



FLYING LESSONS for March 19, 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:

Upgrade Training

We're flying off the end of the chart in terms of the health and economic impact of outbreaks, policies and responses to the COVID-19 virus around the world. As pilots, though, we tend to take advantage of opportunities and work to overcome challenges—sometimes we must guard against being *too* opportunistic and gung-ho. So while the uncertainties are great, if you find yourself isolated with more time on your hands during the worldwide COVID-19 crisis, you may be able to wisely use the time to finally fill in some of the blanks in your skills and knowledge you've intended to address but for which you never quite had the time.

It's common in the wake of an accident or serious safety deviation to hold a Safety Stand-Down. The Safety Stand-Down is a military concept in which an entire unit (or more) stops operations to find what the unit and each individual can learn from an accident or incident. Safety Stand-Downs have evolved into proactive, regular events in both military and civil aviation, perhaps most notably the Bombardier Safety Standdown ([BSS](#)) I've reported on that here as an attendee a couple of times. Assuming the world returns to something approaching normal, I've been invited to present a program on Single-Pilot Operations (SPOs) at this year's BSS in Wichita, Kansas August 25-27. I'm also helping plan and may be a presenter at the National Business Aviation Association (NBAA) Business Aviation Convention & Exhibition (BACE) in Orlando, Florida October 6-8. More specifically, I'm part of the NBAA Safety Committee Single-Pilot Working Group's annual Single Pilot Safety Standdown, which is not yet listed on the [NBAA events website](#). Again, *if* those events are held this year, perhaps I'll see you there.

See:

<https://safetystanddown.com/en>

<https://nbaa.org/events/>

But our current crisis is not an aircraft accident. It's something much different. So, taking what positive I can from the extra time we may all have for a while, instead of proposing a *FLYING LESSONS* safety stand-down of some sort I'd like to direct us all a slightly different way: we have the opportunity to ***earn an upgrade*** as the captain of our aircraft.

The universal symbol of the airline captain is the four-stripe epaulet. Although the four stripes are merely the additive result of lower aircrew ranks—one stripe for crew, two for flight engineer, three for first officer and four for captain—I envision each of the four stripes as representing one of the four disciplines of mastering airmanship.

In this airmanship model the stripes symbolize pursuit and attainment of each of these goals:

1. **Mastery of the aircraft**, its systems and avionics
2. **Mastery of the environment**, including weather, airports and airspace
3. **Mastery of human factors** including Aeronautical Decision-Making and fitness for flight
4. **Mastery of command**—anticipation of what is about to unfold, use of available resources in and out of the aircraft, and directing action for yourself and supporting resources



I've developed this concept earlier here and elsewhere, including [a presentation at EAA AirVenture 2018](#) at Oshkosh. For our purposes in this week's *LESSONS*, let's simply say that **to be the effective and well-rounded captain of your aircraft you must pursue and develop mastery in all four of these areas**. If you detect (or are told) you have a deficiency in one of these areas, seek out training and education in that area to fill your experience gap.

See <https://www.buzzsprout.com/262136/1724920-from-proficiency-to-mastery-by-tom-turner>

To get you started identifying and filling any gaps, your **upgrade** homework this week is:

1. **Read the Aircraft Flight Manual (AFM) or Pilot's Operating Handbook (POH) Section II, Limitations, for the aircraft you most commonly fly.** If you fly an older aircraft that has an Owner's Manual or pilot information in some other format, it probably has a list of Limitations as well. If you don't have access to the manual for your primary aircraft, look online for one for that type or one similar to it. Even the longest Limitations section is 40 pages or so, and much of that is pictures of required placards. So this won't take very long.
2. **Send me an email** with the following information:
 - a. **Aircraft make, model and year:**
 - b. **Something I learned or had forgotten and re-learned was:** (what)
 - c. **Something that surprised me in the Limitations was:** (what)

For example, a friend and *FLYING LESSONS* reader owns an airplane I occasionally fly. Here's my report for that airplane:

- a. **Aircraft make, model and year:** 1961 Cessna 172B
- b. **Something I learned or had forgotten and re-learned was:** The center of gravity loading envelope is very narrow, meaning the airplane can easily be loaded aft out of limits with passengers in the rear seats.
- c. **Something that surprised me in the Limitations was:** There is no Limitation against slips with flaps extended in this airplane's Owner's Manual.

I don't take lightly the very serious health, financial and security consequences of the COVID-19 crisis or the impact it will have on many of us.

But if you're in a position to do so, **get started** on your **upgrade** in the time these events have made available to you.

*I'll resume more typical FLYING LESSONS next week. I will, however, provide a new **Upgrade** exercise for readers as part of each report at least until things return to reasonably normal.*

Stay healthy and good luck!

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

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See <https://pilotworkshop.com>

Debrief: Readers write about recent *FLYING LESSONS*:

Reader Jack Spitler writes about the March 5 *LESSONS* on the value of high angle of attack training, "[In the Middle of the Air](#)":

Thank you, Tom, for more good stuff. When mentoring working pilots in the operation of whatever equipment is in use, I consider it important to emphasize that there two sides of the coin ref limitations/capability. In considering and completing the mission, *it is necessary to both observe the limitations and exploit the capabilities of the aircraft*. Each type has its own and the skillful pilot will apply both in delivering safe, legal, effective, and efficient results.

I agree that **familiarity with the full range of the operating envelope is a good thing**. I once had a civilian instructor for the commercial ticket who did not want to do stall or spin training and signed off the items because of my Navy training records. While legal, it was evident that he was not comfortable at the margins. That did not enhance my confidence in his other instruction.

The Piper pilot [in the examples of intentional gear-up landings] asked for foam and then landed short of it. Most airports no longer offer foam because it has been so common that it is missed anyway. As one of your Debriefers here notes...things stop quickly in a light aircraft.

We pilots need to be good consumers of flight instruction, including making sure we get the training around the edges of the envelope we need for those times when circumstances take us out of the "middle of the air."

I hoped someone would bring up the foam. It is a bit outside the scope of the point I tried to make but was going to follow up next time anyway. As you note, the objective of foaming a runway is not to cushion the slide, it's a fire inhibitor. The objective is to touch down just short of the foamed area and come to a stop in it. This calls for a precision touchdown a hundred feet or so before the foam, which the Piper pilot did not do.

I understand that the fire retardant foam costs several thousands of dollars for a small amount. That's why foam is usually reserved for spraying on the airplane as needed after it stops and is rarely applied beforehand any longer. Thank you, Jack.

See <https://www.mastery-flight-training.com/20200305-flying-lessons.pdf>

Reader, retired Naval Aviator, and well-known instructor in Beech airplanes, Eclipse jets and others Kent Ewing writes about off-airport landings and shoulder harnesses, the subject of [last week's LESSONS](#):

Shoulder harness saved us too. Refer readers to Youtube, [Bonanza Crash Thanksgiving](#). [My video is] still getting reviews. [We were at] approximately 50 MPH into trees on rollout. RIP N5655D.

Absolutely, Kent. Your experience was very similar to last week's example. Again, well done.

See:

<https://www.mastery-flight-training.com/20200312-flying-lessons.pdf>
<https://www.youtube.com/channel/UCpDAL4b-oNelwcnJogfdA7A>

Reader Kirk Thams asks a follow-up question about aircraft shoulder harnesses:

Hello Tom, Great article. My airplane partner and I own a 1980 E55 Baron that has factory installed shoulder harness that are integrated in the seatback. We require their use on every flight by all onboard. We are contemplating added the newer dual strap [harnesses] to the front seats. Are you aware of any data that compares the single-point shoulder harness to the newer dual strap shoulder harness?

The NTSB data all show that **any type of shoulder restraint is far better than none at all**. The NTSB investigation does not distinguish between one-strap, over-the-shoulder harnesses and four- or five-point harness systems. Those are better for holding you in your seat in turbulence (and when appropriate, aerobatic maneuvers), and may in some cases hold you in your seat when a side load during impact might pull you out from under a one-strap system. But then again that may be the difference between a survivable accident and a fatal impact, even with shoulder harnesses. There does not appear to be any data one way or the other. This is probably due to the extremely small sample size of survivable airplane crashes in aircraft fitted with two-strap systems. This is the same reason there are no definitive data on the value of shoulder harness air bags in those airplanes so equipped. It's a good problem to have: not enough crashes. Thanks, Kirk.

Retired U.S. Naval Academy aeronautical engineering professor and test pilot Dave Rogers, a frequent Debrief, comments on Russell Still's "[The Improbable Turn](#)," linked from last week's report:

G'day Tom, Thanks for pointing out Still's "The Improbable Turn".

I assume that when he says "the Dept. of the Navy did concentrated research on the turnback maneuver" he is referring the work done by my student Brent Jeff although he does not reference it. The work is available on the Technical Flying tab at www.nar-associates.com. I recommend that people read it carefully. Here are some pertinent quotes from the report.

"Test Flight 4

The procedure for the 180 deg turn to an emergency landing was specified in this flight as follows:

- 45 degs of bank with coordinated rudder;
- Airspeed just above stall.

The overall success rate for this flight was 75%. As expected, the lowest success rate occurred in the group of pilots with less than 100 hours."

"One hundred percent of the unsuccessful flights were caused by the pilot allowing the bank angle to become too steep. This resulted in a high rate of descent and in some cases, impact while still in the turn. However, the pilots who were unsuccessful were given the opportunity to repeat the flight. Of the 25% of the pilots that failed on the first at-tempt, 10% were successful on their second attempt and 5% were successful on the third attempt. Ten percent of the pilots were unable to perform the maneuver successfully after three attempts. The two pilots who were unsuccessful after three attempts had less than 100 hours and one was a student pilot."

It is also necessary to consider the sample size, i.e., 20 pilots.

Notice that only two of the pilots were unsuccessful after three flights and both had less than 100 hours and one was a student pilot. Even minor training and experience counts. This is a point that most readers miss.

Jeff was correct, based on the data, that a 30 deg bank angle was safer. However, the training factor was not emphasized enough in the AIAA paper. It probably should have been. But...that is hindsight.

The other interesting point is that there were NO visual images in this simulator - only a black painted line on the wall. Hence, these flights were essentially conducted 'on instruments', i.e., with the pilots 'head in the cockpit'. Frankly, this was not all bad considering that I recommend that the 210 deg turnback turn be conducted with the pilot's head in the cockpit. At the completion of the 210 deg turn the pilot then looks out of the cockpit, in the appropriate direction, and the runway should be "right there."

Thanks as always, Dave, for your insights.

See <https://groundschool.com/articles/the-improbable-turn>

Reader Scott (no last name provided) wraps it up for this week:

A small correction regarding the FAA seat belt requirements - 91.205(b)(14). 1978 was the year for requiring front seat shoulder harnesses. 1986 was for year requiring shoulder harnesses for all seats.

Regarding setting expectations and minimum standards, I make clear to all students before beginning training or Flight Review inquirers, *we will go far beyond minimum standards*. This will require adequate study and preparation on their part. Also, *their investment in time and money will be more than for the minimums*. This allows the person to make an upfront decision about the nature of their intent.

Thank you for the clarification, Scott, and your stance on expectations versus standards. With our crisis-imposed **Upgrade** time, we all have the chance to better prepare for our next Flight Review...and our real-world flying.

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

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See:

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At press time

Just before going to "press" tonight I received this email from fellow aviation safety advocate Gene Benson of [Vectors for Safety](#):

During this difficult time, we all crave socialization but we all need to be responsible and follow the government's guidelines as closely as possible. Many of us are staying home but would like to have some interactive aviation socialization.

I am going to try something that might work or it might be a total flop. I am using Bright Spot's Zoom Meetings platform to host a series of events that I am calling "**Pilot Talk**." I have created five events to see if the concept works. If it does, I will schedule more. If it doesn't, I will go back to watching the Hallmark Channel with my wife. My concept is to offer an open forum with me as the moderator. I have a never-ending catalog of flying stories, but I would prefer that others tell us their stories. I want to create a modified virtual "hangar flying" session.

Each event will be limited to a maximum of fifty participants so that most of those interested in sharing stories or asking questions will be able to do so. I am also limiting the duration to 30 minutes per session, but we can go longer if there is interest. There is no Wings credit attached so folks can come and go as they please.

In order to allow participants to register and not be on a first-come basis, I am using Eventbrite to handle registrations. Frankly, I find it to be a bit clunky, but it works. During registration you will see several references to "buying" tickets. When you get to the checkout, you will see that the price of the tickets is "free" and that your shopping cart total is \$0.00. This is not an ideal solution, but I put it together quickly with the hope of refining it if I find that people are interested in this kind of program.

Choose an event that works with your schedule and click on the associated link. It will take you to a registration page on Eventbrite. Once you register, you will receive an E-ticket via email. when it is time for the event, just click on the ticket image and you will be taken to Zoom Meetings. It is admittedly clunky, but pilots are smart and I am sure you will figure it out. If you have difficulty, ask someone under the age of 18 for tech support or send me and email and I will try to help.

All posted times are Eastern Daylight time - convert as necessary

Topic: Pilot Talk 01

Time: Mar 22, 2020 03:00 PM Eastern Time (US and Canada)

<https://www.eventbrite.com/e/pilot-talk-01-tickets-100319851376>

Topic: Pilot Talk 02

Time: Mar 22, 2020 07:00 PM Eastern Time (US and Canada)

<https://www.eventbrite.com/e/pilot-talk-02-tickets-100324348828>

Topic: Pilot Talk 03

Time: Mar 23, 2020 02:00 PM Eastern Time (US and Canada)
<https://www.eventbrite.com/e/pilot-talk-03-tickets-100424245622>

Topic: Pilot Talk 04

Time: Mar 24, 2020 04:00 PM Eastern Time (US and Canada)
<https://www.eventbrite.com/e/pilot-talk-04-tickets-100426522432>

Topic: Pilot Talk 05

Time: Mar 25, 2020 03:00 PM Eastern Time (US and Canada)
<https://www.eventbrite.com/e/pilot-talk-05-tickets-100427342886>

I hope to be able to chat with some of you over the next week. Please provide feedback on the concept, the registration process, and on the events. As always, my email is gene@genebenson.com

Good luck with your experiment, Gene. Readers, if you participate please let me know how it goes.

See <https://www.genebenson.com>

Again, good health and good luck to you all.

Share safer skies. [Forward FLYING LESSONS to a friend](#)



Pursue Mastery of Flight.

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