

Accident Prevention Program

Maintenance Aspects of Owning Your Own Airplane

Introduction

As an owner-pilot, FAR Part 43 allows you to perform certain types of inspections and maintenance on your airplane. Here is a partial list of what you can do. See Appendix A of FAR Part 43 for a more complete list.

1. Repair or change tires and tubes.
2. Clean, grease, or replace landing gear wheel bearings.
3. Add air or oil to landing gear shock struts.
4. Replace defective safety wire and cotter keys.
5. Lubricate items not requiring disassembly (other than removal of nonstructural items such as cover plates, cowling, or fairings).
6. Replenish hydraulic fluid.
7. Refinish the exterior or interior of the aircraft (excluding balanced control surfaces) when removal or disassembly of any primary structure or operating system is not required.
8. Replace side windows and safety belts.
9. Replace seats or seat parts with approved replacement parts.
10. Replace bulbs, reflectors, and lenses of position and landing lights.
11. Replace cowling if removal of the propeller is not required.
12. Replace, clean, or set spark plug clearances.
13. Replace hose connections, except hydraulic connections.
14. Replace prefabricated fuel lines.
15. Replace the battery and check fluid level and specific gravity.

Although the above work is allowed by FAR, each individual should make a self analysis as to whether or not he has the ability to perform the work satisfactorily.

If any of the above work is accomplished, an entry must be made in the appropriate logbook. The entry shall contain:

1. A description of the work performed (or references to data that is acceptable to the Administrator).
2. Date of completion.
3. Name of the person performing the work.
4. Signature, certificate number, and kind of certificate held by the person performing the work. The signature constitutes approval for return to service ONLY for work performed.

INSPECTION CHECK LIST

As a pilot, you may use the following checklist to conduct an inspection of a typical general aviation airplane. Additional copies can be obtained from your FAA General Aviation District Office (GADO).

Propeller; Inspect:

1. Spinner and back plate for cracks or looseness.
2. Blades for nicks or cracks.
3. Hub for grease or oil leaks.
4. Bolts for security and "safetying."

Engine:

1. Preflight engine.
2. Run-up engine to warm-up and check:
 - a. Magnetos for RPM drop and ground-out.
 - b. Mixture and throttle controls for operation and ease of movement.
 - c. Propeller control for operation and ease of movement.
 - d. Engine idle for proper RPM.
 - e. Carburetor heat or alternate air.
 - f. Alternator output under a load (landing light, etc., in the "on" position).
 - g. Vacuum system (if installed) for output.
 - h. Temperatures (CHT, Oil, etc) within proper operating range.
 - i. Engine and electric fuel pumps for fuel flow or fuel pressure.
 - j. Fuel selector, in all positions, for free and proper operation.
3. Remove engine cowling. Clean and inspect for cracks, loose fasteners, or damage.
4. Check engine oil for quantity and condition. Have oil and oil filter changed at 50 hour intervals by an FAA certificated mechanic.
5. Inspect oil temperature "sensing" unit for leaks, security, and broken wires.
6. Inspect oil lines and fittings for condition, leaks and security, and evidence of chafing.
7. Inspect oil cooler for condition (damage, dirt and air blockage), security leaks, and winter ization plate (if applicable).
8. Clean engine.
9. Remove, clean, and inspect spark plugs for wear. Regap and reinstall plugs, moving "top to bottom," and "bottom to top" of cylinders. Be sure to gap and torque plugs to manufacturer's specifications.
10. Inspect magnetos for security, cracks, and broken wires or insulation.
11. Inspect ignition harness for chafing, cracked insulation, and cleanliness.
12. Check cylinders for loose or missing nuts and screws, cracks around cylinder hold-down studs, and for broken cooling fins.
13. Check rocker box covers for evidence of oil leaks and loose nuts or screws.
14. Remove air filter and tap gently to remove dirt particles.
15. Replace air filter.
16. Inspect all air-inlet ducts for condition (no air leaks, holes, etc.)
17. Inspect intake seals for leaks (fuel stains) and clamps for security.

18. Check condition of priming lines and fittings for leaks (fuel stains) and clamps for security.
19. Inspect condition of exhaust stacks, connections, clamps, gaskets, muffler, and heat box for cracks, security, condition, and leaks.
20. Inspect condition of fuel lines for leaks (fuel stains) and security.
21. Drain at least one pint of fuel into a transparent container from the fuel filter and from the fuel tank sump to check for water or dirt contamination.
22. Visually inspect vacuum pump and lines for missing nuts, cracked pump flanges, and security.
23. Inspect crankcase breather tubes and clamps for obstructions and security.
24. Inspect crankcase for cracks, leaks, and missing nuts.
25. Inspect engine mounts for cracks or loose mountings.
26. Inspect engine baffles for cracks, security, and foreign objects.
27. Inspect wiring for security, looseness, broken wires, and condition of insulation.
28. Inspect firewall and firewall seals.
29. Inspect generator or alternator belt for proper tension and fraying.
30. Inspect generator (or alternator) and starter for security and safety of nuts and bolts.
31. Inspect brake fluid for level and proper type.
32. Lubricate engine controls: Propeller, mixture, throttle.
33. Inspect alternate air source "door" or carburetor heat to ensure when "door" is closed it has a good seal. Check "door" operation.
34. Reinstall engine cowling.

Cabin; Inspect:

1. Cabin door, latch and hinges for operation and worn door seals.
2. Upholstery for tears.
3. Seats, seat belts, and adjustment hardware.
4. Trim operation for function and ease of movement.
5. Rudder pedals and toe brakes for operation and security.
6. Parking brake.
7. Control wheels, column, pulleys and cables for security, operation and ease of movement.
8. Lights for operation.
9. Heater and defroster controls for operation and ducts for condition and security.
10. Air vents for general condition and operation.
11. Plexiglass in windshield, doors, and side windows for cracks, leaks, and crazing.
12. Instruments and lines for proper operation and security.

Fuselage and Empennage; Inspect:

1. Baggage door, latch, and hinges for security and operation, baggage door seal for wear.
2. Battery for water, corrosion, and security of cables.
3. Antenna mounts and electric wiring for security and corrosion.

4. Hydraulic system for leaks, security, and fluid level.
5. ELT for security, switch position, and battery condition and age.
6. Rotating beacon for security and operation.
7. Stabilizer and control surfaces, hinges, linkages, trim tabs, cables and balance weights for condition, cracks, frayed cables, loose rivets, etc.
8. Control hinges for appropriate lubrication.
9. Static parts for obstructions.

Wings; Inspect:

1. Wing tips for cracks, loose rivets and security.
2. Position lights for operation.
3. Aileron and flap hinges and actuators for cleanliness and lubrication.
4. Aileron balance weights for cracks and security.
5. Fuel tanks, caps and vents, and placards for quantity and type of fuel.
6. Pitot or pitot-static for security and obstruction.

Landing Gear; Inspect:

1. Strut extension.
2. Scissors and nose gear shimmy damper for leaks and loose or missing bolts.
3. Wheels and tires for cracks, cuts, wear and pressure.
4. Hydraulic lines for leaks and security.
5. Gear structure for cracks, loose or missing bolts, and security.
6. Retracting mechanism and gear door for loose or missing bolts and for abnormal wear.
7. Brakes for wear, security, and hydraulic leaks.

Functional Check Flight (FCF); Check:

1. Brakes for proper operation during taxi.
2. Engine and propeller for power, smoothness, etc.; during run-up.
3. Engine instruments for proper reading.
4. Power output (on takeoff run).
5. Flight instruments.
6. Gear retraction and extension for proper operation and warning system.
7. Electrical system (lights; alternator output).
8. Flap operation.
9. Trim functions.
10. Avionics equipment for proper operation (including a VOR or VOT check for all VOR receivers).
11. Operation of heater, defroster, ventilation and air conditioner.

GENERAL

1. Ensure that all applicable A.D.'s have been met and properly recorded in the aircraft records.
2. Comply with applicable service bulletins and service letters.
3. See that the FAA approved Flight Manual or Pilot's Operating Handbook is aboard and that all required placards are properly installed.
4. See that the Certificate of Airworthiness and aircraft registration are displayed and that the FCC license is aboard.
5. Verify that all FAA required tests involving the transponder, the VOR, and static system have been made and entered in the appropriate aircraft records.

SUMMARY

- It pays to take good care of your engine. Good maintenance is not cheap, but poor performance can be disastrously expensive.
- If you are unqualified or unable to do a particular needed job, depend on competent and certificated mechanics and use approved parts.
- You can save money and have better understanding of your airplane if you participate in the maintenance yourself.
- If you do some of your own maintenance, do it properly. Make sure you complete the job you started.
- Money, time and effort spent on maintenance pays off with your airplane having a higher resale value if you decide to sell.
- Remember, a well cared for airplane is a safe airplane if flown by a competent and proficient pilot. Maintain both your airplane and yourself in top-notch condition.

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