



FLYING LESSONS for July 30, 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.**

FLYING LESSONS is an independent product of MASTERY FLIGHT TRAINING, INC. www.mastery-flight-training.com

Pursue ***Mastery of Flight™***

This week's LESSONS:

Engine failure! *FLYING LESSONS* reader Jeff Dill experienced engine failure this week while flying his 1956 G35 Bonanza over Tennessee. He posted a detailed account of the event online and kindly agreed to allow me to reprint it here so we can all learn from his experience.

I am writing this on the morning after my Bonanza engine lost power and forced me to land. My brother John was with me. He earned a private pilot license as a young man but had not flown for decades and was contemplating getting back into flying. The day was planned from Albany [New York] to Nashville [Tennessee], his home to mine, with a fuel stop in West Virginia. We made it almost all the way with the airplane running great, having logged around five hours of air time when the trouble began.

The weather along the way was gradually changing from clear to low puffs to widely scattered areas of maturing cumulus build-ups. The most favorable winds were at 4-6 thousand feet, but we progressively chose higher altitudes to remain VFR and enjoy a smoother ride. On the second leg, we went straight up to 10,500 feet. As the day went on, John was making a better and better autopilot. Among the things we discussed was the strategy to deal with loss of power in a single engine airplane. Some years back I researched what number to enter into ForeFlight as my engine-out glide ratio and came up with 10.2 [to 1]. This feature depicts a ring around my current position representing how far I can glide, which I had tested on occasions for validation and my own proficiency. I knew that if a runway was inside the ring, I could get there.

We were down to our last 35 minutes shooting a gap between buildups. The Memphis center controller providing Flight Following [radar services] was offering headings to avoid the showers, which echoed the TIS-B weather information we had depicted. After the gap ahead of us, we would be free to proceed direct to my home field. I had just seen my fuel at 24.2 gallons, making the quick mental calculation that, at my current fuel burn of 10.2 GPH, I still had over two hours of fuel remaining.

John was still at the controls when the engine sputtered. It sounded like a fuel tank running out, but I was about halfway through the right tank fuel which, in my mind, ruled out the prospect of bad fuel in that tank. I switched to the left tank nonetheless, which was no help, so I followed with going full rich on the mixture. Naturally, Memphis center issued a handoff to Nashville approach as all this was happening and I took the handoff and didn't mention our dilemma until checking in with Nashville. We did everything we had talked about earlier in an attempt to restore power, including carburetor heat and cycling the ignition switch. I did not think to do reference my engine monitor to help diagnose my loss of power, though looking at the recorded data in hindsight is thus far inconclusive.

When I checked in with Nashville, I told him we had a significant loss of power and that we would be landing short of our destination. By now my hands were on the controls and John's were off, not the best exchange of control, but I was multitasking. I had looked at my glide ring and saw that Lafayette, TN was just inside. I knew that, unless I screwed it up, I could make it there. Other choices that crossed my mind were two restricted fields that were closer, and Gallatin, TN which was outside the ring. With partial power, maybe I could make it to Gallatin and improve the logistics in terms of maintenance and getting home. I told myself how stupid that last thought was and dismissed the chore of gathering more information about the restricted fields as unnecessary. All that took place during the seconds required to affect the frequency

change to Nashville approach. I knew the question was coming when I told the new controller about my power loss, did I want to declare an emergency? I was fine with that, have no fear of the proverbial “paperwork”, and I would have been the first bring it up if I needed traffic priority or had to deviate from any rule.

So, it was established between us that I was going to Lafayette. The controller offered a heading, told me the orientation of the runway, and asked what else he could do. Rather than find the ASOS frequency and listen, I asked him for the winds. The Lafayette weather was not handy to him, but he offered that Nashville winds were out of 220. Good enough. I pulled the traffic frequency from the ForeFlight Sectional and told the Nashville controller that I was anxious to transmit that I was an emergency about to enter the pattern. He asked me if I was able to copy a number to call to let him know that I was down safe; since I had a pen and paper standing by on my yoke, I went ahead and took the number.

Somewhere in there, I handed John the checklist and asked him to flip it over to the emergency side and read me what I was forgetting. We had done pretty much everything that applied, there were one or two items that warranted lip service, but were no help. I was aware that the landing without an engine checklist included some things that we had not done, such as fuel selector off, battery off and unlatch the cockpit door, but I just did not consider these prudent under my circumstance. About a year ago, I came up short during a practice engine out, so my concentration at this point was to manage my energy correctly to make this end well. I briefed John that my plan was to proceed to a point overhead the field, and turn left to join a left downwind for 19. I added “emergency aircraft” to every radio call, but there didn’t seem to be anybody in the pattern.

I had ample altitude to put my gear down overhead the field; this would give me a better look at the resulting descent gradient, and help me judge where to start my base leg. Among the decisions I have made beforehand is the willingness to land gear up if I deem it the safer option, but this would not have added any advantage in this situation. I purposely chose my base leg to result in a high energy final as it is easier to dissipate excess energy than to recoup it. I wound up on about a ½ mile final with about 100MPH and slightly steeper than a normal glidepath, just where I wanted it. I ran my version of GUMP, as I always do, and set my prop to fine pitch. I goosed the throttle after this to test if there was any meaningful power; what power came in was very rough and out of balance, so I pulled the throttle back, not expecting to need any power anyway. There was a helicopter trying to call me, probably on request from Nashville approach. I was busy and chose to ignore his calls. I employed a maneuver reserved only for the real thing, an extreme side-slip, to fine-tune my speed and glide path and when I was sure, I selected full flaps. In the flare, I reduced what was left of the throttle position; this had the effect of causing the engine to quit completely during the roll-out, so I coasted to the taxiway with enough energy to clear the runway. From the quiet of sitting there with the battery switch still on, an airborne Baron called me, presumably on the request of Nashville approach, and I was able to relay that we were down and safe. I dialed the number that approach had provided, and added the last two items he needed for his forms, souls onboard and fuel remaining.

The several morals in this story may be self-evident, but it is worth emphasizing that altitude was my friend on this occasion. There will always be a period of time after takeoff that landing on a prepared surface would be impossible in the event of engine failure. This period of time is arguably longer for a single-engine airplane than for a twin, but if you get up high enough here in the eastern half of the country, you can plan your trip to minimize your exposure. Modern GPS tools can make finding the best candidate a quick task.

My brother was impressed by the aviation community. Nobody was at the airport, but a hint for a combination lock, that would only have meaning to a pilot, soon had us in the air-conditioned pilot lounge. A contribution to the change bucket in the fridge had us sipping on a soft drink while contemplating our next move. Our calls to the airport managers did not go through. After a while a guy with a key to the office happened by and within minutes I had the key to the airport courtesy vehicle. I will return it tomorrow.

As mentioned in the beginning, what I have written so far represents my current point of view, not knowing exactly what the problem will turn out to be. I think it is useful to record that highly perishable perspective. I downloaded the engine data from my EDM830 and can see that the first snapshot of trouble shows a #6 EGT drop of 500 degrees from just 6 seconds prior. Did I lose power in only one cylinder? It sure seemed like more than that at the time. Also, I would expect it not to quit on the ground with 5 good cylinders. It doesn’t really matter, I would have done the same thing anyway.

Experience is learning from what happens to you. **Training** is learning from the experiences of others. Outstanding job, Jeff, and great narrative. Thank you for sharing it so we can all learn from your experience. I think you demonstrated some very good, positive lessons about preparation, training, resource management and command authority that benefit us all.

I'll give *FLYING LESSONS* readers time to contemplate and comment on what they learn from this report, including (but not limited) to the excerpts below:

- ...along the way... we discussed was the strategy to deal with loss of power in a single engine airplane....
- Some years back I researched what number to enter into ForeFlight as my engine-out glide ratio....
- ...I was about halfway through the right tank fuel which, in my mind, ruled out the prospect of bad fuel in that tank. I switched to the left tank nonetheless....
- We did everything we had talked about earlier in an attempt to restore power...
- With partial power, maybe I could make it to Gallatin and improve the logistics in terms of maintenance and getting home. I told myself how stupid that last thought was....
- ...did I want to declare an emergency? I was fine with that, have no fear of the proverbial “paperwork”, and I would have been the first bring it up if I needed traffic priority or had to deviate from any rule.
- The controller offered a heading, told me the orientation of the runway, and asked what else he could do. Rather than find the ASOS freq[ueency] and listen, I asked him for the winds.
- I pulled the traffic frequency from the ForeFlight Sectional and told the Nashville controller that I was anxious to transmit that I was an emergency about to enter the pattern.
- ...since I had a pen and paper standing by on my yoke, I went ahead and took the number.
- I handed John the checklist and asked him to flip it over to the emergency side and read me what I was forgetting.
- About a year ago, I came up short during a practice engine out, so my concentration at this point was to manage my energy correctly to make this end well.
- I briefed John that my plan was to proceed to a point overhead the field, and turn left to join a left downwind....
- ...this would give me a better look at the resulting descent gradient, and help me judge where to start my base leg.
- Among the decisions I have made beforehand is the willingness to land gear up if I deem it the safer option....
- ...altitude was my friend....

The pilot reports that preliminary investigation is indeed pointing toward loss of one cylinder, perhaps as a result of valve failure. I'm professionally interested in his follow-on reports—I've lost a cylinder in a Bonanza once myself; it results in ***much more*** than the one-sixth power loss that such a failure suggests.

You'll probably not see any official reports about this event, because the pilot landed on an airport with no injuries and no damage beyond that which resulted in the initial loss of power. As such this event does not meet the requirements for an accident report under [NTSB 830](#). There will be no official report; there will be no official investigation; there will be no official determination of cause.

See https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=23056ed2bb0dd81cc63e94f88809c94c&mc=true&n=pt49.7.830&r=PART&ty=HTML#se49.7.830_15

But regardless of the reason for the engine failure, the narrative describes the impressive results of well-practiced procedures and well-considered decisions. Reading the description prompts repeating a quote I've included many times in *FLYING LESSONS*:

“We don't rise to the level of our expectations, we fall to the level of our training.”

- Greek lyrical poet Archilochus.

Thank you, Jeff. Well done. **Readers,** what *LESSONS* do you learn from this?

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

FLYING LESSONS Weekly is sponsored by:



See <https://pilotworkshop.com>

Debrief: Readers write about recent *FLYING LESSONS*:

Reader Jack Spitler writes about last week's *LESSONS* on [somatographic illusion](#):

It's worth pointing out that the makers of full motion simulators use these physiological illusions to simulate accelerations as no real ones are available while bolted down. Also, in the event of unreliable airspeed, (frozen pitot or whatever), **it is important to become familiar with not only attitude but also approximate power settings for phase of flight.** I once had a few minutes of zero airspeed indications out of five in an Airbus 310 in icing around FL280 crossing a front...long enough to mentally prepare for approach and landing in middling IMC without airspeed. **It reduces pucker if you know power settings for speeds clean and configured** for the aircraft ahead of time.

Correct, Jack. Aircraft performance is the result of **power + attitude + configuration** (flap and gear position). For any combination of the three an airspeed and vertical speed will result, more predictably in some airplane types than in others. Conversely, for any desired airspeed and vertical speed, there is a known power setting, attitude and configuration—or perhaps more than one combination, again variable from one type of airplane to another. Learning and practicing these combinations is invaluable to flying an aircraft accurately and predictably.

See <https://www.mastery-flight-training.com/20200723-flying-lessons.pdf>

Reader Don Von Bergen asks:

I have a couple of questions I am having trouble finding the source for an answer.

1) I thought HIWAS was a thing of the past. Am I wrong? Did only part of this go away? Why is it still in 2020 AIM, page 947?

"On 8 January 2020 the Federal Aviation Administration discontinued the HIWAS service in favor of Flight Information Services-Broadcast (FIS-B) and other modern means of accessing in-flight weather data."

The demise of the Hazardous Inflight Weather Alerting System was [published in the Federal Register](#) in December 2019. The current edition of the AIM was published in August 2019. But [a January 2020 change](#) appears to have removed all reference to HIWAS.

2) What is the common frequency one can contact FSS while in flight? I thought the answer was 122.2 but can't find the source that states this.

Flight Watch was discontinued in 2015. [The Flight Service contractor \(now Leidos Flight Service\) announced](#) at that time it would consolidate those and other enroute services on the common frequency of 122.0.

See:

<https://www.federalregister.gov/documents/2019/12/09/2019-26386/discontinuation-of-hazardous-inflight-weather-advisory-service-hiwas-in-the-contiguous-united-states>
https://www.faa.gov/air_traffic/publications/atpubs/aim_html/chap7_section_1.html
<https://www.aionline.com/aviation-news/aerospace/2015-09-12/flight-watch-services-consolidated-now-122-mhz>

Questions? Comments? You know the drill: mastery.flight.training@cox.net.

Please help cover the costs of providing **FLYING LESSONS** through the secure **PayPal donations button at www.mastery-flight-training.com**.

Or send a check to **Mastery Flight Training, Inc.** to 247 Tiffany Street, Rose Hill, Kansas USA 67133.
Thank you, [generous supporters](#).

See:

www.mastery-flight-training.com/be_a_master_pilot.html

https://www.paypal.com/donate/?token=E78wOSz-a-IWNuNMxHjQRZ4awYMDr8zvX2jXhs_Cv-b7_6nFbhuIMAJTU-kkBDsW160G&country.x=US&locale.x=US

PIREP Project

Many pilots say they might file more Pilot Reports (PIREPs) during high-workload flights if there were a hands-free or speech-based technology at their disposal. [AOPA announces](#) a study by Purdue University into hands-free or speech-based PIREP filing technology. And they want your input. [Take the survey](#). You will be asked a few questions regarding your flight history, after which you will be given six weather scenarios and asked to record PIREPs as if you were flying.

See:

https://www.aopa.org/news-and-media/all-news/2020/july/23/pilots-needed-for-purdue-pirep-project?utm_source=ebrief&utm_medium=email

https://purdue.ca1.qualtrics.com/ife/form/SV_6iZhv409DcoV8KF

Do You Know a Winner?

Part of the National Aeronautical Association ([NAA](#)) mission is identifying and recognizing those who have contributed to the "art, sport and science of aviation and space flight in the United States." NAA presents more than a dozen awards throughout each year to honor achievements in aviation and space. The nomination period is now open for the following awards:

Wright Brothers Memorial Trophy

This trophy is awarded annually to a living American for "... significant public service of enduring value to aviation in the United States." [Nomination Deadline: August 15](#)

See <https://naa.aero/awards/awards-and-trophies/wright-brothers-memorial-trophy>

Wesley L. McDonald Distinguished Statesman and Stateswoman of Aviation

To honor outstanding Americans who, by their efforts over an extended period of years, have made contributions of significant value to aeronautics, and have reflected credit upon America and themselves. [Nomination Deadline: August 31](#)

See <https://naa.aero/awards/awards-and-trophies/wesley-l-mcdonald-distinguished-statesman-of-aviation-award>

Frank G. Brewer Trophy

Awarded annually to an individual, a group of individuals, or an organization for significant contributions of enduring value to aerospace education in the United States. [Nomination Deadline: August 31](#)

See <https://naa.aero/awards/awards-and-trophies/brewer-trophy>

Public Benefit Flying Awards

Created by NAA and the Air Care Alliance (ACA) to recognize the significant contributions to the Nation of volunteer-based Public Benefit Flying and the outstanding work of the individuals and organizations engaged in this humanitarian activity. [Nomination Deadline: August 31](#)

See <https://naa.aero/awards/awards-and-trophies/public-benefit-flying-awards>

If you have any questions, please contact Stephanie Griffith at 703-416-4888, Ext. 104 or email sgriffith@naa.aero

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



Pursue Mastery of Flight.

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

FLYING LESSONS is ©2020 Mastery Flight Training, Inc. For more information see www.mastery-flight-training.com, or contact mastery.flight.training@cox.net.