



FLYING LESSONS for April 5, 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:

Reported on AVWeb:

Two people died when a Cessna 150 collided with a Cessna 525 Citation jet on the runway at Marion Municipal Airport in Indiana on Monday afternoon, the FAA has reported. The C150 was attempting to take off to the southeast, at about 5:09 p.m., when it struck the tail of the Citation, which had just landed from the north. The tail of the jet was shorn off, and the C150 crashed and caught fire. The pilot and passenger in the 150, both from Indiana, were killed. Five people, including the crew, were on board [the jet], and none were hurt. The airport, about 50 miles north of Indianapolis, has no control tower, and pilots coordinate via CTAF [Common Traffic Advisory Frequency]. The NTSB will investigate.

See <https://www.avweb.com/eletter/archives/101/3992-full.html?ET=avweb:e3992:227136a:&st=email#230556>

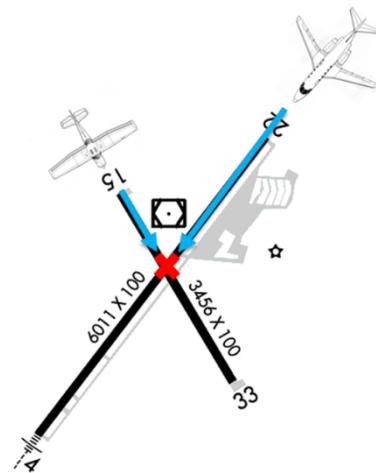
Information about this crash is still coming in, and likely will be for some time. From reports to date it *appears* that the scenario is similar to that in my obviously exaggerated illustration of the Marion, Indiana airport at right: the Cessna 150 was taking off from Runway 15 ("to the southeast") in the shorter runway, while the Cessna 525 Citation was landing from a right base or straight in to the more jet-friendly Runway 22.

What are the odds the two airplanes arrived at the intersection of the two runways at the precise, simultaneous time? I can't image them doing it *on purpose* without significant planning and practice, and active communication between airplanes during the attempt. Yet, they *did* collide. The timing was exactly *wrong*.

This makes me wonder: Since actually arriving at the same point at the same time is challenging at best when attempted intentionally, and completely random at any other time, **how many times is more than one airplane using conflicting runway and traffic pattern space, but a collision does not occur solely because the timing was not wrong?**

In other words, how often does **the unsafe condition** of traffic pattern and runway conflict at nontowered airports occur, but we never hear about it because the aircraft do not collide? It's not all or nothing, a collision or five miles separation. Scary thought, huh?

At the same time, every time a pilot holds short or goes around because he or she detects a possible conflict, the system worked. It's obvious, however, that we need to remain vigilant.



ADS-B, even after the January 1, 2020 installation deadline (in the United States), probably would not have made a difference. The Cessna 150 almost certainly operates in airspace where ADS-B will not be required. If the C150's operation does require ADS-B, its owner may well elect to equip with ADS-B Out only...the Citation pilot might have "seen" the C150 on ADS-B, but the C150's occupants would not have seen an ADS-B plot on the jet. Even if both aircraft had in-cockpit traffic display, and both crews could see the other aircraft on their screens, one or both pilots would have to act to avoid the collision before it was too late.

Two recent publications address collision avoidance at nontowered airports:

- The National Business Aviation Association ([NBAA](#)) has published "[Operating Into a Non-Towered Airport?](#)" The NBAA document is aimed primarily on the issue of closing contract control towers, turning Class D airspace into Class E and often Class G close to the surface. The guide states:

When approaching the airport, crews should also make a point to keep their eyes outside the cockpit in order to see and avoid other traffic and monitor the radio to help ascertain the positions of other aircraft in the vicinity. Pilots should also communicate their position and cooperate with other pilots in the area to establish the safest approach to the field, with the least potential for conflict with other traffic.

This is fairly basic guidance, and is prefaced by this statement:

...pilots operating under an IFR flight plan to a newly non-towered field will need to be prepared for the transition from the positive control environment of instrument flight when approaching their destination. "These are skills that all business aircraft pilots should be familiar with, but now will have to be applied at locations with newly closed control towers...."

Well, yes, business pilots not only *should*, but **must** follow the rules of visual flight in nontowered and uncontrolled airspace. See and avoid is the first and last defense, regardless of the aircraft type or performance.

The NBAA guide does not address the issue of nontowered operations at airports with intersecting runways.

- Just last month the FAA issued Advisory Circular 90-66B, "[Non-towered Airport Flight Operations](#)." Also basic in its guidance, it states:

The pilot in command's (PIC) primary responsibility is to see and avoid other aircraft and to help them see and avoid his or her aircraft. Keep lights and strobes on. The use of any traffic pattern procedure does not alter the responsibility of each pilot to see and avoid other aircraft. Pilots are encouraged to participate in "Operation Lights On," a voluntary pilot safety program described in the AIM, paragraph 4 - 3 - 23, that is designed to improve the "see - and - avoid" capabilities.

Continuing,

Pilots should clearly communicate on the CTAF and coordinate maneuvering for and execution of the landing with other traffic so as not to disrupt the flow of other aircraft. Therefore, pilots operating in the traffic pattern should be alert at all times to aircraft executing straight-in landings.... Instrument approaches should be particularly alert for other aircraft in the pattern so as to avoid interrupting the flow of traffic, and should bear in mind they do not have priority over other VFR traffic. Pilots are reminded that circling approaches require left-hand turns unless the approach procedure explicitly states otherwise. This has been upheld by prior FAA legal interpretations of § 91.126(b).

The AC goes on to describe radio communications and traffic pattern entries in detail. But it doesn't provide any specific guidance for nontowered operations with intersecting runways. In fact, even the [Aeronautical Information Manual](#) fails to mention this directly.

See:

www.nbaa.org

<https://www.nbaa.org/ops/safety/operating-into-a-non-towered-airport.pdf>

https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_90-66B.pdf

https://www.faa.gov/air_traffic/publications/media/AIM_Basic_dtd_10-12-17.pdf

But maybe I'm overthinking this. Regardless of the number of runways, and whether or not you hear any reports on the radio, report your position and intentions on the CTAF, and look *all around* the airport before you begin your takeoff roll, and also as you're coming in to land.

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



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See <https://www.pilotworkshop.com/nto-ifr?ad-tracking=turner-nto-ops>

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Debrief:

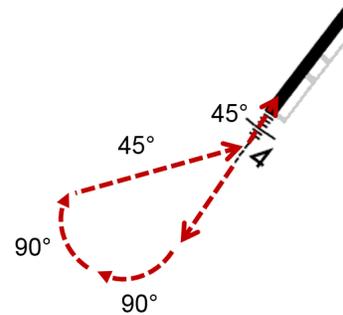
Readers write about recent *FLYING LESSONS*:

Reader Tony Johnstone continues our discussion of “The Improbable/Impossible Turn”:

Relating to the “Improbable/Impossible Turn,” I have been teaching this for years. A 45° bank angle is most efficient. This raises stall speed by 20% which is usually well under best glide speed for most GA aircraft. This gives a reasonably tight turn radius back to the runway, but keep in mind that it is **actually a 210° or so turn to get [aligned with] the runway** and will result in a downwind landing against departing traffic.

Two points, Tony. **First**, bank angle only increases stalling speed if the pilot pulls against the airplane's tendency to nose down in a steep bank (from loss of vertical component of lift). If the pilot pushes the nose down as necessary to maintain Best Glide speed, the stalling speed will increase, but not as much as it would if he/she attempts to hold level flight. The hazard of stalling out of an attempted return to the runway is that the pilot may (consciously or not) pull *back* on the elevator because the ground is so very close and he/she is descending toward it quite rapidly in an unusual and quite frightening way.

Second, because I am asked it a lot, here is where that 180° vs. 210° of turn comes from. Intuitively turning around means making a 180° turn. However, turning around to align with a line on the ground (the runway), then turning to align with that line, will take much more than that. **The return-to-the-runway maneuver requires a total of 270° of turn.** Visualize it in four segments: The first two segments combined total 180° of turn, which points you back in the general direction from whence you came, but offset to one side (we'll come back to that in a moment). From there it will take a total of *another* 90° of turn to get back in front of the runway and then turn to align with it—think of it as a 45° turn back toward centerline, and a second 45° turn to line up to land.



Now, the first two turns don't need to be 90° each, but the two will combined will equal 180°. The second two segments don't have to equal 45° each (it could be more of a 60/30 combination), but the total heading change of the two together has to equal 90°. And of course the turns can (and should) be done in a continuous, fluid motion, not leveling your wings between them, because leveling the wings after anything but the final turn to align for touchdown will take you further away from the runway. Regardless of how you do it, however, it takes a total of 270° of turn to execute the turnback maneuver to a point where you are aligned with the runway. This is why I

wrote earlier that you may be high enough and proficient enough to turn back toward a parallel runway, or a taxiway, or even the grassy level infield of the airport, and that may be your best option in some cases. But don't expect you're going to make a smooth, rolling touchdown on the runway and exit smiling and unhurt from a completely undamaged airplane (except for perhaps the engine that caused this in the first place).

Note that if there is a significant crosswind, and you turn *into* the wind, you'll be in line with the runway sooner. Turn away from the wind, however, and it will take longer to get back to the runway. With power loss time is altitude; less time takes less altitude, but more time requires more altitude. It's important to know which direction the wind is coming from, and turn appropriately if you elect to return to the airport.

Everything [I wrote last week](#) remains valid. As the webinar that started this discussion states, attempting a turnback after engine failure only the correct option if no options exist roughly straight ahead, and *then* only if you have devoted significant time to training for the maneuver. As I added last, once you get to 400 feet AGL all bets are off; it's time to aim more or less straight ahead, so you have time to prepare to touch down **Wings level, Under control, at the lowest Safe Speed.**

See <http://www.mastery-flight-training.com/20180329-flying-lessons.pdf>

Tony continues:

A good risk mitigating strategy is to **initiate the crosswind turn at 400 feet AGL**—which is what we are expected to do when given a departure heading under IFR [even] in a Jet, so shouldn't be an issue in a 172! This takes out 90° degrees of the turn back to the airport [in the event of power loss] and also gives you a view of the runway and any conflicting departing traffic. Just my humble opinion.

Tony also adds some Wise Words to those I included in [last week's LESSONS](#):

Finally, you obviously haven't seen my hangar at Winfield [Kansas]! On the walls there are multiple aviation chestnuts expressed with a Sharpie and here are a few (some time-honored, some hopefully new).

- Tailwheels are nature's way of separating pilots from airplane drivers
- We can teach you to fly better, but gravity and physics will still apply
- Crosswinds should not be feared, they should be actively challenged
- 3 most useless things in aviation- Runway behind you, altitude above you, fuel left on the ground
- Learn from the mistakes of others, you will not live long enough to make them all yourself
- Two worst days in a fighter pilot's life: the day you step on the ramp knowing it's your last day to fly a fighter, and the day you step out not knowing it's your last day to fly a fighter!
- Never count on the engine to get you to the runway (from a 747-sized pattern!)
- And, slightly off-topic- If at first you don't succeed, skydiving is probably not for you!

Great discussion items. Thanks, Tony.

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

I'll be busy working at Sun n Fun next week, and will therefore forego next week's report. Perhaps I'll see some of you at Lakeland, Florida. I'll be back on April 19th.

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



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