

Command Pilot

What I Won't Do

By Thomas P. Turner

One of the most elusive concepts in personal aviation is the idea of personal minimums. There are hundreds of articles that promote the idea of deciding what may be legal and safe, but you may feel this is too much for you. I've written several such articles myself. Two common themes I've addressed are that:

1. you should adjust your minimums up and down to meet your level of currency, for example, raise the minimum ceiling and/or visibility that must exist before you begin an instrument approach depending on how long it's been since your most recent Instrument Proficiency Check (IPC); and
2. personal minimums are only as good as your personal discipline. You can't violate your personal minimums just because they become inconvenient to getting to where you want to be at the time you want to be there.

Evaluating your own certification, currency, and skills is hard to do. Personal minimums aren't popular because by their nature they limit the utility of the airplane, and some pilots interpret them as an admission that you're not as good as other pilots who will accept conditions and situations you choose to avoid. Instead of coming up with a detailed personal operations manual listing as many possible scenarios as possible, and specific conditions under which you will accept or avoid the risk, I prefer to think about things I vow not to do...and then work to avoid doing them. This article covers the first of many things I've decided I won't do in an airplane.

I won't run out of fuel. Although we tend to focus on the unusual situations that result in in-flight engine failure or the need to put some money into an engine

because of something that's found using an engine monitor or at annual, statistics prove that our engines are extremely reliable. In ABS-type airplanes and the entire piston airplane fleet, the vast majority of engine failures result from the pilot's mismanagement of the fuel system – they are 100 percent avoidable. *Fuel starvation*, that is having fuel on board the airplane but not getting that fuel to the engine, is somewhat more common in Beech airplanes than *fuel exhaustion*, which is running completely out of fuel. Both scenarios are a significant threat.

From decades of evaluating fuel-related crashes in Beech piston airplanes, and my own 30 years as a Bonanza/Baron instructor, here are some techniques to avoid fuel mismanagement accidents:

- Whenever possible, personally fuel your airplane, or watch it being refueled. Ensure that the proper type and quantity of fuel is added in the tanks you want it put into.
- Compare the fuel bill to your expectations. Check the amount of fuel that was added against the amount you thought you would need. If there is a big discrepancy, figure it out, whether less fuel than you expected was put in or you needed more than you thought because your fuel tracking was flawed on prior flights.

- If you're not present during refueling, check the fuel receipt for the type of fuel that was put in – the price is different and FBO fuel tracking procedures are strict, so although the line guys may get it wrong, the fuel bill usually gets it right.

- Check all available fuel quantity indications: a visual check, sight gauges in airplanes so equipped, a record of engine time and fuel added, fuel totalizers, fuel gauges, and fuel receipts. If any one source differs from the others, resolve the discrepancy before takeoff to arrive at a positively identifiable fuel level and tank distribution.

- Check all the fuel sumps before takeoff, whether or not the airplane was refueled. The longer the airplane has sat since fuel was added, the more likely any contamination will be detectable in your fuel sample. So it's even better to check the sumps if the airplane has not recently been fueled.

- Personally close the fuel caps to make sure they're properly secured. If you weren't at the airplane when it was fueled, open and secure the caps before your next takeoff.

- Add fuel to your totalizer based on verifiable, known quantities, not just the amount you asked to be put into the airplane.

- Adhere to fuel system limitations in the POH and any Supplements for modifications, including using auxiliary tanks only in level cruise flight.

- Do not run auxiliary fuel tanks completely dry – their longer fuel lines have a history of developing a vapor lock if emptied that may not be eliminated without removing the associated tank's fuel cap...something you obviously cannot do in flight.
- For those engines with fuel return lines, know which tank return fuel flows to at different tank selections, and the rate at which return fuel flows. If the engine feeds directly from auxiliary tanks, add the return fuel amount to the current fuel burn rate to determine how soon the tank will be empty. Then switch tanks before the tank is depleted to avoid vapor lock.
- Leave the auxiliary fuel pump OFF when the engine-driven fuel pump is working properly unless you're flying a 58P, 58TC, or a Travel Air that has a completely different fuel delivery system from most Beechcraft, or a modified airplane that has specific guidance in the POH Supplement for using the auxiliary fuel pump in flight.
- Switch to the tank you'll use for takeoff no later than before you do your Before Takeoff engine run-up. That way you know the engine is drawing fuel sufficiently to support power on your takeoff tank. Some pilots like to start the engine on a tank and not change that selection until level in cruise, while others like to test the system by starting on one tank and switching to the other tank before the run-up. Whichever technique you prefer, make your last selection before your Before Takeoff checks and always take off on the tank you use for the run-up.
- During climb and occasionally in flight, scan the area around and behind fuel caps to see if fuel is leaking or being drawn out because of a bad cap seal or a poorly fitting fuel cap.
- Lean the engine to attain your performance and endurance goals.
- Plan not only how long you'll be aloft, but when you'll switch tanks (except in Barons with interconnected tanks). Compare your expectations of how much time and how much fuel at points along your flight to these expectations. Repeatedly recalculate your fuel remaining in each tank and fuel remaining at destination, as your flight progresses, and check that against your fuel minimums.
- Don't dismiss the indications of factory fuel gauges. Totalizers tell you how much fuel has gone through the engine, but not how much remains in each tank. Totalizers also cannot detect fuel leaks. A common leak scenario is the fuel cap vents fuel overboard. A blocked fuel vent causes a fuel bladder to collapse, may actually move the fuel tank sensor floats up and cause an erroneously high fuel indication in the cockpit. Beware any indicated increase in fuel level as much as any unexpectedly low fuel indication.
- Ensure your fuel gauges are accurate. Our Australian friends are required to have their fuel gauges calibrated every two years, and a placard next to the gauges that show the instrument error for each marking on the gauges (similar in concept to a compass correction card). It is possible for our fuel gauges to be reliable. The U.S. Federal Air Regulations require them to read accurately.
- Establish a fuel minimum at destination. For example, I do not drain a fuel tank completely dry, but on a maximum endurance flight I will get one down to no less than two gallons while ensuring the other tank has no less than 12 gallons when I land. That's about one hour's reserve at my typical cruise power setting. This is the required fuel state at my alternate if I need one and/or the weather at

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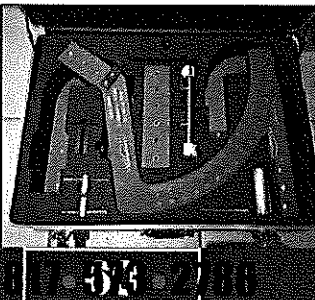
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my planned destination is less than very good VFR with acceptable winds. Under most circumstances I plan to arrive with much more fuel than that...so if I'm going for maximum endurance I'm looking for alternates all the way into the traffic pattern. I have to be willing to stop for fuel at the airport that's 20 miles short of my destination if I won't land with my minimum fuel.

- Make your final prelanding fuel tank selection at Top of Descent (TOD), which is the point you leave your final cruise altitude for an instrument approach or a visual landing. Ensure your selected tank has enough fuel for descent, approach, a go-around or missed approach if necessary, and climb back to level flight without requiring you to switch tanks.
- Do not switch tanks in the traffic pattern, while flying an approach, or any time close to the ground.
- In Barons with interconnected fuel tanks (those that do not have independently selectable auxiliary tanks), run the engines in crossfeed for about a minute before shutdown at least once a month or so to exchange the fuel in the crossfeed lines. There are no fuel drains in the crossfeeds in these Barons, so unless you move the fuel out of them this way occasionally the fuel may become contaminated. I do this just before engine shutdown at the end of the flight so there are several checklist steps to remind me to move the selectors back to the main tanks before the next takeoff.
- Use Start, Before Takeoff, Takeoff, Cruise, Descent, and Approach/Landing checklists to ensure you don't miss any of these techniques if you're distracted or rushed.

I'll continue with other things I won't do in an airplane next time. Meanwhile, ask yourself: What won't *you* do in your Beechcraft?