Aircraft fuel systems supply fuel to the fuel control or carburetor within the aircraft. Fuel systems are intricate and interconnected with many parts, including tanks, fuel cells, pumps, fuel strainers and float switches. Only certain categories of tools can be used to repair or maintain parts of the fuel system.

Fuel System Components

Multiple fuel tanks and components are joined together by metal fuel lines and flexible hose lines made of synthetic rubber or Teflon. Integral tanks are built into the fuselage and wing sections, with the main tank separating the fuel tanks. Fuel cells are bags containing fuel that are conformed to the shape of wing or fuselage cavities. The engine-driven pump delivers a steady, properly pressurized fuel supply continuously throughout aircraft operation. An axillary pump is on a tank outlet inside a sump or the bottom of a tank. The axillary pump delivers pressurized fuel to the engine-driven fuel pump and transfers fuel between tanks and can send fuel to the carburetor if the engine-driven pump fails. Both pumps have sumps at the bottom that catch contaminants in the fuel. Tanks have fuel strainers, which filter out dirt and water from the fuel. Float switches activate caution lights in the cockpit when fuel levels are too low. Other parts of the aircraft fuel system include selector handles connected to individual selector valves that help the fuel flow and other connecting joints, levers, gears, pins and splines.

Tools

Only spark-proof hand or air power tools are recommended for maintaining aircraft fuel systems. Rubber-wheeled toolboxes are bonded and grounded to the aircraft inside the fuel cell repair area. Individual maintenance tools are carried to the fuel area in nonmetallic containers. Litmus paper can be used to check for contamination in storage tanks.

Tasks

Maintenance of aircraft fuel systems includes making sure that all system components are operating properly, kept separate from components they should not interact with and connected to those they are designed to interact with. All components need to be monitored for cracks, looseness and leakage that could lead to fuel supply decrease, fuel contamination or system failure.

Replacing Parts

Maintenance also includes replacing system parts. The most difficult parts to replace are the fuel system lines. The fittings should be compatible to their interconnecting parts. Fittings that seem compatible can have slight design alterations or different thread pitches, which could make the joint fall or leak. Replacement lines should be kept separate from airframe structures, control cables and electrical wiring. With metallic fuel lines, bond and cushion them for each place where they are bonded to the structure

Key Concepts

- aircraft fuel systems
- aircracft fuel maintenane
- fuel sysytem maintenance

References

- Liberated Manuals: Aircraft Fuel Systems [http://www.liberatedmanuals.com/TM-1-1500-204-23-3.pdf]
- Aviation Database: Aircraft Fuel Systems Maintenance [http://www.aviation-database.com/Technical_Aviation_Articles/Aircraft-Fuel-Systems-Maintenance.html]