Pilots With Wrenches

The FAA has published a great deal of information for private pilots to explain what work they can do on a small Piper. But there is very little information available to inform a professional pilot about what, if anything, he or she can fix on a Falcon or Hawker or any other type of high-performance aircraft.

The starting point for pilots is FAR Part 43.3(g), which states that a pilot may perform “preventive maintenance” on any aircraft owned or operated by that pilot which is not used under Parts 121, 129 or 135. According to Part 1.1, “preventive maintenance” means simple or minor preservation operations and the replacement of small standard parts not involving complex assembly operations.

However, the FAA has not defined what it means by “complex assembly operations.” While the agency does list 32 “preventive maintenance” tasks in Part 43 Appendix A, since the FAA can (after the fact) proclaim that a particular repair function was a “complex assembly operation,” a jet pilot with a screwdriver should think twice about undertaking some preventive maintenance activity that would clearly be allowed for a Cherokee pilot.

The list of preventive maintenance actions has grown and changed over the past 40 years, and can be broken down into groups of similar tasks or groups related to the evolution of aircraft. (Omitted items relate to repairs on non-turbine aircraft.)

The first four items all relate to the landing gear. These are:
1. Removal, installation and repair of landing gear tires;
2. Replacing elastic shock absorber cords on landing gear;
3. Servicing landing gear shock struts by adding oil, air or both; and
4. Servicing landing gear wheel bearings, such as cleaning and greasing.

Few corporate aircraft today are equipped with elastic shock absorber cords on their landing gear. The item not only shows that this grouping of tasks dates back several decades, it may also imply that applying preservative or protective material to components where no disassembly of any primary structure or operating system is involved and where such coating is neither prohibited nor contrary to good practices;

8. Replenishing hydraulic fluid in its reservoir;
9. Refinishing decorative coating of fuselage, wing tail group surfaces (excluding balanced control surfaces), fairings, cowlings, landing gear, cabin or cockpit interior that does not require the removal or disassembly of any primary structure or operating system;
10. Applying preservative or protective material to components where no disassembly of any primary structure or operating system is involved and where such coating is neither prohibited nor contrary to good practices;
11. Cabin or cockpit upholstery and decorative furnishings repair not requiring disassembly of any primary structure or operating system or interference with an operating system or affecting the aircraft’s primary structure;
12. Making small simple repairs to fairings, non-structural cover plates, cowlings and small patches and reinforcements not changing the contour so as to interfere with proper airflow.

Today’s FAA may not be comfortable allowing a pilot to determine whether a small patch on the wing of a jet will or will not interfere with proper airflow. The agency never wanted pilots to paint or otherwise alter ailerons, elevators or other weight-sensitive aircraft elements. In one enforcement case, a pilot argued that his replacement of upholstery was clearly supported by item (11) above. Unfortunately, the judge disagreed, since the pilot changed the upholstery to hide a hydraulic leak. Similarly, in a separate case, a judge ruled that chroming an exhaust system is not the same as applying “preservative” as allowed in item (10).

The next group of preventative maintenance actions clearly contains a few items — particularly (13) and (22) — that might be too complex for a pilot to perform on a jet. This baker’s dozen of do-ables includes:

13. Replacing side windows where that work does not interfere with the structure or any operating system such as controls, electrical equipment and such;
14. Replacing safety belts;
15. Replacing seats or seat parts with replacement parts approved for the aircraft, not involving disassembly of any primary structure or operating system;
16. Troubleshooting and repairing broken circuits in landing light wiring circuits;
17. Replacing bulbs, reflectors and lenses of position and landing lights;
18. Replacing wheels and skis where no weight and balance computation is involved;
19. Replacing any cowling not requiring removal of the propeller or disconnection of flight controls;
20. Replacing or cleaning spark plugs and setting of spark plug gap clearance;
21. Replacing any hose connection except hydraulic connections;
22. Replacing prefabricated fuel lines;
23. Cleaning or replacing fuel and oil strainers or filter elements;
24. Replacing and servicing batteries; and

When can a non-mechanic pilot perform maintenance?

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(26) Replacement or adjustment of non-structural standard fasteners incidental to operations.

The final group of preventive maintenance actions contains several items that are of particular interest to the jet pilot with a screwdriver, namely:

(28) Installing anti-misfueling devices;
(29) Removing, checking and replacing magnetic chip detectors;
(31) Removing and replacing self-contained, front instrument panel-mounted navigation and communication devices that employ tray-mounted connectors that connect the unit when the unit is installed into the instrument panel (excluding automatic flight control systems, transponders and microwave frequency DMEs). The approved unit must be designed to be readily and repeatedly removed and replaced, and pertinent instructions must be provided. Prior to the unit's intended use, an operational check must be performed in accordance with the applicable sections of Part 91; and
(32) Updating self-contained, front instrument panel-mounted ATC navigational software databases (excluding those of automatic flight control systems, transponders and microwave frequency DMEs) provided no disassembly of the unit is required and pertinent instructions are provided. Prior to the unit's intended use, an operational check must be performed in accordance with applicable sections of Part 91.

If a pilot wants to do work on an airplane that the pilot owns or flies, the work must be on the list. For some aircraft, the pilot operating handbook specifically lists the preventive maintenance tasks that a pilot may perform. Unless the aircraft manufacturer has specifically authorized a pilot to perform a task, the pilot runs a risk in attempting one of the FAA's 32 items of preventive maintenance: The FAA could still determine that, depending on the aircraft, system or setup, the work is simply too complex for a pilot to undertake and, therefore, is not allowed. B&CA