

Nuts, Bolts, and Electrons

Read Any Good *Logbooks* Lately? *Making Sense of Aircraft Maintenance Records*

As any pilot, aircraft owner, or maintenance professional knows, an aircraft requires a thorough and seemingly complex system of record-keeping to ensure it can be operated safely. In addition to having the shared responsibility of ensuring an aircraft complies with all relevant regulations to maintain its airworthiness, there is also a need to keep an accurate log of equipment changes—everything from a new transponder to a new seat belt system.

Logbooks are the preferred method to enter and track these changes. With so many variations, it can be a daunting task to know which logbook to use when you are making or verifying an entry. And, even when you use the correct one, deciphering information from a logbook can be frustrating. With a little guidance on where and what to look for, you will have a clearer path to ensuring your aircraft has what it needs to fly legally and safely.

Logbook Breakdown—A Pilot Perspective

Most pilots are familiar with at least one type of records repository: the pilot logbook. Since it preserves all a pilot's flight time and training accomplishments, pilots are especially keen to ensure the precision of the entries that they and their instructors make.

That same enthusiasm for logbook accuracy does not always extend equally to maintenance

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logbooks. That could be due to a renter's not-my-airplane mentality or, even for involved aircraft owners, simply a lack of logbook know-how. It could also be that some pilots are too intimidated to ask to review the records, thinking that logbook peeping somehow second-guesses the integrity of the mechanics performing the work. Whatever the reason, too many pilots take aircraft maintenance record entries for granted. This unfortunate mindset can result in pilots missing critical information about the aircraft, not to mention the requirement for a pilot-in-command to verify airworthiness before a

flight. Bottom line: If you are flying an aircraft, you should be familiar with its logbooks.

Sometimes You *Can* Judge a Book by its Cover

It sounds basic, but a key to understanding logbooks is to know what they look like. Regulations provide guidance for the required maintenance record entries, but technically you do not need a "logbook." Maintenance records can be entered in a binder, notebook, work card, or even on the back of a napkin (*not* recommended). Although most maintenance operators do not use such casual methods, it is still important to expand your interpretation of a logbook beyond the traditional black, leather-bound booklet with "logbook" neatly embossed on the cover.

That said, a commercially printed logbook is still the tool of choice to track maintenance records for GA aircraft. In some cases, aircraft owners use a single master logbook with index tabs for each component. In others, aircraft owners use different documents for each category of equipment. This practice helps organize recordkeeping and enables easier transfer of records if the engine or some other component is removed or replaced.

Typical GA maintenance logbooks may include the following categories:

- **Engine**—used to track engine inspections, tests, repairs, alterations, Airworthiness Directives (AD), Service Bulletins (SB), and equipment removal or exchange.
- **Airframe/Aircraft**—used to track airframe inspections, tests, repairs, alterations, ADs, SBs, and equipment removal or exchange. It may also be used as a master logbook to track records for the entire aircraft.
- **Propeller**—used to track hub and blade inspections, repairs, alterations, ADs, factory bulletins, etc.

Other component-specific logbooks include a rotor logbook to track helicopter rotor assembly,

blade, and torque-event inspections; a wing logbook to track entries for weight-shift control and powered parachute aircraft wings; and an avionics logbook for avionics-related maintenance.

Knowing Where to Look

The most common items pilots look for include documentation of the annual inspection and, if the aircraft is used for hire, the 100-hour inspection. Owners who maintain a single aircraft logbook must record annual and 100-hour inspections in that record. However, those who maintain separate records for the airframe, powerplant, propellers, and other components must document the 100-hour inspection, if required, in the record of each component (see 14 CFR 43.11(a)). Entries for the annual inspection are required only in the main aircraft or airframe record.

ELT, static system, altimeter, and transponder inspections are typically accomplished during an annual inspection and recorded in the main airframe/aircraft logbook. The static system, altimeter, and transponder inspections may be combined in one entry, but these should still provide a date and description of the work performed. The maintenance provider may choose not to list an ELT operation test separately in the maintenance records if it is covered under a normal annual or 100-hour inspection for that aircraft. However, the expiration date of the ELT battery is a required entry.

To be airworthy, an aircraft's records must also show that it complies with any applicable ADs. This compliance status must be noted in the maintenance record; the entry must include the AD number, the method used to comply with the AD, and the date of any required future action with recurring ADs. It is a good idea to note what the ADs are and to be clear on specifically what work was performed. All maintenance record entries should be written so those unfamiliar with the work can read and understand it. For more specifics on the format of maintenance record entries, see Title 14 Code of Federal Regulations (14 CFR) sections 91.417 and 43.11.

Beyond the Logbook

The search for airworthiness verification does not stop with the logbook. Any time an aircraft has a major alteration or repair, the maintenance technician must complete and file FAA Form 337 with the aircraft's maintenance records. Some owners file these with the aircraft logbooks; others keep them in a separate binder. Regardless of

the method, know that after a major alteration or repair, Form 337 becomes part of the aircraft's permanent record. The AMT must send a copy to the FAA Aircraft Registration branch in Oklahoma City, where it is kept on file. Anyone interested in obtaining these records for any aircraft can request an electronic copy on CD from the FAA for a \$10 fee (<http://aircraft.faa.gov/e.gov/ND/>).

Another vital but often overlooked document is the aircraft equipment list. This document, a list of installed equipment on an aircraft, is usually included in the Pilot's Operating Handbook (POH) or Airplane Flight Manual (AFM). An AMT will post an addendum to this list any time equipment is added or removed. Not only is this crucial to calculating accurate weight and balance, but, depending on how long records are kept, it may be the only way to maintain an aircraft's historical accuracy. That is because 14 CFR 91.417(b)(1) stipulates keeping maintenance records (found in 91.417(a)1) only for one year after the work is performed, or until the work is repeated or superseded by other work.

While electronic maintenance logs are not (yet!) common practice in many GA maintenance facilities, their usage is growing since they provide an easier and more organized method of recording entries. However, many electronic systems do not meet the signature requirements of 14 CFR parts 43.9 or 91.417. If you are an aircraft owner/operator, it is your responsibility to ensure any system used to track and record maintenance complies with the appropriate regulations.

Bottom line: If you are flying an aircraft, you should be familiar with its logbooks.



Photo by Tom Hoffmann

Are We on the Same Page?

I cannot stress enough the importance of good communication between pilot and mechanic. A well-known aviation joke makes this point: The pilot's maintenance discrepancy ("squawk") states, "something is loose in cockpit;" the mechanic replies, "something tightened in the cockpit."

To avoid miscommunication, a pilot who has difficulty understanding a maintenance record entry should talk to the AMT who performed the work instead of brushing off or taking the entry for granted. Asking questions will provide better understanding and could also reveal something missing or overlooked in the entry or the procedure.

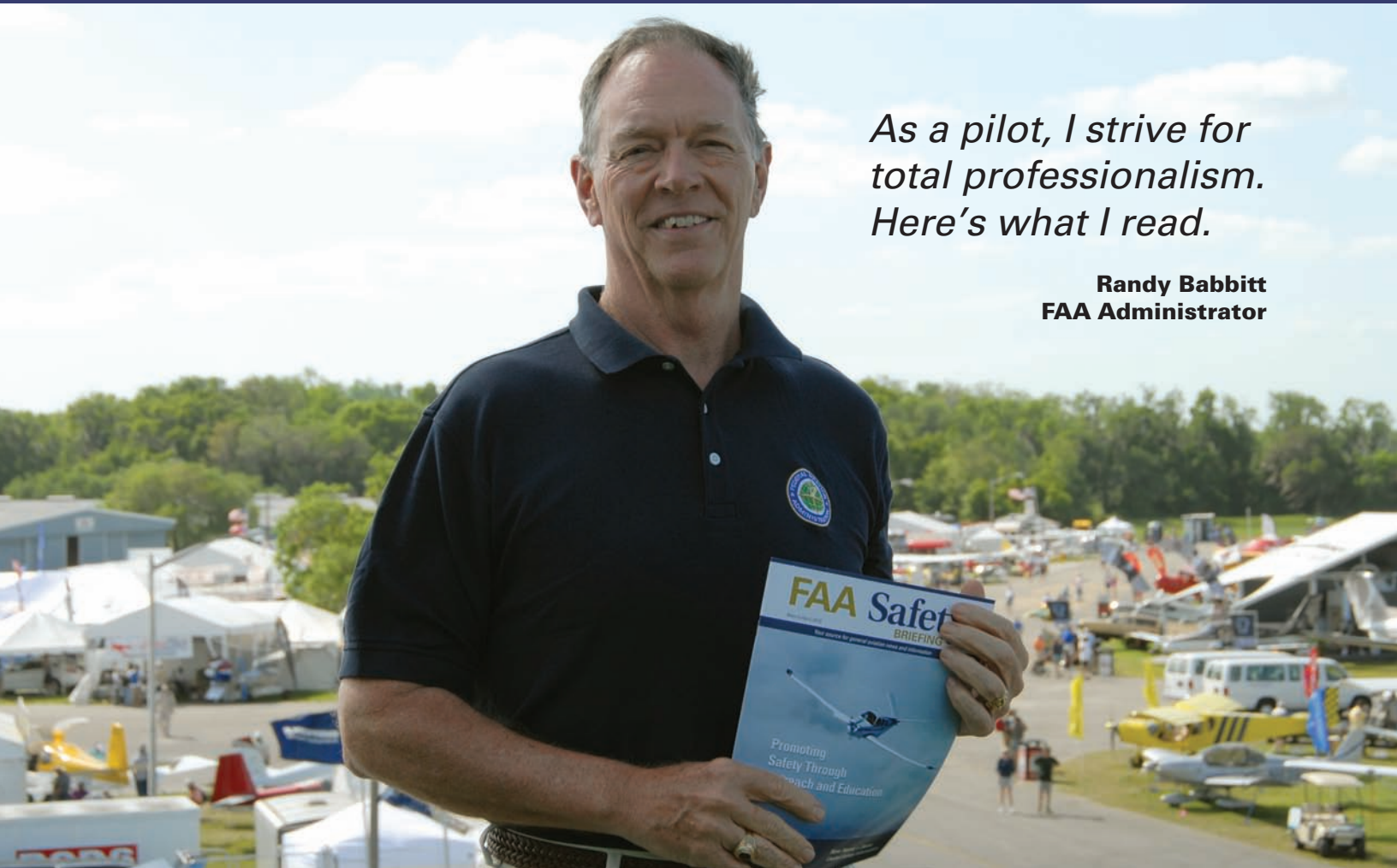
If you are a mechanic, it is imperative to be clear when you make logbook entries. Those entries may follow the aircraft through its entire

life, which, in all likelihood, may include more than one owner and several maintenance professionals. For example, when you perform an annual or 100-hour inspection, note whatever corrective and/or preventive action you performed instead of simply signing the inspection as complete. By providing a more complete picture of an aircraft's life story, you can help owners and other mechanics stay more in tune with the aircraft.

Following a detailed routine of verifying and documenting an aircraft's airworthiness may take some extra time and effort, but its potential lifesaving payoff is priceless.

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*As a pilot, I strive for
total professionalism.
Here's what I read.*

Randy Babbitt
FAA Administrator