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Going Beyond

Preflight



Tips for Perfecting Your Preflight Inspection

On the evening of July 12, 2002, a pilot operating a Piper *Warrior II* departed Wiley Post airport (KPWA) in Bethany, Okla., to McKinney, Texas, to pick up a friend's family and head back to KPWA. During the return leg, the pilot and his passengers—a mother, her 5-year old son, and 14-year old daughter—experienced what many pilots only have nightmares about: an in-flight fire. The passengers first realized there was a problem when they noticed a burning smell and excessive heat coming from beneath the aircraft's backseat. A fire broke out minutes later, filling the small airplane cabin with smoke and flames. Calm nerves, quick thinking, and properly executed emergency procedures saved the day as the pilot safely landed the smoldering plane on a nearby interstate highway and all aboard exited without injuries. However, as was discovered in the ensuing investigation, the pilot was unaware of a missing item required by an airworthiness directive (AD), which, if caught during preflight, would likely have avoided such grave danger.

For many pilots, the preflight inspection cliché of “kick the tires and light the fires” is difficult to shake. Then, there is the strong tendency to fall victim to complacency, especially when dealing with an aircraft you fly all the time. Consider this: NTSB aviation accident data show that in the last 10 years, poor preflight inspections caused or contributed to 156 general aviation accidents and resulted in 41 fatalities. As these pilots, including the pilot of the Piper described above, have discovered, a good preflight can be the difference between a safe flight and quite possibly your last flight. Let's have a look at how you can hone your inspection skills and go above and beyond a routine preflight.

Read Between the Lines

Every good preflight starts with a basic, yet valuable tool: a checklist. Given the multitude of aircraft types and the variations of all you can see and feel during a preflight, a checklist is an excellent resource for ensuring you follow a reliable workflow

Photo by Susan Parson

and cover all the required inspection items for your aircraft. But, there is a lot more to a preflight than checking items off a list.

“Not everything you need to look for is spelled out nicely on a checklist,” says Steve Keesey, FAA airworthiness safety inspector. “A good pilot knows there are several items ‘between the lines’ that are equally important during a preflight.” One such item, often accomplished before even seeing the aircraft, is ensuring its airworthiness from a records perspective. The *Nuts, Bolts, and Electrons* article on page 28 offers more on this subject, but a task worth mentioning here is the AD compliance check.

Had the pilot in the in-flight fire scenario known how easy it is to determine that an aircraft is out of compliance with an AD requirement, he and his passengers would have been spared the onboard fireworks. In this case, the culprit was a missing piece of plywood between the battery and the springs under the backseat. The plywood was required by a one-time AD in 1982 and compliance could easily be verified by just lifting the backseat. Without the plywood, the seat springs and the battery terminals made contact, shorted, and caused the fire. The plywood was removed during one of two interior modifications, which took the Piper out of compliance with this AD, and the missing plywood was never discovered or corrected during subsequent annual or preflight inspections.

While not all ADs cover items that are easily visible or obtainable during a preflight, be sure to include those that are during your inspection. A good example of AD compliance that is easy to verify but not included on the manufacturer’s checklist is the seat-track installation on many Cessna models. During preflight, look for excessive wear across the seat-track holes and for proper operation of the lock pins that keep the chair in place. AD 87-20-03 R2 contains more information on this important check.

Finding information on ADs applicable to your make and model aircraft is easy—just click the AD link from www.faa.gov. You can search by make, appliance, product, or AD number. You can also glean helpful tips on AD awareness by getting involved with your local type club or by simply asking an AMT or owner of a similar type aircraft.

Let’s Go For a Walk

Learning the importance of a quality preflight inspection is something engrained in a pilot’s basic skill set from day one. Some student pilots may get overwhelmed by all the tugging, pushing, pulling, and jiggling going on during a walk-around inspection, especially with certain aircraft systems that can seem foreign to a beginner. However, your flight instructor should be there to help you understand what you are checking and help take the mystery out of the process.

“It’s easy to go through all the motions of a preflight without really knowing what you’re doing,” says FAA Aviation Safety Analyst Barry Hyde, who recalls his years as a passionate advocate for sound preflight checks during his time as a flight instructor. “One thing I always stressed to my students was to be as familiar as possible with all the aircraft’s components and systems. The more you know about how certain parts operate and interact with each other, the better you’ll be at knowing what to look for during preflight and how to handle an emergency in flight.”

When preflighting an aircraft, whether it is for the first or the thousandth time, ask yourself some basic questions about what you are looking for and how the item you are inspecting could affect your flight. For example, you may strain fuel from your aircraft and get a clean sample every time. But, have you ever seen exactly what the fuel would look like mixed with water and/or contaminants? And, what if



This Piper fire had a safe outcome (see article), but stands as an important reminder to verify AD compliance before your flight.

Photos by John D. Montgomery



Photos by Susan Parson

some Jet A or AVGAS 80 or 100 somehow wound up in your fuel tanks? Would you know how to detect it? How do you know you would not mistakenly overlook something you checked without incident a hundred times before? NTSB data show dozens of recent cases where improperly checked fuel led to a tragic result.

Another important item to consider is the life-blood of your aircraft: the engine oil. A preflight should always include a look at the quantity and condition of oil in your engine. Even if the oil looks fresh, it is still a good idea to note the last time it was changed. The cooling and lubrication properties of oil can degrade if it sits for a long period of time. Also, if you find yourself having to regularly add oil, or notice the level dropping, your aircraft may have a leak somewhere. Check for signs of oil in and around the engine compartment and study the ground beneath where you regularly park for any unusual stains or spots.

Don't forget to replace and tighten the oil filler cap after an inspection. The pilot of a Cessna 182 forgot to do just that on May 12, 2007, resulting in a fatal accident. Data from the investigation of that accident suggest that oil escaping the engine through a loose oil filler cap obstructed the aircraft's windshield and may have caused the pilot to impact the ground during a landing attempt.



Preflight Highlighted at Safety Standdown

If you are headed to the Sun 'n Fun International Fly-in and Expo this year in Lakeland, Fla., be sure to check out the "Going Beyond Preflight" seminar presented as part of the FAA Safety Team's 2nd Annual Safety Standdown (also at various locations nationwide—see www.faasafety.gov/Standdown/ or your local FAASTeam rep for details). The presentation will offer more details on what to look for during your next preflight, whether it's how to spot worn, broken, or loose components, or how to verify if your airplane complies with all the necessary inspection and AD requirements.

Where the Rubber Meets the Runway

Anyone who notices the long black streaks at the approach end of a runway can appreciate the brutal forces aircraft tires endure during the transition from being airborne to earthbound. Exposed to a regular mix of temperature extremes, pressure changes, and powerful friction forces, aircraft tires definitely require special attention during a preflight.

For instance, do you know how much tire wear warrants a replacement? If you can see the casing fabric or notice any large bulges, cuts, or cracks, you know it is time for a tire change. How about the last time you checked the air pressure? Do you know what the acceptable pressure is and the best time to check? In some cases, it could take hours for an aircraft tire to cool to the ambient temperature after a flight. Uneven wear on a tire could also mean your aircraft is trying to tell you something: The tires could be over- or underinflated, or there could be a problem with gear alignment. When in doubt, have an AMT check it out.

What's Your Type?

Another overlooked area during a preflight inspection is recognizing the differences between aircraft types. For example, pilots who fly a high-wing Cessna 152 may find it a lot harder to crouch down and inspect flap hinges or sump fuel on a low-wing Piper *Cherokee*. A low-wing aircraft also has a greater tendency for wing or flap damage, such as that caused by someone standing on a no-step area, to go unnoticed.

Even among similar manufacturers there can be big differences—a Cessna 172 could have as few as three or as many as 13 places to drain and inspect fuel. That could prove crucial to a pilot who rents an aircraft and skips over unfamiliar fuel strainer locations.

While it would be impossible to cover the almost infinite number of maintenance "gotchas" and scenarios you might encounter during a preflight, I hope this article has piqued your curiosity about

aircraft systems and the items you routinely check during a preflight but may take for granted.

As acting Assistant National FAA Team Manager Phil Randall points out, it is more than just knowing your aircraft that prevents mistakes, it is knowing how to properly follow through and execute that knowledge that makes the difference in a quality preflight.

“Sometimes just the sheer repetition of an inspection task—even with an aircraft you know inside and out—could lead you to miss a problem that is staring you right in the face,” says Randall. “By taking your time and by mentally reviewing each item you check, you will have a much better chance of catching something unexpected.”

Case in point: We have all heard—often with disbelief—about pilots who become statistics because of something as obvious as forgetting to remove a control lock before takeoff. These are tragic reminders of how distractions and complacency can creep into even the most steadfast safety routine and wreak havoc.

On your next flight, make it a point not to speed through your preflight checklist. Instead, take the time to know exactly what it is you are checking

Preflight Knowledge Check

Question:

When does an aircraft’s airworthiness certificate expire?

Answer:

It does not expire, provided it remains within the guidelines established for its approved type design, is in a condition for safe operation, and maintenance, preventive maintenance, and alterations are performed in accordance with 14 CFR parts 21, 43, and 91.

and why you are checking it. Learning to challenge yourself to go above and beyond your preflight will make you a wiser and safer pilot. ✈️

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For More Information

Check out the AOPA/Air Safety Institute Aircraft Preflight Safety Quiz with a free account at

www.aopa.org/asf/osc/loginform.cfm



Among the critical steps of a proper aircraft preflight, shown here and on page 14, include checking the fuel (p. 14, l), inspecting the engine compartment (p. 14, r), checking the oil (top), and checking the condition of the flight controls (l and r).