FLYING LESSONS for August 26, 2021

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 in your success as the 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:

Let's catch up with the volume of reader mail…and go direct to the Debrief.

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Debrief: Readers write about recent *FLYING LESSONS:*

Reader Randy Phillips, who is also retired Manager of B777 Line Check Airmen for a major airline, writes about the fatal Lewiston, Idaho crash that prompted the August 12 *LESSONS* and August 19 Debrief:

> What an excellent and valuable summary regarding the Lewiston, Idaho, accident! Sorry to load up your inbox. I couldn't help myself. I would like to add another remote possibility: **Autopilot ON**. Yes, they can be manually overridden…with control input force. Or, clicked off with disengage switch. If…the strange behavior of the aircraft is identified. We're talking about **"startle effect" response time**. This aircraft became uncontrollable in a matter of three to four seconds after becoming airborne.
>
> We'll see if the control lock was a factor when the NTSB issues their preliminary accident report. I'll bet, like you, that I seldom install the control lock on my P35 [Bonanza] unless parked outside with a strong wind. **Upon exiting the runway after all landings**, I raise the wing flaps, open the cowl flaps, set the pitch trim to zero then select the left fuel tank (or the fullest tank)…***making the airplane ready for the next takeoff*** even though I'm heading for the hangar.
>
> On a recent nationwide search for a v-tail Bonanza with a friend, over 50% of the airplanes we looked at had the pitch trim indicating 10 to 12 units nose up sitting in the hangar.
>
> **On my BEFORE TAKEOFF checklist (first item), I engage the autopilot roll mode, exercise the autopilot servos with the heading bug then disengage with the yoke button BEFORE doing the standard control check.**
>
> Following my retirement from United Airlines, I spent three years doing SME contract work with NASA on a project studying general aviation airman adaption to the then new glass (Garmin 1000 suite) avionics. I had

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> the pleasure of working with Key Dismukes and Barbara Burian, chief scientists for NASA's Human Factors division. Since you have demonstrated a high level of thirst for wisdom (just a guess), I've attached a NASA article co-authored by Key which addresses sudden aviation stress among other things.
>
> Looking forward to the next Mastery.Flight.Training email.

Thank you very much, Randy. I greatly appreciate the article—perhaps I'll quote from it in future *FLYING LESSONS*. Back to the discussion, yes, an autopilot malfunction or a pitch trim runaway can also cause a rapid pitch change shortly after takeoff (I had this happen myself, although in my case the nose pitched radically downward shortly after takeoff). Preflighting the autopilot and electric trim, if installed, is (or should be) a routine part of the Before Takeoff checklist. The preflight check procedure will be in the Pilot's Operating Handbook/Airplane Flying Handbook (POH/AFM) Supplement for the autopilot Supplemental Type Certificate (STC).

See:
http://www.mastery-flight-training.com/20210812-flying-lessons.pdf
http://www.mastery-flight-training.com/20210819-flying-lessons.pdf

Reader Henry Fiorientini asks about off-airport landing procedures as discussed in last week's *LESSONS*:

> One question and one observation:
>
> 1. Why turn off the magnetos? What problem does that mitigate?
> 2. Should you not also pop open/unlock the door before touchdown, lest it jam shut upon impact?

Hi, Henry:

1. The idea is to limit the chance of a post-crash fire. If the magneto is OFF any spark that is generated by its rotation is grounded through the P-lead instead of traveling out the ignition harness where it might come into contact with something flammable. It's a long shot, I'm sure, but that's the conventional wisdom and the reason for the checklist step.
2. This is often recommended. But there is another school of thought that says the closed door provides better impact protection. Manufacturers generally don't take a position (or mention it on their checklists) either way. Personally, I'd probably pop the door open.

Reader/instructor Dan Bindl continues the discussion of trim control:

> A half century ago, I did a lot of flight with 'learners' in C[essna]150s and C140s, and one of my routines in those "trainer airplanes" was to arrange for the learner to trim those type airplanes to full up trim, and then on the next takeoff, to have the experience of using full down trim, to learn the importance of attitude management, too supersede pressures, during the takeoff experience.

I've done that too, Dan. But with experience I turned it into what I think is a better *LESSON*: if the control pressures during the takeoff roll feel wrong—it the yoke or stick feels like it's pushing nose up or pulling nose down—abort the takeoff immediately. Come to a stop and clear the runway, then complete a "flow check" of the cockpit and your Before Takeoff final preparations check to ensure the airplane is set for takeoff…notably, trim flap position. Thanks, Dan.

Reader John Townsley adds more about last week's *LESSONS*:

> I was impressed by Wyatt Honomichi's excellent discussion of his highway landing. His account of actions he took is impressive as was the outcome of his emergency. Major KUDOS to Mr. Honomichi!
>
> I think I've mentioned to you I've had a similar **night landing catastrophic engine failure** experience in a Cessna 182. Though for me the oil departed the bottom of the cowl, and I had brakes though once on the ground I chose not to use them.
>
> I came away from my personal "teachable moments" with a few realizations beyond affirming the value of thoroughly pre-briefing the flight, knowing Vbg [speed for best glide] at the weights I would fly, Memory Items, checklists, passenger pre-briefs, the value of ATC, etc.:
>
> 1. **"TWO is ONE and ONE is NONE!"** Piston-powered single engine aircraft are generally reliable. However, **engine failures (either partial power loss or complete power loss) are more common than many of us realize**. For the past several years the NTSB has listed "System

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Malfunction - Powerplant" among the top three "defining events" for general aviation personally flown aircraft accidents. The NTSB also lists fuel issues from starvation or exhaustion as one category among defining events. **Once the engine quits from either a mechanical issue, fuel issue, or other problems like carb ice a successful outcome demands basically the same responses as mechanical failures.**

2. **"Time to Spare? Go By Air!"** See also No. 1, above. **My personal experiences in single engine piston aircraft—three mechanical failures impossible to detect in my preflight, and one exciting carb ice event, two resulting in night landings, 1 day IMC carb ice power loss resolved after descending through 5000 feet of IMC [instrument meteorological conditions] above rough terrain, and a non-emergency day VFR partial power loss from a magneto issue—*I've limited my travel in piston singles to day VMC, with a few exceptions.*** If I *have* to be someplace the next day I schedule appropriately. I generally have five choices: (1) Drive, (2) Reschedule. (3) Use a web tool like GoToMeeting. (4) Buy an airline ticket. (5) Cancel.

3. Aircraft engines are subject to failure (See No. 1, above.). **Even turbines occasionally fail.** In turbine aircraft the risks of engine failure are definitely smaller than in a piston. For some of us that's an adequate margin, for others even that small added risk might be too much. I know of more than one single-engine turbine that dead-sticked to landing. So item No. 1 still applies at some scale.

Best to you. You always give me fodder for thought and discussion!

And your experiences give me a lot to think about, too. Thank you, John.

Reader Lorne Sheren responded to my request last week for opinions about night flying in single-engine airplanes:

Nice work [by the pilot] on the emergency landing. Although I'm *really* impressed at the motorist who realized the plane wasn't stopping and gunned it.

That indeed was a driver with great situational awareness. Lorne continues:

That said: night single engine IFR? I commuted to work [in a Beech Bonanza] from northern New Jersey to West Virginia for ten years, and the flights back Sunday evening were always at night. Sometimes IFR, mostly VFR but always over terrain that was at least mildly unfriendly. **My Baron-owning colleagues thought I was nuts, but I was comfortable with the situation** given my currency at night flight (at that time night accounted for 40% of my flying) and the condition of the airplane. Example: I had run a few hundred hours over TBO and was planning an engine replacement that winter (I drove rather than flew from December until March) when the mechanic discovered bronze chips in my oil filter. He suggested a resample in 10 hours; I ordered a new engine. So **I think its a matter of *you, your aircraft and the terrain*** you are flying over**. *That little voice in your head is always right.*** I wouldn't condemn night IFR per se, there are plenty of LIFR situations that are just as challenging in the day.

As always, it's a balance between risk and utility.

Don't forget that cracked exhaust stack you sent me that I still have on a shelf in my office from that time too, Lorne! Seriously, You're right—it's a matter of personal risk management. You could say it's riskier to fly over Los Angeles even in day VFR. There are huge differences between warm- and cold-weather night flying (as you noted). The key is to remain within the bounds of regulations, aircraft limitations, pilot qualifications and currency…and to "always have an out," which is harder to do at night.

It's often said, "the engine doesn't know" whether it's dark. The problem is, if an engine failure *does* happen at night the options are fewer and **the consequences can be far more severe**. But as long as you've got that "out," the regulations permit the pilot to choose for him/herself. Thanks, Lorne.

Reader Jack Spitler takes us back to the August 5 *LESSONS* and the visual approach (and perhaps circling approach) of a Challenger business jet:

I have waited a bit to address the Challenger event, and will not be exhaustive here. A couple of things are relevant which are not necessarily apparent to [light airplane] aviators, however.

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> Most folks know that **higher wing loaded aircraft fly differently** than lighter ones. Jet wing loads can easily be an order of magnitude greater than even turboprops. Added to this, without experience in same, it is not possible to visualize the **differences between swept vice straight wing airframes in flight characteristics**.
>
> Next, ***there are NO sink rate cues from ambient ear pressure in pressurized aircraft***...something quite foreign to [most] general aviation pilots.
>
> **Therefore, without significant pitch changes, a swept wing jet can quickly develop instantaneous descent rates between five and ten thousand fpm before the GPWS effectively provides warning, and then only if near the surface.** (Rate is related to absolute altitude, but this is not a discussion of certification design, rather of practical experience).
>
> All of these are reasons which DO provide cautionary guidance to all operators... something we have recently discussed....**if/when things go sideways, *always execute the missed approach*** and give yourself and your passengers an opportunity to talk about it later on the ground.
>
> One of my PIC self-inquiries has, for forty plus years,]been]: "If I do this and it doesn't work out, **what will they say in the investigation?**" Alongside this is: "What does it cost to be wrong?" **If the cost is unacceptable, do something else.**

I was aware of most of what you wrote but I had not considered the lack of ear-pressure descent cues in pressurized aircraft. That makes perfect sense. I also appreciate your two summary questions—a great self-query for sanity-checking any decision. Thank you very much, Jack.

UPDATE: The NTSB released its preliminary report on this accident this week.

See:
http://www.mastery-flight-training.com/20210805-flying-lessons.pdf
http://www.mastery-flight-training.com/20210726-challenger-truckee.pdf

Frequent Debriefer and one-time test pilot Dale Bleakney writes about a request from an Air Traffic Controller in the August 5 Debrief:

> I read the feedback from "flight instructor and Air Traffic Controller Dean Brown" and have some comments:
>
> As you know and maybe some of your readers know, I have had a few engine failures in my 45-year career. In my humble opinion, **as much as ATC would like to help** with these situations, ***less communication is better***. The only thing that has helped me is a vector to the nearest airport. I understand how helpless it must feel to be on the other end of the radio and know that the outcome of the event is out of your control, but trying to talk to a properly trained pilot at this time is, in my opinion, **a distraction that the pilot doesn't need**.
>
> **I have nothing but respect for ATC in these situations** but during these emergencies, in my opinion, less is much better. One of my last engine failures, I was IFR on top of a cloud deck (1500 OVC ceiling) and the ATC controller did a great job of helping keep airplanes out of my path and coordinated with the closest airport tower so that I didn't need to worry about other airplanes. They did tell me that they had done this, that I was cleared to land on all runways, and to contact tower. The controller could have given me a frequency to change to, but that was the only missing piece that would have been helpful.
>
> The tower controller had a couple of airplanes waiting for takeoff and one of them was cleared for takeoff. **That airplane pilot politely declined to takeoff until I was safely on the ground.** I sure did appreciate that pilot's willingness to do that. Fortunately, I was able to land on the runway without incident.
>
> Perhaps if the pilot is a student, telling the pilot to maintain best glide airspeed and fly the airplane, open doors, ensure shoulder harness is on, talk them through a restart procedure, etc., might be helpful. But to a properly trained pilot, it just provides **another level of distraction that is not really helpful** at the time.
>
> We have all been told to do the following: **aviate, navigate, and communicate**. These should be **prioritized *in that order***. To the ATC controllers out there, I want to personally thank you for all the help you have given me over my career. To the other pilots out there, **don't be afraid to ask for help** even when the avionics can give you the nearest airport, frequencies, etc.

Thanks for responding from the depth of your experience, Dale.

See http://www.mastery-flight-training.com/20210805-flying-lessons.pdf

Reader Mike Ray takes us back to the July 8 *LESSONS* about two crashes, one a high-elevation departure that ended in Controlled Flight into Terrain…but also prompted more discussion.

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> I made my first real mountain flight in Colorado on July 3rd, the day before the Aspen incident. I flew a round trip from Ft Collins/Loveland on the northern Front Range to Durango in southwestern Colorado, and flew through two passes each way. 14,000-foot peaks coupled with summertime weather and high density altitude considerations are new to me. **My flight planning included several Colorado Front Range pilots who had made the trip** across various routes numerous times and provided valuable advice, and I incorporated all of it. **I also had a CFI on board who had made this trip several times** and who was, in fact, the reason for the trip. And his advice and experience was consistent with that of the locals. This alignment was **critical in providing me with confidence** in the best chance of a successful outcome.
>
> Having completed the flight, I have come to the conclusion that **there is mountain flying, and then there is MOUNTAIN flying**. I have plenty of experience around the eastern continental divide (NC/SC/TN/WV/GA), and while wind considerations for flying/crossing are roughly equivalent (20 knot rule applies), that was really the only consistent element. There is no simple comparison between 5-6000 foot peaks and 12-14,000 foot peaks from a planning, timing, routing, performance and "outs" perspective, at least not for someone who is new to tall peaks and very dynamic weather while flying an unpressurized non-turbo piston aircraft.

See https://www.mastery-flight-training.com/20210708-flying-lessons.pdf

And reader Greg Beckner wraps it up this week with more about the July 8th *LESSONS*:

> I am an 800-hour pilot, instrument rated who recently acquired a 2000 G36 [G1000-equipped Beech Bonanza] with a stock normally aspirated engine. After completing transition training and a couple of solo cross countries I loaded up the family for a trip to Santa Fe, New Mexico (KSAF). **We arrived in the middle of the afternoon on 95 degree day.** Field elevation is 6350 feet so **density altitude, while not reported on the ATIS, had to be around 10,000 feet** [assuming standard pressure and typically low New Mexico humidity, you're correct. – tt].
>
> I was fully cognizant of the issues and **planned to leave early the next day with half full tanks**. I was cleared to land number 2 behind a Civil Air Patrol [Cessna] 182 and all was nominal on the approach and I observed the 182 to exit the runway. Because there was only one controller I could hear the taxi instructions given to the 182 and he was clearly confused. So I was alert to him but still surprised when he did a 180 and taxied back onto my runway as I was clearing the fence at 50 feet. I was already well into my cram, climb, etc. [go-around] before the tower started yelling at everyone. Another controller came on the same frequency and commenced to shout as well. However, I was otherwise busy. As you know "cram" doesn't mean much when you need 18 inches to maintain a stabilized approach in the landing configuration and full throttle is about 20 inches. So there was no "climb" either. Luckily the Bonanza has a fast gear and flaps and this is what saved me from having demonstrate superior aeronautic skills. As I leveled off abeam the 182 the tower controller told me to turn 90 degrees left. Of course **I ignored this questionable advice** and made my way around to an uneventful landing.
>
> My takeaway from this episode is that **while we are all taught about the perils of high density altitude on takeoff nothing much had ever been said to me about problems with *landing* at high density altitude**. I would suggest that ***if you would not attempt a takeoff due to high density altitude you should weigh very carefully whether you should be trying to land in those conditions*** as well.
>
> My second issue concerns the FAA. My opinion is that the 182 [pilot] got confused because the controller issued poor taxi instructions and was sarcastic when the pilot requested clarification. When I called the Albuquerque FSDO to discuss this event I was surprised to learn that all Class D airports are staffed by contract controllers over whom the FAA has no jurisdiction. He said that the FSDO cannot initiate an investigation unless the tower personnel concerned file a deviation against me or the 182 pilot. Obviously they will not do this in a case like this where they may be at fault. So who is policing these people? I hope you can shed some light on this situation.

Excellent observation about landing in a density altitude that gives you pause for taking off under those conditions. You're right—there's not enough talk about landing (and a go-around) at high density altitudes. The chapter on approaches and landings in the *Airplane Flying Handbook* says nothing about density altitude. The *Pilot's Handbook of Aeronautical Knowledge* likewise discusses density altitude and alludes to its impact on takeoff (but not landing) performance, but does not delve into decision-making when landing at high density altitudes.

Readers, if you have a resource for this (specific techniques for high density altitude landings and go-arounds) please let me know. I'll dig deeper for actual reference material as well.

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As for contract towers, they are still managed by the FAA and should be subject to the safe safety reviews and responses as a Federally staffed facility. One option for you might be to file a safety report about the incident you described, both using the Aviation Safety Reporting System (ASRS, the so-called "NASA form") and the FAA Hotline for reporting safety issues. But I suspect you're correct that, if your grievance is more a personnel management issue than a regulatory one, the FAA may not be able to act. In this case you might contact the U.S. Contract Tower Association and ask for its guidance on how to proceed.

Here is more information about the FAA's contract tower program.

See:
https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/airplane_handbook/media/10_afh_ch8.pdf
https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/media/13_phak_ch11.pdf
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https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/mission_support/faa_contract_tower_program/

Thank you, readers, for your input. Your experiences and valuable insights add so much to *FLYING LESSONS Weekly*

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