**Aircraft Owner Assisted Maintenance Requirements**

Aircraft maintenance requires more than just wrench turning for success. Maintenance must conform to the Federal regulations. All work on an aircraft starts with paper work and ends with paper. Initially the paper work authorizes parts to fly, defines processes to follow and shows parts and part numbers. Final paperwork, documents what was done and who did. All this is for owners and future owners to know that their airplane meets original manufacturers design and is airworthy.

**PART PAPERWORK**

In order to save time and money the owner can do much of this paperwork him/herself. For parts that are going on the airplane they must be approved by four (4) processes:

1. **TCDS**. Parts called out by the TCDS (Type Certificate Data Sheet) are the original manufacturer’s design for the configuration of the airplane. Parts that supersede an original part will have a PMA (Parts manufacturer Appoval). This piece of paper is usually in the box with a new part. Replacement of original parts is generally minor repair.
2. **TSO**. TSO is Technical Standard Order and parts that have been approved using a TSO have met performance and requirements and can be installed on aircraft. These are generally for minor repairs and alternations.
3. **STC**. STC is a Supplemental Type Certificate and it is issued by the person or company that created the new parts. The inventor has received FAA approval to modify an aircraft from its original design with their parts. STC’s are issued for specific airplane types. These are ‘major’ alternations.
4. **Field Approval**. A field approval is the granting, by an FAA airworthiness inspector, of the FAA approval for a major repair or alteration. The approval is given only after conducting a physical inspection and reviewing all the data. This process is not casual and not something we are going to do with you. It’s really for expert aircraft builders who are modifying an aircraft to test new ideas, or fly fast at Reno races or set a record for Guinness Book. It’s not maintenance.

So, an owner can be involved buying parts and kits for their airplane. They just need to make sure they get the appropriate paperwork that authorizes the parts to fly on their airplane. This means, gathering receipts with part numbers showing a one for one replacement of the same part, or PMA forms showing the manufacture has approved the revised part. Or the owner needs to get the paper which shows the parts have been TSOed. I’m not mentioning STC because it is a major change, requires an FAA 337 form, inspection by a IA (Inspection Authorization) license and is beyond the scope of our current owner assisted maintenance.

**MAINTENANCE MANUALS**

The next piece of paperwork needed to work an aircraft is the manufacture’s maintenance manual and parts catalog. The maintenance manual is king for how to remove and install parts and the parts catalog is well illustrated showing all the parts on the aircraft. Maintenance has to be conducted in accordance with approved processes. The manufacturer’s maintenance manual is approved.

If a part to be replaced or minor repair is not covered by the maintenance manual there is an FAA “approved: document called the AC43-13—1B2B which is titled Aircraft Inspection, Repair & Alterations Acceptable Methods, Techniques and Practices. AC stands for Advisor Circular which means it is not technical approved by FAA but is acceptable.

So, an owner, that wants to assist in maintenance needs to have all three documents:

1. Manufacturer’s Maintenance Manual
2. Manufacturer’s Parts Catalog
3. AC43-13

These are available on-line from various sources. They are not cheap, but are important to an owner who wants to learn about his/her airplanes parts and systems. We also have digital copies of many manuals.

**MAJOR vs MINOR Repairs and Alternations**

The FAA makes it the responsibility of the installer to determine whether an alternation is minor or major based on the FAA regulations. The primary regulation is 14 CFR 21.93 Classification of changes in type design. In summary, it says minor changes are ones that have no appreciable effect on weight, strength, reliability, operation or airworthiness. All others are major. As you might see these words are subjective, and there are many writings to clarify, but the bottom line is that if you are changing how a system works, or changing the basic structural integrity, or the certified operational characteristics of an aircraft, you are making a major alteration. If not, it’s minor. The documents described above become a major way of showing the maintenance you are doing is minor and part of the reason they are so important.

**LOG BOOK**

The log book documents the work performed on the aircraft. Sometimes log entries are made that are too cryptic to understand fully what was done. And consequentially, log entries can be too long filling pages of documents. A log book needs to be succinct. Generally, the A&P will fill in the log book, but for Owner Assisted Maintenance the owner can write the log entry in draft form to be used in the log book, or if the owner is familiar with how to write a good log entry, they can write it in advance on a sticker that can be stuck in the log book. The A&P working with the owner will sign it, including their A&P number. Log entries generally include: Date, Aircraft Model, Airframe Total Time, Tach Time since last major engine overhaul, Description of work, Printed mechanics name, Signature, and A&P number.

**FINALLY, WRENCH TURNING**

With the parts in hand and the process understood the owner is ready to do the maintenance. The actual physical maintenance that needs to be done to aircraft can be done by anyone under the supervision of an A&P. Many owners take great care being careful not to scratch the paint, or make dirty spots. A&Ps do to, but it is satisfying to do the work yourself and know you did your best at it. Most every bolt has a specific torque. Sequence of part remove and installation is defined. Lubricants are called out. Servicing airplanes is partly following the directions the OEM (Original Equipment Manufacturer) has published in their maintenance manuals. Sometimes it seems tedious to follow steps in a manual, but this keeps you from getting in trouble and going astray and getting lost. Over time people learn the process and can do it without actually re-reading every step in the manual, but you still need to have manuals on hand for when needed.

Airplanes, unlike cars are mostly aluminum which is softer than steel and can be easily damaged if a bolt is turned to hard. Many bolts have to be safety wired. Wire runs have specific requirements to clear abrasive spots, or hot spots. Hydraulic lines also have requirements for number of bends and minimum bend radius. All requirements for airplane maintenance can be learned and appreciated for the safe and efficient operation of the aircraft.