Thomas P. Turner's
Mastery of Flight
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FLYING LESSONS for December 28, 2023

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 most 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.**

This week's LESSONS:

Never Forget

Sometimes in the process of analyzing accident reports to glean *LESSONS* we can apply to make our own flying safer, it's easy to forget the horrible tragedy that unfolded and the consequences of that tragedy on those aboard, their family, friends and others who depend upon them. I usually manage to avoid criticism for being too objective, and try my best to respectfully acknowledge the human cost while applying what we know to what *could* happen under similar (or even different) circumstances.

No one called me out, or even mentioned it to me in any way, when I included this item condensed from an FAA preliminary accident report in last week's Beech Weekly Accident Update:

> **12/17 2014Z** (1414 local Saturday afternoon): Both persons aboard a Be36 suffered "serious" injuries, and the B36TC was destroyed in a post-crash fire, after crashing into power lines and then a vehicle on a highway while taking off from Burnet, Texas. One person in the vehicle has "minor" injuries. N70SL (EA-459) was a 1986 B36TC.
>
> ("Takeoff/Unknown"; "Serious injuries"; "Airplane destroyed")

See https://thomaspturner.com/beech-weekly/

A possible first thought if I was to develop *LESSONS* from this preliminary information would be a discussion of establishing and maintaining a climb attitude after takeoff, perhaps in reduced visibility conditions or when departing a short runway…things not necessarily the case in this event, but which are at least suggested by the circumstances of the initial report. **Something told me, however,** that this might have also been a partial or total power loss following takeoff, or that collision with power lines was a result of something else. I didn't know, so I simply added that report to the tally I keep on piston Beechcraft mishap statistics.

A few days later I saw this posted on social media:

> I'm the pilot of N70SL. We're in the hospital and when I get time I'll give everyone the play by play. I should be released early this week. For now, I have to be with my wife who is in extremely critical condition with a 30% chance of survival. It'll be a while before I can update you but it was power loss on takeoff with an inflight fire as well. Please be in prayer for my wife. That's the only thing that matters right now.

A loss of engine power including an inflight fire suggests an exhaust system or turbocharger leak that creates a 1300°F/700°C blowtorch in the engine compartment in close proximity to fuel and oil lines. In one case several years ago such a leak burned all the way through the firewall of a Beech Baron, cutting through the forward wing spar with disastrous effect. It can happen fast, with little the pilot can do in response. It's a great reminder of the positive impact of Airworthiness Directives, which warn turbocharged airplane pilots to watch engine exhaust clamps closely and requires they be proactively replaced on a 400- to 500-operating hour schedule depending on the engine type. Even then, there's a chance a clamp might fail sooner, or some other crack mechanism occur, that is hard to detect.

There are a lot of accident commentators out there. Many are very quick to judge the pilot based on meager information of just-released preliminary and local media reports. Some others—the late Richard McSpadden's *Early Analysis* series, Scott Purdue's *FlyWire* videos, Max Trescott's *Aviation News Talk* reports among them—try to be as respectful as possible while drawing positive, actionable information from the data. I hope I'm always as successful at maintaining this respect and objectivity.

See:
https://www.aopa.org/training-and-safety/online-learning/early-analysis
www.flywire.online
https://aviationnewstalk.com/

I try to end each year of *FLYING LESSONS* on a high note. Seeing the B36TC pilot's online comment this week changed that somewhat, but I think we can still be positive. *LESSONS* for the coming year should include:

- Airworthiness Directives (ADs) and other maintenance and inspection requirements are not a bad thing. Sometimes the requirements might not seem to be supported by data, but especially in recent years most ADs must pass stringent rules of evidence before regulators even consider adding a maintenance requirement. Be diligent about AD compliance. Don't be too quick to oppose new proposals, but include hard data in your comments to regulators if you feel they modify or refute a proposed rule. In my real job at the American Bonanza Society I've taken hard data to FAA asking for a necessary inspection requirement that was subsequently adopted, used manufacturer and other objective information to remove some affected models from an existing AD whose design made the AD meaningless for the type, and caused the FAA—again, with data—to withdraw a proposed AD and replace it instead with a recommendation and not a requirement. With data you can be heard. The result is worth listen to (and acting upon) for your personal safety and that of your passengers, not just because it's required.
- If a commentator jumps to personal judgement on the basis of preliminary information, honestly evaluate if it's done to prevent future accidents or if it's just for shock value to increase the number of hits and make the commentator appear more magnificent. Consider the possible motivations before accepting advice or opinion—mine included.
- Never forget the human tragedy behind accident reports. Regulators, investigators and pundits focus on fatal crashes. But surviving "serious" injuries is almost always a major, life-changing physical and emotional event involving real people and all those around them. Even if it turns out the pilot did—or did not—do some identifiable thing that caused or could have prevented an accident, learn the *LESSONS* and leave judgement to others.

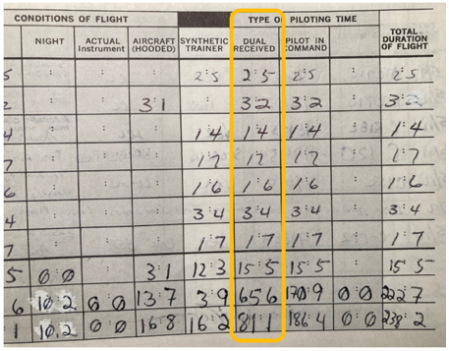
See www.bonanza.org

Have a happy, safe and flight-filled New Year!

Questions? Comments? Supportable opinions? Let us know at mastery.flight.training@cox.net.

An hour's worth?

Has what you've learned in *FLYING LESSONS* this year been worth it to you? How many hours of "dual" have you received from the weekly reports? If you've learned at least as much as you do in an hour of flight instruction, please consider donating the amount you'd pay your flight instructor for just one hour of her/his time. The proceeds will help cover my out-of-pocket expenses for hosting and delivering *FLYING LESSONS Weekly*. If that's more than you feel it's worth, even $5 helps cover my out-of-pocket costs.



I only make this appeal two weeks each year. Please consider donating what you'd pay for **just *one hour* of flight instruction**, to help me cover the costs of hosting, delivering and improving *FLYING LESSONS Weekly.* **Thank you** to all who have contributed through the year, and all who will help now.

See https://www.paypal.com/donate?token=w9YM9qBtM86oFByc-ZC4bf6et7v9vC1R6uS9YhFMP2BzN-7_301FxSgolu9kCP_7BhexCi099wj2W1vF

Debrief: Readers write about recent *FLYING LESSONS:*

Reader/instructor Paul Sergeant writes about engine failure technique, which is a very aircraft type-specific thing:

> As a new Bonanza owner about a decade ago, I spent a fair amount of time on Beechtalk.com to learn from my betters. One of the most valuable pieces of advice I got was ***after an emergency***, especially loss of power, to ***regard the aircraft as the property of the insurance company***. Since it's no longer yours, why risk YOUR life to save THEM money? Now when I teach Bonanza transitions for new owners, that is a point of emphasis (along with your WUSS concept). I do a **drag demo during the glide** to show them the effect of pulling the prop speed back, and of lowering the gear. I remember how surprised I was to see that the first time.

Me too, many years ago. Check out this video you might use with your students. Thanks, Paul.

See https://www.youtube.com/watch?v=pInuDy1Tzo4&t=36s

Mike Radomsky, one of the founders of the Cirrus Owners and Pilots Association and owner of a Cirrus-based simulator training program in Las Vegas, Nevada, writes about last week's *LESSONS* on flying in the fourth dimension:

> Regarding the Fourth, I subscribe to (and teach) the "Quantum Theory of G.A. Flying": You can choose ***where*** you want to go, or ***when*** you want to go, but not (necessarily) both together.

As a once-astrophysics major (I went to college to take up space) who drifted into other areas I love a good science tie-in. Thanks for relating a good way to think about four-dimensional flight, Mike.

See:
https://www.cirruspilots.org/Publications/Articles/a-bonanza-pilot-flies-the-cirrus-sim
https://thomaspturner.com/wp-content/uploads/2023/12/2023.1221-FLYING-LESSONS.pdf

Reader and business aviation consultant Jim Lara adds:

> We were faced with the same weather challenges [as used as a good example in last week's report] returning from the First Flight celebration. We arrived Friday afternoon, planning to stay until Monday morning. As the weather forecasts came into a clear and certain focus, we decided to depart Saturday afternoon. At 2:45 PM, we were airborne from KFFA to KMQI (for fuel), then on to KDKX, our home base.
>
> As we approached The Great Smoky Mountains, our direct route was a 45-degree crossing, about a 230 heading for 22 minutes. About halfway across, we entered cloud at 8,000'. There was a shorter route over the mountains (340 degrees, towards KTRI – Our "Plan B"). Then, after about 5 minutes, mixed icing began, which was neither forecast nor reported. I requested the northwest heading (340) and a lower altitude. First came 7,000', then 6,800' as we began to clear the west side of the mountains. The icing became light to intermittent. Then 6,200', then 6,000 as we emerged from cloud into clear air with unlimited visibility, but moderate turbulence. Next was the left turn to the southwest, direct for KDKX. Another reaffirming lesson/reminder to me that I always need to **think through and prepare a real "Plan B" long before it may be required**.
>
> Tom, thanks for all that you do, write and share. We are all much better pilots, in command of our aircraft and flight operations, thanks to your dedication and professionalism.

Thank you very much, Jim. And thanks for providing another good example from which to learn.

Accident investigator, instructor and past Naval Aviator Jeff Edwards continues:

> Excellent as always… we exercised our fourth dimension Christmas flight from Florida to St. Louis yesterday due to forecast poor flying weather this weekend. It was a great flight clear, blue, and 22. Got to KSUS and Millionaire put in the barn where it will be warm and dry.
>
> As to your article on off-airport landings let me add a few thoughts. This year I did a study of Cirrus off-airport engine out landings without CAPS [Cirrus Airframe Protection System, the parachute] use. The terrain varied from snow covered mountain slopes to treed forests to rocky desert scapes. All were gear down-no option there. Eight five percent of those involved had no or only minor injuries. Fifteen per cent had serious injuries. No one was killed. The takeaway was an affirmation of Bob Hoover's famous quote, ***"fly it all the way into the crash."*** Maintain control of the aircraft. Looking at CAPS pulls….Eighty five percent had no or minor injuries.
>
> Most of the fatal engine out accidents the GAJSC [General Aviation Joint Safety Committee] studied involved a ***loss of control that generally occurred when the aircraft ran out of airspeed and stalled prior to touchdown***. There were also fatal events when the aircraft had too much energy to land in the chosen field and crashed beyond the far end. **Practice is the key to success.**

As I wrote last week, I'm at least as concerned about the destabilizing effect of gear extension late in an engine-out glide as I am the irregular loading that results from landing gear shearing off during impact. Interesting stats from your Cirrus review. 85% of descents under CAPS parachute had no or only minor injuries. 85% of those in which the parachute was not used had no or only minor injuries. If I had a parachute I'd use it when the situation requires. For the vast majority of us who do not have that option, nearly identical results occurred as long as the pilot maintains control to touch down **wings level, under control at the slowest safe speed**. Thanks, Jeff!

Reader John Miller asks (for a friend):

> One of my fellow aviators asked: what about water landings - gear up or down? He is an avid sailplane guy and says a sail plane will submarine under water……maybe your experts can shed some light here.

I don't know about sailplanes (perhaps they have enough cavities they scoop themselves full of water when ditched?). I do know one the worst things you can do in an amphibious airplane is to land in water with the wheels down (far worse than the converse). That may be, however,

because as soon as the airplane pitches forward when the wheels drag against water the nose of the floats dig into the water and flip the airplane over. Experts, what do you say?

Reader Jim Preston takes us back to the tragic event that started much of this train of thought:

> Regarding the Lake Placid accident, I'm a former 1977 Cardinal RG owner. I sold the airplane in 2005, so I can't be completely sure about this, but I'm wondering if maybe the gear was still in transit to UP when they had the engine issues and tried to return to the airport.
>
> As I recall, the gear takes quite a while to retract, and if the retraction mechanism is either directly or indirectly tied to the engine, reduced engine power may have contributed to a longer than normal retraction cycle. From my understanding of the situation, there was some type of engine malfunction upon which the turn back to the airport was initiated.
>
> So, bottom line, maybe the gear wasn't purposely extended; rather, it may not have completed the retraction cycle. I guess we'll find out when we see where the landing gear handle was placed.

Someone earlier (I forget who, sorry) noted the C177RG's unusual nose gear door that works a little like the speed brake on a tactical fighter jet. This would make gear extension even draggier in the Cardinal RG than most other types, and even more of an impediment in an engine-out glide.

See https://skybrary.aero/aircraft/c77r

Yes, I eagerly await more information about the Richard McSpadden/Russ Francis crash to fine-tune Richard's final *LESSONS* to us all. What we know so far is that (from the NTSB preliminary report):

> The purpose of the flight was to photograph the accident airplane while airborne for later publication in a magazine article. According to witnesses, there were two airplanes that made up the flight. The lead airplane was a Beech A36 with a photographer onboard, which took off first…. The accident airplane took off about 700 feet behind the Beech A36…. During the initial climb, the…accident airplane…made a gentle left turn while it was 300 to 400 feet above ground level to join with the Beech A36. As the accident airplane closed to within about 1,000 feet of the Beech A36, it suddenly made a hard right turn back toward the departure airport. During the turn, the pilot of the Beech A36 heard the passenger in the accident airplane transmit on the common traffic advisory frequency, "We have a problem and we're returning to the airport."

A C177RG trying to catch up with a preceding A36 Bonanza most likely had its gear up before the point it turned back toward the airport with a reported problem. However, you're correct, Jim, in that the added drag of retracting landing gear can make matters worse too, if the gear is down in a glide and the pilot decides at the last minute he/she is not going to make it. All the more reason to **use gear-up as the default technique** in an engine-out glide in retractable gear airplanes, unless you find yourself close in and high on the approach to a runway or other prepared surface you could reasonably take off from normally (such as a highway). Thank you.

See https://data.ntsb.gov/carol-repgen/api/Aviation/ReportMain/GenerateNewestReport/193166/pdf

Reader/instructor/investigator and commentator Scott "Gunny" Perdue wraps it up for this week:

> I was reading [the December 15th] newsletter comments to [the previous] week's article. Glad to see you are coming around, I've been preaching that for years.
>
> One additional thing relating to gear shearing off in a GA accident. The strongest part on a GA airplane is the gear, followed by the mounting structure to back it up. If that shears the resulting declaration and unpredictable loading and the follow-on path are unpredictable with one exception. **The G-loading imposed is not survivable.** Our organs will begin tearing as they are affected by differential deceleration. Generally, a human body cannot survive a 26g deceleration without considerable mitigation components.
>
> I could elaborate, but won't. Was the passenger who died in that forced landing wearing their seatbelt? Properly? The seatbelt/shoulder harness is a go-no go for me nowadays.

I posed those same questions about pilot and passenger restraints in the November 30 *FLYING LESSONS*. Thanks, Scott.

See:
https://thomaspturner.com/flying-lessons-weekly/flying-lessons-2/
https://thomaspturner.com/wp-content/uploads/2023/11/2023.1130-FLYING-LESSONS.pdf

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NEW THIS WEEK: Peter Grass, David Butoe, Bill Cannon, Thomas Fankhauser, David Kenny

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