



FLYING LESSONS for May 2, 2019

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FLYING LESSONS uses recent mishap reports to consider what *might* have contributed to accidents, so you can make better decisions if you face similar circumstances. In almost all cases design characteristics of a specific airplane have little direct bearing on the possible causes of aircraft accidents—but knowing how your airplane's systems respond can make the difference as a scenario unfolds. So apply these *FLYING LESSONS* to the specific airplane you fly. Verify all technical information before applying it to your aircraft or operation, with manufacturers' data and recommendations taking precedence. **You are pilot in command and are ultimately responsible for the decisions you make.**

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This week's LESSONS:

I was flying on a company trip about 30 miles west of my planned fuel stop. I was IFR (flying under Instrument Flight Rules) for additional safety and currency despite the crystal-clear skies. As I began my descent the pilot of another airplane on frequency—I later learned it was a Piper Cherokee Six—called Air Traffic Control (ATC) in an excited voice. "I have a panel fire," the pilot reported. "I just saw a big puff of smoke from the panel. I smelled it too."

The controller replied professionally, but with some excitement in his voice as well. He reported an airport—the same airport I was approaching—was at the pilot's 12 o'clock position and seven miles away. Did the pilot want to land there? Yes, the pilot replied.

"I think it was my fuel gauges," the pilot opined on frequency. "That's where I saw the smoke, and now the gauges read full."

The controller immediately replied: "Do you want to declare an emergency, or just land" at the airport straight ahead? Although the controller phrased it as an either/or proposition, I probably would have replied "both." The pilot replied "I'll just land," and the controller gave him another choice. "You can contact UNICOM on 122.8 or stay with me." "I'll stay with you," the pilot said, professional but still with a little edge.

ATC then asked me to go to UNICOM and check if there was anyone in the pattern. I did and no one replied to my radio call; I reported same back to ATC. The controller advised the Cherokee Six pilot that the pattern appeared clear and the pilot landed straight ahead on the runway.

After I landed and I paid for fuel, I wandered down the empty, former military airfield ramp to where the Six was parked, a mechanic beginning to look at the airplane's panel. I spoke with the pilot who was standing nearby with his baggage, which he'd unloaded from the airplane's nose baggage compartment. I asked if everything was all right—nothing I hadn't heard had threatened the airplane—and commended him for maintaining command and control of his aircraft under stressful and potentially hazardous circumstances.

I offered the Cherokee Six pilot help but he was near his intended destination and was already arranging ground transportation. After my fairly quick-turn fuel stop I checked in with Center for the flight to my destination. "The emergency pilot got down OK and they're looking at his airplane now," I told the controller, who I recognized by his voice as the same one on frequency when I landed. "That's good to hear, thank you," the controller replied.

I think the pilot indeed do a good job. There's one discrepancy, however. What's the first step on most airplanes' Electrical Fire or Smoke/Overheat checklist? That's right: turn the battery master [and presumably] alternator switches off. This removes electricity from electrical equipment, the assumption being there's very little behind the panel that will sustain combustion if you remove the source of heat—electricity.

The pilot had not done that first step. If he had I would not have heard him on the radio. Of course ATC would not have heard him either, so in some cases there may be some value to omitting or delaying this step. It's possible the pilot turned the switch off, isolated equipment and then turned the battery and alternator back on. But the pilot's statement that he had "just" seen and smelled smoke does not support that he'd done that.

CHEROKEE SIX - 300

1. Electrical Fire (Smoke in Cabin):
 - a. Master Switch - Off
 - b. Vents - Open
 - c. Cabin Heat - Off
 - d. Land as soon as possible.

NOTE

The possibility of an engine fire in flight is extremely remote. The procedure given above is general and pilot judgment should be the deciding factor for action in such an emergency.

This omission probably had no negative impact in this case, and permitted continued help from Air Traffic Control. In other scenarios, however, knowing and following the Electrical Fire or Overheat checklist (or whatever your airplane's manufacturer calls it) can make *all* of the difference in your survival.

A common introduction to the Emergency section of an Airplane Flight Manual (AFM) or Pilot's Operating Handbook (POH) goes something like this:

The following information is presented to enable the pilot to form, in advance, a definite plan of action for coping with the most probable emergency situations which could occur in the operation of the airplane. The [AFM/POH] cannot anticipate every possible emergency situation. It is up to the Pilot-in-Command to determine the best course of action when presented with emergency indications in flight.

If you alter the steps of the Emergency Procedures checklists to fit the unique circumstances of an actual emergency, do so intentionally and with a specific purpose...not because you did not know what to do or forgot to perform the procedure.

Questions? Ideas? Opinions? Send them to mastery.flight.training@cox.net



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See <https://www.pilotworkshop.com/botched-go-around?ad=turner-goaround-botch>

Debrief: Readers write about recent *FLYING LESSONS*:

Reader Robert Benda wrote about [last week's LESSONS](#) prompted by the crash of a Beech Duke during liftoff at Fullerton, California. Bob writes:

Thank you for sharing this synopsis and regrettably, tragic example of what can go wrong real fast in a twin. I recently finished a week long course at Tru Simulation in Carlsbad California for the Conquest 1 (C425) aircraft that a client of mine recently purchased and I have been tasked with flying him and his family. One of the items that we practiced everyday in the sim was engine failure at all regimes of flight, especially at liftoff. The C425 has a feature called "Auto Feather" that is checked before each and every flight and is

considered a "No-Go" item if the test is not successful on the ground. When you lose an engine with the Auto Feather working, the system feathers the prop in under 5 seconds, which gives the pilot the opportunity to focus on "Flying the Airplane." With the Auto Feather functionality turned off, the plane rolls about as quick as the Duke did in the video. It is truly an eye-opening experience to see what happens when you get into higher performance airplanes. I will also have to say that another item my instructor beat into me was one of maintaining airspeed all the time. **Pitch for the proper airspeed and fly those numbers, for if something happens, you are not turning into a test pilot.**

As you know, autofeather is not an option in most (if not all) piston twins. With or without it, control requires doing exactly what you say: "Pitch for the proper airspeed." Thanks, Bob.

See <http://www.mastery-flight-training.com/20190425-flying-lessons.pdf>

Corporate captain and frequent Debriefing Karl Fischer adds:

I looked at the incident video many times using "High-Speed Golf Evaluation Jog Shuttle" technology. As you know I have quite a lot of Beechcraft single and multi experience ... Duchess, Baron, Duke (recip and turbine), Queen Air, all the King Airs including the modified, powered-up versions. Have you looked at the video in detail or heard any preliminary NTSB Findings and suspicions?

That 60 Duke experienced some radical diversion from normal flight parameters ... not much left to examine! That left-to-right medium lift helicopter was lucky to be fully ready to lift and translate. Post-impact fire was pretty hard on some line aircraft.

I saw an aft CG Beech 18 follow a similar flight profile. Discovered that its elevator control cables were reversed and the load shifted. [The] obvious conclusion was "failure to accomplish a thorough and proper control check before flight."

[In the King Air] check all flaps starting 'Fully Retracted', then 'Full Deployed' when the [battery] master is energized. Listen and look. Bring them up and or down in stages and check visually (a copilot is useful). Flaps UP or DOWN in the barn [hangar], we started with "fully opposite condition" and checked visual and audibly every new working day. Full preflight, by the book, always "Touch, Look & Listen."

About the [possibility of] control locks on the Duke: If nothing else 'CIGAR' would reveal that status.

With no [copilot]: Control surfaces: I always got the fuel boy to report position visually [to me] or I would do the full check myself before [boarding the aircraft]. Your point that the PIC cannot see the starboard flaps is well taken.

Thank you for your experiences also, Karl. The NTSB has not yet published a preliminary report for this crash, which is not unusual this soon after a fatal mishap. Watch my [Beech Weekly Accident Update](#) in future weeks for a link to the NTSB "prelim" when it's available.

See <http://www.mastery-flight-training.com/beece-weekly-accident-updat-2.html>

Reader Richard Dempsey takes us back where *FLYING LESSONS* intends to be, going from the specifics of one crash to general information that applies to all our flying:

Too early to tell what happened with the Duke accident as you said, but it certainly did look like something failed while flying below V_{MCA} .

I had the privilege to get a type rating in a B-25 once. I often saw warbirds pilots rotate, then stay in ground effect for some time before climbing. I thought it was for the airshow, as it is where I see them fly the most.

In training I learned that it isn't so: V_{MCA} in the B-25 is 20 knots higher than the rotation speed. It isn't possible to rotate at V_{MCA} because you would be bouncing off [the runway] too much. So we rotate, then stay on ground effect until we get to V_{MCA} . If we were to lose an engine in that 20 knots gap zone, we would reduce power on the good engine and crash straight ahead. There is so much power on the remaining engine that you would become inverted, much like this Duke. Just an interesting tidbit, when flying twins with a lot of power below the "red radial."

I don't doubt that amazingly powerful military twins with thick World War II airfoils have that characteristic at all. In light twin certification the typical standard is that rotation (liftoff speed in some POHs) occurs at V_{MCA} plus five knots, all in calibrated airspeed. Lift off sooner, or allow the airplane to get slower than that once in the air, and loss of engine power must be dealt with just as you say: **PUSH** to a short-field landing attitude **and HOLD** wings level with rudder, retard both throttles, and land as if you were in a single-engine airplane with engine failure.

See <http://mastery-flight-training.com/20160304-flying-lessons.pdf>

Frequent Debriefer Lorne Sheren wrote about the [April 18 LESSONS](#) derived from what appears to have been fuel exhaustion while the pilot of a Cessna 172 was attempting a fifth (or maybe sixth?) instrument approach after over three hours of flight at the end of a long duty day:

I listened to the ATC recording. A few observations:

- After miss #3 at KFRG [Farmington, New York] it was the controller who suggested he attempt the ILS to 22L at KJFK. Listening, it is obvious that the pilot was becoming increasingly unglued, missing headings and altitudes. Reportedly he was a Boeing 737 rated pilot, trained in USA but employed in Korea.
- It was also the controller who started asking his fuel status. It was never brought up by the pilot, nor did the pilot ever declare an emergency.
- I understand TEB [Teterboro, New Jersey] had substantially better weather but wasn't an option by the time things started deteriorating.

The Flightaware.com tracks indicate that none of the approaches was really performed to the precision that approach to minimums requires. A Hawker landed shortly before the first miss and reported he broke out 100 feet above the minimums. Given the weather report I wonder. And of course it's likely the [rented late 1970s model] 172 had at best rudimentary avionics.

Thanks for your insights, Lorne. It's often said that the skills learned in small airplanes apply to flying large ones, but not all of the skills needed in large airplanes apply to flying smaller ones. A vital skill no matter what you fly is the ability to manage fuel and the willingness to divert long before conditions devolve into an emergency. Even transport-category pilots need to know when to declare "[Minimum Fuel](#)" and "[MAYDAY Fuel](#)" emergency, a *LESSON* learned in the same airspace long ago by [Avianca Flight 52](#).

See:

<http://www.mastery-flight-training.com/20190418-flying-lessons.pdf>

https://www.skybrary.aero/index.php/Fuel_Emergencies:_Guidance_for_Controller#Minimum_Fuel.2FFuel_Emergency_Declaration

<https://www.nytimes.com/1990/02/05/nvregion/avianca-flight-52-the-delays-that-ended-in-disaster.html>

Reader Ron Herold continues the discussion:

Given the fuel and range of the C172 and the weather that day, I wonder if there was an alternative airport. Once the pilot had exhausted the fuel to go to KFRG and then do an approach and missed – was there another airport he could have reached that met the alternative minimums? If the east coast was socked in, there may not have been. There is nothing to the south [but] water. There is Connecticut to the north but it can often have the same weather as Long Island. So the way out was west into headwinds and probably into New Jersey, or northwest back into New York. He probably didn't have the fuel to do that! Clearly, the trick to have done this flight safely was to **stop on the way home** at say the last decent weather airport to **top off**. Then, there would have been fuel for the second leg and I am assuming enough fuel to return to the top-off airport. That would have been safe. **Non-stop was the mistake.**

As I wrote in that week's *LESSONS*,

...the rule requiring an alternate—the 1 – 2 – 3 Rule— describes fairly good visual weather conditions, while the minimums for the alternate itself—600 and 2 or 800 and 2—are fairly low IFR weather. The idea is that **if there's even a chance you may have to fly an approach at your destination, there's a chance the weather will worsen and you'll need to miss the approach.** In that case you need a backup plan that gives you at least a decent chance the weather **there** will be above minimums....

I caution you, however, to avoid planning on an alternate that is under the influence of the same weather conditions that apply to your planned destination. Sure, if you have to miss the approach and somewhere closer works at that time you can go there instead. But at least **plan on having to get away not just from your intended destination, but from the weather that is influencing that area as well.**

I'll add that I think many pilots don't think to file an alternate is one is needed (in today's self-briefing world there's no one to remind you), and that when they *do* file an alternate they pick one very close by the planned destination instead of fully planning out a way to escape the local

weather with enough fuel on board to avoid ending up in someone's front yard (as did the Cessna in question).

Reader Tony Crescimanno sums up this and just about every other *FLYING LESSON* ever discussed:

Good job analyzing this event Tom. "Pilot Error" is the term too often associated with aircraft accidents. The more descriptive term to use should be "**Pilot Judgement Error.**" Here is another example of *a good airplane flown by a pilot with good flying skills who exercised less than good judgment.* Pilots, being human, are apt to error. Let's remember that **to err on the side of safety is always sound judgement.**

Questions? Comments? Suggestions? Let us know, at mastery.flight.training@cox.net

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You Choose the Outcome

The Aircraft Owners and Pilots Association (AOPA) Air Safety Institute (ASI) has released *Thunderstorm Challenge*, its first video-formatted course in a new *Weather or Not* safety course series, sponsored by SiriusXM Aviation. *Thunderstorm Challenge* engages the course taker to fly a scenario and make decisions along the way, to continue the flight or divert when faced with threatening weather.

Choices lead the user down a flight path and subsequently to an outcome that's based on their decisions. Their choices can end well or not so well. At each outcome, users are provided explanations based on their thought process while being given advice on how to make the best and safest choice. They are also offered the option to try other flight paths to experience the results of different decisions. The scenario is accompanied by a short chapter on thunderstorm avoidance strategies, resources, and a 10-question quiz.

Check out [Weather or Not: Thunderstorm Challenge](#).

See <https://www.aopa.org/training-and-safety/online-learning/online-courses/weather-or-not-thunderstorm-challenge>

Interesting data

I saw this online; I can't verify the source of the graphic but the numbers match others I've seen. It presents an interesting look at the numbers of pilots, technicians and others in the industry, and the numbers of aircraft and unmanned aerial vehicles. One note: of the 291,184 registered manned aircraft, [a recent FAA report](#) states 211,757 are general aviation aircraft—everything from light sport to light jets, including rotorcraft. About 140,000 of those are fixed-wing piston airplanes (although not exclusively, the types flown by the majority of *FLYING LESSONS* readers).

See https://www.faa.gov/data_research/aviation/aerospace_forecasts/media/FAA_Aerospace_Forecasts_FY_2019-2039.pdf



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