



FLYING LESSONS for May 11, 2017

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:

It's time again to catch up on your great Debrief emails.

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Debrief: Readers write about recent FLYING LESSONS:

Reader Steve Schofield comments on the Piper PA12 post-IMMRR (Inspection, Maintenance, Modification, Restoration or Repair) flight crash that has been the focus of *FLYING LESSONS* for several weeks:

I too was a friend of Tom's, being a co-worker of his at Spirit Airlines, and was shocked and deeply saddened to learn of his accident through an email from our ALPA MEC [that] Saturday afternoon. I will miss hearing about "The Cub" and "The Bonanza" when I would run into him at work or at Sun n Fun.

I am still puzzled, knowing Tom, how he allowed the elevator to be rigged incorrectly...to the point of actually attempting a flight. It would seem that the flight controls would have been checked numerous times during the re-assembly of the aircraft. I guess that Swiss cheese has some pretty big holes in it.

Failing to catch the improper elevator movement during his control check is slightly easier for me to reason with...On the Airbus [he captained at Spirit], we accomplish the flight control check as part of the Before Takeoff checklist and this is normally done while the captain is taxiing the aircraft. Most of this checklist is read and responded to by the first officer but there are a few items that demand a response from both pilots, such as takeoff V speeds, flap setting, takeoff power setting and flight controls. However, the flight control check is accomplished differently than in a single pilot aircraft. Since the aircraft is moving when the flight control check is normally accomplished, the captain will ask the first officer if they are ready for the flight control check. If they respond in the affirmative, the captain will then pull the side stick full back and wait for the first officer to state "full up", then the captain will push the sidestick full forward and wait for the first officer to state "full down", now the captain releases the sidestick to neutral and waits for the "neutral"

response from the first officer. The ailerons are checked in a similar manner with the captain moving the sidestick and the first officer calling out “full left”...“full right” ...“neutral.” Lastly the rudder is checked by having the captain disable the input from the rudder pedals to the nosewheel by pressing a disconnect button on the tiller and then, while steering the aircraft with the tiller, will press the rudder pedals to full travel and listen for the first officer to callout “full left...full right...neutral.” The first officer then checks the elevator and aileron inputs from his or her sidestick for full and correct movement and will then begin reading the Before Takeoff Checklist.

Since we can't see any of the flight controls from the flight deck, and this check is being done while the captain's attention is focused outside while taxiing, the captain is reliant on the first officer callouts of the control movement indicated on the screen.

To finally get to my point...I think Tom may have been in “Airbus Mode” while accomplishing his control check and equating control stick movement with control surface check. Another example of the pitfalls that may lie in wait for pilots that shift between their primary mode (air carrier, part 121 multi crew aircraft) and the single pilot general aviation mode.

Thank you for your efforts to improve pilot abilities and knowledge.

You likely knew Tom better than I...I'm very sorry for your loss. We'll probably never know much more than we already do about how the incorrect control linkage slipped past all attempts at inspection and verification. It is interesting that the Airbus check you describe is a test to see that the controllers (sidesticks and rudder pedals) are moving correctly, not that the controls themselves are. I guess that's meant to be left to the mechanics in the Part 121 (airline) world. It certainly would have done nothing in the cited event. All the more reason, as you suggest, for commercial pilots to be even more focused when flying privately. Not only are the airplanes very different, the entire aircraft support network—mechanics, dispatchers, schedulers, medical examiners and pilots themselves—boils down to the Pilot in Command who must fulfill all of these roles. Thanks for the reminder, Steve.

Debriefer Paul Siegmund writes:

I had the same initial thought about cause as you did, because it could have happened to me once and it gave me religion. Its doxology is "controls free **AND** correct." I have a lifesaving story.

In the late 70s I was readying to fly a friend's Schweizer 2-22 from midfield at Dillingham [on Oahu, Hawai'i]. He didn't fly often, he mentioned that his [glider's] wings had recently been off. We were hooked up at the runway for Bill Starr to tow us. I did the usual mixmaster check of the stick and pedals, but I was eyeballing outside and *the little voice spoke to me*. **I listened to it**, and that's why I can tell this story. I rechecked a couple of times and calmly told my friend, "The ailerons are reversed." Not impossible, evidently. I could have easily missed it.

We punched off [released the tow cable] before moving, opened up, fixed [the ailerons], and flew later in the day. I became a believer. **I check everything now, every time**. Thanks for your good education. Always.

Paul and I flew gliders at Dillingham in the Civil Air Patrol during high school, although he got a lot more time in than I did. Thanks, Paul, for relating your experience—I remember you telling me when it happened, now that you remind me.

Frequent Debriefer John Sherer adds:

Great issue! When I was an FCF (post maintenance test flight) pilot on T-37s and T-38s, I discovered something wrong on the flaps on a T-38 FCF. The right flap moved about 3 inches up and down. [The maximum] limit was about 1.5 inches as I recall. I had the mechanic (**always had a mechanic follow on FCF preflight**) open the flap motor access panel. When he opened it, the flap motor fell out onto the ramp. That one was pretty obvious.

Next one was a preflight on a C-5 [Galaxy]. The flight engineers did all preflights. When I arrived at the airplane, the flight engineer told me, "Sir, *there's something not right* with the elevator trim". I sat down in the seat and checked. Sure enough, **the trim was hooked up backwards**. The flight engineer earned her pay that day. She told me *it was supposed to be impossible to hook up the trim backwards. Apparently not...* In the C-5, you could not see rudder or elevators from cockpit. The flight engineers did those checks on preflight. Pilots did full controls travel check on taxi out, but had to trust [the] flight engineers preflight. The FE was 6 feet behind me, so I trusted they did a good check. It goes without saying that we in the C-5 community **took these checks deadly serious**. And that was your point in your issue.

One last thought: In the flight manual on Air Force airplanes there are **notes, warnings and cautions***. Many are as a result of a fatal or serious accident. In the T-38 there is a warning of intermittent hydraulic caution lights on climb out. I called that warning the “Tom Christensen” warning. Tom was my boss in the FCF section. He had to bail out of a T-38 on an FCF gone wrong. I was on his wing when he punched out. He was not hurt, but the intermittent hydraulic lights he had gotten on climb out indicated the left hydraulic system cap had not been sealed correctly. That was under a sealed panel that maintenance was responsible for. After this accident, the sealed panel was left open so we could check the hydraulic system cap. Thankfully Tom was back flying in a couple days. He retired many years later as a full Colonel. Ironically, he became a maintenance group commander.

Keep up the great work!

*In USAF technical orders:

- **Notes** highlight *essential information*;
- **Cautions** enforce *operation practice* and *prevent equipment damage*; and
- **Warnings** enforce *safety during operations* and *prevent death or injury*.

It's notable (maybe in Air Force parlance that should be *warning-able*) that post-IMMRR flights by their very nature involve a heightened chance of error detection. It is not an “acceptance” flight; it is the final quality control check of the work that was performed, plus any unintended results of that work, in a flight test environment. Be very skeptical, follow all procedures, and as I wrote early in this discussion, allot the time and effort necessary to complete a full flight test after *any* IMMRR event. Do not just jump in and fly off.

Master mechanic and pilot Dick Pedersen chimes in:

Here is a tip that I give my customers concerning the flight control check. **Always do the flight control check BEFORE you start the engine and BEFORE you put your headset on.** This way you can hear if there is any rubbing or binding in the controls or a slight restriction in movement. Once the engine is running and you have your noise canceling headsets on you will never hear any unusual sounds as you move the controls. This way one gets familiar with the sounds that the controls make as they pass over the pulleys and through the fairleads. You also hear the down springs and servos moving. I often catch loose cables, binding pulleys, cables rubbing on bulkheads or tie wraps behind the panel, or rubbing on the prop/throttle/mixture controls behind the panel. Or in a couple cases a slight resistance in one certain area of movement due to a tiny avionics screw caught in the groove of a pulley.

This before engine start control check doesn't replace the control check just prior to takeoff by any means, its just *an extra check that may change your mind* about going flying that day. This check is *a priority for me when riding in planes I'm not familiar with, such as flight instructors do* by jumping into different planes to instruct all the time.

One can never be too safe, whether wrenching or piloting. As I tell my customers, "**Know your limitations, and more importantly respect them.**"

Reader and aviation human factors authority Jefferson Koonce echoes Dick's words:

I teach students that they should **make a flight control check** (complete box and rudders independently) after getting seated and belted in, **before turning on any switches**. It is easier to hear the frayed cables trying to move over the squeaking pulleys with the engine and radios off rather than in the run-up area with all the noise and distracting anticipation of takeoff and other aircraft. I still insist on the performance of a proper controls check in the run-up area as it is published in the BEFORE TAKEOFF checklist.

Reader Paul Sergeant relates another tragic story:

While you were experiencing the grief and loss of a friend in the crash of a light airplane, so was I. Yours was a pilot and builder who failed to do a simple control check, mine was a pilot I flew with and did his simulated CFI checkride, and signed him off to take his initial-CFI test. He passed first time, and rewarded himself with a beautifully restored 1948 Cessna 170. He was going to take me up in it to get my tailwheel endorsement, and I was going to take him up in my Bonanza to get his high performance signoff. Life intervened and before we could do that, he moved to Atlanta to work in the Atlanta TRACON.

A couple of weeks ago, they found his C170 wrecked in Florida, with my student, his wife and 2 young children all dead inside. They'd been there for a day before being discovered. No one saw the accident, no one knows what happened. I know my student was a good pilot, but what did he do that killed him, or was it

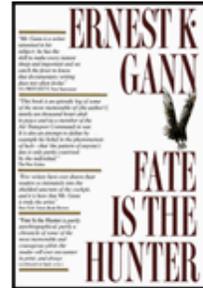
just Fate on the Hunt again? The best guess now is that he stalled and spun while taking off, but why? He certainly knew better, and that aircraft was so light and controllable. And simple.

This has been really the first time I've ever known someone who died in a plane crash, not a close friend but someone I knew and staying in touch with on Facebook, so he was real person to me, not just a name. Tomorrow another student and I are ferrying a Cessna 172 from Texas to Ohio for a friend who moved a few months ago. Am I feeling very aware of the risk? Heck yes.

I heard about that C170 crash. I'm very sorry it touched you so personally.

I'll tell you, the first time I flew after Tom Camman's PA12 crash I must have checked the controls seven times between the preflight and before takeoff checks! It's terrible it takes these things to remind us of the need to focus on the basics. But frankly I hope this feeling of awareness never fades. **Awareness and action, not fear and complacency, can and do make the risks of personal flight acceptable.**

I may change this attitude some day, but I don't subscribe to the *Fate is the Hunter* mentality, the feeling that we're all teetering on the edge of calamity with only luck and good fortune to get us by. The sad reality is that almost all mishaps are caused by something we pilots do, usually intentionally out of complacency, or from ignorance. Simply subscribing to the regulations, limitations and the rules of common sense that are handed down will almost always keep us from having mishaps. For example, I recall last year taking off in a Cessna 172 with a student, behind a departing Beechjet. We all know (or should know) the conventions for avoiding wake turbulence from a larger, heavier airplane: at least two minutes of time, lift off before the point where the heavier airplane lifted off, and offset upwind to avoid its wake turbulence as you climb out (since a Cessna 172 cannot climb above a Beechjet's climbout path, at least not for long).



My student, to his eternal credit, wanted to wait the full two minutes. I reasoned after about a minute we could follow the rest of the convention and safely lift off and climb away from the Beechjet's wake. Unfortunately this was Kansas, and a 20 knot+ wind was blowing right down the runway. Although the Beechjet's wake was being formed further down the runway, it blew invisibly toward the approach end to where we were. Just as we lifted off the Cessna rocked violently to the left, undoubtedly caught in the twisting vortices. I stomped opposite rudder and pushed the controls forward, landing again...and apologized to my student. Fate was not in play that day, it was my willful violation of an establish rule of flying. Despite my experience I was impatient and complacent, and put our flight into a situation where I had to exercise my "superior" skills. I'm not proud. It happened to me. It can, and does, happen to any of us. But it's not *fate*.

An anonymous reader winds things up this week:

[I] was sitting with a couple of friends of Capt. C at a private club on the grounds of Sun 'n Fun when word came of the PA-12 crash....we'd been discussing aircraft building and rebuilding, with C's PA-12 the rebuilding example we were discussing. When a club member arrived to tell of Capt. C's crash within minutes of the accident, their reaction was, *first*, disbelief, *then* speculation that he suffered a medical event. My reaction to the news and the description echoed yours, thinking that it sounded like a reversal of the pitch-control system. His friends' reaction was to immediately reject that possibility, contending he had too much experience and knowledge of the aircraft for that to possibly happen. We toasted Capt. C and moved on, briefly, to other topics.

Then one of Capt. C's close friends quietly asked, "Do you *really* believe that such a mistake could get past all the checks, all the people who looked over the airplane?" "Absolutely," was my response. I told him, "It's happened before, to professionally maintained and flown aircraft, private pilots flying their own aircraft, and builders of experimental aircraft."

Sometimes, when all the cheese holes align, it's difficult to accept that our friends and the people who were supposed to have their backs were *just complacent enough* to sail right through all those holes. Sad as it is, **this accident should spur many a pilot to be more diligent -- at least for a while.** Keep up the good work.

That's the *LESSON*, anonymous reader: All it takes is a little diligence to follow accepted practice and procedure to avoid ever having to talk about this type of event. That's the challenge, too: to

retain that diligence for every flight, not just for a while until we relax and become complacent again.

With what I hope is an appropriate level of respect to the persons involved in the events we've discussed, including pilots, passengers, mechanics, families, co-workers, employees and friends, we'll move on to other issues next week.

I hope as a result of this extended focus on preflight actions and post-IMMRR flights in particular, no *FLYING LESSONS* reader or student/mentee of a reader, will ever again take off without a complete **CONTROLS: FREE and CORRECT** check in memory of Tom Camman and all who have fallen victim to complacency when controls are locked, blocked or improperly rigged. **We can't eliminate all accidents. But this simple reminder can eliminate an entire class of accidents** that has affected low-time, high-time, commercial and military pilots in light airplanes, corporate jets and military aircraft.

Thank you everyone for your comments.

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

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