

Aircraft parts by Bill O'Brien

"I" versus "We"

Bill O'Brien

Along with the pilot shortage and the mechanic shortage, there is also a parts shortage that plagues the general aviation industry. Because supply and demand are out of balance the cost of new and used parts seem to increase every day. Let's examine the reasons why this is so.

First, we have an old fleet. The average general aviation (GA) single engine airplane is approximately 32 years old. The average age of GA multi-engine reciprocating aircraft is close to 27 years old. The average age for the turbine powered multi-engine propeller driven aircraft average out around 19 years of age. So because of long term wear and tear the demand for replacement parts and large sub-assemblies is much greater today than it was even 10 years ago.

The second reason is our general aviation fleet has been well maintained over the years. So well maintained in fact, the average GA aircraft with a mid-time engine and decent avionics has appreciated to two or three times its original purchase price and is still climbing. Yet even in that land of many zeros the older aircraft are still substantially lower in price than the cost of a brand new aircraft with similar performance numbers and equipment. So the value of older aircraft in good shape are proven investments that over time have beaten the DOW JONES average. So we have an economic imperative on the part of the owners to keep maintaining older aircraft in flying condition which increases the demand for replacement parts.

The third reason is the increasing production costs to make a part. Today aircraft manufacturers are not making makes and models of aircraft in the same quantity they made them back in the Seventies. So the production runs for parts are not as frequent and not as many parts are produced. In addition, it is not cost effective for a manufacturer to make a lot of parts even if the unit price for each part is out of this world because taxes on maintaining a large inventory of parts would eat all of the profits. This low parts production keeps the supply of replacement parts low.

The fourth reason is that some manufacturers would prefer that their older makes and model aircraft-made a million years ago-would quietly disappear from the aircraft registry. This retroactive birth control on the part of the manufacturers may seem not to make any sense until you look at aircraft market dynamics of creating demand and reducing costs. First, each older aircraft that is no longer in service creates a demand for a new, more expensive aircraft to take its place. Second, despite some tort claim relief granted to GA manufacturers in the early Nineties, the fewer older aircraft there are in service, the manufacturers of those aircraft enjoy reduced overall liability claims and ever decreasing continuing airworthiness responsibilities.

So how are we going to maintain these older aircraft with an ever dwindling parts supply when Part 21, section 21.303 Replacement and modification of parts, requires us to use the Parts Manufactured Approval (PMA) parts on a type certificated product? Well, the same rule grants four exemptions to the PMA requirement.

1. You can use parts produced under a type or production certificate such as a Piper, Cessna, or Mooney produced part;
2. A owner or operator produced part to maintain or alter their own product;
3. Parts produced under a Technical Standard Order (TSO) such as radios, life vests and rafts, and GPS; or,
4. A standard aviation part such as fasteners, washers, or safety wire.

Before I segue into the subject of "owner produced parts" as called out in section 21.303, which is the purpose of this article. I would like to create a small uproar with this statement: "FAA Airframe and Powerplant rated mechanics can maintain, repair, and modify parts, but they cannot make a

brand new part and call it a repair." Before you accuse me of losing dendrites by the minute, check out section 65.81 General privileges and limitations. The section talks about maintenance, preventive maintenance, and alterations, but not the manufacturing of parts. Nor is it an implied privilege in Part 65, because Part 21 section 21.303 says "no person" may make a replacement part for a type certificated (TC) product unless that person has a PMA, etc.

While I write this I can remember 25 pounds ago and when I had hair, I worked in the real world and I specialized in making engine baffles for Lycoming engines. Before someone accuses me of bureaucratic ventriloquism which is roughly translated as "talking out of both sides of my mouth." My weak defense is, I made the parts because I thought I could." It never dawned on me that I could not legally make a part. Some of you may be astounded that I make this confession freely. It's no big thing because I know the statute of limitations has run out years ago and a jury of my peers would never look me in the eye and convict me.

So here is our problem that we must solve. Since mechanics cannot legally make parts for aircraft and aircraft need replacement parts, how are we going to keep the fleet flying? If we cannot find PMA, TSO, standard, or production holder replacement parts, we are left to make the part under the owner-produced option under section 21.303(b)(2). However, we must remember that the part is for the owner/operator's aircraft only and is not manufactured for sale to other TC aircraft.

To get through confusing regulatory policy with our pride intact, let's try the question and answer routine. (Note: This policy is taken from FAA 's AGC-200 policy memorandum to AFS-300 on the definition of "Owner-Produced Parts" dated August 5, 1993)

Question 1: Does the owner have to manufacture the part him or herself in order to meet the intent of the rule?

Answer 1: No, the owner does not have to make the part him or herself. However to be considered a producer of the part he/she must have participated in controlling the design, manufacturer, or quality of the part such as:

1. provide the manufacturer with the design or performance data from which to make the part, or
2. provide the manufacturer with the materials to make the part, or
3. provide the manufacturer with fabrication processes or assembly methods to make the part, or
4. provide the quality control procedures to make the part, or
5. personally supervised the manufacturer of the part.

Question 2: Can the owner contract out for the manufacture of the part and still have a part that is considered "owner-produced?"

Answer 2: Yes, as long as the owner participated in one of the five functions listed in Answer 1.

Question 3: Can the owner contract out the manufacture of the part to a non-certificated person and still have a part that is considered "owner-produced?"

Answer 3: Yes, as long as the owner participated in one of the five functions listed in Answer 1.

Question 4: If a mechanic manufactured parts for an owner, is he/she considered in violation of section 21.303(b)(2)?

Answer 4: The answer would be no, if it was found that the owner participated in controlling the design, manufacture, or quality of the part. The mechanic would be considered the producer and would not be in violation of section 21.303(a). On the other hand, if the owner did not play a part in controlling the design, manufacture, or quality of the part, the mechanic runs a good chance of being in violation of section 21.303 (b)(2).

Question 5: What kind of advice can you give on how a mechanic can avoid even the appearance of violating section 21.303(b)(2)?

Answer 5: First, a mechanic should never make a logbook or maintenance entry saying that he/she made a part under his certificate number. This foopah will send up a flare and get you undue attention from your local FAA inspector, which you could do without. However, the mechanic can say on the work order that he helped manufacture an owner-produced part under section 21.303 (b)(2). Second, the owner or operator should be encouraged to make a log book entry that is similar to section 43.9 maintenance entry that states: The part is identified as an owner produced part under section 21.303 (b)(2). The part was manufactured in accordance with approved data. The owner/operator's participation in the manufacturer of the part is identified, such as quality control. The owner must declare that the part is airworthy and sign and date the entry.

Question 6: Is there anything else a mechanic must do?

Answer 6: The mechanic must ensure that the owner-produced part meets form, fit, and function, and, within reasonable limits, ensure that the part does meet its approved type design (e.g. like looking at the approved data used to make the part). Then the mechanic installs the part on the aircraft, makes an operational check if applicable, and signs off the required section 43.9 maintenance entry.

Question 7: What is the owner responsible for and what is the mechanic responsible for concerning owner-produced parts?

Answer 7: The owner is responsible for the part meeting type design and being in a condition for safe operation. The mechanic is responsible for the installation of the owner-produced part being correct and airworthy and for a maintenance record of the installation of the part made.

Question 8: How does the owner or operator get the approved data to make a part if the manufacturer and other sources are no longer in business?

Answer 8: For aircraft that the manufacturer is no longer supporting the continuing airworthiness of, the owner or operator can petition the FAA Aircraft Certification Directorate under the Freedom of Information Act for the data on how the part was made. Or the owner or operator can reverse engineer the part and have the data approved under a FAA field approval or, if it is a really complicated part, have the data approved by a FAA engineer or FAA Designated Engineering Representative.

Question 9: What happens to the owner-produced part on the aircraft if the original owner sells the aircraft?

Answer 9: Unless the part is no longer airworthy, the original owner-produced part stays on the aircraft.

I hope that I spread some light on the murky subject of owner-produced parts, so the next time instead of saying to the owner of an broke aircraft: "Sure, 'I' can make that part," you will now say "Sure, 'WE' can make that part."

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