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TECHNICAL MANUAL
AIRPLANE INSPECTION GUIDE
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SECTION I

ORIENTATION AND FAMILIARIZATION IN THE VISUAL INSPECTION SYSTEM

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1. Purpose of the visual inspection system.--a. Detection and correction of defects.

- b. Detection and correction of maladjustments.
- c. Ascertaining the need of and cleaning engines and airplanes.
- d. Ascertaining the need of and oiling and greasing parts.
- e. Checking and filling oil, fuel, and accessories tanks.
- f. Recording all maintenance performed or due.
- g. Recording all inspections made or due.
- h. Detection of the need of and replacement of accessories.
- i. Detection of the need of and engine change.

2. Explanation of the visual inspection system and duties of the personnel of the system.--a. Organization Engineering Officer.

(1) Inspect each airplane and its Maintenance Inspection Record once each month, to determine:

- (a) Condition of airplane.
- (b) Manner in which routine maintenance and inspection work has

been accomplished.

- (c) Accuracy of entries on Maintenance Inspection Record.

12. Basic conditions for center of gravity calculations.--a. First basic condition includes normal load with small crews.

b. Second basic condition has full combat load and combat crew in place.

13. Center of gravity calculation charts.--a. Select chart which conforms to basic load to be carried on flight.

b. Add units of load to be added to these included in the basic condition and tabulate effect of each as indicated on chart.

(1) Negative figures indicate loads shifting C of G forward.

(2) Positive figures indicate loads shifting C of G backward.

(3) Total units (Algebraically) and add to the C of G as indicated for the basic condition on the C of G chart.

c. Use of chart.

(1) Estimate weight of load to be added.

(2) Select place to stow weight in airplane.

(3) Follow line on chart indicating position in airplane to line representing weight.

(4) Follow horizontal line on chart to left and add to or subtract index unit.

(5) Weights added at stations aft of pilot's position give positive units.

(6) Weights added at station forward of pilot's position give negative units.

(7) Add positive number to the center of gravity position of basic condition. Subtract negative units.

(8) The Center of gravity should be kept between 19% and 32% of the Mean Aerodynamic Chord aft of the leading edge of the M.A.C.

(9) Airplanes with outer wing tanks and full load have the center of gravity 37% aft of the leading edge of the Mean Aerodynamic Chord compensated by down spring on the elevator.

(10) Added load affects the center of gravity approximately in proportion to its torque effect on the lateral axis.

(11) Reference to the operation and flight instructions will be necessary for center of gravity calculation on each model of the B-17 series.

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14. General.--The greatest possible degree of care of parachutes is imperative. When not in use they should be stored in a place which is adequately locked and guarded at all times. That storage place should be accessible only to personnel expressly designated as being in charge of the parachutes and especially selected for reliability. The guarding, issuing, and receiving for storage of parachutes should be under the supervision of an officer.

15. When to obtain parachutes and by what authority.--a. Before flight in an army airplane.

b. Drawn by order of Commanding Officer.

16. Obtaining a parachute.--a. For pilot, enlisted or civilian personnel.

(1) Drawn on a memorandum receipt, Form No. 99, and signed by the Commanding Officer.

(2) Drawn from Post Operations.

17. Adjustment of the parachute.--a. Back type B-7 (24 foot harness) is adjustable by wearer.

b. S-1 (24 foot harness) and S-2 (28 foot harness) is to be adjusted by parachute department.

c. T-5 (2 parachutes, 28 foot and 22 foot--i.e. back type and lap or chest type).

d. A-1 (24 foot) and A-2 (24 foot) lap or chest type, harness not adjustable by wearer.

18. Care of the parachute.--a. If it is to be carried for any distance, it should be placed in flyer's kit bag.

b. If it is to be carried for a short distance, it should be carried by leg strap over shoulder.

c. Care must be exercised that it does not get wet or greasy, nor come into contact with acids or chemicals.

d. If it becomes greasy or wet, or any visible defects are apparent, it must be returned to the parachute department immediately.

e. Each ten days, the parachute must have a visual inspection.

f. Each sixty days, the parachute must be repacked.

g. If the parachute drops into salt water, it should be turned in to the parachute department and must be washed with clean, fresh water.

h. Grease and other substances of an injurious nature may be removed from cover and harness with carbon tetrachloride (CCl₄) or a similar solvent which will not injure the fabric.

19. Disposition of the parachute.--When ordered by Officer, the mechanic removes the Officer's parachute from the airplane and stores it in Officer's locker. The parachute is usually stored in a dry, clean place.

SECTION V

THE PREFLIGHT AND DAILY INSPECTION--B-17E

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20. General.--The preflight inspection is a check of the airplane to determine that the instruments, controls, auxiliary systems, power plants, etc., are functioning properly; that all cowling, fuel and oil tank caps, etc., are in place and properly fastened or secured; and that the airplane is properly serviced and ready for flight.

(2) Inspect airspeed tube for security of mounting for operation of heating element, and remove sock. After flight see that the sock is reinstalled.

f. Top of wing section. Care should be exercised in walking on wings. Do not use hard-soled shoes.

(1) Inspect the entire wing for dents, buckles, loose rivets and wrinkles (indication of structural weakness).

(2) Inspect for proper supply of glycol fluid (inboard nacelle left wing).

(3) Inspect for proper oil supply (each wing).

(a) Inboard nacelle engine oil.

(b) Outboard nacelle engine oil.

(c) Outboard nacelle supercharger oil.

(4) Inspect the fuel level in all tanks for capacity level and security of all caps and inspection doors.

NOTE: Before inspecting fuel tanks, ground for static electricity by rubbing hand along wing. Levels must be checked the day the airplane is flown. Airplanes must be serviced immediately after flight.

22. Interior inspections.

a. Tail gunner's compartment.

(1) Inspect for operation of door, emergency release, window and oxygen equipment.

(2) Inspect for cleanliness of entire compartment, toilet and supply of paper and windows.

(3) Inspect for condition of fire extinguisher and security of mounting, tail wheel boot, fairing and strut and escape hatch latch.

(4) Inspect for presence of engine service platforms and mounts, and for security of stowage.

b. Waist gunner's compartment.

(1) Inspect for security of all stowed articles, operation of oxygen equipment, foreign matter, loose tools, etc., in the gear of the lower turret, and presence and completeness of first aid kit.

c. Radio compartment.

(1) Inspect for presence of crank and extension, freedom of access to life raft handle, operation and cleanliness of camera and view finder door, proper level of propeller anti-icer reservoir, CO₂ fire extinguisher for security of attachment, oxygen equipment for proper operation, full thermos bottles, and supply of paper cups.

d. Bombay compartment.

(1) Inspect for security of attachment of guard rail and level of hydraulic fluid reservoir.

NOTE: This level should be 1 inch below the filler neck.

CAUTION: Before checking, be sure that the gage shows a zero reading.

e. Cockpit.

(1) Inspect for presence and security of flares and flare gun, completeness of flight report and presence of pencil, and cleanliness and ease of operation of all plexiglas and windows. (Should be cleaned if dirty, either inside or outside), operation of oxygen valves at pilot and co-pilot stations, and leaks around the primer when in the "Off" position.

(2) Zero reading of the following instruments.

(a) Rate of climb.

(b) Airspeed indicator (with the sock on).

(c) Fuel pressure gage.

(d) Oil pressure gage.

(e) Suction gage.

(f) Vacuum gage.

- (3) Wind clock and set with operations.
- (4) Determine whether engines are due for overhaul (T.O. 00-25-4).
- (5) Ignition switches "Off".

NOTE: At this time the propellers are pulled through at least five (5) times, and the propeller blades are inspected for nicks, cuts, bruises, etc. and the propeller hub and governor is inspected for oil leaks. At the end of the day's flight, clean the propeller and coat with clean lubricating oil. Propellers installed on airplanes operating near salt water will be flushed off with fresh water, dried, and coated lightly with lubricating oil.

- (6) Check for security of mounting of all instrument indicators.
- (7) Set parking brake.
- (8) Altimeter should be set at station altitude and panel vibrated.
- (9) Uncage the magnitude of turn indicator and check for free swing in each direction. (Should come slowly and evenly to rest).
- (10) Reading equal to free air temperature of oil temperature gage and cylinder head temperature gage.
- (11) Proper marking, cleanliness, slippage, breaks and distribution of light of all cover glasses.
- (12) Check all autosyn instruments by turning on main line switch, inverter switch, and emergency switch.
- (13) Manifold pressure reading equal to local barometric pressure.
- (14) Tachometer reading should not vary more than 30 R.P.M. from 0.
- (15) Check for maximum capacity of all fuel tanks.
- (16) Turn flap indicator switch to down and observe dial inside and flaps outside, then turn flap indicator switch to up, and observe dial inside and flaps outside. Inspect for proper functioning and general conditions of flaps. Turn off switch.
- (17) Check alarm bell operation.
- (18) Test fuel booster on all four engines. Note fuel pressure indicator.
- (19) Free movement and full operation of all flight controls. This should be accomplished with the automatic flight control off and the elevator and rudder unlocked, aileron pin pulled, and the trim tabs in the neutral position. (See that nothing interfered with the controls.)
- (20) Operate intercooler controls to determine free and full movement.
- (21) Open the cowl flap selector valve, place the hydraulic valve on pressure storage tank, and with hand pump build up a pressure of 450 p.s.i., and test the operation of all cowl flaps. Return cowl flaps to the locked position and the hydraulic valve to normal. Inspect for proper operation and functioning and general condition of cowl flap and oil temperature regulator shutters. Cowl flaps must operate in 2 to 5 seconds.
- (22) Lights.
 - (a) Turn on and check functioning of exterior lights.
 1. 1 passing light.
 2. 2 landing lights.
 3. 7 position lights. (2 on each side of the horizontal stabilizer. 3 on the fuselage.)
 4. 2 running lights on wing.
 5. 2 running lights near top of stabilizer.
 6. 2 signal lights (1 red, 1 white).
 - (b) Turn on and check functioning of interior lights.
 1. Cockpit lights.
 2. Dome light in tail gunner's compartment. Dome lights in lower turret (two lights).

SECTION VI

AFTER FLIGHT INSPECTION

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25. De-icer system.--Caution: After every flight, the static electricity in the de-icer boots should be discharged. If the operation has been neglected, or imperfectly performed, no attempt to refuel the airplane should be made until the operation has been repeated. It is recommended that a grounded wire brush be passed carefully over the entire surface of the boots. Rubber is not a conductor of electricity and consequently the boots cannot be completely discharged if only a portion of the surface is grounded.

26. Power plant, general.--Sufficient cowling will be removed in order to check for fuel and oil leaks within the engine section, and for other failure of wires, lines, connections, attachment of exhaust manifolds, pipes, collectors, etc.

27. Fuel and oil systems.--All fuel and oil tanks will be serviced to the normal supply after the day's flying is completed.

28. Propellers and accessories.--At the end of the day's flying, clean the propellers, inspect and coat with clean lubricating oil. Reference: T.O. 03-20 CA-2 (Propeller Governor Control).

Daily--Inspect for external oil leaks around governor base and head. T.O. 03-20CC-2.

Daily.--a. Inspect for bent or damaged blades.

b. The interior of all parts of the propeller will be carefully examined for cracks or other failures.

c. Check for all oil leakage from propeller.

d. At the completion of each day's flying, clean and oil with clean engine oil.

e. If vibration is noted or reported, check the blade angle setting. If necessary, check track of each blade.

f. Perform preflight inspection as specified in the handbook for the airplane in which it is installed.

NOTE: Coating of metallic propeller blades and hubs with engine oil protects the exposed surfaces of the propeller from rust and corrosion. The oil also seeps into cracks that exist in the blade or hub, making otherwise obscure cracks stand out, thus facilitating inspection. Exposed surfaces of the blades and hubs installed but not in daily use, will also be coated with clean engine oil, as often as required to prevent corrosion. Propellers installed on aircraft operating near salt water will be flushed off with fresh water, dried, and coated by spraying lightly with lubricating oil. Refer to T.O. 01-1-2. Anti-corrosion treatment for airplanes operating in salt water

29. Oxygen equipment.--At the completion of flights involving the use of oxygen, mouth pieces should be sterilized. Valves on oxygen cylinders will be

turned off immediately upon landing. Check contents of cylinders as indicated by pressure. Refer to T.O. 03-50A-5 (Oxygen). If Type A-12 DEMAND type oxygen regulator is used when flying at altitudes requiring oxygen supply, the oxygen equipment must be checked for completeness and for proper operation before each flight. Turn on the oxygen supply, close the air valve, and depress the diaphragm button which is accessible through the hole in the cover. A noticeable stream of oxygen should pass through the elbow indicating that the oxygen is flowing freely. Release the button and open the emergency valve to make sure that it is in operating condition. T.O. 03-50-16 (Oxygen) Check for sufficient oxygen pressure to meet estimated flight requirements. If the gage is obviously inaccurate, or does not operate, it should be replaced.

30. Navigation instruments.--See that airspeed head protection cover is installed.

SECTION VII

PREFLIGHT AND DAILY INSPECTION PRECAUTIONS

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31. Precautions during inspections.--g. In making a preflight or daily inspection always observe the following precautions:

- (1) Do not fail to see that the static ground touches the ground or a spark and fire may result.
- (2) Do not work on airplane until wheel chocks are in place or airplane may move forward or spin.
- (3) Do not start engine until hydraulic pressure has been checked, or built up, and the brakes are on.
- (4) Do not start engines until filler caps of fuel and oil tanks are checked for security.
- (5) Do not operate engine unless white reference marks on the instruments are aligned, otherwise readings have no meaning and the red line positions may be exceeded.
- (6) Do not pull the propeller through by hand until the ignition and battery switches have been checked to see that they are off. If the engine is slightly warm, it may start.
- (7) Do not pull propeller through by hand without first checking the magneto ground as an ungrounded magneto has the same effect as the ignition switch being "on".
- (8) Do not attempt to start without first pulling the propeller through by hand at least five times. If this is not done, and oil has accumulated in the lower cylinders, a cylinder head may be blown off when the engine starts.
- (9) Do not attempt to start with the turbo in the "On" position or an initial manifold pressure which is too high will result.
- (10) Do not start an engine unless there is a man on the ground to be sure that the propeller is clear of all obstructions.
- (11) Do not start more than one engine at a time.
- (12) Do not re-engage starter while flywheel is still rotating. This occurs if engine does not start after one try. Failure to do this causes damage to the starter. If starter becomes hot, allow it to cool before attempting another start.
- (13) Do not overprime as fire may result.
- (14) Do not advance throttle too rapidly after engine kicks over or lean mixture, backfire, or fire may result.

- (4) Spark plugs dirty, improper clearance and not of the proper type.
 - (a) Aero LS38C or Champion C34S.
 - (b) New plugs spark gap--.012" + .002" or -.001".
 - (c) If the gap exceeds .020" replace for re-gapping.
- (5) Valve and valve-gear trouble. Check the valve-tappet clearance, (cold .010) valve spring tension and the valves to determine if they are sticking.
- (6) Poor fuel. Use only 100 octane fuel.
- (7) Ignition wiring deteriorated or burned. Check the condition of terminals and connections of the ignition system.
- (8) Engine overheating due to:
 - (a) Improper cowling.
 - (b) High carburetor air temperature.
 - (c) Thin oil.
 - (d) Insufficient air cooling.
- (9) Ice on carburetor air intake screen. Proper use of the carburetor air heater will result in smooth operation of the engine.

SECTION IX

TWENTY-FIVE HOUR, FIFTY-HOUR, ONE HUNDRED-HOUR AND SUBSEQUENT INSPECTIONS

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33. Propellers and accessories.--a. Inspect propeller governor external oil lines on the 25-hour inspection (B-17E and B-17F) for leaks, dents, cracks, chafing, etc., security of attachment, general condition, and condition and security of lagging.

b. In case the airplane is not to be used for several days, feather and unfeather the propellers with engine stopped and engine sump plug removed. (T.O. 03-20CC-2, Section V, paragraph 5a)

34. Manifolds and superchargers.--a. Inspect relief valves for adjustment of spring tension on the 25-hour inspection.

(1) Test by pressing inward with hand.

(2) Adjust spring tension to approximately the equivalent of 1/10 p.s.i. relief pressure on the valve in the filter unit and 1/4 p.s.i. relief pressure on the valve in the duct.

b. Check the ducts on the leading edge of the wing for clogging, accumulation of trash, tools, rags left in duct.

c. Check blast gate for operation and proper condition on the 25-hour inspection and after each engine backfire.

d. Test lines for leaks on the 25-hour inspection.

(1) Establish a closed system by disconnecting and closing the ends of ducts or lines.

(2) Apply pressure, about 10 p.s.i., and spray soap and water solution on the duct being tested.

(3) Repair any leaks indicated by loss of pressure or by bubbles in soap and water solution.

e. Remove supercharger for overhaul at 500 hours, $\pm 20\%$.

(1) Replace cooling cap with the turbine bucket cover that is used in shipping.

(2) Remove panels from nacelle on each side of the supercharger.

(3) Disconnect the two lubricating lines at the forward end of the supercharger.

(4) Disconnect the exhaust pressure line and waste gate control rod.

(5) Disconnect the transition from the nozzle box.

(6) Disconnect the intake and pressure ducts.

(7) Lower the supercharger from the airplane. (Lowering the supercharger in a tilted position is best.)

(8) Be positive that no loose objects have fallen into the supercharger.

(9) Install the new supercharger in reverse order of removal.

(10) Adjust cables to approximate tension with cable links.

(11) Adjust to correct tension with turnbuckles.

35. Engine controls.--a. Inspect the automatically controlled oil cooler shutters for proper operation on the 25-hour inspection. Malfunctioning will normally cause the shutters to remain open, and the oil temperature to remain lower than normal. Disassembly and cleaning will normally be sufficient to remedy this trouble.

b. Engine control cables will be maintained as flight control cables. Do not coat with rust preventive compound while airplane is operating from a dusty field. (T.O. 01-1-57).

36. Fuel systems.--a. Recharge filter screens on the 25-hour inspection. Remove from filter unit and wash in gasoline. Allow all gasoline to evaporate so that none will be left on screen. Dip in engine oil. Drain two hours. Reinstall unit without wiping oil from frame of screen as the oil forms a seal.

37. Oil systems.--a. Inspect oil dilution valve for leakage on the fifty-hour inspection.

(1) Disconnect inlet and outlet lines of the oil dilution valve.

(2) Connect external fuel pump to inlet and apply 26 p.s.i.

(3) Operate the oil dilution valve with the solenoid switch.

(4) Remove the lock wire and drain plug.

(5) Check leakage. (Not to exceed 10 drops per minute from outlet connections and drain plug.)

(6) Reassemble if satisfactory. Replace if unsatisfactory.

38. Ignition and electrical.--a. Inspect filter motors for proper operation and condition on the 25-hour inspection.

b. Remove retracting motors on the 200-hour inspection and check clutch adjustments with prony brake.

propeller hub, cones, cone seats and other attaching parts for galling, wear and bottoming.

(3) Whenever the propeller is removed for overhaul the propeller governor assembly will accompany the propeller. Inspect the assembly for oil leaks and for free movement of drive. In cases where external piping is required, check security of mounting.

(4) Check the starter for excessive oil in starter gear housing and fly-wheel, cracked housing or flange, cleanliness, worn or binding brushes, and rough or dirty condition of commutator. Check for correct brush length, brush spring tension, and general condition.

(5) The generator checks are similar to those made on the starter. Refer to (4).

(6) Check the glycol pump for leaks, proper operation, damage and wear. Inspect the vent opening.

(7) Check the fuel pump for leaks, proper operation, damage and wear. Inspect the vent opening in the relief or by-pass valve cover plug.

(8) Check the vacuum pump for damage and wear. Inspect the safety valve and relief valve screen for cleanliness.

(9) Check the hydraulic pump for leaks, damage and wear. Turn the drive coupling with the fingers and if an excessive resistance to rotation of the moving parts of the pump is found, the pump should be returned to the depot for overhaul.

(10) Remove the magneto breaker cover, clean the breaker housing and inspect the mechanism for damaged cam follower, damaged breaker felts, weak or broken breaker arm spring. Inspect the distributor for cracked head or rotor, sticking or worn brushes. Inspect the ignition cable for condition of connections. Adjust the breaker points and lubricate felts if necessary.

(11) Check the cuno for cleanliness and free movement. If repair in the field is necessary (a practice to be resorted to only in an emergency) examine all parts for wear and proper clearances. (See T.O. 02-1-24).

(12) Check the cowling assembly for cracks, defective fasteners and condition of padding and protective coating. Check the cowling support cups and brackets for condition and security of attachment.

(13) Check all lines, etc., for cleanliness, alignment, code markings and general condition.

(14) Check the control assembly for bent rods, frayed cables, broken or misaligned pulleys, loose or missing bolts and for proper safetying. Lubricate the shaft bearings with light engine oil. Clean all electrical insulations and check all electrical leads for condition. Check the electrical contacts of cannon plugs for cleanliness and general condition. Check all hose clamps and connections.

55. Disposition of engine, assemblies and accessories.--a. Engines which are to be installed within seven days will be rotated at least four complete revolutions by hand each day. Engines not to be operated from seven to thirty days will be given a temporary treatment (T.O. 02-1-1). Engines which are removed for overhaul are given an initial treatment (T.O. 02-1-1).

b. Thoroughly clean the outside of all accessories and assemblies. Coat with a light film of clean engine oil and place on a rack out of the way. Have all copper or brass lines annealed.

c. Attach "Identification Tag" Form No. 83, with all necessary information to the engine and accessories. If the engine or accessories are to be repaired attach a "Reparable Parts Routing Tag" Form No. 50.

65. Inspection of power plant.--a. Check control assemblies through all rods, cables, linkage, supporting brackets, guides, pulleys, etc. The controls to be inspected are throttle, mixture, propeller, intercooler temperature, oil cooler and supercharger regulator.

b. Check the thermometers to see that they are correctly marked. Check tachometers, engine gage units, and manifold pressure gage for dial markings, loose cover glasses, etc. Check all the instrument lines for tightness of fittings, line kinks and anchorage.

c. The generator, starter, magnetos and spark plugs are inspected before engine installation. Check the control panel for security of mounting, cleanliness, condition of leads, terminals and connections and condition of contact points.

d. The fuel pump is inspected before engine installation. Check the fuel pressure gages and liquidometers for proper operation. With the mixture control in "Idle Cut-Off", fuel on and pressure up, inspect fuel lines for leaks, cracks, security, anchorage, code marking, and bonding. Inspect the carburetor linkage for free and full movement. Check the clearance between the thrust plate and the cap of the fuel cock. Check the fuel cocks to see that the connections to the tanks correspond with the dial markings. Remove and clean the tank strainers. Lubricate the fuel pump.

e. Inspect the oil cooler shutters for clogged core, dents, leaks and operation. Check the supercharger oil supply. Check the oil tanks for security of mounting, leakage, padding between the tanks and straps and padding between the tanks and mounts. Check the tension and anchorage of oil tank straps and lines. Clean the cuno oil screen. Check the oil dilution control linkage for binding and proper closing.

f. The valves and manifolds are to be checked before engine installation. Check the supercharger regulator for security of mounting, leaks and proper attachment of oil pressure and drain lines. Check for proper functioning of cockpit adjustments.

g. The propeller and governor are to be checked before and during installation in the airplane. Inspect all exposed bolts, nuts, screws and pins for proper safetying. Check for deterioration of hub and blade markings. Check propeller hub for lubricant.

h. The "Power Plant General" inspection was covered before installation of the engine in the airplane.

66. Inspection of airplane.--a. In order that the time for accomplishment of the airplane and engine inspection periods will coincide, it is necessary to either perform a 50-hour inspection at the completion of engine change or to drop the accumulated "Time since last 50-hour inspection".

b. If the 50-hour inspection is to be made it will be made in accordance with existing technical data.

67. Special engine change inspections.--a. Accomplish all special inspections and maintenance work prescribed by technical instructions to be done at engine change. When replacement pumps are available, all accessory pumps, except those with less than 100 hours since last overhaul, will be replaced. This includes de-icer pumps, fuel pumps, electric motor driven pumps, anti-icer pumps, hydraulic pumps, auxiliary pumps, vacuum pumps and other similar power driven units.

b. Change the oil. Pre-oil the engine prior to first start following oil change (T.O. 02-1-22). After servicing with oil, and before starting engines, remove plugs of the hydromatic propellers supply tank until the tank fills completely and replace the plug and safety.

SECTION XII

ASSEMBLY OF ENGINE AND ACCESSORIES INTO THE ENGINE MOUNT

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56. Preparation of engines for service.--a. Locate and remove the unattached parts from the engine crate. Install the propeller lifting eye and hoist the engine from the crate. Install the engine on the overhaul stand.

b. To prepare the engine for service after initial treatment, it will be necessary to remove all external lubrication and all excessive internal corrosion preventative compound. Check for and remove oil in blower section and cylinders. Remove all plugs, cover plates, etc., which were installed to close lines or other openings. Lubricate valves and check for proper operation. Prepare accessory drives for installation of accessories.

NOTE: Refer to T.O. 02-1-1 for more complete instructions.

c. To prepare the engine for service after temporary treatment, check for and remove the oil in the blower section and cylinders. Lubricate the valves and check for proper operation.

d. Attach the heavier of the accessories and others as may be appropriate. If the accessories to be installed are new or overhauled, remove excessive lubricants and inspect as outlined in Section XI, paragraph 53. Check for proper tags. Check tags on engine to see what storage treatment is indicated.

57. Installation of engine in mount.--a. Inspect the shock absorbing equipment. Replace rubber vibration absorbers if condition or flying time warrant. Lightly coat the interior of fittings, metal spacers and washers with castor oil, prior to assembly of rubber grommets in mount. To tighten engine bolts apply torque of 300 to 500 inch pounds. Make a 1500 hour replacement of rubber engine mount grommets at Engine Change nearest 1500 hour period. Install the engine sling (for points of attachment see Section X). Hoist the engine from the overhaul stand to the mount. Install mounting bolts and secure. Remove the hoist.

58. Installation of assemblies and accessories.--a. Install the accessories not installed before installation of the engine in the mount. Lightly lubricate the threads of the spark plugs with lubricant, Spec. 3578. Install with new gaskets and draw down firmly (for correct torque and further information refer to T.O. 03-5E-1). Connect the anti-icer tubing at the nose section. The fixed type fire extinguisher, magneto blast tubes, vacuum pump cooling tubes are also to be connected.

59. Connection of lines, control rods, electrical conduit and leads.--a. The following lines are to be connected:

(1) Fuel lines.--Main fuel lines to the pump, lines to the fuel pump to the carburetor, fuel pump drain line, primer line, fuel pressure line, oil dilution line, and supercharger vent (blower section) drain line.

(2) Oil lines.--Return from the vacuum system, engine inlet, vent connections, supercharger regulator lines, oil drain lines from the accessories, engine outlet, inlet to the auxiliary pump, and oil pressure line.

c. The fixed cowl was replaced before the engine was installed. The removable panel at the top is to be left off until the carburetor duct elbow and the cowl flap cylinder have been installed. Install the cowl flaps as directed in the Cowl Flap Rigging Diagram. Defer final adjustment until installation of the nacelle cowling. Install the removable panel in the fixed cowl. Check to see that the Dzus fasteners in the stationary panels are securely locked. Install the nose cowl. Put the top section in place and check for proper contact of the stops. Connect the bottom sections and latch the clamping bolts. Check for proper contact of the stops and mating of the tongues. Draw the clamping bolts tight and set the lock nuts. Install the nacelle cowling. Check for security of attachment.

68. Entries required on Form No. 41B.--a. When removing an engine from an airplane, place a red "X" in Column 19, "Daily Inspection Power Plant". Place a red "X" in Column 47, "Status Today". It is not necessary to place any symbols in "Power Plant" columns. If new accessory equipment is added or removed, proper notations will be made in "Time of Accessory Equipment" column at top of the form. Enter a record of inspection made in Column 18. Enter new inspection data in "Inspection Schedule" column.

b. Upon completion of the engine operation, including completion of inspection, the red "X" will be cleared in the manner prescribed in T.O. 00-20A.

69. Swinging the compass.--a. Ground swinging is for small and medium size airplanes. This is not applicable to B-17 series airplanes.

b. Air swinging, large airplanes, is the method used for compensating the compasses on the B-17 series airplane. The headings are to be determined by reference to terrestrial bearings while being flown over known courses or by reference to celestial bodies when azimuths of sun or stars are used. The airplane is to be level both longitudinally and laterally. The wheels, guns, controls, etc., containing ferrous metals are to be in flying position. Swinging should be accomplished only under calm weather conditions. Bearings of terrestrial objects or of celestial bodies used as reference should be accurately known. The celestial bodies should be low in the sky. The turn indicator is used to measure the amount of turn. If sufficient personnel are not available, it is advisable to first swing the navigators compass. The first thing to do is to remove all previous compensation. Keep all loose magnets at least 2 feet from the compass. Check the card for free rotation on the pivot. Turn the airplane to one of the cardinal headings and compensate. Remove all the error. Next turn 90° and compensate on that heading. Next, turn 90° and correct on that heading. Remove 1/2 the error. Use the turn indicator to make the 90° turns. Fly by reference to the turn indicator over each 15° heading or on a sufficient number of headings to plot the required curve. (T.O. 05-15-2) and record the corrections on the compass correction card.

SECTION XV

OPERATION AND GROUND TEST

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