should familiarize themselves with the procedures given in this section in order to become proficient in the normal operations of the airplane.

The first portion of this section consists of a short form check list which supplies an action sequence for normal operations with little emphasis on the operation of the systems.

The remainder of the section is devoted to amplified normal procedures which provide detailed information and explanations of the procedures and how to perform them. This portion of the section is not intended for use as an in-flight reference due to the lengthly explanations. The short form check list should be used for this purpose.

4.3 AIRSPEEDS FOR SAFE OPERATIONS

The following airspeeds are those which are significant to the safe operation of the airplane. These figures are for standard airplanes flown at gross weight under standard conditions at sea level.

Performance for a specific airplane may vary from published figures depending upon the equipment installed, the condition of the engine, airplane and equipment, atmospheric conditions and piloting technique.

(a)	Best Rate of Climb Speed (IAS)	87 MPH (76 KTS)
(b)	Best Angle of Climb Speed (IAS)	74 MPH (64 KTS)
(c)	Turbulent Air Operating Speed (IAS)	124 MPH (108 KTS)
(d)	Landing Approach Speed (IAS)	76 MPH (66 KTS)
(e)	Maximum Demonstrated Crosswind Velocity	20 MPH (17 KTS)

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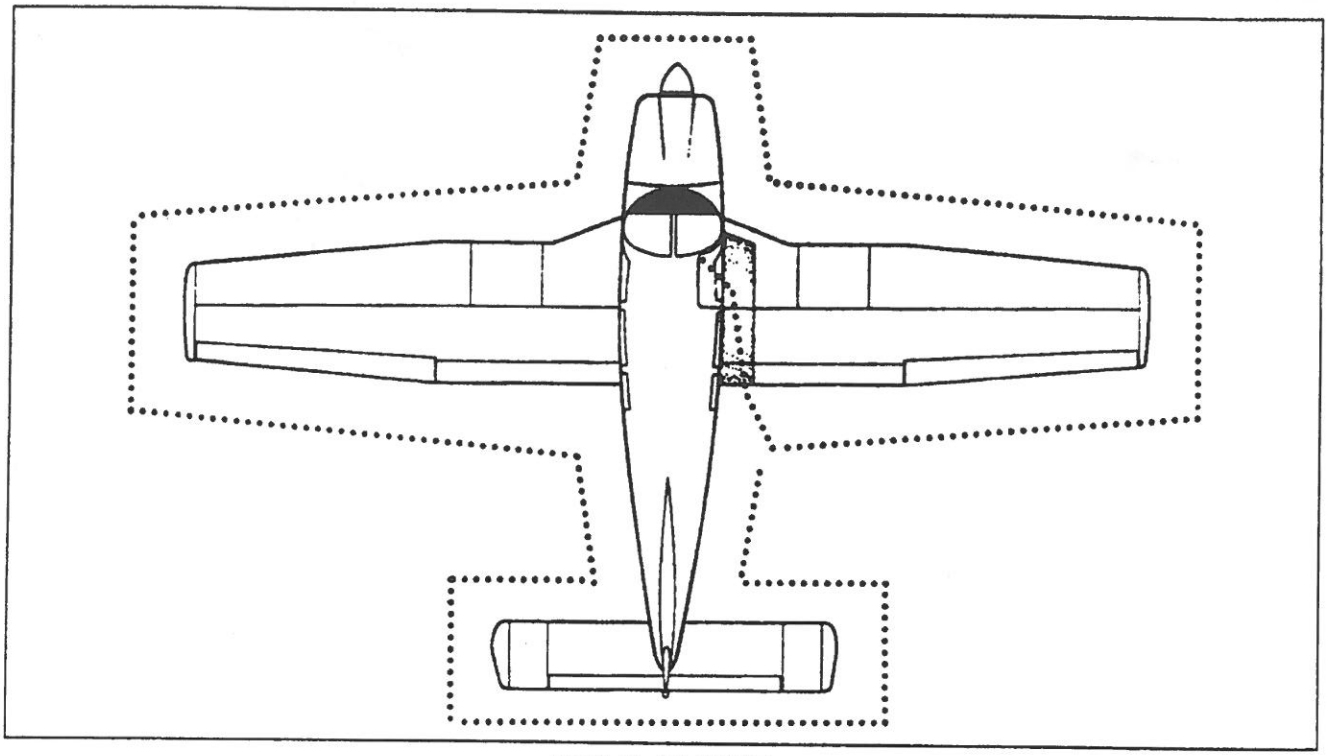

WALK-AROUND

Figure 4-1

4.5 NORMAL PROCEDURES CHECK LIST

PREFLIGHT CHECK

Control wheel .....release belts
Master switch .....ON
Fuel quantity gauges .....check
Master switch .....OFF
Ignition .....OFF
Exterior .....check for damage
Control surfaces .....check for interference - free of ice, snow, frost
Hinges .....check for interference
Wings .....free of ice, snow, frost
Stall warning .....check
Navagation lights .....check
Fuel tanks .....check supply visually - secure caps
Fuel tank sumps .....drain
Fuel vents .....open
Main gear struts .....proper inflation (4.50 in.)
Tires .....check
Brake blocks .....check
Pitot head .....remove cover-holes clear
Windshield .....clean
Propeller and spinner .....check
Fuel and oil .....check for leaks
Oil .....check level
Dipstick .....properly seated
Cowling .....secure
Inspection covers .....secure
Nose wheel tire .....check
Nose gear strut .....proper inflation (3.25 in.)
Air inlets .....clear
Alternator belt .....check tension
Tow bar and control locks .....stow
Baggage .....stowed properly - secure
Baggage door .....close and secure
Fuel strainer .....drain
Primary flight controls .....proper operation
Cabin doors .....close and secure
Required papers .....on board
Seat belts and harness .....fastened - check inertia reel

BEFORE STARTING ENGINE

Brakes.....set
Carburetor heat.....full COLD
Fuel selector.....desired tank

STARTING ENGINE WHEN COLD

Throttle.....1/4" open
Master switch.....ON
Electric fuel pump.....ON
Mixture.....full RICH
Starter.....engage
Throttle.....adjust
Oil pressure.....check

If engine does not start within 10 sec. prime and repeat starting procedure.

STARTING ENGINE WHEN HOT

Throttle.....1/2" open
Master switch.....ON
Electric fuel pump.....ON
Mixture.....full RICH
Starter.....engage
Throttle.....adjust
Oil pressure.....check

STARTING ENGINE WHEN FLOODED

Throttle.....open full
Master switch.....ON
Electric fuel pump.....OFF
Mixture.....idle cut-off
Starter.....engage
Mixture.....advance
Throttle.....retard
Oil pressure.....check

STARTING WITH EXTERNAL POWER SOURCE

Master switch.....OFF
Terminals.....connect
Plug.....insert in fuselage
Master switch.....ON
Proceed with normal start
Master switch.....OFF
Plug.....disconnect from fuselage
Master switch.....ON - check ammeter
Oil pressure.....check

WARM-UP

Throttle.....800 to 1200 RPM

TAXIING

Chocks.....Removed
Taxi area.....clear
Throttle.....apply slowly
Brakes.....check
Steering.....check

GROUND CHECK

Throttle.....2000 RPM
Magnetos.....max. drop 175 RPM
-max. diff. 50 RPM
Vacuum.....5.0" Hg. ± .1
Oil temp.....check
Oil pressure.....check
Air conditioner.....check
Annunciator panel.....press-to-test
Carburetor heat.....check
Engine is warm for takeoff when throttle can be opened without engine faltering.
Electric fuel pump.....OFF
Fuel pressure.....check

BEFORE TAKEOFF

Master switch .....ON
Flight instruments .....check
Fuel selector .....proper tank
Electric fuel pump .....ON
Engine gauges .....check
Carburetor heat.....OFF
Seat backs.....erect
Mixture .....set
Belts/harness .....fastened
Empty seats.....seat belts snugly fastened
Flaps .....set
Trim tab .....set
Controls .....free
Doors .....latched
Air conditioner .....OFF

TAKEOFF

NORMAL

Flaps .....set
Tab.....set
Accelerate to 60 to 75 MPH IAS (52 to 65 KTS IAS)
Control wheel.....back pressure to rotate to climb attitude

SHORT FIELD, OBSTACLE CLEARANCE

Flaps .....25° (second notch)
Accelerate to 47-56 MPH IAS (41 to 49 KTS IAS) depending on aircraft weight
Control wheel.....back pressure to rotate to climb attitude
After breaking ground, accelerate to 52-62 MPH IAS (45 to 54 KTS IAS) depending on aircraft weight
Accelerate to best flaps up angle of climb speed - 74 MPH IAS (64 KTS IAS), slowly retract the flaps and climb past the obstacle.
Accelerate to best flaps up rate of climb speed - 87 MPH IAS (76 KTS IAS)

SOFT FIELD

Flaps .....25° (second notch)
Accelerate to 47-56 MPH IAS (41 to 49 KTS IAS) depending on aircraft weight
Control wheel.....back pressure to rotate to climb attitude
After breaking ground, accelerate to 52-62 MPH IAS (45 to 54 KTS IAS) depending on aircraft weight
Accelerate to best flaps up rate of climb speed 87 MPH IAS (76 KTS IAS)
Flaps .....retract slowly

CLIMB

Best rate (flaps up).....87 MPH IAS (76 KTS IAS)
Best angle (flaps up) .....74 MPH IAS (64 MPH IAS)
En route .....100 MPH IAS (87 KTS IAS)
Electric fuel pump .....OFF at desired altitude

CRUISING

Reference performance charts and Avco-Lycoming Operator's Manual.
Normal max power 75%
Power.....set per power table
Mixture .....adjust

APPROACH AND LANDING

Fuel selector .....proper tank
Seat backs.....erect
Belts/harness.....fasten
Electric fuel pump .....ON
Mixture .....set
Flaps.....set - 115 MPH IAS (100 KTS IAS) max
Air conditioner.....OFF
Trim to 86 MPH IAS (75 KTS IAS)
Final approach speed (flaps 40°) .....76 MPH IAS (66 KTS IAS)

STOPPING ENGINE

Flaps .....retract
Electric fuel pump .....OFF
Air conditioner .....OFF
Radio's .....OFF
Throttle.....full aft
Mixture .....idle cut-off
Magnetos.....OFF
Master switch .....OFF

PARKING

Parking brake .....set
Control wheel.....secured with belts
Flaps .....full up
Wheel chocks .....in place
Tie downs.....secure

4.7 AMPLIFIED NORMAL PROCEDURES (GENERAL)

The following paragraphs are provided to supply detailed information and explanations of the normal procedures necessary for the safe operation of the airplane.

4.9 PREFLIGHT CHECK

The airplane should be given a thorough preflight and walk-around check. The preflight should include a check of the airplane's operational status, computation of weight and C.G. limits, takeoff distance and in-flight performance. A weather briefing should be obtained for the intended flight path, and any other factors relating to a safe flight should be checked before takeoff.

Upon entering the cockpit, release the seat belts securing the control wheel. Turn "ON" the master switch and check the fuel quantity gauges for sufficient fuel. After the fuel quantity check is made turn the master switch "OFF" and the ignition switch "OFF."

To begin the exterior walk-around, check for external damage and operational interference of the control surfaces or hinges. Insure that the wings and control surfaces are free of snow, ice, frost or any other foreign materials.

An operational check of the stall warning system should now be made by turning the master switch "ON," lifting the detector and checking to determine if the horn is actuated. The master switch should be returned to the "OFF" position after the check is complete.

The next step is to check the navigation lights. The master switch must be "ON" for this check. Return the master switch to "OFF" after this check is complete.

A visual check of the fuel tank quantity should be performed. Remove the filler cap from each tank and visually check the supply and color. Be sure to secure the caps properly after the check is complete.

The fuel system should be drained daily prior to the first flight and after refueling to avoid the accumulation of water or sediment. Each fuel tank is equipped with an individual quick drain located at the lower inboard rear corner of the tank. The fuel strainer is equipped with a quick drain valve located on the front lower corner of the fire wall. It is important that the fuel system be drained properly.

Open the quick drain valve with the fuel selector valve on one tank and allow fuel to flow for a few seconds. Place a container under the drain and examine the contents for sediment and water.

When enough fuel has flowed to ensure that the lines and strainers are free of water and sediment, close the drain and dispose of the contents of the container.

Repeat the procedure with the fuel selector valve changed to the other tank.

CAUTION

When draining any amount of fuel, care should be taken to insure that no fire hazard exists before starting engine.

After using the quick drain, it should be checked to make sure it has closed completely and is not leaking.

Check all of the fuel tank vents to make sure they are open.

Next, a complete check of the landing gear. Check the main gear shock struts for proper inflation. There should be 4.50 inches of strut exposure under a normal static load. The nose gear should be checked for 3.25 inches of strut exposure. Check all tires for cuts and wear and insure proper inflation. Make a visual check of the brake blocks for wear or damage.

Remove the cover from the pitot head on the underside of the left wing. Check the pitot head to make sure the holes are open and clear of obstructions.

Don't forget to clean and check the windshield.

The propeller and spinner should be checked for defects or nicks.

Lift the cowling and check for any obvious fuel or oil leaks. Check the oil level. Make sure that the dipstick has properly seated after checking. Secure the cowling and check the inspection covers.

Check the air inlets for foreign matter and the alternator belt for proper tension.

Stow the tow bar and check the baggage for proper storage and security. The baggage compartment doors should be closed and secure.

Upon entering the aircraft, ascertain that all primary flight controls operate properly. Close and secure the fore and aft cabin doors and check that all the required papers are in order and in the airplane.

Fasten the seat belts and shoulder harness and check the function of the inertia reel by pulling sharply on the strap.

4.11 BEFORE STARTING ENGINE

Before starting the engine the brakes should be set "ON" and the carburetor heat lever moved to the full COLD position. The fuel selector should then be moved to the desired tank.

4.13 STARTING ENGINE

(a) Starting Engine When Cold

Open the throttle lever approximately 1/4 inch. Turn "ON" the master switch and the electric fuel pump.

Move the mixture control to full "RICH" and engage the starter by rotating the magneto switch clockwise and pressing in. When the engine fires, release the magneto switch, and move the throttle to the desired setting.

If the engine does not fire within five to ten seconds, disengage the starter, prime the engine and repeat the starting procedure.

(b) Starting Engine When Hot

Open the throttle approximately 1/2 inch. Turn "ON" the master switch and the electric fuel pump. Move the mixture control lever to full RICH and engage the starter by rotating the magneto switch clockwise and pressing in. When the engine fires, release the magneto switch and move the throttle to the desired setting.

(c) Starting Engine When Flooded

The throttle lever should be full "OPEN." Turn "ON" the master switch and turn "OFF" the electric fuel pump. Move the mixture control lever to idle cut-off and engage the starter by rotating the magneto switch clockwise and pressing in. When the engine fires, release the magneto switch, advance the mixture and retard the throttle.

(d) Starting Engine With External Power Source

An optional feature called the Piper External Power (PEP) allows the operator to use an external battery to crank the engine without having to gain access to the airplane's battery.

Turn the airplane master switch "OFF." Connect the RED lead of the PEP kit jumper cable to the POSITIVE (+) terminal of an external 12-volt battery and the BLACK lead to the NEGATIVE (-) terminal. Insert the plug of the jumper cable to the socket located on the fuselage.

Turn "ON" the airplane master switch and proceed with the normal engine starting procedure.

After the engine has started, turn the master switch "OFF" and disconnect the jumper cable from the airplane. Return the master switch to the "ON" position and check the alternator ammeter for an indication of output. DO NOT ATTEMPT FLIGHT IF THERE IS NO INDICATION OF ALTERNATOR OUTPUT.

When the engine is firing evenly, advance the throttle to 800 RPM. If oil pressure is not indicated within thirty seconds, stop the engine and determine the trouble. In cold weather it will take a few seconds longer to get an oil pressure indication. If the engine has failed to start, refer to the Lycoming Operating Handbook, Engine Troubles and Their Remedies.

Starter manufacturers recommend that cranking periods be limited to thirty seconds with a two minute rest between cranking periods. Longer cranking periods will shorten the life of the starter.

4.15 WARM-UP

Warm-up the engine at 800 to 1200 RPM for not more than two minutes in warm weather and four minutes in cold. Avoid prolonged idling at low RPM, as this practice may result in fouled spark plugs.

Takeoff may be made as soon as the ground check is completed, provided that the throttle may be opened fully without backfiring or skipping, and without a reduction in engine oil pressure.

Do not operate the engine at high RPM when running up or taxiing over ground containing loose stones, gravel or any loose material that may cause damage to the propeller blades.

4.17 TAXIING

Before attempting to taxi the airplane, ground personnel should be instructed and approved by a qualified person authorized by the owner. Ascertain that the propeller back blast and taxi areas are clear.

Power should be applied slowly to start the taxi roll. Taxi a few feet forward and apply the brakes to determine their effectiveness. While taxiing, make slight turns to ascertain the effectiveness of the steering.

Observe wing clearances when taxiing near buildings or other stationary objects. If possible, station an observer outside the airplane.

Avoid holes and ruts when taxiing over uneven ground.

Do not operate the engine at high RPM when running up or taxiing over ground containing loose stones, gravel or any loose material that may cause damage to the propeller blades.

4.19 GROUND CHECK

The magnetos should be checked at 2000 RPM. Drop off on either magneto should not exceed 175 RPM and the difference between the magnetos should not exceed 50 RPM. Operation on one magneto should not exceed 10 seconds.

Check the vacuum gauge; the indicator should read 5.0" ± .1" Hg at 2000 RPM.

Check both oil temperature and oil pressure. The temperature may be low for some time if the engine is being run for the first time of the day, but as long as the pressure is within limits the engine is ready for takeoff.

Check the annunciator panel lights with the press-to-test button. Also check the air conditioner.

Carburetor heat should also be checked prior to takeoff to be sure the control is operating properly and to clear any ice which may have formed during taxiing. Avoid prolonged ground operation with carburetor heat "ON" as the air is unfiltered.

The electric fuel pump should be turned "OFF" after starting or during warm-up to make sure that the engine driven pump is operating. Prior to takeoff the electric pump should be turned ON again to prevent loss of power during takeoff should the engine driven pump fail. The engine is warm enough for takeoff when the throttle can be opened without the engine faltering.

4.21 BEFORE TAKEOFF

All aspects of each particular takeoff should be considered prior to executing the takeoff procedure.

Turn "ON" the master switch and check and set all of the flight instruments as required. Check the fuel selector to make sure it is on the proper tank (fullest). Turn "ON" the electric fuel pump and check the engine gauges. The carburetor heat should be in the "OFF" position.

All seat backs should be erect.

The mixture should be set and the seat belts and shoulder harness fastened. Fasten the seat belts snugly around the empty seats.

Exercise and set the flaps and trim tab. Insure proper flight control movement and response.

All doors should be properly secured and latched.

On air conditioned models, the air conditioner must be "OFF" to insure normal takeoff performance.

4.23 TAKEOFF

The normal takeoff technique is conventional for the Cherokee Archer II. The tab should be set slightly aft of neutral, with the exact setting determined by the loading of the airplane. Allow the airplane to accelerate to 60 to 75 MPH IAS (52 to 65 KTS IAS) depending on the weight of the aircraft and ease back on the control wheel to rotate to climb attitude.

The procedure used for a short field takeoff with an obstacle clearance or a soft field takeoff differs slightly from the normal technique. The flaps should be lowered to 25° (second notch). Allow the aircraft to accelerate to 47 to 56 MPH IAS (41 to 49 KTS IAS) depending on the aircraft weight and rotate the aircraft to climb attitude. After breaking ground, accelerate to 52-62 MPH IAS (45 to 54 KTS IAS), depending on aircraft weight. Continue to climb while accelerating to the flaps-up rate of climb speed, 87 MPH IAS (76 KTS IAS) if no obstacle is present or 74 MPH IAS (64 KTS IAS) if obstacle clearance is a consideration. Slowly retract the flaps while climbing out.

4.25 CLIMB

The best rate of climb at gross weight will be obtained at 87 MPH IAS (76 KTS IAS). The best angle of climb may be obtained at 74 MPH IAS (64 KTS IAS). At lighter than gross weight these speeds are reduced somewhat. For climbing en route, a speed of 100 MPH IAS (87 KTS IAS) is recommended. This will produce better forward speed and increased visibility over the nose during the climb.

When reaching the desired altitude, the electric fuel pump may be turned off.

4.27 CRUISING

The cruising speed of the Cherokee Archer II is determined by many factors, including power setting. altitude, temperature, loading and equipment installed in the airplane.

The normal maximum cruising power is 75% of the rated horsepower of the engine. Airspeeds which may be obtained at various altitudes and power settings can be determined from the performance graphs provided by Section 5.

Use of the mixture control in cruising flight reduces fuel consumption significantly, especially at higher altitudes. The mixture should be leaned during cruising operation above 5000 ft. altitude and at pilot's discretion at lower altitudes when 75% power or less is being used. If any doubt exists as to the amount of power being used, the mixture should be in the full "RICH" position for all operations under 5000 feet.

To lean the mixture, disengage the lock and pull the mixture control until the engine becomes rough, indicating that the lean mixture limit has been reached in the leaner cylinders. Then enrich the mixture by pushing the control towards the instrument panel until engine operation becomes smooth.

If the airplane is equipped with the optional exhaust gas temperature (EGT) gauge, a more accurate means of leaning is available to the pilot. For this procedure, refer to the "Avco-Lycoming Operator's Manual."

In order to keep the airplane in best lateral trim during cruise flight, the fuel should be used alternately from each tank at one hour intervals.

Always remember that the electric fuel pump should be turned "ON" before switching tanks, and should be left on for a short period thereafter. In order to keep the airplane in best lateral trim during cruising flight, the fuel should be used alternately from each tank. It is recommended that one tank be used for one hour after takeoff, then the other tank be used for two hours; then return to the first tank, which will have approximately one and one half hours of fuel remaining if the tanks were full at takeoff. The second tank will contain approximately one half hour of fuel. Do not run tanks completely dry in flight. The electric fuel pump should be normally "OFF" so that any malfunction of the engine driven fuel pump is immediately apparent. If signs of fuel starvation should occur at any time during flight, fuel exhaustion should be suspected: at which time the fuel selector should be immediately positioned to the other tank and the electric fuel pump switched to the "ON" position.

4.29 APPROACH AND LANDING

Check to insure the fuel selector is on the proper (fullest) tank and that the seat backs are erect. The seat belts and shoulder harness should be fastened and the inertia reel checked.

Turn "ON" the electric fuel pump and turn "OFF" the air conditioner. The mixture should be set in the full "RICH" position.

When on final approach, the airplane should be trimmed to an approach speed of about 76 MPH IAS (66 KTS IAS) with flaps extended. The flaps can be lowered at speeds up to 115 MPH IAS (100 KTS IAS), if desired.

The mixture control should be kept in full "RICH" position to insure maximum acceleration if it should be necessary to open the throttle again. Carburetor heat should not be applied unless there is an indication of carburetor icing, since the use of carburetor heat causes a reduction in power which may be critical in case of a go-around. Full throttle operation with carburetor heat on is likely to cause detonation.

The amount of flap used during landings and the speed of the aircraft at contact with the runway should be varied according to the landing surface and conditions of wind and airplane loading. It is generally good practice to contact the ground at the minimum possible safe speed consistent with existing conditions.

Normally, the best technique for short and slow landings is to use full flap and enough power to maintain the desired airspeed and approach flight path. Mixture should be full "RICH," fuel on the fullest tank, and electric fuel pump "ON." Reduce the speed during the flareout and contact the ground close to the stalling speed. After ground contact hold the nose wheel off as long as possible. As the airplane slows down, gently lower the nose and apply the brakes. Braking is most effective when flaps are raised and back pressure is applied to the control wheel, putting most of the aircraft weight on the main wheels. In high wind conditions, particularly in strong crosswinds, it may be desirable to approach the ground at higher than normal speeds with partial or no flaps.

4.31 STOPPING ENGINE

At the pilot's discretion, the flaps should be raised and the electric fuel pump turned "OFF." The air conditioner and radios should be turned "OFF," and the engine stopped by disengaging the mixture control lock and pulling the mixture control back to idle cut-off. The throttle should be left full aft to avoid engine vibration while stopping. Then the magneto and master switches must be turned "OFF."

4.33 PARKING

If necessary, the airplane should be moved on the ground with the aid of the nose wheel tow bar provided with each airplane and secured behind the rear seats. The aileron and stabilator controls should be secured by looping the safety belt through the control wheel and pulling it snug. The flaps are locked when in the "UP" position and should be left retracted.

Tie downs can be secured to rings provided under each wing and to the tail skid. The rudder is held in position by its connections to the nose wheel steering and normally does not have to be secured.

4.35 STALLS

The stall characteristics of the Cherokee Archer II are conventional. An approaching stall is indicated by a stall warning horn which is activated between five and ten miles per hour above stall speed. Mild airframe buffeting and gentle pitching may also precede the stall.

The gross weight stalling speed of the Cherokee Archer II with power off and full flaps is 61 MPH CAS (53 KTS CAS). With the flaps up this speed is increased 7 MPH (6 KTS). Loss of altitude during stalls varies from 100 to 350 feet, depending on configuration and power.

The following performance figures were obtained during FAA type tests and may be realized under conditions indicated with the airplane and engine in good condition and with average piloting technique. All performance is given for 2550 pounds. Stall speeds at lower weights will be correspondingly less.

Stalling speeds, in mph and knots, power off, versus angle of bank (calibrated airspeed):

Angle of Bank		0°	20°	40°	50°	60°
Flaps Up	MPH	68	70	78	85	96
	KTS	59	61	68	74	83
Flaps Down	MPH	61				
	KTS	53				

NOTE

The stall warning system is inoperative with the master switch "OFF."

During preflight, the stall warning system should be checked by turning the master switch "ON," lifting the detector and checking to determine if the horn is actuated. The master switch should be returned to the "OFF" position after the check is complete.

4.37 TURBULENT AIR OPERATION

In keeping with good operating practice used in all aircraft, it is recommended that when turbulent air is encountered or expected, the airspeed be reduced to maneuvering speed to reduce the structural loads caused by gusts and to allow for inadvertent speed build-ups which may occur as a result of the turbulence or of distractions caused by the conditions.

4.39 WEIGHT AND BALANCE

It is the responsibility of the owner and pilot to determine that the airplane remains within the allowable weight vs. center of gravity envelope while in flight.

For weight and balance data, refer to Section 6 (Weight and Balance).