



**BRADY LANE**  
BETTER PILOT / AB INITIO

EAA multimedia journalist Brady Lane chronicled his journey to earn his sport pilot certificate at [www.EAA.org/wings](http://www.EAA.org/wings). *Ab initio* is Latin for "from the beginning," and in this column he'll continue to share his adventures as he gains experience as a newly certificated pilot. —Eds.

## “You Smell That?”

Diagnosing burning smells in the cockpit

**LEVELING OFF AT 9,000** feet we were still in the same layer of clouds we entered 7,000 feet below. Not the conditions we were hoping for on this cross-country trip, but I was in good hands. Jeff Skiles, the first officer of US Airways' Miracle on the Hudson Flight 1549, was at the controls for this leg from Wisconsin to Tennessee. I sat in the back seat and enjoyed watching Jeff methodically scan the instruments of this Cessna 180, keeping the needles pegged right where they should be.

Then we smelled it: a very distinct burning smell. No smoke, but it was strong and immediate. Our casual conversation ceased.

Watching from the back seat, I sat in silence, helpless for what seemed like an eternity. Jeff did nothing. Finally, he calmly said, “I’m going to turn the heater off.” Leaning forward, he switched the cabin heat off. The cockpit again returned to silence and we waited.

The smell began to dissipate, and I let out a deep sigh.

I’ve reflected on what I saw Jeff do during those heart-pumping eight seconds and have learned more than I realized at the time. For the remainder of our flight, I wrestled with a tough question—what would I have done if I were the pilot in command?

### SLOW HANDS

I was initially surprised Jeff didn’t start flipping switches the second he smelled something burning. He had slow hands. I learned later this is a practice regularly taught to military and airline pilots. Before taking any action, Jeff continued to fly the plane and thought about the situation, which was obviously the right first step. Had Jeff switched the master off immediately, we would’ve lost all communication with the controllers—not an ideal situation while flying blind in the clouds. Cutting the engine or fuel supply would’ve also been the wrong decision.

Adrenaline kicks in during moments like this, and it’s important to make yourself slow down and think. Jeff did that. Flipping switches frantically will likely only make more problems.

First lesson: Think. Be intentional. Have slow hands.



Brady conducted a series of test-burns to explore the range of smoke odors.

**DIAGNOSING THE SMELL**

So, why did Jeff shut off the heater? It's not like he had just turned it on, and it didn't smell like that dusty heater smell to me. "So, what did it smell like?" a colleague asked me upon returning home. "A burning smell" was all I could say to describe it.

Trying to describe the smell revealed a gaping hole of experience in my résumé as an aviator: I couldn't differentiate various burning smells.

**First Lesson:**  
**Think. Be intentional.**  
**Have slow hands.**

I know the correct textbook answer for what to do during an electrical fire, but it wasn't until I smelled that burning smell at 9,000 feet that I realized when you're in

flight, it's difficult to distinguish a burning drop of oil from a burning piece of wire.

This flight provided all the motivation I needed to become a more informed student of smells.

**WINE TASTING**

To a rookie wine connoisseur, a wine just tastes like wine. It's only after a bit of experience that someone can distinguish a merlot from a shiraz or a pinot grigio from a riesling.

Upon returning home, I wanted to conduct something similar to a wine-tasting event by sampling the burning smell of various substances commonly found in aircraft. A couple other pilots joined me for this exercise where after sampling each substance we discussed what it smelled like, where it was found on a plane, and what the correct action would be in each situation.

We all agreed, no matter what was burning, the best action would be to land the plane as soon as possible to investigate the problem on the ground. Even if the smell dissipates, there was a cause, and you and/or a mechanic should find that cause.

However, on the way to the nearest airport, or even nearest field depending on severity, there may be some things a pilot could do to eliminate or resolve the problem. That was the purpose of this experiment—to discover how these smells differ from each other so we could take some pro-active and thoughtful steps, like Jeff did.

Smoke often accompanies smells, but not always. If you do encounter smoke in the cockpit, landing immediately becomes even more critical. Dealing with smoke in flight is an entire discussion on its own, so for the sake of our experiment, we focused primarily on recognizing and diagnosing smells.



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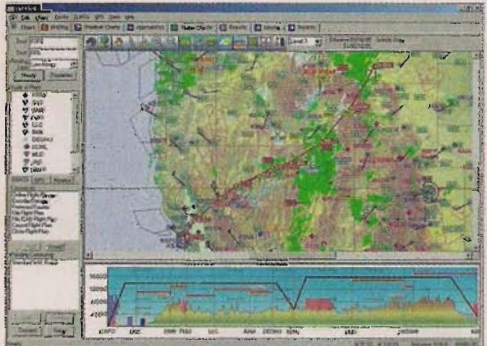
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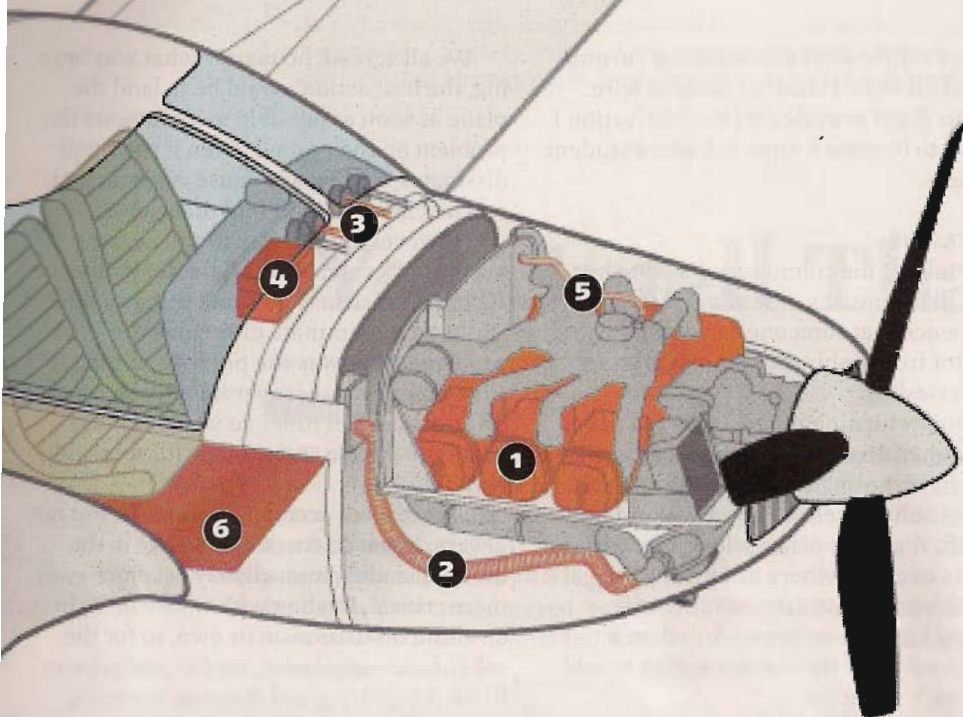
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### 5 RUBBER HOSE

**How it smells:** Deep, sharp, acidic, toxic, like burning tires or a car peeling out

**Where it's found:** Fuel/oil line, alternator belt

**What to do:** Shut off non-essentials, watch ammeter, land, and investigate.

### 6 CARPET/INTERIOR

**How it smells:** Acidic, plastic, unnatural, acrid, like burning tennis shoes

**Where it's found:** Along cockpit walls, floor, and panel

**What to do:** Shut off heater, turn off non-essentials, watch the ammeter, try to identify source, land, and investigate.

### CONCLUSION

While burning smells are not commonly experienced in flight, they're also not particularly rare. There is a hot engine just a few feet away from us on every flight, so we'll all likely smell something eventually. It may just be a harmless drop of oil on a cylinder, or it could be the first sign something is not right and you need to get back on the ground immediately.

Every airplane has emergency procedures for such situations, and it's important to know them for the aircraft we fly. However, practical understanding in diagnosing the situation can also be greatly beneficial.

Before those eight seconds at 9,000 feet, I thought my textbook answer about what to do with an electrical fire was sufficient. I still may not be able to tell a merlot from a shiraz, but I am one step closer to distinguishing a drop of smoking oil from a loose hose cooking on exhaust pipes.

I'm extremely thankful for my experience with Jeff. Flying with other pilots, especially experienced ones, can provide some of the best training for new pilots like me.

After we landed, I asked Jeff what he thought the smell was. He didn't have a clue, but with a grin on his face, he said he knew it wasn't a bird. *EAA*

**Brady Lane**, EAA 808095, is a multimedia journalist for EAA and a sport pilot.

## I am one step closer to distinguishing a drop of smoking oil from a loose hose cooking on exhaust pipes.

Here is our unofficial, non-scientific analysis of what we burned and smelled.

### 1 OIL

**How it smells:** Metallic, hot, natural, dirty, like a hot airplane engine after a flight  
**Where it's found:** Oil leaks can originate in a variety of places like oil lines, oil filters, etc., but it is likely to burn or smoke when coming in contact with hot surfaces like the exhaust pipes or cylinders.

**What to do:** Monitor oil temperature and oil pressure; think about what's been worked on recently (i.e., an oil change, filter, etc.). If the smell goes away quickly on its own, it may have just been a drop that burned up. If it continues or gets stronger, it may be a more serious leak. Either way, land and investigate.

### 2 SCAT TUBING

**How it smells:** Mild, rubbery, like an old gym mat

**Where it's found:** Air intakes, heater, carb heat system, etc.

**What to do:** Turn heater off.

### 3 ELECTRICAL WIRES

**How it smells:** Potent, sharp, unnatural, plastic, sweet, like toasted marshmallows

**Where they're found:** Wires to lights, instruments, panel, etc.

**What to do:** Did you just turn something on? Turn it off. Did a circuit breaker pop? Turn off non-essentials. Monitor the ammeter. If the smell or smoke continues and you can't identify the specific source, consider turning the master switch off.

### 4 ELECTRICAL RESISTORS

**How it smells:** Toxic, potent, unnatural, like burnt caramel

**Where it's found:** In avionics, instruments

**What to do:** Look to see if an instrument or radio failed; pull the circuit breaker for that instrument if it hasn't already popped. Does the smell continue or does it go away? Monitor the ammeter.