# *FLYING LESSONS* for March 12, 2020

*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:*


**If you follow** social media, any online aviation news, or for that matter many local and national news sources, you probably saw this photo last this week. As the FAA Preliminary Report states,

> …the pilot "declared MAYDAY due to engine failure and landed in a residential neighborhood" at Destin, Florida.

See https://www.fox10tv.com/news/two-men-and-one-dog-survive-small-plane-crash/article_c697bb22-6158-11ea-803b-efb9e9737acf.html

**The flight was arriving** at its planned destination after slightly over three hours en route when the engine failure occurred. ***Amazingly,*** the pilot and his young son, as well as a family dog, not only survived this impact but walked away unscathed.

**The pilot** went on FaceBook and provided a long personal narrative. Highlights:

> I'm a very blessed man tonight. I shouldn't be here right now, but not only am I here, but I don't have a single scratch or bruise. For that, I have a new perspective on life and am eternally grateful to the Lord for giving me another day.
>
> We were cleared for a straight-in approach to runway 14 and the engine quit about halfway between the ocean and the threshold. If you've ever flown into KDTS, you know that the entire area is mature trees and houses. I immediately declared an emergency with tower, ensured I was full rich, power full forward and instinctively switched tanks and attempted a re-start. I put the flaps up and was about to pull up the gear in an attempt to make the field. The engine would not come back to life.
>
> Looking out for a landing spot confirmed my worst fear. There was no place to go and there was no way to make the runway. Even the streets are covered in a canopy of trees. Honestly, I thought that there was no way to survive. I did my best to avoid homes and for some reason only God knows, we were able to walk away after coming to rest in the trees. These things always to seem to end in a ball of flames and I was blessed to find the perfect landing tree. All of this happened in a matter of seconds.
>
> For those speculating, we departed KFSM with full tanks, I ran ROP on this leg at 16.1 GPH in cruise and was scheduled to arrive with 23+ gallons in the tanks according to my calculations and the JPI. When the plane came to rest, there was a strong smell of fuel, my son said he saw fuel pouring from the wings (both torn open) and my biggest fear was that something would catch fire from the spilled fuel. After shutting things down, we got out quickly.
>
> Don't stop flying the plane until it's time to get out. Sometimes that's all you can do.
>
> The FAA and the NTSB have started their investigations. Today, they confirmed fuel was in the belly sump,

> which was a big relief to me, for obvious reasons. Now, the plane is with the NTSB and hopefully, they will find why my engine quit. The information that they gather might help the aviation community avoid something similar happening to the next guy. As for me, while I loved this [Bonanza], my next one will probably have two engines.
>
> I love to fly. This Bonanza has been a pleasure to own and operate. I've been meticulous with maintenance and flight management... Truly, it's been fun and a blessing.

**Shortly before** I saw that excellent online post, the airplane's co-owner (whom I've met before in western Kansas) telephoned me, and also relayed that NTSB confirmed fuel was available in both tanks and in lines to the engine during as-yet-unpublished preliminary investigation. The co-owner suggested investigators are looking into possible ignition system issues that I hope will be addressed in the preliminary report. He said that the airplane was cut apart to get it out of the tree and has been effectively destroyed.

**Both the pilot** in his Facebook post and the co-owner reported, as do other pilots who have flown in the area, that there are few options for a forced landing in that area. It looks as though the pilot did an outstanding job "flying as far into the crash as possible," as Bob Hoover so famously said.

**What almost certainly** saved the pilot's life and that of his son, was the relatively recent installation of shoulder harnesses. Death from massive head trauma to front-seat occupants (who, unlike those in the rear cabin, will hit their head or face on the panel) is ***extremely*** common in airplanes that decelerate rapidly despite the airframe remaining intact, if the airplane is not equipped with shoulder harnesses and/or shoulder harnesses are installed but they are not worn.

**In 1986** a change in FAA aircraft certification required the installation of front-seat shoulder harnesses in all general aviation airplanes from that date onward, and further required that they be used by occupants of those seats. As early as 1977 the NTSB made a formal recommendation that FAA require this as well as retrofit in all airplanes. In 1980 FAA declined to act on an NTSB recommendation requiring retrofit of shoulder harnesses in *all* general aviation airplanes because, as FAA wrote, "there is insufficient justification to impose the additional cost" to aircraft owners to have those shoulder harnesses installed. NTSB called this an "unacceptable" response. The back-and-forth between FAA and NTSB is recorded here.

See https://www.ntsb.gov/_layouts/ntsb.recsearch/Recommendation.aspx?Rec=A-77-071

**In 2011** NTSB published a study that included more than 37,000 general aviation accidents over a 25-year period. The study concluded that:

> The likelihood of serious injury in a crash was 50 percent when the aircraft was equipped with lap belts alone, instead of shoulder-and-lap restraints.

**The same study** included evaluation of the effectiveness of front seat air bags integral to shoulder harnesses, a recent technology available in some light airplanes. A contemporary press account states:

> A three-year study of small plane accidents released by the National Transportation Safety Board found several cases in which air bags prevented serious injuries or fatalities. But investigators said that since only about 7,000 planes have air bags, there haven't been enough accidents yet to judge whether they should be required on all planes.

**As a result** of the 2011 report the NTSB again recommended regulation requiring shoulder harness installation in all light airplanes. The FAA did not act on the recommendation.

See:
https://www.adn.com/bush-pilot/article/ntsb-moving-forward-shoulder-harness-retrofitting-recommendation/2011/02/04/
https://archive.sltrib.com/article.php?id=51028914&itype=CMSID

**To its credit,** a few years ago FAA significantly loosened the requirements for certification of shoulder harness installations to make those installations easier and less costly for aircraft owners operating under U.S. rules.

**The co-owner of the "Bonanza in a tree"** told me on the phone he had "talked [his partner] into having shoulder harnesses installed" about a year ago. Excellent job by the co-owner as well as the pilot in this accident—had *either* not done what they had done, the outcome of this engine failure would almost certainly have been dreadful.

**If you don't** have shoulder harnesses in the airplane(s) you fly, and if you have *any* say in upgrades to the airplane, **shoulder harnesses should be your first, next addition**. If you don't have any say, or are not yet in a position to modify the aircraft, there are portable shoulder harness solutions that may work in the airplane you fly. **Once you have a shoulder harness, *use it!*** You won't have time to clip it on in an emergency if you're not already secured.

See https://www.hookerharness.com/aviationquickie.html

Comments? Questions? Relevant experiences? Let us all learn from you, at mastery.flight.training@cox.net

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# Debrief: Readers write about recent *FLYING LESSONS:*

Reader and aeronautical engineer and pilot (and my one-time "mentee") Allan Herbert writes about last week's *LESSONS* concerning the way stall and "slow flight" training affects the outcome of abnormal and emergency events:

> An observation on your comments with regard to stalls and slow flight training. First with regard to turbine training: the primary Part 142 sim trainers (FlightSafety, etc.) spend little time emphasizing stall characteristics. In my experience [they] provide only one or two "full" stalls during simulator training; the remaining stall events and checkride events are limited to stick shaker activation only. **This is good operational training technique** to be sure, and emphasizes recovery while substantial margin to aerodynamic stall is still available. **Unfortunately, this does rob turbine pilots of experience with the actual stall characteristics of their aircraft.**
>
> Second, with regard to the light piston end of the training spectrum: The current ACS [Airman Certification Standards] encourages slow flight to occur well above stall warning. It is my understanding the activation of stall warning during the slow flight demonstration is grounds for failure during the private checkride, ***pushing students and instructors to bias slow flight training to speeds with lots of "margin."*** This is in contrast to previous PTS [Practical Test Standards] guidance that emphasized minimum controllable airspeed. Secondly, stalls are required to be demonstrated in specified takeoff and landing configurations for power on and power off stalls respectively. Busy and constrained ***training environments*** then ***fail (141 schools particularly) to emphasize exploring stall speeds and characteristics in a variety of configurations*** (I am just as guilty of this oversight).
>
> All of that is to say that **current training regimes do not, in my opinion, sufficiently emphasize low speed handling and maneuvering characteristics at either end of the performance spectrum**. The trend toward encouraging recovery from potential stall scenarios early is laudable and appropriate, **but instructors should emphasize these skills above and beyond the requirements, and pilots should be actively seeking to receive training in the low speed flight regime**. You are aware of these trends, but it is worth emphasizing that ***the push toward middle-of-the-envelope operation is affecting the general aviation world as a side effect of the push toward airline focused training***. GA should be looking to build skills that recognize the difference between 737/A320 operations and 172/Meridian/Cirrus/Bonanza operations.

I agree, Allen. Thank you. The instructional community seems to have always recognized that the ACS and even the superseded PTS represent **a *minimum* standard of pilot proficiency**—

hence the ubiquitous **"you now have a license to learn"** speech that traditionally accompanies the award of a pilot certificate or rating at the end of a Practical Test. Those minimum standards have (arguably) decreased over time by narrowing further the performance envelope pilots are exposed to in training in an ironic quest to make us safer once training is done and we are flying on our own.

***Experienced instructors*** know we should take our students much farther toward the edges of the envelope. But going beyond the minimums is often interpreted by students as, at best, unnecessary (because the FAA does not require it and says we are safe without it), and at worst "milking" them for more money (by intentionally prolonging their training). ***Inexperienced instructors***, who make up the bulk of actively practicing flight instructors and endorse the greatest number of advancing pilots, often don't know the Standards are the bare minimum. If they do (as Allen wrote), they often do not have the flexibility or authority to go beyond the minimums in career-path training programs, and risk the same criticism as experienced instructors training outside that career-path environment.

In my own way I've been trying to help popularize the need to train beyond the minimums for some time, encouraging my readers and students to adopt an attitude of lifelong continuing education. Recognizing that for personal and business pilots who will never again take a checkride for a new certificate or rating, I emphasize meaningful and effect Flight Reviews as the primary means of skills enhancement and quality control, and the best hope for positively affecting the general aviation fatal and nonfatal accident rates.

As early as 2005 I addressed an NTSB symposium on fatal general aviation accident rate, suggesting that pilots receiving Flight Reviews be required to demonstrate competence on a minimum set of Practical Test Tasks that focus primarily on high angle of attack maneuvers, just as Instrument Proficiency Checks already require pilots to demonstrate proficiency on a list of specific Instrument Practical Test Tasks.

This summer, I've accepted an invitation from the Society of Aviation and Flight Educators (of which I'm a Life Member) to make a presentation on presenting effective emergency procedures simulations in flight training, a presentation that will emphasize aircraft control during abnormal and emergency procedures. This is part of SAFE's CFI-Pro program to be held **June 10-11 at Sporty's Pilot Shop at Batavia, Ohio**. CFI-Pro is a program for flight instructors to teach **envelope-expanding maneuvers** to "reinvigorate your teaching and accelerate your mastery and proficiency with new ideas and techniques." Instructors, I hope to see—and learn from you—there.

See:
https://www.mastery-flight-training.com/20200305-flying-lessons.pdf
www.safepilots.org
https://safecfipro.org

Comments? Questions? Experiences to relate? Let us know, at mastery-flight-training@cox.net.

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See:
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## Required Reading

…or they should be

Take a few minutes this week to read or view each of these items:

Gold Seal Ground School's Russell Still writes an outstanding and thought-provoking update on "The Improbable Turn" you may face if you have a loss of engine power shortly after takeoff.

A new NTSB study finds that 28% of all pilots involved in fatal accidents tested positive for drugs the use of which is prohibits the exercise of pilot privileges. 97% of these events occurred in general aviation. Investigators note that pilot impairment was not always a factor in these accidents, and conclude that many pilots do not know how to determine whether a particular (legal) medication is approved for flight.

AOPA reports that the U.S. National Transportation Safety Board vows to speed up the process of accident investigation and publication of final Probable Cause reports. Final reports are rarely published less than 12 to 18 months after an accident occurs. More timely reporting may help us more swiftly develop mitigations to avoid repeating accident causes—if we are willing to learn.

Also from AOPA, a chilling and informative video describes what was supposed to be "Just a Short Flight" of a Learjet, and *LESSONS* from the tragedy that unfolded.

See:
https://groundschool.com
https://groundschool.com/articles/the-improbable-turn
https://www.ntsb.gov/news/press-releases/Pages/NR20200310b.aspx
https://www.aopa.org/news-and-media/all-news/2020/march/02/ntsb-working-to-speed-up-accident-investigations?utm_source=epilot&utm_medium=email
https://www.youtube.com/watch?v=BML2lfqaK-4&feature=youtu.be

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Thomas P. Turner, M.S. Aviation Safety
Flight Instructor Hall of Fame 2015 Inductee
2010 National FAA Safety Team Representative of the Year
2008 FAA Central Region CFI of the Year
Three-time Master CFI