Making sense of the rules and regulations

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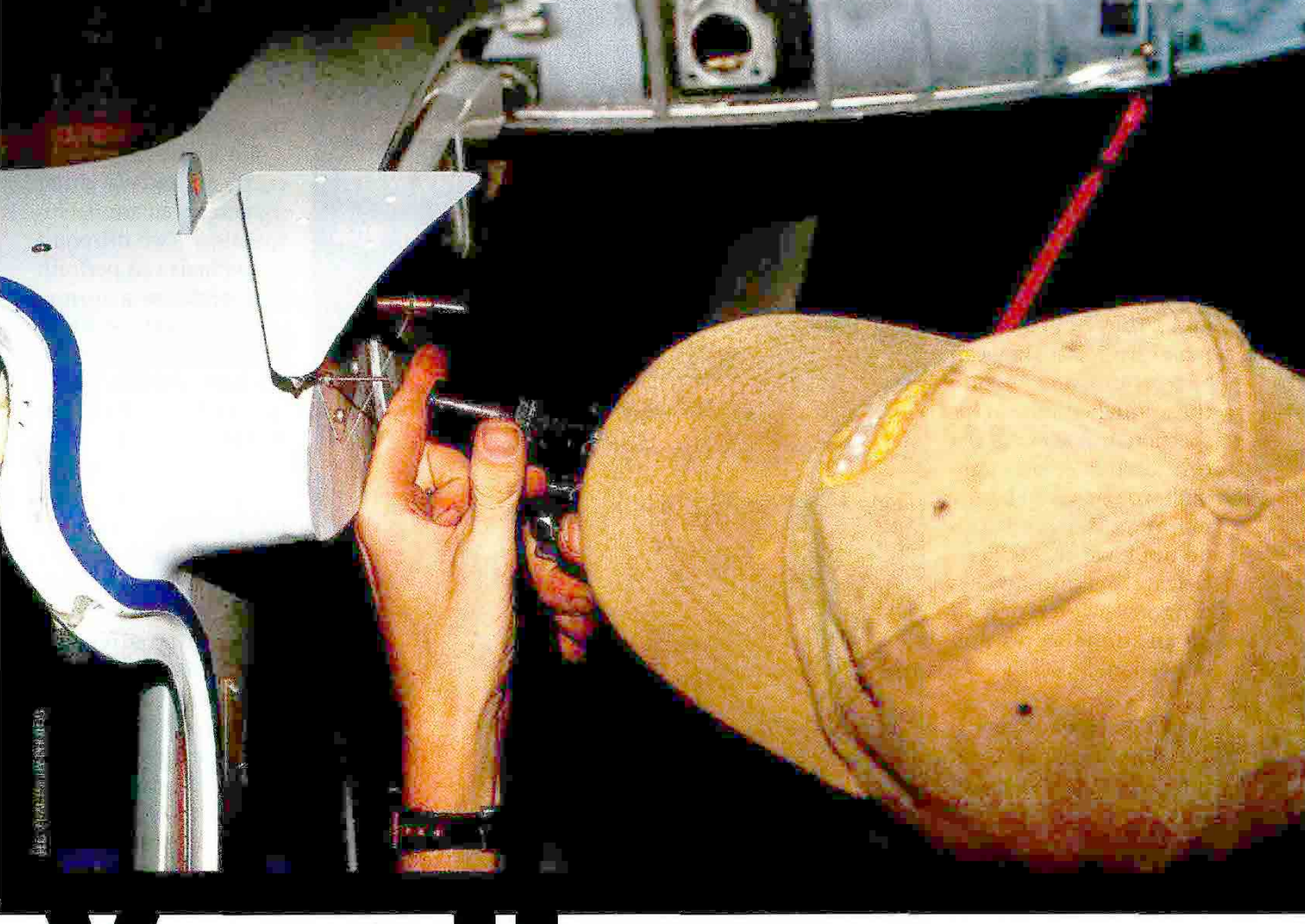
Aircraft builders work long and hard to complete their airplanes. Others are the second owner of an amateur-built experimental aircraft. Either way, these owners regularly fly—and enjoy—their homebuilts. With this pleasure comes the responsibility of maintaining their mounts.

MAINTAINING



YOUR HOMEBUILT

Confusion and misinformation exists within the aviation community about the maintenance of amateur-built aircraft. Rather than perpetuating the myths by repeating them, let's look at the Federal Aviation Regulations that govern aircraft maintenance.

The Rules

Maintenance of production aircraft falls under FAR Part 43, which covers maintenance, preventive maintenance, rebuilding, and alteration. As clearly stated by FAR Part 43.1, "This part does not apply to any aircraft for which an experimental airworthiness certificate has been issued."

Although Part 43 does not regulate homebuilt maintenance, it does provide good guidance. This is especially true of Appendix D, "Scope and Detail of Items (as Applicable to the Particular Aircraft) To Be Included in Annual and 100 Hour Inspections."

FAR Part 43 also spells out who can maintain production aircraft, and it prescribes the necessary certificates, authorizations, and logbook entries these individuals must make to preserve a certificated aircraft's airworthiness. Because Part 43 does not apply to amateur-built experimental aircraft, anyone can work on them.

Anyone—without a certificate, training, or demonstrating ability—can legally work on a homebuilt. Just grab your tools and have at it. What's legal is one thing. What's smart, prudent—and safe—is another thing altogether. Remember, your life—and the lives of your passengers—depends on the quality of maintenance applied to *any* aircraft you fly regardless of who made it.

Certificated aircraft must have an annual inspection that assesses its airworthiness, and an authorized airframe and powerplant mechanic (A&P) with an inspection authorization (IA) must sign this inspection. Homebuilts have a similar requirement. Each year an approved individual must perform an annual condition inspection to assess a homebuilt's airworthiness and ensure that all maintenance done on it has been completed in an accepted manner.

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BRETT BROCK

Builders are, naturally, the ones best suited to maintain their homebuilts because they fabricated, built, constructed, and assembled just about everything on their craft, and if they hold a repairman certificate, they can also perform and endorse the annual condition inspection. If you're the second owner of a homebuilt, you, too, can legally maintain it, even if you do not have an A&P certificate. Second owners cannot, however, sign off on an annual condition inspection.

Condition Inspections

You find the requirement for a homebuilt's annual condition inspection not in FAR Part 43, but in FAR Part 91.319(c), which says the FAA can prescribe additional special operating limitations it considers necessary. Upon completion and after an inspection, the FAA issues homebuilts an airworthiness certificate and a set of operating limitations that apply to a specific, single amateur-built experimental aircraft.

Operating limitations are essentially the rules and regulations the owner of that homebuilt must adhere to. Among them is this: "No person may operate this aircraft unless within the preceding 12 calendar months it has had a condition inspection performed in accordance with the scope and detail of Appendix D to Part 43, or other FAA-approved programs, and found to be in a condition for safe operation. This inspection will be recorded in the aircraft maintenance records."

With this operating limitation, an annual condition inspection is the homebuilt version of a production airplane's annual inspection because the items both must inspect come from the same list, Appendix D of FAR Part 43. What's different is who can sign off on the annual in the airplane's logbooks.

On a certificated aircraft, an A&P-IA must sign off on an annual inspection. Two different individuals can perform and endorse a homebuilt's annual condition inspection logbook entry. FAA Advisory Circular 20-27E, "Certification and Operation of Amateur-Built Aircraft," names them: "the original builder who holds the repairman's (experimental aircraft builder, per FAR 65.104) certificate for that aircraft," and "an FAA-certificated mechanic as authorized by section 43.3 per the operating limitations."

This means any FAA-certificated A&P can perform a homebuilt's annual condition inspection, and regulations *do not* require this individual to have an IA. (An FAA-certificated repair station can also perform homebuilt annual condition inspections.) Only the airplane's original builder can hold the repairman certificate for that craft.

Repairman's Certificate

In describing the repairman certificate, AC 20-27E says, "The aircraft builder may be certificated as a repairman if that person is the primary builder of the aircraft and can satisfactorily prove requisite skill in determining whether the aircraft is in condition for safe operation.... Each certificate is issued for a particular aircraft."

You can register an amateur-built aircraft in a corporation's name, and one of the aircraft's builders can receive the repairman's certificate. Through the builder's log the applicant proves that he or she possesses the requisite skill to determine whether the aircraft is in condition for safe operation.

Like all FAA certificates, the repairman certificate has

privileges and limitations. Per FAR 65.104, the limitations are few. Besides being the aircraft's primary builder of proven skill, applicants for a repairman certificate must be at least 18 years old and be a U.S. citizen or foreign national with legal, permanent U.S. residence.

There is only one privilege—" The holder of a repairman certificate (experimental aircraft builder) may perform condition inspections on the aircraft constructed by the holder in accordance with the operating limitations of that aircraft."

Applying for a repairman certificate is easy. FAA Advisory Circular 65-23A, "Certification of Repairmen (Experimental Aircraft Builders)," gives all the particulars, but in brief you need to get FAA Form 8610-2, "Airman Certificate and/or Rating Application," from the nearest FAA Flight Standards District Office, fill it out and check the "Repairman" box, writing "Experimental Aircraft Builder" beneath it, and submit it to the FSDO.

What's important to remember is that *only one* person can be listed as the primary builder, and the certificate permits the holder to perform the annual condition inspection on *only one aircraft—the one he or she built.* If you build an RV-8, you can perform the condition inspection on your RV-8 only. If your friend has an RV-8, you *cannot* perform the condition inspection on his or her RV-8.

If you are the second owner of a homebuilt, in most circumstances you cannot get a repairman certificate for it. Remember, being the airplane's primary builder is one of the certificate's requirements, a requirement second owners cannot usually meet. Nor can the original builder transfer the "primary builder" designation and/or repairman certificate for the airplane.

When it comes to annual condition inspections, this gives second owners of homebuilts two options—have an A&P mechanic perform the inspection or ask the original builder (if he or she holds the repairman certificate for that aircraft) to inspect it.

About the only time a second owner can hold the repairman certificate for a homebuilt is when the second person buys an airplane under construction and finishes it. But this isn't a guarantee.

Whether the second owner who completes the airplane gets a repairman certificate depends on the FAA inspector and how he or she views the applicant's capabilities to properly inspect the homebuilt. If you buy a project and finish the remaining 20 percent of the work, the FAA may not feel you're familiar enough with the airplane to be able to properly inspect it.

But remember one of the certificate's requirements: "Demonstrate to the certificating FAA inspector his or her ability to perform condition inspections and to determine whether the subject aircraft is in a condition for

safe operation." If you complete a partially built project, you *can* apply for a repairman's certificate and attempt to prove to the FAA your ability to adequately perform the inspection.

Performing the Condition Inspection

EAA has an excellent annual condition inspection checklist that's available online (click on "homebuilders hq" in the "members only" section on the EAA website at *www.eaa.org*) or by calling EAA Aviation Information Services at 888/322-4636, Ext. 6806. And get a copy of Appendix D or FAR Part 43 for a reference document.

You can also see if local A&Ps and/or repair stations have developed annual inspection checklists you might get a copy of. Another helpful resource is Advisory Circular 20-106, "Aircraft Inspection for the General Aviation Aircraft Owner," which gives a good review for inspection techniques on all aircraft.

After performing the inspection and ensuring the aircraft is in a condition for safe operation, you must make logbook entries. Refer to your aircraft's special operating limitations for the exact logbook entry requirements.

The entry should include the aircraft's total time and its certificate type and the name, signature, and number of the person performing the inspection. The entry should read, "I certify that this aircraft has been inspected on (date) in accordance with the scope and detail of FAR Part 43, Appendix D, and found to be in a condition for safe operation."

Engine Maintenance

Considerable myth and misinformation surrounds the maintenance of aircraft engines on homebuilts. A type certificated aircraft powerplant is one the FAA has approved for use on a production airplane. Once you install and operate this engine on an experimental aircraft, in the FAA's eyes this engine no longer conforms to its original type design and is considered "experimental," and it cannot be installed on a certificated airplane until an A&P has inspected and found it to meet its original type design—and to be airworthy.

Taking another tack, Lycoming's O-360 is a certificated engine used in a number of different airframes. Regardless of where you get it, out of a production airplane or new from the factory, once you install it in your homebuilt, that Lycoming cannot be used in a production airplane until an A&P confirms that you haven't changed anything and that it's safe to operate.

Contrary to common advice, you *do not* have to remove the dataplate from a certificated engine to use it on a homebuilt. This "change" prevents the engine from finding a home on a certificated aircraft after it's passed an A&P's scrutiny for airworthiness and safe operation.

What all this means is that you can maintain your homebuilt's engine without holding the powerplant half of an A&P certificate. But let common sense rule what you do. If you don't have experience working on aircraft engines, think twice about what you do. Changing the oil or cleaning the spark plugs is one thing; replacing a cylinder is another.

If you don't have any aircraft engine experience, I recommend that you leave the complicated engine maintenance tasks to an A&P because that maintains the safety and protects the integrity of the engine certification specifications, and this is what many homebuilt owners do. Just because it may be legal for you to work on the engine does not mean that you should undertake major maintenance items solo.

Airworthiness Directives

Airworthiness Directives (AD notes) are mandatory directives the FAA issues to correct an unsafe condition that may exist on an airframe, a powerplant, a propeller, or an appliance, and by regulation you must comply with it.

The FAA does not issue ADs for homebuilt aircraft, but it does issue ADs for the engines, propellers, magnetos, alternators, and other "appliances" that may be installed on your experimental airplane. Because these items are installed on an experimental airplane, like certificated engines, they are no longer "certificated" and mandatory compliance is not necessary.

Again, just because ADs don't apply to amateur-built experimental aircraft and the equipment installed on them doesn't mean it's prudent—or safe—to ignore the problems ADs address. If an AD (or service bulletin) applies to anything installed on your homebuilt, I recommend that you, at the very least, review the AD (or service bulletin), decide whether to comply with it, and make an aircraft logbook entry that records your review and resulting action. It will certainly be in your best interest should something unfortunate happen later.

Major Alterations

By their nature homebuilders often make changes to their homebuilts after they have completed them. Often they install a different engine (usually with more power) or change the prop. A few change the airframe in some way to improve performance or capabilities.

These changes are "major alterations," as is any change that may affect the weight and balance, structural strength, performance, powerplant operation, flight characteristics, or other qualities affecting airworthiness. For a more complete list see Appendix A of FAR Part 43, "Major Alterations, Major Repairs, and Preventive Maintenance." It's for production aircraft, but it's a good guide for homebuilts.

Review your operating limitations to determine what action you must take if you're thinking about making a major alteration to your homebuilt. Very old operating limitations may state that any major change or modification will invalidate the homebuilt's airworthiness cer-

tificate, and that you must contact your FSDO for further instructions. Semi-old operating limitations may require you to submit in writing to the FSDO your plans for any major change before starting work. The FSDO will then provide further guidance.

Operating limitations based on the new FAA Order 8130.2D will say something like, "After incorporating a major change as described in FAR 21.93, the aircraft owner is required to re-establish compliance with FAR 91.319 (b). (Test flying.) All operations will be conducted day VFR in a sparsely populated area. The aircraft must remain in flight test for a minimum of 5 hours.... Following satisfactory completion of the required number of flight hours in the flight test area, the pilot shall certify in the records that the aircraft has been shown to comply with FAR 91.319 (b)."

Under new operating limitations you no longer have to contact the FSDO. You document the change in the homebuilt's logbook and flight test the airplane as prescribed for five hours. This test-flight period is considered a minimum. More flight time may be required to verify the safety and controllability of the airplane.

If your homebuilt falls under the older operating limitations, call EAA Aviation Information Services for guidance in getting this portion changed. EAA was instrumental in bringing about this change in how major alterations are handled.

One reason people build their own airplane is so they can do their own maintenance, which makes owning an airplane more affordable. Properly maintaining your amateur-built airplane and inspecting it regularly protects your investment in it—and your safety.

If you doubt your ability to maintain any part of your airplane, seek help. Remember, education is one privilege that accompanies homebuilding. Find an A&P, an EAA Technical Counselor, or another builder to help you. Don't undertake maintenance procedures you're unsure of; mistakes cost you flying time and money.

Even if you hold the repairman's certificate and accomplish your own condition inspection, it's a good idea to have a knowledgeable A&P mechanic perform this inspection every two or three years. A different set of eyes never hurts. Remember, as the operator of the airplane, you're responsible for your airplane's maintenance and its maintenance records. Call EAA Aviation Information Services at 888/322-4636, Ext. 6806, with any additional questions you may have on this subject.