



FLYING LESSONS for February 22, 2018

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:

The May 2017 crash of a Learjet 35 at New Jersey's Teterboro Airport has much to teach us, even those of us who fly piston-powered airplanes in a single-pilot environment. The U.S. National Transportation Safety Board published its [preliminary report on this accident](#) last October, but it several aviation outlets reported on it in the last week or so, so it is "top of mind" for those of us who read such things. From the report:

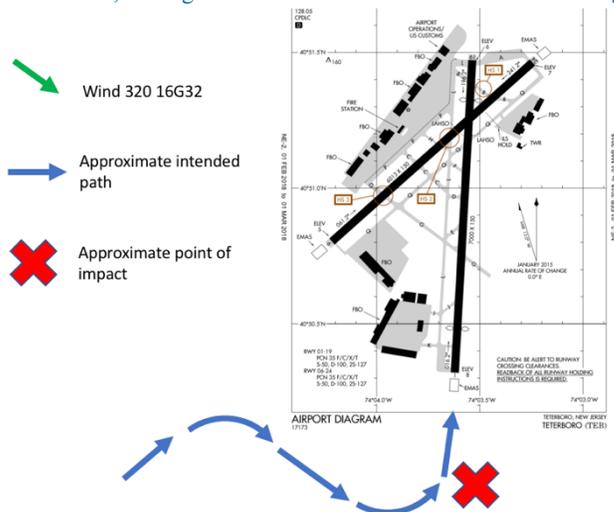
On May 15, 2017, at 1529 eastern daylight time, a Gates Learjet 35A departed controlled flight while on a circling approach to runway 1 at the Teterboro Airport (TEB), Teterboro, New Jersey, and impacted a commercial building and parking lot. The captain and first officer died; no one on the ground was injured. The airplane was destroyed by impact forces and postcrash fire. The airplane was operated as a Part 91 positioning flight. Visual meteorological conditions prevailed, and an instrument flight rules (IFR) flight plan was filed. The flight departed from the Philadelphia International Airport (PHL), Philadelphia, Pennsylvania, about 1504 and was destined for TEB.

The accident flight was the crewmembers' third flight of the day. The first flight departed TEB about 0732 on a Part 91 positioning flight and landed about 0815 at the Laurence G. Hanscom Field (BED), Bedford, Massachusetts, where they refueled and boarded a passenger. They departed BED about 1009 on a Part 135 on-demand charter flight and landed at PHL about 1104.

The IFR flight plan to TEB planned a 28-minute flight at flight level 270 (27,000 feet). After departure about 1504, the flight was cleared to climb to 4000 feet. The flight reached a maximum altitude of 4000 feet MSL.

About 1515, the flight was cleared to descend to 3000 feet. The New York Terminal Radar Approach Control (TRACON) cleared the flight for the TEB ILS Runway 6 Approach, circle to land runway 1. TRACON instructed the flight contact TEB Tower about nine miles from the airport; however, the flight did not check onto the tower's frequency until four miles from the airport. ATC cleared the flight to land on runway 1 and issued the TEB winds of 320 degrees at 16 knots, gusting to 32 knots.

Radar track data indicated that the flight did not start its right circling turn until it was less than 1 mile from the approach end of runway 6. According to TEB ATC, aircraft typically start the right turn at the final approach fix for runway 6, which is located 3.8 nm from the approach end of runway 6.



A TEB controller reported that he observed the airplane bank hard to the right and he could see the belly of the airplane with the wings almost perpendicular to the ground. The airplane then appeared to level out for just a second or two before the left wing dropped, showing the entire top of the airplane. Other ground witnesses also reported that they observed the airplane in a right turn with the wings in a high angle of bank. **Some witnesses described seeing the airplane's wings "wobbling"** before the left wing dropped and the airplane descended to the ground. Security video cameras installed at numerous commercial buildings also captured the last moments of the flight, showing the airplane at high angles of bank. One security camera showed the airplane in a steep right wing low, nose down attitude at impact.

The accident site was located on a 180-degree bearing about 1/2 nautical miles from the threshold of runway 1 at TEB. The main wreckage was distributed in the parking lots of commercial businesses. The wreckage path and debris field was about 440 ft. long on a 135-degree heading, and 3 buildings and 16 vehicles were damaged by impact or fire.

The 1451 ATIS Information Z stated that the current weather was: wind 350 degrees at 18 knots gusting to 29 knots; visibility 10; light rain, 5500 ft scattered; temperature 18 degrees C; dew point 6 degrees C; altimeter 29.74 inches of mercury. ILS Runway 6 circle approach in use...Low level wind shear advisory in effect... "

See <https://app.ntsb.gov/pdfgenerator/ReportGeneratorFile.ashx?EventID=20170515X80533&AKey=1&RTtype=Prelim&IType=MA>

There are many *LESSONS* promoted by this event, two of which I want to draw from this example this week. The first comes from the NTSB excerpt above. 14 CFR 91.175 tells us that flight below Decision Height (DH), Decision Altitude (DA), or apropos to the Learjet's circle-to-land maneuver, Minimum Descent Altitude (MDA), is permissible **only** when "...the aircraft is continuously in a position from which a descent to a landing on the intended runway can be made at a normal rate of descent **using normal maneuvers....**" (emphasis added). Although "normal maneuvers" is not defined, banking excessively in the traffic pattern is not usually considered "normal." The need to bank so steeply should prompt the pilot(s) to level the wings, then execute the missed approach procedure as applicable to the aircraft's current location in the circle-to-land maneuver.

The first LESSON this week, then, is to **keep bank angle shallow close to the ground**, even (especially) if in a circle-to-land or other visual maneuver. If your flight path, the wind or any other factor would require a steep bank or other unusual maneuver to establish or maintain alignment, **use that apparent need as a prompt to break off the approach**—using *normal* flight maneuvers as you extricate yourself from the hazard.

Commentary this week (such as [this report from FLYING Magazine](#)) centered on crew qualifications, especially that of the First Officer. As reported by *FLYING*, both the Captain and the First Officer, who was Pilot Flying at the time of the crash that killed them both, had less-than-stellar backgrounds, and there are reportedly questions about their ability to hold their respective jobs.

See <https://www.flyingmag.com/teterboro-learjet-crash-raises-questions-about-crew-qualifications?enews021318>

As noted in the article, the [NTSB Docket](#) reports:

Within the [aircraft owner's] operation, SIC [Second-in-Command] pilots were ranked on a 0 to 4 scale, and restricted as to the type of flying they were allowed to perform so as not to overwhelm them before they were ready. In order to be allowed to fly as SIC on empty legs [positioning flights], the right seat pilot of the accident aircraft would have been required to hold a rating of SIC-2. On the day of the accident, he was rated as a "0" and as such should not have been in command of the aircraft at any time.

See <https://dms.ntsb.gov/pubdms/search/hitlist.cfm?docketID=60373&CFID=1511108&CFTOKEN=d131888b416718bd-4EA6C8DD-D2E7-DD0A-99A92BCF18295381>

However, both the Captain and the First Officer appear to have been qualified for their respective roles, at least as far as the Federal Aviation Administration is concerned. The "0-4" rating scale discussed in the NTSB docket is a company policy, not an FAA rule...unless, perhaps, it is written into the charter operator's FAA-approved Operations Specifications (OPS-SPEC), *and* that OPS-SPEC was required to be in force not only while the carrier engaged in Part 135 (charter) operations, but also when on positioning flights between passenger-carrying gigs.

This brings us to the second *LESSON* I want to draw from this week's example: **personal minimums are only useful and valid if we adhere to them all of the time, not just when it is convenient.**

I can't tell you how many times I've been tempted to land with 45 or 50 minutes of fuel remaining on board instead of my personal one-hour minimum. I can't relate the number of cases when I've looked at a cloud layer just a little below circling minimums for the runway in use, and *really* wanted to take off. The times are much fewer, but they have been several when I've had to fight off a "go" mentality for a late-day departure when I've been awake for more than 12 hours. Yet, each one of these flights are perfectly legal. The limitations are my own—my **personal minimums**.

You probably have some personal minimums of your own. They come from your own experience—something you did or did not do, and you *learned better*—or from reading or hearing the *FLYING LESSONS* from some other pilot's experience. **Personal minimums are a very good thing.** But you have to use them even when you want to. In fact, that's the whole idea of personal minimums—**they're the voice of reason and logic, when you're most tempted to make decisions emotionally**, often when you have insufficient information with which to choose.

I'm pretty sure the Learjet pilots' employers would have made its "0-4" rating rule clear to the pilots in their new-hire training and when upgrading to Captain. The pilots probably knew better than to do a *lot* of what it preliminarily appears they did in the months, days, hours and minutes that inexorably led to their deadly loss of control.

Yet despite all the mistakes, poor technique and faulty decision-making the NTSB docket and those who wrote about it assign to the crew, if they had only followed the two limitations—one regulatory, about maneuvers below MDA, the other "personal," the company OPS-SPEC requiring the Captain to fly the approach—the decision to act on "personal" minimums, if it had been done, might have been enough to save their lives and prevent all that destruction.

Accident causation has been likened to a chain of decisions or a chain of events. It has also been modeled as layers of Swiss cheese—each layer is the chance to block an accident path, if the "holes in the cheese" don't line up. All it takes is to break a critical link in that chain, or to move the cheese, to prevent a crash. OPS-SPECs, in the case of a personal/recreational/business pilot the regulations and your personal limitations, are your means of breaking the accident chain or moving the Swiss cheese, to reverse trends that might lead to an accident.

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



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I thank you, Tom, for all I have learned about aviation over the five years I have enjoyed reading *FLYING LESSONS*. I hope you know that your work has changed my safety awareness as a pilot in countless ways, and I believe it's safe to assume hundreds of others. I will always be most grateful for your gift to aviation.

– Richard Benson

Wow, thank you very much, Richard. You, and all our [generous supporters](#).

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Or send a check to **Mastery Flight Training, Inc.** 247 Tiffany Street, Rose Hill, Kansas USA 67133.

Debrief:

Readers write about recent *FLYING LESSONS*:

Several readers wrote that they were unable to open the video I referenced in last week's report. Suffice to say, the aircraft did not climb—and it collided, disastrously, with the low building off the end of the runway. I apologize...I'll refrain from linking to FaceBook in the future. For what it's worth, I tried to find it on YouTube last week, without success. Oh well.

Eagle-eyed reader Mike Radomsky found where I slipped on the keyboard in last week's report:

[I'm] trying to figure out what word or words are missing after "But it..." here: " But it unless the instructor comes back after a lesson or two to point out *all* the factors that go into making a successful takeoff. "

Found it, Mike. It should have read:

But unless the instructor comes back after a lesson or two to point out *all* the factors that go into making a successful takeoff, we may be left without an appreciation for the normal and emergency contingency planning that ought to accompany every departure.

Good catch, Mike. Thank you—I've updated the online posting of [last week's report](#). Sorry I let it go out with that error.

See <http://www.mastery-flight-training.com/20180215-flying-lessons-2.pdf>

Questions? Comments? Suggestions? Let us know, at mastery.flight.training@cox.net

Will we never learn?



Once again the FAA is stressing Back to Basics. The January/February 2018 issue of *FAA Safety Briefing* "takes a forward-thinking journey 'back to the basics' of flying fundamentals. Articles in this edition provide important tips, techniques, and resources that can help you better aviate, navigate, communicate, and mitigate in today's complex operating environment." [Check it out.](#)

See https://www.faa.gov/news/safety_briefing/

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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

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