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## WHY ANNUAL INSPECTIONS?

The big boys don't do them—why must we?

Given today's acute shortage of GA mechanics and the difficulty owners are having getting their airplanes on shop schedules, I've been receiving an increasing number of inquiries about the need for annual inspections from frustrated owners.



Illustration by John Holm.

"Why is it necessary to have my airplane completely torn apart every 12 months?" one owner asked. "I've only flown about 40 hours since the last annual inspection."

"Wouldn't it help solve the mechanic shortage if the FAA would let noncommercial operators like me do inspections every 18 or 24 months?" another owner asked.

Those are great questions. I've long thought that the rule requiring small GA airplanes to receive a complete inspection every 12 calendar months didn't make a lot of sense. Larger airplanes aren't required to do it that way, so why are we?

There are certainly parts of our small GA airplanes that need to be inspected frequently. For piston aircraft, that includes pretty much everything forward of the firewall. I'm talking about all that stuff that's constantly trying to cook and vibrate itself to death. Inspecting that stuff once a year might not be often enough.

I would probably also include tires, wheels, and brakes in that category. They live a tough life, too, and need to be inspected frequently. For retractables, I'd include the gear retraction system.

But is it really necessary to open up the wings, empennage, and tailcone and remove the carpets, seats, and floorboards to inspect for corrosion every 12 months? Do we really need to check control cable tensions that often? How about instruments and avionics? Wouldn't it be adequate to do that every other year?

I certainly think so, at least for the lion's share of small GA airplanes that fly less than 150 hours a year—often much, much less—in noncommercial Part 91 operations.

## Double standard

The regulation that governs how often we need to do inspections is 91.409. It's a long and complicated regulation that divides the universe of GA airplanes into two buckets—let's call them the "big boys" and the "rest of us." Multiengine turboprops (e.g., Beechcraft King Airs) and multiengine turbojets (e.g., Cessna Citations) are put into the "big boy" bucket. Large airplanes that weigh more than 12,500 pounds (e.g., DC-3s) are put there, too. All other aircraft go into the "rest of us" bucket.

There's one exception: Curiously, the owner of a turbine-powered rotorcraft is permitted to choose which bucket he wants his whirlybird to be placed in. The FAA doesn't give that option to owners of any other kind of aircraft. (As we'll see, it sure would be nice if they did.)

Owners of aircraft in the "rest of us" bucket—that's most of us—are required to perform a complete inspection every 12 calendar months, regardless of hours flown. If they use their aircraft to carry passengers for hire or to give flight instruction for hire, then they also are required to perform complete inspections every 100 hours.

In lieu of doing annual or 100-hour inspections, "rest of us" owners are permitted to elect a "progressive inspection" program so long as it is approved by their local flight standards district office. Such a progressive inspection program is essentially an annual inspection on the installment plan. Piston GA manufacturers like Beechcraft, Cessna, and Cirrus have developed progressive inspection programs that FSDOs will almost always approve. These

typically consist of four phased inspections to be performed every 50 hours. When combined, these four phased inspections constitute a complete inspection of the aircraft. But here's the rub: The FAA requires that all four phased inspections be completed within 12 calendar months. Thus, a progressive inspection program doesn't allow any portion of the aircraft to go more than a year without being inspected. Since the four inspections are to be performed at 50-hour intervals, a progressive inspection program generally does not make sense for an aircraft that flies fewer than 200 hours per year. It can be a useful alternative for flight schools and freight haulers, but not for most owner-flown aircraft.

In contrast, owners of "big boy" aircraft like King Airs and Citations are not required to do annual or 100-hour inspections. Instead, they are permitted to choose from a variety of inspection options. One option is to use the inspection program recommended by the aircraft manufacturer, and this is the option that most "big boy" owners choose. However, owners may also develop their own custom inspection program and ask the local FSDO to approve it. Typically, such "approved aircraft inspection programs" (AAIPs) are based on the manufacturer's recommended inspection program with certain modifications. But any inspection program that the FSDO is willing to approve may be used.

The manufacturer's recommended inspection program for "big boy" aircraft is almost always a phased inspection program, but unlike progressive inspections there's no FAA requirement for all the phases to be completed in one year. Let's take a look at one such program, the one for the ubiquitous King Air.

### King Air inspection programs

There are actually three manufacturer-recommended inspection programs for King Airs, each consisting of four phased inspections. The choice of which program applies depends on how many hours the airplane is flown per year.

The "standard program" is for aircraft that fly at least 400 hours per year. It involves performing one phased inspection approximately every 200 hours. The maintenance cycle is complete when the phase 4 inspection has been completed. The phase 1 inspection is then due 180 to 210 hours later. All four phases must be completed within 24 months.

For aircraft that fly fewer than 400 hours per year, the "alternate program" involves doing both phase 1 and 2 inspections after 200 hours or 12 months, and doing phase 3 and 4 inspections after the next 200 hours or 12 months. Finally, for aircraft that fly fewer than 200 hours per year, there's a "biennial program" that involves an abbreviated interim inspection (basically an operational check) after 12 months and then doing all four phased inspections at 24 months.

These three alternative inspection programs give owners considerable flexibility, and all are based on the concept of completing all four phases every two years. If that's not sufficiently flexible, owners have the opportunity to modify the program and ask their FSDO to approve it as an AAIP.

## What about the rest of us?

Frankly, it has always baffled me why the FAA—in its infinite wisdom—approves this kind of two-year phased inspection program for King Airs but requires a complete inspection every single year for a Pilatus PC-12 or Daher TBM 940 or Cessna 421 or Mooney 252. Not only does this seem to make no sense, but it seems contrary to one of the FAA's most fundamental guiding principles, the “safety continuum doctrine.”

Mandated by Congress, the safety continuum doctrine recognizes that different types of aircraft and operations require different levels of safety. Under this doctrine, aircraft that carry more people, that weigh more, and that fly faster need to be held to a higher level of safety than ones that are smaller, lighter, and slower. Public carriers need to be safer than private carriers. Based on this doctrine, experimental amateur-built, light sport, certificated GA and transport aircraft are held to a progressively higher level of safety. This makes perfect sense, doesn't it?

So how does it make sense that a Cessna 150 requires a complete inspection every 12 months, but a King Air requires one every 24 months? Beats me!

The FAA could fix this seemingly absurd situation simply by granting owners of all “rest of us” aircraft the same privilege it now grants to owners of turbine-powered rotorcraft: the privilege of choosing which bucket we want to place our aircraft in. If the FAA made this simple change to §1.409, then the owner of a Beechcraft Bonanza or Cessna 310 or TBM 940 could choose to do annual inspections or to follow a manufacturer-recommended phased inspection program (with no FAA-mandated 12-month limit).

If the FAA made this rule change, then manufacturers like Cirrus and Diamond would probably develop much more enlightened phased inspection programs where things like engines, propellers, wheels, brakes, and tires would be inspected more often and other things like internal structure and instruments and avionics and control cable tensions would be inspected less frequently. Hopefully our aircraft could then have a 24-month inspection cycle the same way King Airs do now. And if Beech or Cessna or Mooney didn't step up to the plate and develop such programs, then perhaps type clubs could do so and get the FAA to approve their programs.

Of course, all this is fantasyland—defined in my dictionary as “a place that is unreal or imaginary or that excites wonder.” None of this can happen without this simple rule change by the FAA to let the “rest of us” play in the same bucket that the “big boys” do. I'm not holding my breath.

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Photography by Chris Rose.



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## Mike Busch

Mike Busch is arguably the best-known A&P/IA in general aviation. He writes the monthly "Savvy Maintenance" column in AOPA PILOT and hosts free monthly EAA-sponsored maintenance webinars. Mike is a mathematician by training, having received his Bachelor of Arts degree in mathematics from Dartmouth College. After Dartmouth, he did graduate work in mathematics at Princeton University and in business administration at Columbia University. While at Dartmouth, Mike did pioneering work in computer software development, and ultimately retired from a long, successful career as a software entrepreneur. Mike then co-founded AVweb in 1995 and served as its editor-in-chief and investigative journalist until its sale to Belvoir Publications in 2002. Through his work as a type club tech rep for Cessna Pilots Association, American Bonanza Society, and Cirrus Owners and Pilots Association, and as CEO of Savvy Aviation, Inc., Mike has helped thousands of aircraft owners resolve thorny maintenance problems that have stumped their local A&Ps. Founded in 2008, Mike's company Savvy Aviation, Inc. provides a broad palette of maintenance-related services to thousands of owners of piston GA airplanes. Those services include maintenance management and consulting, engine monitor data analysis, a nationwide prebuy management program, and 24/7 breakdown assistance that's essentially "AAA for GA."



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