



FLYING LESSONS for October 11, 2018

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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:

Willful Noncompliance

A Falcon 50 three-engine business jet ran off the end of the 5393-foot (1644 meter) Runway 19 at Greenville, South Carolina. The Airline Transport Pilot (ATP)-certificated occupant of the left seat, and the Private Pilot seated in the right, were killed. Two passengers suffered "serious" injuries and the aircraft broke apart, undoubtedly destroyed.

Air traffic control personnel reported that the airplane touched down "normally" at a normal touchdown point on runway. They saw the airplane's sole thrust reverser on the center (No. 2) engine deploy; the controllers then watched as the airplane "did not decelerate" as it continued down the runway. An airport security video captured the airplane's touchdown and confirmed that the No. 2 thrust reverser and the airbrakes were deployed. The video also showed the airplane as it continued down to the end of the runway and then went over an embankment.

First responders reported that all three engines were operating at full power for at least 20 minutes after the accident with, one engine running until about 40 minutes after the accident. Both the right and left airbrakes (spoilers) were extended. Both main landing gear were fractured at the trunnion and displaced aft into the flaps. The braking anti-skid switch was in the No. 1 position, and there was an "INOP" (inoperative) placard next to the switch, dated the day of the accident. The Nos. 2 and 3 fire handles were pulled. The parking brake was in the normal (off) position.

The NTSB reports the left-seat pilot held an ATP certificate with a type rating for the Falcon 50 with a limitation for second-in-command only. He held a Federal Aviation Administration (FAA) first-class medical certificate issued on August 7, 2108; at that time, he reported 11,650 total hours of flight experience. The right seat pilot held a private pilot certificate with ratings for airplane single and multiengine land. He did not hold an instrument rating. He held a FAA second-class medical certificate issued on March 27, 2017, and on that date reported 5,500 total hours of flight experience.

See <https://app.nts.gov/pdfgenerator/ReportGeneratorFile.aspx?EventID=20180927X41915&AKey=1&RTtype=Prelim&IType=FA>

Three skydivers and the pilot of a 1958 Cessna 182 died, and a fourth jumper was seriously injured, when the Skylane collided with terrain shortly after taking off. The [NTSB Preliminary Report](#) quotes a witness, one of the parachute riggers, as reporting:

... while the pilot was refueling the airplane, he realized that the right wing fuel cap was missing. The pilot asked the parachute rigger to get in contact with the maintenance facility on the airport to see if they had an extra fuel cap. The parachute rigger told the mechanic that they were missing a fuel cap and the maintenance facility sent someone over. The parachute rigger saw the mechanic and the pilot working on the airplane, and later told the parachute rigger that they decided to use "fuel cell tape" over the fuel filler port. The flight then departed with a group of skydivers, and the parachute rigger returned to the hangar to repack parachutes.

When the flight returned, the skydivers entered the hangar and prepared for the sixth flight. When the jump airplane returned the final group of skydivers boarded the airplane for departure. While in the hangar the parachute rigger saw the airplane taxi for takeoff but did not see the airplane depart. Shortly after that he saw a police car heading towards the end of runway 14. The parachute rigger exited the hangar and saw a huge fire at the end of the runway.

See <https://app.nts.gov/pdfgenerator/ReportGeneratorFile.ashx?EventID=20180825X51934&AKey=1&RTType=Prelim&IType=FA>

Most (if not all) Cessna 182s have vented fuel caps. Air must be able to enter the tank through the fuel cap vent to permit fuel to be drawn from that tank. A blocked (or in this case missing) vent may prevent fuel from flowing from that tank to the engine.

The pilot of a Cirrus SR22T was [captured on a widely circulated video](#) hand-propping the aircraft. When the engine started, the power apparently set fairly high, the unsecured airplane quickly began to move forward. As the pilot is seen attempting to enter the aircraft to regain control, a passenger who was aboard is seen rolling off the airplane's right wing, leaving the cabin apparently unoccupied. The Cirrus accelerates into a hangar, causing substantial damage. There appears to have been no significant injuries, although the pilot reportedly went to the hospital because of an injury to his arm.

See <https://www.youtube.com/watch?v=7KpOg9Ci284>

Statements alleged to be from witnesses are included in the online video. One notes the pilot called a mechanic on a Saturday morning asking for a battery charge, as the airplane's battery "did not have enough energy to turn over the prop." The mechanic told the pilot no mechanic would be at the airport until Monday, and "that ended" the call. Six minutes later the pilot called the mechanic again, telling him the Cirrus had impacted a hangar.

Another pilot with SR22 experience heard the collision and came to the scene. That pilot noticed fuel leaking and, entering the cabin, turned off the fuel, pulled the mixture to idle and turned off the electrical system, all of which were still "on."

The SR22T Pilot's Operating Handbook contains a Limitation that requires an operable battery be installed for flight. Arguably, a discharged battery is in violation of this Limitation. You might be able to argue otherwise...but would you want to be this pilot, having to make that argument?

We don't know if the Falcon 50 pilots' lack of qualification for operating the big trijet was a causal factor in the Greenville crash. It appears the inoperative braking system may be a focus of the investigation, with possible [dynamic hydroplaning](#) and/or [reverted rubber hydroplaning](#) as factors to be explored.

See:

<https://aviationglossary.com/dynamic-hydroplaning/>

<https://aviationglossary.com/reverted-rubber-steam-hydroplaning/>

It's unknown what may have led to the apparent departure stall of the skydiving Cessna 182, or if the unauthorized tape-over of the open fuel filler port in lieu of a proper fuel cap was involved in any way.

It's possible that if the pilot of the SR22T had correctly chocked or tied down his airplane while he "propped" the engine, and/or if he had trained his passenger to pull the mixture control at the first sign the airplane was moving forward (to *pull the "other" red handle*), that the admittedly high-risk hand-start would have been successful...leaving the pilot with possible other electrical system and/or battery failure issues in flight that we won't address this week.

In all three recently notorious cases, however, there is a common thread: ***pilots were intentionally choosing to violate regulations, rules or good operating practice.***

It's easy to point at the Falcon 50 crash and say, “these pilots were intentionally noncompliant with the regulations.” Anyone who believes in the need for any safety oversight of aviation at all should agree these pilots did not meet the minimum standard prescribed for the operation, assuming the NTSB preliminary information is correct.

It's probably easy also to agree that the pilot of the Cessna 182 was willfully noncompliant with aircraft maintenance and certification standards by taking off with fuel cell tape in place of a missing fuel cap. Some *FLYING LESSONS* readers, however, might shake their head at this practice but feel there may be some justification for this unapproved modification. The pilot (and readers) may be unaware of the need for vented fuel caps in some airplanes, or how vital those vents are to fuel system and engine operation. The fuel system should work fine using the other tank, they might think. In a concern for “the mission” of one-way air transportation (“up”) in the busy drop zone operation, the line between willful noncompliance and acceptable modification may become a little fuzzy to some.

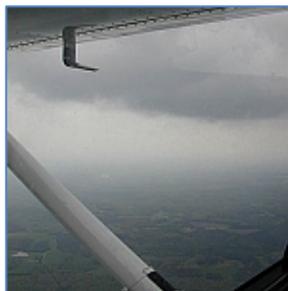
I've heard even some big names in aviation comment on the Cirrus event, focusing not on the need to comply with type design and aircraft Limitations—requiring a delay until the battery may be recharged—but instead on the “correct” way to hand-prop an airplane, even one without much propeller clearance and requiring a downward, body-into-the-prop-arc stroke. When pilots hear this happened on a Saturday morning, and that charging it up couldn't happen until Monday, it's not unexpected that “go mentality” goal-oriented pilots would consider propping the airplane even if they had no prior experience doing so. After all, why do we learn about how the archaic magneto-powered ignition system of our engines works if we aren't supposed to use this information to our advantage?

So ask yourself: *Where do you draw the line* on willful noncompliance with:

- **Pilot certification, qualifications and currency.** What if a pilot is legally qualified, but not current for a given operation? IFR currency? Night currency with passengers? Current in multiengine airplanes, but not in singles?
- **Airplane maintenance and airworthiness.** Unapproved alterations? Inoperative fuel gauges or other required items, if you've developed a work-around? The airplane is “a little” out of annual?
- **Deviations from Standard Operating Procedures (SOPs) or accepted practices.** Are you willing to do things you wouldn't normally do, if the usual way of doing things becomes inconvenient?

Where do you draw the line? Honestly evaluating yourself to be able to answer that question every time you come upon the need to make a decision, then making an objective choice that avoids hazard and protects lives and equipment (in that order), is the essence of risk management. It is what it means to be in ***command*** of the aircraft.

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



How Much Flight Risk Should You Accept?

[Watch this video](#) for a thought-provoking answer to this important question.



See https://www.pilotworkshop.com/how-much-risk?utm_source=flying-lessons&utm_medium=banner&utm_term=&utm_content=&utm_campaign=risk&ad-tracking=fl-risk

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Debrief: Readers write about recent *FLYING LESSONS*:

Reader Marc Dulude revisits recent *LESSONS* about checklists and mnemonic devices:

I wanted to provide my own comment about the use of mnemonics. I have a pre-departure mnemonic that I use every single time and normally even say each item out loud. Mine is very similar to yours and I admit that it surprised me a bit since I thought I had developed it years ago with a prior aircraft and I just keep evolving it with each airplane I've flown since then. Mine is FFFLATTTTS, now for a [Cessna] Citation. It is FUEL, FLAPS, FLIGHT CONTROLS, LIGHTS, ANTI-ICE, TRIM, TRANSPONDER, TAKEOFF HEADING, SCOREBOARD check.

I do agree that so many of the mnemonics the various organizations have tried to put in place just don't stick but I think **when they are used in situations where you want to ensure you've covered a number of required item checks without looking at a checklist for the moment, mnemonics are very effective.** I also like the use of physical flows, again depending on the phase of flight and the needs of the moment. Each has its place.

By the way, people seem to like hearing me go through that pre-departure mnemonic sequence and it seems to provide some kind of comfort that I'm actually thinking about something in the takeoff roll ☺

I agree—mnemonics are great devices for times when you cannot reference a printed checklist. You mention also cockpit *flows*, the process of methodically proceeding—from memory—across the cockpit in a practiced sequence of actions to reconfigure the aircraft. Cockpit flows are the accepted standard in airline and corporate crew operations, backed up by printed challenge-and-response (one crewmember calls for an action, another performs and confirms that action) checklists when time permits. Without a crew, single-pilot operators can use similar flows, confirmed by printed checklists when able and mnemonics when time is limited. Thanks, Marc.

For more read my article "[Checklists and Flows](#)" from AVWeb's *Leading Edge* archives.

See https://www.avweb.com/news/leadingedge/leading_edge_checklists_and_flows_194990-1.html

Reader John Scherer writes about aircraft trim, which is implicated in the Australian King Air crash that prompted our checklist discussion:

My vivid memory of a near trim problem was on a preflight of the C-5 [Galaxy heavy transport]. The flight engineer (they get to the airplane one hour before the pilots) said as I entered the cockpit, "Sir, the elevator trim doesn't look right". So I got in the seat and ran the trim in both directions. It was hooked up **BACKWARDS!** I like to think that I would have caught it during the Before Takeoff checklist, but it was a great catch by the flight engineer. I wish I could remember her name...she was top notch. So, I always pay close attention to trim every time I fly.

For most of us those warnings must come from our own inspection and skeptical evaluation. We're not fortunate enough to have an entire team looking out for us—a reminder that we must always be very, very careful. Thanks, John.

Closer to the event, reader Edgar Bassingthwaight first addresses last week's *LESSON* on accurate landings, and then adds his insights to the Victoria King Air crash that may answer a lot of my questions (and those of several other readers):

Great *LESSON* on landing long, which of course results from having too much energy (speed) when crossing the runway threshold. If you fly through what I call the "gate", that is 30 to 50 feet "over the fence" or runway threshold, stabilised at V_{ref} , and then close the throttle, your aircraft will have a certain amount of energy. Whether you fly it on from that point and use the brakes, or hold it off and decelerate in ground effect, you will use the about the same landing distance, which will be close to the POH performance distance.

I also like your emphasis on **"aim point" which does the same job as a glideslope on an ILS.** In instrument flight if you can't maintain the glideslope without exceeding V_{ref} you do a missed approach. For a VFR pilot,

if you can't make the aim point without exceeding Vref, or are holding Vref but overshooting the aim point, even with the throttle closed, **GO AROUND**.

Regarding the conversation about the mis-trimmed King Air accident at Melbourne/Essendon [Victoria]. *It is possible that the pilot may have been interrupted during the normal pre-flight check where trim travel is checked to left and right stops*. If he was interrupted right at the point of having wound it to one stop, he may have mentally ticked it off and passed on to the next item. If it was not his habit to re-check rudder trim as well as elevator trim in the pre-takeoff check he would not have picked it up.

Not being a King Air pilot, I was not aware that such a check is prescribed. However, where I've written in general terms about *how* pilots can detect and prevent erroneous configurations before flight, your theory is the best explanation I've heard or read to date as to *why* the pilot may have attempted takeoff with the rudder trim deflected to an extreme position. Thank you, Edgar.

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

“When we feel comfortable is when we need to become uncomfortable.”

- Doug Downey, President, Convergent Performance
in AIN's [Tales from the Flight Deck](#)

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