



Federal Aviation
Administration

Maintenance Aspects of Owning Your Own Aircraft



Introduction

According to 14 CFR Part 43, *Maintenance, Preventive Maintenance, Rebuilding, and Alteration*, the holder of a pilot certificate issued under 14 CFR Part 61 may perform specified preventive maintenance on any aircraft owned or operated by that pilot, as long as the aircraft is not used under 14 CFR Part 121, 127, 129, or 135. This pamphlet provides information on authorized preventive maintenance.

How To Begin

Here are several important points to understand before you attempt to perform your own preventive maintenance:

First, you need to understand that authorized preventive maintenance cannot involve complex assembly operations.

Second, you should carefully review 14 CFR Part 43, Appendix A, Subpart C (Preventive Maintenance), which provides a list of the authorized preventive maintenance work that an owner pilot may perform.

Third, you should conduct a self-analysis as to whether you have the ability to perform the work satisfactorily and safely.

Fourth, if you do any of the preventive maintenance authorized in 14 CFR Part 43, you will need to make an entry in the appropriate logbook or record system in order to document the work done. The entry must include the following information:

- A *description* of the work performed, or references to data that are acceptable to the Administrator.
- The *date* of completion.
- The *signature, certificate number, and kind of certificate* held by the person performing the work. Note that the signature constitutes approval for return to service *only* for work performed.

Examples of Preventive Maintenance Items

The following is a partial list of what a certificated pilot who meets the conditions in 14 CFR Part 43 can do:

- Remove, install, and repair landing gear tires.
- Service landing gear wheel bearings (for example, cleaning and greasing).
- Service landing gear shock struts (for example, adding oil, air, or both).
- Replace defective safety wire or cotter keys.
- Lubricate items not requiring disassembly other than removal of nonstructural items (for example, cover plates, cowling, and fairings).
- Replenish hydraulic fluid in the hydraulic reservoir.
- Apply preservative or protective material to components where no disassembly of any primary structure or operating system is involved, and where such coating is not prohibited or contrary to good practices.
- Replace safety belts.
- Replace bulbs, reflectors, and lenses of position and landing lights.
- Replace or clean spark plugs and set spark plug gap clearance.

- Replace any hose connection, except hydraulic connections.
- Replace and service batteries.
- Make simple fabric patches not requiring rib stitching or the removal of structural parts or control surfaces. *(Note: For balloons, this includes making small fabric repairs to envelopes as defined in, and in accordance with, the balloon manufacturer's instructions and which do not require load tape repair or replacement.)*
- Replace any cowling not requiring removal of the propeller or disconnection of flight controls.

Sample Checklists

Propeller Check

Check the following items:

- Spinner and back plate for cracks or looseness.
- Blades for nicks or cracks.
- Hub for grease or oil leaks.
- Bolts for security and safety wire.

Engine Check

Perform the following tasks:

- Preflight engine.
- Run up engine to warm-up and check the following:
 - Magnetos for RPM drop and ground-out.
 - Mixture and throttle controls for operation and ease of movement.
 - Propeller control for operation and ease of movement.
 - Engine idle for proper RPM.
 - Carburetor heat or alternate air.
 - Alternator output under load (for example, landing light in "on" position).
 - Vacuum system (if installed) for output.
 - Temperatures (CHT, oil, and so on) within proper operating range.
 - Engine and electric fuel pumps for fuel flow or fuel pressure.
 - Fuel selector, in all positions, for free and proper operation.
- Remove engine cowling. Clean and check for cracks, loose fasteners, or damage.
- Check engine oil for quantity and condition. Change oil and oil filter; check screens.
- Check oil temperature "sensing" unit for leaks, security, and broken wires.
- Check oil lines and fittings for condition, leaks, security, and evidence of chafing.
- Check oil cooler for condition (damage, dirt, and air blockage), security, leaks, and winterization plate (if applicable).
- Clean engine.

- Remove, clean, and check 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 the manufacturer's specifications.
- Check magnetos for security, cracks, and broken wires or insulation.
- Check ignition harness for chafing, cracked insulation, and cleanliness.
- Check cylinders for loose or missing nuts and screws, cracks around cylinder hold-down studs, and broken cooling fins.
- Check rocker box covers for evidence of oil leaks and loose nuts or screws.
- Remove air filter and tap gently to remove dirt particles.
- Replace air filter.
- Check all air inlet ducts for condition (no air leaks, holes, and so on).
- Check intake seals for leaks (fuel stains) and check clamps for security.
- Check condition of priming lines and fittings for leaks (fuel stains) and check clamps for security.
- Check condition of exhaust stacks, connections, clamps, gaskets, muffler, and heat box for cracks, security, condition, and leaks.
- Check condition of fuel lines for leaks (fuel stains) and security.
- Drain at least one pint of fuel from each fuel filter, each fuel tank sump, and any other aircraft fuel drain into a clean, transparent container to check for water, dirt, wrong type of fuel, and any other type of contamination.
- Visually check vacuum pump and lines for missing nuts, cracked pump flanges, and security.
- Check crankcase breather tubes and clamps for obstructions and security.
- Check crankcase for cracks, leaks, and missing nuts.
- Check engine mounts for cracks or loose mountings.
- Check engine baffles for cracks, security, and foreign objects.
- Check wiring for security, looseness, broken wires, and condition of insulation.
- Check firewall and firewall seals.
- Check generator (or alternator) and starter for security and safety of nuts and bolts.
- Check brake fluid for level and proper type.
- Lubricate engine controls: propeller, mixture, and throttle.
- Check alternate air source "door" or carburetor heat to ensure that the door has a good seal when closed. Check door operation.
- Reinstall engine cowling.

Cabin Check

Check the following items:

- Cabin door, latch, and hinges for operation and worn door seals.
- Upholstery for tears.
- Seats, seat belts, and adjustment hardware.
- Trim operation for function and ease of movement.
- Rudder pedals and toe brakes for operation and security.
- Parking brake.

- Control wheels, column, pulleys, and cables for security, operation, and ease of movement.
- Lights for operation.
- Heater and defroster controls for operation and ducts for condition and security.
- Air vents for general condition and operation.
- Windshield, doors, and side windows for cracks, leaks, and crazing.
- Instruments and lines for proper operation and security.

Fuselage and Empennage Check

Check the following items:

- Baggage door, latch, and hinges for security and operation; baggage door seal for wear.
- Battery for water, corrosion, and security of cables.
- Antenna mounts and electric wiring for security and corrosion.
- Hydraulic system for leaks, security, and fluid level.
- ELT for security, switch position, and battery condition and age.
- Rotating beacon for security and operation.
- Stabilizer and control surfaces, hinges, linkages, trim tabs, cables, and balance weights for condition, cracks, frayed cables, loose rivets, and so on.
- Control hinges for appropriate lubrication.
- Static ports for obstructions.

Wing Checks

Check the following items:

- Wing tips for cracks, loose rivets, and security.
- Position lights for operation.
- Aileron and flap hinges and actuators for cleanliness and lubrication.
- Aileron balance weights for cracks and security.
- Fuel tanks, caps and vents, and placards for quantity and type of fuel.
- Pitot or pitot-static port(s) for security and obstruction.

Landing Gear Check

Check the following items:

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

Functional Check Flight

Check the following items:

- Brakes for proper operation during taxi.
- Engine and propeller for power, smoothness, and so on during runup.
- Engine instruments for proper reading.
- Power output (on takeoff run).
- Flight instruments.
- Gear retraction and extension for proper operation and warning system.
- Electrical system (lights, alternator output).
- Flap operation.
- Trim functions.
- Avionics equipment for proper operation (including a VOR or VOT check for all VOR receivers).
- Operation of heater, defroster, ventilation, and air conditioner.

General

Perform the following tasks:

- Ensure that the aircraft is in compliance with all application Airworthiness Directives (ADs) and that compliance has been properly documented in the aircraft records. If the AD involves recurring action, know when the next action is required.
- Comply with recommended service bulletins and service letters. (*Note: These are recommendations unless an AD requires compliance.*)
- Ensure that a current FAA-approved Flight Manual or Pilot's Operating Handbook with all required changes is aboard and that all required placards are properly installed.
- Check that the Certificate of Airworthiness and Aircraft Registration are displayed. Check for an FCC radio station license, if required for international operations.
- Verify that all FAA-required tests involving the transponder, VOR, and static system have been performed 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 authorized job, you must depend on competent and certificated aircraft maintenance technicians to perform the job. Always use FAA-approved parts.

You can save money and have a better understanding of your aircraft if you participate in the maintenance process.

If you do some of your own preventive maintenance, do it properly. Make sure that you complete the job you start and that you make all the required record entries.

Money, time, and effort spent on maintenance pay off and ensure that your aircraft will have a higher resale value if you decide to sell.

Remember, a well-maintained aircraft is a safe aircraft. A safe aircraft needs to be flown by a competent and proficient pilot. Maintain both your aircraft and yourself in top-notch condition.

Additional Reading

- Advisory Circular (AC) AC 20-106, *Aircraft Inspection for the General Aviation Aircraft Owner*. (http://www.airweb.faa.gov/Regulatory_and_Guidance_Library%5CrgAdvisoryCircular.nsf/0/33172CD8A28FD290862569BD00687151?OpenDocument).
- 14 CFR Part 39, *Airworthiness Directives*.
- 14 CFR Part 43, *Maintenance, Preventive Maintenance, Rebuilding, and Alteration*.

About This Series

The purpose of this series of Federal Aviation Administration (FAA) safety publications is to provide the aviation community with safety information that is informative, handy, and easy to review. Many of the publications in this series summarize material published in various FAA advisory circulars, handbooks, other publications, and audiovisual products developed by the FAA and used by the FAA Safety Team (FAASafetyTeam) for educational purposes.

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