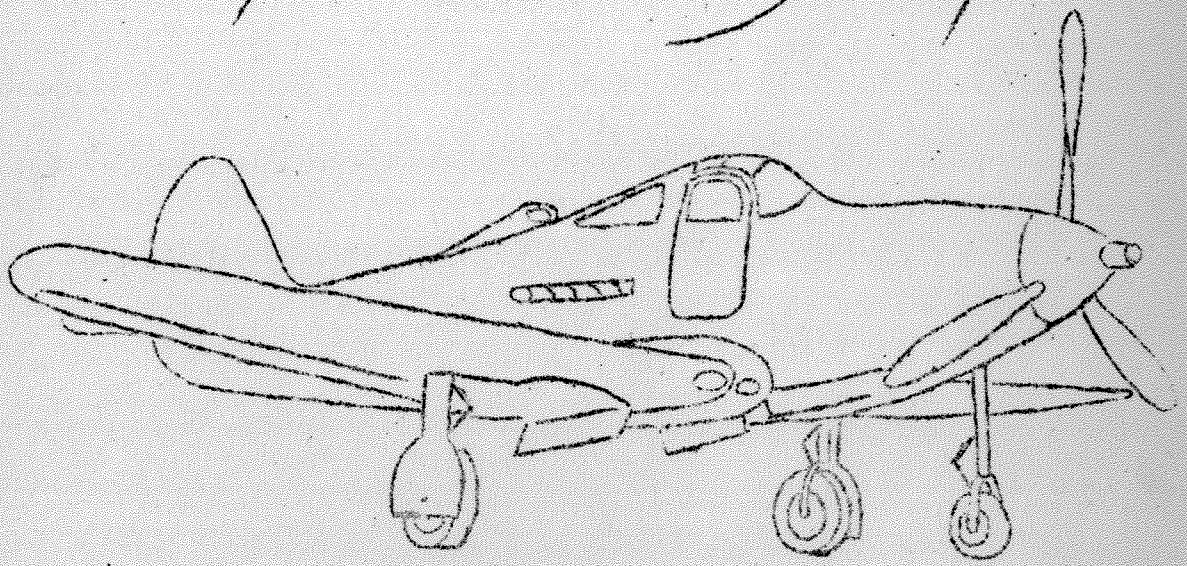
P-39



R E S T R I C T E D

PRE-FLIGHT CURRICULUM FOR P-39

I. GENERAL DESCRIPTION

The P-39 single seater interceptor pursuit airplane is a low wing, all metal, land monoplane equipped with retractable tricycle type landing gear and enclosed cockpit. The airplane is designed as a day and night fighter and is powered with an Allison V-1710-85 Vee type, twelve cylinder, liquid cooled engine mounted within the fuselage aft of the pilot which drives a constant speed type prop by means of an extension shaft and a separate forward reduction gear box.

II. DIMENSIONS

Span	34 feet
Length	30 feet
Height	9 feet 3¼ inches
Cross weight	7900 pounds
Tread	11 feet 4 inches
Fuel capacities	(Main tanks, 120 U.S. gallons (Auxiliary tank, 75 U.S. gallons
Oil capacities	(6.5 U.S. gallons (7.5 U.S. gallons when carrying the auxiliary gas tank

III. PROPELLERS

The P-39's are equipped with either a Curtiss Electric Propeller or the General Motors Aeroproducts Propeller.

On the latest P-39's the propeller control has been linked to your throttle control. With this system any time you make a change in throttle setting you automatically change your propeller setting also.

It is no longer possible to make a mag check by noting the drop-off on the ground. Mag checks on the ground must be performed the same as the pilot performs mag checks in the air - that is, by switching from both mags to right and left mag., and noting the smoothness of engine operation and apparent loss in the "feel" of power. If bad plugs are indicated from a check of this sort, it may be well to disconnect the propeller pushrod at the quadrant, push the propeller linkage to the full high RPM position, and make a "drop-off" mag. check at 2300 RPM as has been done heretofore.

"Purging" of the propeller (if it does not seem to govern properly) may be accomplished by changing manifold pressure from 20 inches to 37 inches several times in succession.

Magneto checks without synchronized throttle and RPM are taken at 2300 RPM. Magneto checks with synchronized throttle and RPM are taken at 30" M. P.

IV. LANDING GEAR

The retractable tricycle landing gear is electrically operated and is controlled by a toggle switch on the left side of the cockpit. The nosewheel operates simultaneously with the main wheels.

The landing gear struts are the air oil type. Limit switches stop the landing gear at both extreme positions. A ratchet type handcrank and control mechanism, used for emergency manual operation to extend or retract the entire landing gear, is on the cockpit floor to the right of the pilot. The main wheels are magnesium alloy castings. Hydraulically operated multi-disc type brakes are installed within each main wheel of the landing gear. The tires are 26 inch high pressure, 6 ply tires. The nose wheel is equipped with a 19 inch, 6 ply, heavy duty smooth contour tire and a dual seal inner tube. The strut assembly is self-centering during extension and retraction and is non-steerable by the pilot. This installation does not include a brake.

PRE-FLIGHT CHECK SHEET FOR P-39

LOOK YOURSELF! DON'T TAKE ANYONE'S WORD FOR IT.

1. Look the ship over for low shock struts and tires, also tire slippage.

2. Check for signs of oil or hydraulic leaks.

3. Take hold of auxiliary gas tank and see if it is secure. Take cap off and check fuel.

4. Verify that switch is OFF then check propeller for nicks or defects.

5. Check ship for loose inspection plates (there are dozens of inspection plates).

6. Check wing tanks visually for amount of fuel. NOTE: Some ships may have wrong capacity gauges or the tanks may have been changed. Check gas caps for correct amount of fuel.

7. See that airspeed tube cover is off.

8. Inspect flight control surfaces (flaps, ailerons, rudder and elevators for holes or damage and for free movement).

9. Climb in right side of ship (hand hold is on that side).

10. Check form 1A.

11. Put chute on, fasten safety belt and shoulder straps.

12. Check that switch is OFF, and have propeller pulled through 2 or 3 times.

13. Check gear switch (should be OFF before turning battery ON).

14. Start your left to right cockpit check.
    a. Carburetor heat COLD
    b. Ram air OPEN
    c. Rudder tab 5° RIGHT
    d. Elevator tab 1° NOSEUP
    e. Ailerons NEUTRAL
    f. Gas Selector RESERVE
    g. Throttle cracked 1"
    h. Mixture IDLE CUT-OFF
    i. Propeller HIGH RPM
    j. Check landing light switches OFF
    k. Battery and generator ON
    l. Fuel booster ON
    m. Check your standard instrument panel for correct settings
    n. Check radio for proper settings
    o. Check gear clutch handle ELECTRIC
    p. Coolant shutters OPEN
    q. Oil shutters OPEN
    r. Caution in use of hand brake "Always use your right hand to operate your hand brake." The auxiliary gas tank release is too handy if you use your left.

OPERATING INSTRUCTIONS

I. START ENGINE - Refer to starting procedures - Section VII.

II. BEFORE TAKE-OFF
    A. Mixture Auto RICH, carburetor heat FULL COLD
    B. Coolant and oil shutters OPEN
    C. Propeller in FULL HIGH RPM position
    D. WARM up at engine speed that is free of vibration (under 1400 RPM)

R E S T R I C T E D

E. Check magnetos at 2300 RPM, or 30" depending on type of installation. (refer to Mag Check - see section 2 page 6).
F. Check operation of propeller
G. Check generator
H. Check flap operation
I. Check all instruments for proper functioning especially coolant temperatures. Watch for overheating.
J. Close latch cabin door and windows.
K. Open throttle occasionally while taxiing to 1500 RPM to keep plugs from fouling.

III. USE OF POWER

	Manifold Pressure	RPM	Mixture Control
Take-Off	40"	3000	AUTO RICH
Climb	35"	2500	AUTO RICH
Cruise	27"	2280	AUTO RICH

IV. LANDING PREPARATIONS

A. Gas selector on RESERVE.
B. Fuel booster pump ON.
C. Mixture Control AUTO RICH.
D. Gear down at 200 IAS or less.
E. Prop set 2600 RPM automatic.
F. Oil and coolant shutters as required.
G. Flaps down below 150 IAS (or as ship is placarded)
H. Check gear and flap instruments.

NORMAL LANDING GEAR DOWN PROCEDURE

A. Slow ship to 170 IAS Desired.
B. Clutch in electric position.
C. Gear switch to down.
D. Return gear switch to neutral.

LANDING GEAR DOWN CHECKS

A. Red warning light burns while gear is in transit; then out when gear is down.
B. High amperage reading while gear is in transit; then back to normal when gear is down.
C. Landing gear switch to neutral; gear clutch to manual; ratchet on gear handle to down position and crank down.

EMERGENCY PROCEDURES

I. EMERGENCY LANDING GEAR PROCEDURE

Should the landing gear not extend, crank it down manually by means of the emergency crank located on the floor to the right and forward of the pilot's seat.

A. Slow down to 130 IAS.

B. Place the landing gear switch in the neutral or off position.
C. Turn the landing gear clutch to manual position.
D. Operate the ratchet emergency crank toward, up, and then reverse the ratchet and turn down.

II. FLAPS

NORMAL FLAP PROCEDURE

A. Desired Airspeed 140.
B. Flap switch to down position.
C. Flap switch to neutral when flaps are down.

EMERGENCY FLAP PROCEDURE

A. There is no emergency procedure for operating the flaps.

NOTE: Simultaneous operation of flaps and gear should be avoided in order to prevent overloading of the electrical system.

III. ENGINE FAILURE DURING TAKE-OFF OR IN FLIGHT

Should the engine fail during take-off proceed as follows and LAND STRAIGHT AHEAD IF ON TAKE-OFF:

A. Put the nose down to maintain flying speed.
B. Drop your auxiliary tank.
C. Mixture in IDLE CUT-OFF.
D. Right door emergency released.
E. Landing gear should be coming up.
F. Lower your flaps.
G. Gas OFF, fuel pump OFF, switch OFF, battery OFF.

Judging from the landscape determine the best place to land and keep the nose of the airplane down sufficiently to maintain flying speed of 130 IAS to successfully reach point where landing is to be made. The pilot must decide if it is advisable to lower the landing gear. If in doubt, leave it retracted. Use full flaps and land straight ahead.

IV. FIRE IN FLIGHT

Procedure to be followed in case of fire:

A. Fuel selector OFF, fuel pump OFF, switch OFF.
B. Mixture in IDLE CUT-OFF.
C. Close throttle.
D. Do not open windows.
E. Do not jettison doors unless contemplating immediate exit. Attempt to extinguish flames by diving the airplane. If the fire is put out, make a dead stick landing rather than

turning on the fuel again, since the latter procedure would probably restart the fire. Do not land if the plane is burning. Jumping or landing is up to the individual pilot.

V. RELEASE OF BELLY TANK

Drop belly tank before a forced landing. When it is necessary to drop the belly tank in flight, pull the release handle located on the left side of the radio control panel or the lower left corner of the instrument panel. The airplane should be held straight and level when dropping the auxiliary tank.

VI. PROHIBITED MANEUVERS

A. Outside loops
B. Inverted Stalls
C. Snap rolls
D. Spins
E. Inverted flight

Never try any acrobatics with a heavily loaded airplane.

VII. EMERGENCY EXIT

Pilot should have as much altitude as possible. Reduce airspeed below cruising speed. Then proceed as follows.

1. Trim nose heavy and switch OFF.
2. Put aircraft in shallow right turn.
3. Free shoulder harness and belt.
4. Release right top door pin.
5. Pull right door emergency release
6. Push right door out.
7. Go out right side head low.

PRECAUTIONS WITH 175 GALLON AUXILIARY TANK INSTALLED

I. Airplanes on which 175 gallon auxiliary tank is installed are flight tested by the Army and the flap operation is checked for correct operation at 150 MPH. Any crabs are corrected and airplane again test flown for checking.

II. Engineering, Aerodynamics and Flight Research were contacted and stated that there was no difference in air loads imposed on the flaps when 175 gal. aux. tank is installed and when it is not installed.

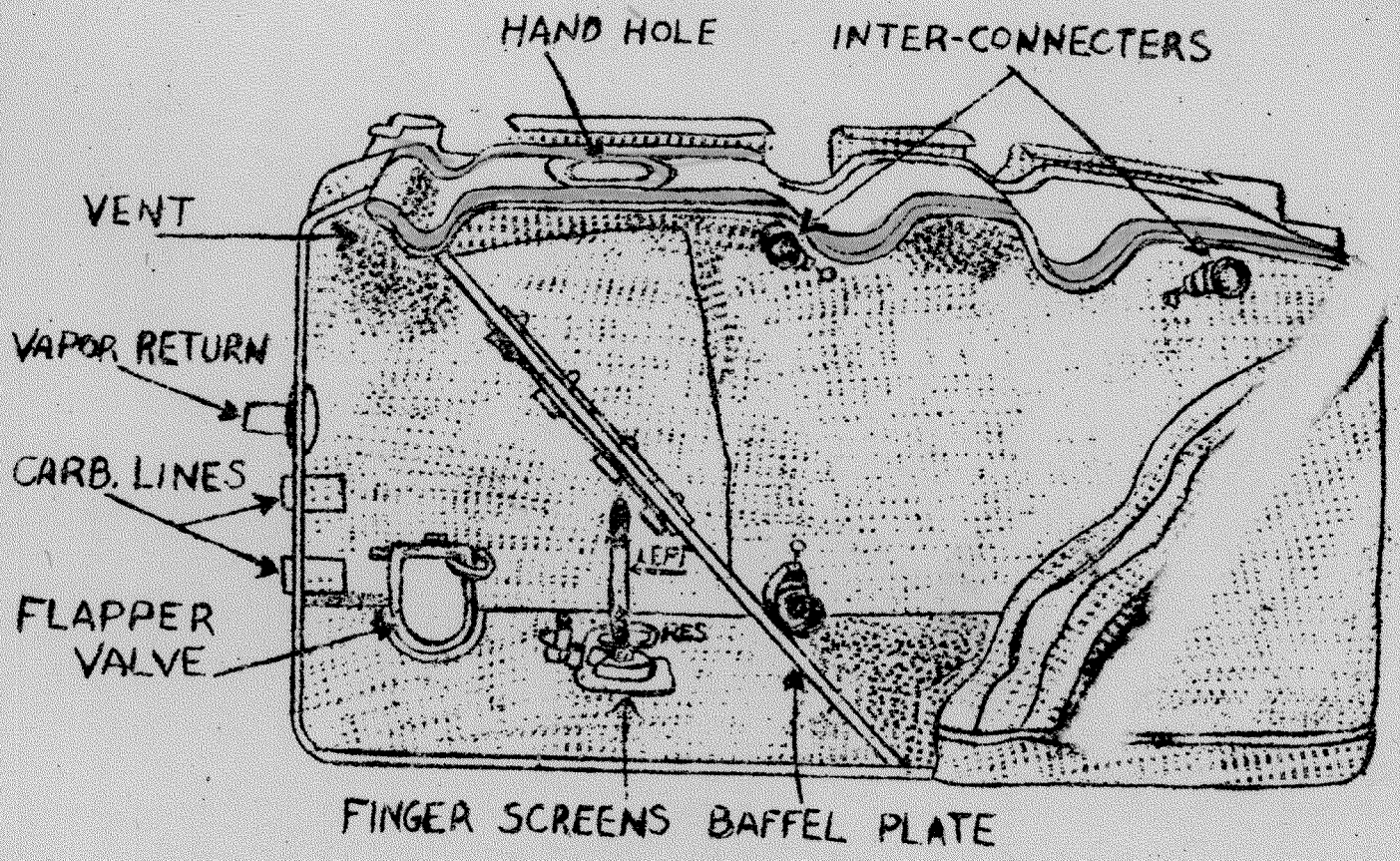
III. Flight Research stated that their pilots glide at between 130 to 150 MPH when 175 gal. auxiliary tank is installed. Their procedure is as follows:

a. They circle the field at approximately 160 MPH.

b. They make a sufficiently long approach to line the airplane up with the runway.

c. The flaps are lowered during the straight landing approach as their airspeed reaches 150 MPH which is within operating limits of the flaps.

d. Make no turns under 160 IAS.



FUEL CELL

SYSTEMS ON THE P-39

FUEL SYSTEM

The fuel system consists essentially of six cells built into each outer wing panel, a strainer, a selector valve, a fuel pressure gauge, an engine driven fuel pump, and an electric booster pump. The maximum capacity is 120 U.S. gallons. The airplane is also equipped with auxiliary tanks (belly) which range in capacity from 75, 150 to 175 gallons. These tanks can be jettisoned in emergency. To release the auxiliary tank pull the RELEASE HANDLE located on the left side of the radio control panel or brake. The tanks should be used in the following order; start, take-off, and fly on reserve for 20 minutes; switch to auxiliary if tank is installed under belly; then switch to right; then to left; and then back to reserve to use up the gas that has flowed back in from the carburetor at 10 gallons per hour. Operating pressure on earlier models is 14 to 16 pounds whereas on the later model normal pressure is 16 to 18 pounds. Electric fuel booster upmp should be used for priming, take-off, landing, and at altitudes over 10,000 feet. Always check gas caps for correct capacities especially on the belly tanks.

CARBURETOR AIR FILTER SYSTEM

A carburetor air filter and heater unit is installed to send either filtered cold air or unfiltered hot air to the carburetor. This unit is located in the aft fuselage at the rear of the engine. Heated air is taken from behind the prestone radiator through two four inch diameter flexible ducts leading to the forward portion of the carburetor air filter hopper. The filtering element is then by-passed and the heated air is led directly to the carburetor. Unrammed cold air to be filtered is taken through an opening in the top cowl of the fuselage, through the filter and then through the two ducts to the carburetor. Two controls for operation of the filter and heater are located in the cockpit on the left hand turnover beam. These controls operate dampers in the air ducts. The first control selects the desired amount of cold, rammed, unfiltered air which is led directly to the carburetor through a duct from the air scoop located on the top cowl directly over the carburetor or cold filtered air in the "out" position. The second control permits selection of hot unfiltered air only.

SUPERCHARGER AND MANIFOLD REGULATOR

The supercharger in a P-39 is a single stage blower gear driven off the crankshaft with a ratio of 9.6 to 1. On take-off this blower will turn up 28,800 RPM to the 3000 RPM of the engine. The supercharger is connected directly with the carburetor taking the mixture from the carburetor and packing it into the manifold. The airplane also has an automatic manifold regulator which will maintain constant manifold pressure irregardless of altitude change or icing conditions in the carburetor. The manifold regulator is linked with an aneroid barometer to compensate for altitude changes. It also is linked with the manifold to maintain constant pressures. In case icing should start in the carburetor the regulator would gradually open to hold the pressure up, this action is so smooth and gradual that the pilot would not be warned until the carburetor was so full of ice that the regulator could not compensate for it; then the engine would start roughening up. The pilot must then use full carburetor heat and possibly the engine will pick up in time. The pilot's only precaution against icing in the carburetor is to be constantly on the alert for icing conditions.

OIL SYSTEM AND OIL DILUTION

The oil system consists essentially of an oil tank, two oil temperature regulators, two radiators, surge valve, and necessary lines and fittings. The normal oil required is 6.5 gallons when operated with the fuel capacity of 120 U.S.gallons. Whenever these airplanes are operated with the belly tank the oil system is filled to 7.5 gallons. The engine lubricating oil is circulated by a main pressure pump having a built-in check valve and a scavenger pump located at the lower right hand side of the accessory housing at the rear of the engine. This returns oil to the tank maintaining a dry crank case. The propeller reduction gear box located in the nose of the fuselage is lubricated by a separate oil circulating system with a capacity of 2 U.S. gallons. The pressure of the gear box system is 70 to 190 pounds. A check should be made before flying to be sure the oil cap is safetied down.

Normal oil dilution should be done with the engine at 1000 to 1200 RPM. Dilution is done for 2 minutes only with the oil temperature at 40° to 50° C to prevent evaporation of the gas and unnecessary fire hazards. For ground temperatures below 10F hold dilution switch ON 2 minutes, stop engine, release oil dilution switch, and 2 quarts of gas will have flown into the oil system at the rate of 1 quart per minute. For temperature of -0°F or less dilute for a second 1 minute period - 15 minutes after first dilution.

To preheat the engine the oil temperature regulators, air ducts, and shutters should be closed and the heat applied through the openings in the engine and at the accessory compartment. At least two hours is required to heat an engine at extremely low temperatures. If the engine oil has been drained, it is necessary to preheat it to 93°C (200°F) before pouring it back into the tank. The engine should then be started within a few minutes before the oil cools. During the warm-up the propeller controls should be operated throughout their full RPM range. Operate all ailerons, elevators, rudder and trim tabs through their complete travels three or four times noting the forces required. If forces are excessive, check system for cause. Priming is particularly important in very cold weather and should be used with caution to avoid over priming, if the first start is not successful.

COOLING SYSTEM

The engine is cooled by a high temperature liquid prestone cooling system with a capacity of 13.5 gallons. The percentage of ethylene glycol and water under normal weather conditions is 97% ethylene glycol and 3% water (the water per centage will increase in colder climates). The installation consists of a radiator, expansion tank, air ducts, manually operated coolant, radiator shutter, and a coolant circulating pump mounted on the bottom of the accessory housing of the engine. Normal operating temperatures are 105 to 125 C. If c coolant gets low only ethylene glycol is added.

HYDRAULIC SYSTEM (brakes only)

The brake system is simple and complete having two separate units, one for each brake operated by depressing the brake pedal and forcing the fluid through the lines and forcing the multiple discs in the braking assembly together thus giving the airplane its braking action.

THE ELECTRICAL SYSTEM OF THE P-39

The most important electrical circuit on the P-39 is the battery and generator system.

The 24-volt storage battery in the P-39 is used as an electrical power supply in conjunction with a 28-volt generating system. The battery consists of 12 wet cells, connected in series, for generating electricity by the reversal

of a chemical reaction previously produced in it by an electric current. The cells are enclosed in a hard rubber inner case which, in turn, is housed in a rubber lined aluminum box. The battery is mounted in the upper forward part of the nose of the airplane between the two fuselage guns. Access is gained by the removal of the upper gun cowling. The battery charged and filled weighs 76 pounds.

The efficiency of the current voltage in relation to the generator current required to produce it is dependent upon the internal resistance of the battery. The internal resistance increases as the battery becomes more discharged and decreases as the battery becomes more charged. A fully charged battery presents little resistance to a circuit, and a very low rate of current from the generator will maintain it fully charged. A battery in a low or discharged condition would require a heavy current from the generator to maintain its condition and a much heavier charge to improve its condition towards a full charge.

It is futile and foolish to fly an airplane with a low battery and expect to have the battery become recharged in flight. Do not attempt to recharge a battery through the use of another, and at all times when an outside source of power is used the main battery switch in the airplane must be turned OFF or the battery be removed from the airplane. When an outside source powered by a generator is used, the battery in the airplane may be allowed to remain connected to the line and be subjected to a charging current.

A rubber lined aluminum cover plate, held fast by the battery installation bolts, completely seals the battery case except for vent connections. One battery vent opens to the air through the upper side of the nose of the airplane near the battery location. The other vent line is connected to the drain jar, located at the right aft side of the reduction gear case. Here, any acid drained from the battery case (because of spillage within the case) is neutralized and vented through the bottom side of the nose of the airplane. This protects the airplane's parts from any corrosive effects of battery acid. Acid is prevented from spilling inside the case by nonspill caps on each cell of the battery. These caps are installed so that in turning the battery upside down, as in inverted flying, enclosed conically shaped lead weights will drop and cover the cap vent hole, thereby retaining the acid within the battery cell.

The P-39 uses a 28 volt, 50 ampere hour generator. The generator output is connected to a buss bar in the generator control box, which is at the extreme rear end of the airplane's electrical load line. Thus, the generator is at one end, the battery is at the other end, and the electrically operated apparatus is connected to the load line between the two. Should a piece of electrical equipment be turned on, it will operate from one of three buss bars in the load line which are energized jointly by the battery and the generator.

The electrical load line of the P-39 may be compared to a water-pipe line having a mechanically driven pump on end and a chemically operated device at the other end, the faucets in the water-line corresponding to the buss bars in the electrical load line. If enough faucets are opened to draw a greater capacity than the combined capacity of the two pumps, both pumps will become overworked and be ruined from overload in trying to maintain pressure in the line. Similarly this happens electrically in the airplane when the battery and generator become overloaded.

Either the battery or the generator can become overloaded easily. The combined safe power output from both is needed for the use of heavy current drawing apparatus. Should one be weakened or out of service the other is forced to attempt to carry the load.

A generator large enough to supply all accessories simultaneously is not desired, because the four heaviest current carrying circuits on the P-39 (namely, the starter, landing gear, wing flap and landing light circuits) operate only a few minutes over a possible interval of several hours, each of these circuits being several times as heavy as any other circuit on the airplane.

Unless the pilot uses extraordinary skill in the use of the electrical devices a burned out generator will result each time a flight is made with a low battery installed. The battery may be overloaded in almost the same way, if the generator is not used in flight, either because of burn-out or failure to turn on the generator control switch.

A. Taxiing Instructions

1. Release the Parking Brakes by depressing both brake pedals.

2. When taxiing the airplane, set the mixture control to "Automatic Rich".

3. From a standing start, it is not possible to start a sharp turn in one direction if the airplane has been stopped and the nose wheel used in the opposite direction. Get the airplane moving and then apply brakes in direction of the desired turn.

4. Taxi slowly.

5. Do not unnecessarily ride the brakes as they will overheat and malfunctioning may result.

B. Take-Off
Prior to Take-Off.

1. Trim tab controls - adjust the trim tab controls as follows:
   a. Rudder - four graduations "right rudder".
   b. Elevator - three graduations "nose up".
   c. Ailerons - zero or neutral setting.

2. Mixture - adjust the mixture control to "automatic rich".

3. Ignition - be sure the magneto switch is turned to "both".

4. Propeller - set the propeller control lever forward to give 3000 RPM. Check to determine that the propeller safety switch is "on" and that the selector switch is on "automatic".

FLAPS - Note: The flaps may be used for "take-off" if desired. If so, they should be extended approximately 1/4 for the 'take-off' position.

CAUTION: THE USE OF FLAPS FOR THE "TAKE-OFF" IS NOT RECOMMENDED FOR THE FIRST FEW FLIGHTS AND IS UNNNECESSARY FOR ANY FLIGHT.

PRESTONE AND OIL COOLERS - Keep the Prestone shutters open prior to and including "take-off".

CAUTION: BE SURE THAT THE COOLANT TEMPERATURE IS NOT BELOW 85° CENTIGRADE OR ABOVE 125° CENTIGRADE FOR THE TAKE-OFF.

Note: In extremely cold weather (temperatures of from 20° to 50° below 0) it is necessary to keep the oil shutters closed until uniform heat is maintained to prevent the oil from congealing in the cooler. After uniform heat has been maintained, the shutter should be opened gradually and a constant watch must be kept on the oil temperature gauge.

5. Prolonged idling for taxiing results in fouled plugs, - this can be remedied by setting the brakes and running the engine up to 2200 RPM and decreasing the prop pitch.

6. Make sure that the Sutton Harness is locked back. The control for the harness is located in the left forward corner of the pilot's seat.

7. Release the brakes.

8. Check the tendency of the airplane to swing to the left after the engine has been opened by immediate application of the right rudder and reduction of power if necessary.

CAUTION: DO NOT EXCEED THE PERMISSABLE MANIFOLD PRESSURE (WHICH VARIES WITH DIFFERENT MODEL ENGINES) AND HOLD A PEAK OF 3000 RPM.

Note: When flaps are used, the airplane will fly itself off the ground with scarcely any assistance from the pilot, but if the flaps are not used, it will be necessary to ease the airplane clear of the ground when it has reached the speed of approximately 100 MPH.

9. It is recommended that a mechanical "take-off" be made. Because of the tricycle landing gear, it is a good practice to ease the ship from the ground when an "indicated air speed" of 105 MPH is obtained.

Note: All P-39 series airplanes are equipped with temperature gauges which indicate safe limits for flying by a green line along the contour of the dial. These gauges should be watched carefully. If controllable instruments show temperatures outside of the limits of the green line, the necessary adjustment should be made. If uncontrollable instruments indicate temperatures outside of the green line, land the airplane and determine what is the cause of the difficulty.

10. After take-off, raise the landing gear by turning the landing gear switch to "up" and check ammeter to see that it indicates high rate. (Approximately 60 to 100 amperes) while the landing gear motor is running and returns to normal (10 to 25 amperes) when the motor is automatically shut off.

11. Turn the flap switch to "up" (assuming the flaps have been used in "Take-Off").

12. Return the landing gear and flap switches to the neutral position one at a time.

Note: At the time, pilot should switch over to right tank after 20 minutes of flight.

13. Respond to engine failure at the "take-off" as follows:
   a. Put the nose of the airplane down and maintain flying speed. 130 mph IAS.
   b. Drop the auxiliary fuel tank.
   c. Mixture in idle-cut-off.
   d. Emergency release right door. (Strike door at front lower corner)
   e. Check and make sure that the landing gear has started to retract.
   f. Turn the flaps switch to "down".
   g. Ignition switch "off".
   h. Turn the battery switch off.

C. Climb

The best climbing speeds of these airplanes are as follows:

1. Altitudes up to 8000 feet — 162 MPH, IAS.
2. Altitudes 8000 to 30,000 feet — a drop of 1 MPH for each 1000 feet over 8000 feet.

PaTrinia Marsh

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OBJECTIVE To acquire an internship to gain knowledge and experience in the Civil Engineering field.

EDUCATION

2004 – Present **Prairie View A&M University** Prairie View, TX
- Junior in Civil Engineering degree program
- Expected Graduation: May 2008
- GPA: Cum. 3.424

EXPERIENCE

08/06 - 12/06 **3D Mathematics Academy** Prairie View, TX
Mentor
- Tutor grade school students in math

05/06 - 08/06 **Texas Department of Transportation** Houston, TX
Engineering Intern
- Observed the assembling of forms
- Observed the paving of roads and side street
- Prepared and preformed:
  Pressure Test
  Air Test
  Slump Test

08/05 - 05/06 **LSAMP Research Program** Prairie View, TX
- Researched and presented reports about minorities and diversity in the science, technology, mathematics, and engineering fields
- Coordinated surveys of faculty and staff

ORGANIZATION / MEMBERSHIPS

- Tau Beta Pi, member 04/2006 – present
- Epsilon Gamma Iota, Inc., Asst. Treasurer 03/2006 – present
- ASCE American Society of Civil Engineering, Treasurer 03/2005 – present
- STEM Science Technology Engineering Math Program, member 01/2005 – present
- NSBE National Society of Black Engineers, member 09/2004 – present

AWARDS RECEIVED

- Honors List 2005
- Honors List 2006
- Most Outstanding Junior Civil Engineering Student
- High School Salutatorian
- Presidential Scholarship

SKILLS Efficient in Microsoft Word, PowerPoint, basic understanding of Unigraphics

INTERESTS Reading and community service

it necessary to exercise care while maneuvering; and light stick loads will be apparent upon steep turns at low speed. During recovery from a dive, moderate to heavy rearward stick loads may be encountered on the pull-out, so that considerable forward pressure may be needed on the stick to avoid a too rapid recovery if airplane is not properly trimmed in a dive. At low speeds, or during the approach for landing, lessening of the lateral (aileron) control will be slightly apparent.

CAUTION: THE ELEVATOR TRIM TAB IS VERY EFFECTIVE AND SHOULD NOT BE USED TO AID RECOVERY DURING ACROBATICS, BUT SHOULD BE USED DURING A DIVE.

Note: It will be found that both the rudder trim and the elevator trim must be used to a considerable degree throughout the speed range.

F. Stalls

This airplane has good stalling characteristics (however, a hard stall is not recommended) (about 105 MPH, flaps "up", 100 with belly tank installed, and 90 MPH with flaps "down".) The airplane will "mush" considerably at stalling speeds. The stall occurs first at the center section of each wing panel and progresses outboard. At minimum speeds the stall is gentle and the airplane will drop off on right wing. At high speeds, the stall characteristics on a turn are average with sufficient warning being given to the pilot by a shudder of the airplane. To recover, allow the speed to build up sufficiently, or approximately between 130 and 140 MPH so as to completely unstall the center section. As soon as the insipient stall is attained, immediately make a smooth recovery. It is recommended that all slow speed stalls be made straight ahead.

G. Spins

Do not spin this airplane intentionally. If, however, a spin develops, follow exactly the instruction given in T.O. No. 01-110F-112, as listed below:

1. Observe the following pre-recovery measures:
   a. Throttle must be "off".
   b. Propeller control should be in a "low" RPM position.
   c. Stick "full back".

2. Recovery from spin, left or right.
   a. Apply full opposite rudder when at its slowest.
   b. After about 1 second, sharply apply full forward stick and aileron against the spin. (Actual tests show position of aileron causes very little difference in spin recovery.

c. To permit adequate control, extreme caution must be exercised not to level out before a minimum indicated air speed of 180 MPH is attained.

3. The spin is usually oscillatory in rate and it is advisable that the opposite rudder be applied when the spin is at its slowest.

4. If the procedure above is followed, the airplane will normally recover in one half turn.

CAUTION: IF THE PROCEDURE IS NOT FOLLOWED CLOSELY, THE AIRPLANE MAY NOT RECOVER. MAY NOT RECOVER IF ELEVATOR IS USED BEFORE RUDDER.

CAUTION: SPINNING AN AIRPLANE SUCH AS THE P-39, WHICH HAS A HIGH WING LOADING, IS VASTLY DIFFERENT FROM SPINNING A TRAINER WHICH HAS A LOW WING LOADING. IT HAS BEEN DIAGNOSED THAT THE P-39 SERIES REQUIRES ABOUT 1000 FT. PER TURN AND 1000 FT. FOR RECOVERY FROM A SPIN. EXAMPLE: A 3-TURN SPIN REQUIRES 4000 FT.

H. Diving

1. The maximum recommended diving speed of P-39 series airplanes is 475 MPH, IAS and the maximum permissable diving speed while carrying a 75 gal. auxiliary fuel tank is 280 MPH, IAS.

2. The minimum altitude for pulling out of a dive varies in relation to the speed of the airplane and the attitude or angle of the dive.

NOTE: Under normal operational load conditions, the trim tab wheel should be about 3 graduations further forward (nose down) from the position required for cruising.

I. Side Slipping Characteristics

The airplane may be slipped during approach for the purpose of losing altitude. However, the steep angle of approach generally renders such a maneuver unnecessary.

J. Gliding Characteristics

Owing to the rather high stalling speed of this airplane and to the considerable amount of drag when the landing gear is lowered, it is inadvisable to make gliding turns under 140 MPH.

1. The lateral control being less effective for a given moment with the landing gear lowered, there is a tendency to make gliding turns of a larger radius than when the

landing gear is retracted. This is particularly true during the last turn-in on the approach for landing; a characteristic to be carefully noted.

2. The "power on" glide can be made as flat as desired, but it is advisable not to reduce the speed below 115 to 120 MPH, IAS.

3. The engine "off" glide for the final straight approach can be made at a starting speed of 120 MPH, IAS.

K. Approach for landing

Note: Approaches and landings are extremely easy as the tricycle landing gear obviates many of the disadvantages generally associated with conventional landing gear.

1. Turn the fuel selector to "reserve tank".

CAUTION: NEVER USE THE LEFT MAIN TANK FOR "TAKE-OFF" OR LANDING.

2. Turn on the electric booster fuel pump, if it has been off during flight.

3. Reduce speed to below 200 MPH, IAS and lower landing gear (170 IAS desired)

4. Make sure mixture control is in "automatic rich".

5. Set the propeller control lever to 2500 RPM, checking the propeller switch panel to see that the safety switch is "on" and the control switch is in "automatic".

6. Lower the flaps when facing landing strip. Position of the flaps on the P-39N-1 and subsequent models is shown by a plastic indicator in the left wing, over the flap area and near its outboard edge. This indicator is a semi-circular piece of plastic which projects from a slot in the trailing edge of the wing. When the flaps are 1/3 down, the yellow top of the indicator projects above the wing surface. At "full down" position, the indicator shows 1/3 yellow and 2/3 red.

CAUTION: DO NOT LOWER THE FLAPS AT OVER 150 MPH or LANDING LIGHT AT OVER 130 MPH.

7. Turn the flap switch "on".

8. Throttle back as required.

Note: In a normal power approach, a glide of approximately 120 MPH is advised.

9. The angle of descent with the wheels and flaps "down" is very steep.

10. "Hold Off" slightly, tail down from the normal taxiing position.

1. Landing

1. Forget that the airplane has a tricycle type landing gear and make a normal type landing. This type landing should be one where the nose of the airplane is well up and the main wheels touch the ground before the nose wheel. Proceed as follows:

a. Allow the airplane to swing to the ground in a tail down position with the throttle shut.
b. Bring the control stick back enough to hold the nose wheel off the ground until the speed has been considerably reduced. This type landing will result in a landing speed between 95 and 100 MPH. Once the main wheels touch the ground, the plane will, without any help from the pilot, nose "down" until the nose wheel is on the ground. There will be no tendency whatsoever for the airplane to ground loop or bounce.

2. During the landing run, do not lock the brakes or apply them continually. It is recommended that they be applied, then released numerous times to prevent severe wear or overheating on the brakes. Stopping will be accomplished satisfactorily if done in this manner.

Note: This point is stressed as application and holding on "full brake" will lock the wheels and cause skidding, which will, in all possibility, ruin the tires on the main wheels.

CAUTION: DO NOT APPLY THE BRAKES UNTIL THE NOSE WHEEL IS ON THE GROUND.

3. It should also be emphasized that due to the favorable landing characteristics of the Airacobra, it is not necessary to land this plane as speeds above 95 to 100 MPH. In fact, the landing run increases in relation to the landing speed.

4. Retract the flaps while standing at the end of the landing run.

5. Open the oil and coolant shutters.

P-39 Review Questions

1. Name five important things to look for in the pre-flight check.

2. What is the fuel capacity of each tank and where are they located?

3. How many fuel cells are there in each wing?

4. What is the fuel consumption per hour under normal cruising conditions?

5. What is the proper order of fuel tank selection?

6. What is the oil capacity without belly tank? With belly tank?

7. Where is the starter located and in what manner is it used?

8. Why is it recommended to use your right hand to operate the parking brake?

9. What are the coolant and oil shutter positions for take-off?

10. What is the total coolant capacity?

11. If your coolant temperature dropped abnormally low when cruising, give procedure.

R E S T R I C T E D

12. If your oil temperature rises abnormally and can't be stopped when flying in cold weather, give procedure. What is wrong and how can it be corrected?

13. What is the maximum RPM allowed?

14. What is the desired manifold pressure for take-off?

15. What should the coolant temperature and oil temperature read on take-off?

16. How should the control tabs be set for take-off?

17. Give the minimum and maximum pressures for the nose gear box.

18. What is the oil capacity for nose oil tank?

19. What is used to guard against carburetor icing? Where is the control located?

20. What maneuvers are prohibited when flying the P-39?

21. If the engine fails on take-off give a short procedure?

22. What type propellers does the P-39 have?

23. What are the maximum IAS for lowering the gear and flaps?

24. Explain emergency gear and flap procedure.

25. What are three methods of telling whether or not the gear is down?

26. Give emergency exit procedure in detail.

27. What is proper length of time to dilute engine and at what oil temperature?

28. How much gasoline is put in the oil system per minute when diluting at 1000 RPM?

29. What is the RPM for a magneto check?

30. When using an outside battery is it proper to have cockpit battery switch on?

31. Does the engine oil system supply oil to the reduction gear assembly?

32. What is the proper ratio of ethylene glycol and water?

33. Name three advantages of tri-cycle gear.

34. What position should the prop selector switch be on for take-off and landings? (Curtiss Electric)

35. What unit is the carburetor heat taken from on a new P-39?

36. How many RPM's does a P-39 supercharger obtain on take-off? 2000, 2700, 28,000 or 25,000?

37. How much oil is taken from the engine to operate the gear box?

38. How does an overheated electric motor effect the gear in operation?

39. Where are the extra fuses carried in a P-39?

40. What is the reason for not filling the oil tank full?

41. Where is the flap switch on a late P-39?

42. If you had your engine oil removed and heated for a cold engine start, how warm would you have it heated?

43. What particular thing on a P-39 makes it hard to tell if your carburetor is icing up?

44. How many gallons an hour approximately return to the reserve fuel tank from the carburetor?

45. What is the proper way of dropping the auxiliary tank and where is the release handle?