

Thomas P. Turner's Mastery of Flight

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FLYING LESSONS for July 4, 2024

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 most 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 in your success as the 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 with reader insights and experience by going straight to the Debrief.

Questions? Comments? Supportable opinions? Let us know at mastery.flight.training@cox.net.

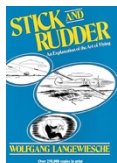
	<p>IFR Procedures: A Pilot-Friendly Manual</p> <p>A handy guide to help you review, understand, and fly IFR procedures with confidence.</p> <p>Get Details and Samples...</p> 
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See https://pilotworkshop.com/products/ifr-procedures-pfm/?utm_source=abs&utm_medium=bnr&ad=abs-bnr

Debrief: Readers write about recent *FLYING LESSONS*:

Reader Kyle Lumsden writes:

I am writing to express my sincere appreciation for the outstanding notes you have created on stick and rudder techniques. Your detailed and diligent work has significantly enhanced my understanding and retention of these essential skills. However, I have encountered an issue while trying to download your notes from the website. Would you be able to guide me on how to resolve this issue or provide an alternative method to obtain your excellent notes? I truly value your expertise and would greatly appreciate any assistance you can offer.



Thank you, Kyle. Here are direct links to my notes on [Wolfgang Langewiesche's](#) classic *[Stick and Rudder: An Explanation of the Art of Flying](#)*. Perhaps my notes and observations will inspire you to buy your own copy and learn from this classic...or to take the copy you already own off the shelf and revisit its great *LESSONS*, just as I did.

[Chapters 1 and 2](#)

[Chapter 3](#)

[Chapter 4](#)

[Chapter 5](#)

[Chapter 6](#)

Chapter 7	Chapter 8	Chapter 9	Chapter 10	Chapter 11
Chapter 12	Chapter 13	Chapter 14	Chapter 15	Chapter 16
Chapter 17	Chapter 18	Chapter 19	Chapter 20	

See:
https://en.wikipedia.org/wiki/Wolfgang_Langewiesche
<https://www.amazon.com/Stick-Rudder-Explanation-Art-Flying/dp/0070362408>
<https://thomaspturner.com/wp-content/uploads/2024/07/stickandruddernotes-1-and-2.pdf>
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Long-time reader Marty Vanover writes:

I haven't commented on your articles in a very long time. [The June 6 publication](#) article of short field takeoff technique got me thinking. As a long time-low time pilot, I found the relationship between V_x and V_y of [Rod Machado's chart](#) very interesting. I actually don't understand it. *As I was taught, probably incorrectly, stall (non-accelerated) occurs at the same airspeed regardless of altitude.* If this was true, and the airplane in Rod's example had an arbitrary IAS (assume the same as CAS) stall speed of 54 knots (at a given weight in the clean configuration) at sea level, then it should have the same stall speed up to its absolute ceiling. That would be a vertical line at 54 kts to its absolute ceiling of, say 12,000 ft. I was under the impression (told) that at absolute ceiling, if an airplane, with max available power, would slow down, it would stall and descend. If it would speed up, it would descend.

To me this infers that V_x and V_y meet very near the absolute ceiling. Meaning that the lines of V_x and V_y would converge at slightly less than stall speed at the airplane's absolute. To me, that made sense, but apparently it is not so. To be honest, I have not researched V_x and V_y in relation to altitude. Perhaps, when I get a roundtuit, I will.

I'm still enjoying your *FLYING LESSONS* as a lurker. I don't fly much anymore as I can't afford to in this economy, but I can sometimes finagle a flight with a friend.

Stalls (and optimum angle- and rate of climb speeds) occur at a constant angle of attack, not necessarily a constant indicated airspeed. V_x and V_y are also drag-dependent, and differences in air density create differences in drag for a given indicated airspeed. Best Angle and Best Rate will indeed converge near the absolute ceiling. Oh, and although I used Rod Machado's illustration in the [June 6 LESSONS](#) because it is a colorful illustration, [the concept is widely taught](#)...except, as it seems, in typical flight training. Thanks, Marty. Good to hear from you, and I hope you finagle those flights frequently.

See:
<https://thomaspturner.com/wp-content/uploads/2024/06/2024.0606-FLYING-LESSONS.pdf>
<https://www.boldmethod.com/learn-to-fly/performance/vx-vy-altitude-and-where-they-meet/>

Reader Harvey Martens take us back to the [May 9th LESSONS](#):

On the topic of "touch and goes," I had a scary experience with a rental 172. I had been doing touch and goes on a 3,000 foot runway (400' ASL) and, **on the "go", I found that the engine was not producing full power.** It would not advance beyond 2,000 RPM. As I had done a somewhat poor landing, being about halfway down the runway at this point, and after some brief trouble-shooting (carb heat off, flaps up) I judged that **I was too far down the runway to come to a safe, full stop** (there is a drop-off to a quarry at the end of this particular runway), **so I executed the takeoff at 2000 RPM.** Some nervous seconds later (seemed like minutes), I finally reached pattern altitude and continued to a normal landing.

Upon inspection, the airport maintenance shop found that a **throttle cable had come loose**. Most likely it was secure enough to function normally if the throttle was advanced smoothly but, in this situation, I probably jammed it forward due to the rapidly approaching runway end. **Had I been doing a full stop landing and then normal takeoffs, it probably would not have failed.** But it would perhaps have happened to the next guy....

P.S. This and other maintenance issues with those rental aircraft convinced me that it's safer to purchase and fly one's own aircraft and do maintenance jointly with an A&P whenever possible. I now own a 2023 Vashon Ranger and have done all the maintenance allowed by the owner and, when required, jointly with a certified LSA repairman.

I suspect the throttle cable would have eventually failed regardless, but perhaps your aggressive throttle advance might have accelerated the failure. Thank you, Harvey, and enjoy your Light Sport!

See <https://thomaspturner.com/wp-content/uploads/2024/05/2024.0509-FLYING-LESSONS.pdf>

Reader/instructor John Collins continues the touch-and-go discussion:

In the mid 1990s to early 2000s, I operated a Part 61 flight school at a non-towered airport. We operated 3 C152 and 4 C172 aircraft for primary training. **I did not permit touch and goes in the school aircraft, although I would permit stop and goes** if there was at least half of the remaining runway available (5500 feet full length). The policy had no negative effect on training or total time one of our student's took to earn a Private Pilot certificate. I had several reasons for not authorizing touch and goes:

- 1) T&G were very hard on the aircraft, particularly nose gears and would induce nose gear shimmy.
- 2) Students were so focused on the go, that landings were hurried, botched.
- 3) Instructor corrections or debrief/review of landing mistakes were lost on the student when given during the go. A taxi back was much more conducive to debrief and discuss instructor to student. It also allowed for post-take off and pre-takeoff check lists to be followed.
- 4) In my opinion, very little learning occurred during the T&G. Our students averaged in the mid 40s hours to earning their Private Pilot certificates which was well under the national average in the 60s.

With retractable gear aircraft, anything that distracts the pilot during the landing phase is at higher risk of getting a gear up scenario to occur.

Great personal confirmation of the down side of touch and goes, and how mitigating that risk did not detract from the learning schedule. Thank you, John.

Reader Mike McNamara addresses the [May 16 LESSONS](#):

Great discussion on partial panel.

I fly a [Beech] Debonair with a lot of redundancy. A mix of old instruments and new. As an electrical engineer I am aware of cascading failures and many of my systems are disconnected from each other. On purpose. To avoid common mode failures.

I recently went to a [BPT](#) training weekend which was good. In the flight portion **I asked if we would do partial panel. He said no, it would be too easy for you because of all your redundancy.** Dual G5s, 530W, hard mounted Aera 660, iPhone in mount with power, iPad in bag, separate electric AI, backup alternator, SL30, etc. The Aera 660 has a synthetic vision page. Turn and bank.

Last weekend I had several flights to make to visit several friends, do Young Eagles, go to a museum event with other friends. I was flying all over the northeast. It is a good thing it was VFR. **The cascading failures I experienced would have tested my IFR ability.**

First, I pulled up a taxi diagram on the iPhone at a towered airport. My location was not shown. Odd. Programmed a route in the iPhone and sent it to the 530W which sends it to the Aera 660 and the G5s. 100 miles later, a tower asked me to report 5 mile final. The magenta line on the 530W disappeared and the G5s stopped showing certain things. The autopilot still worked (GFC500) but reverted to roll mode, altitude functions still worked. I was struggling to find out where I could see 5 miles on the iPhone.

After landing, all came back. On the next leg everything worked for a while. **Then I lost all GPS reception in the airplane.** No location systems. I was looking out the window, comparing things on the ground to the chart on the iPhone. Fortunately my home base, KPTW, is located next to a nuclear power plant which can be seen 60 miles away.

Obviously, **something in the plane was interfering with all GPS receivers.** It was not ground based because of the different locations. IFR I would have been relegated to vectors for an ILS. My home base does have a localizer approach but minimums are not low. But maybe; they do vector for it.

I could have started taking things offline to locate the problem. Turns out the problem is the last thing I would have expected so that would probably not have worked. ***Old Garmin 530W antennas before a certain serial number are active antennas and known to have this failure mode.*** Known to who? Not me. My antenna was installed in 2006. Next week I will fly to the avionics shop with the 530W off and get it fixed.

Interesting scenario. What does that tell you about the benefits of partial panel training?

In my opinion, modern “partial panel” includes **failure simulations** like loss of all GPS and GPS-driven equipment (Example: “A national emergency has been declared while you are in flight and the government has disabled the GPS system”); the **cascading effect** (to use your descriptive term) of a blocked pitot tube or iced-over static port, which depending on the system can take out a lot more than the same condition with traditional instruments; the “there is no standardization” **interface of avionics**, within a product line or cross-brand, which means failure modes cannot be precisely predicted without experimentation in the specific aircraft; or **simple hardware failure** of a primary display with all others working perfectly—the act of using a new and unusual scan itself can be distracting and fatiguing.

Rather than tell the pilot with advanced and redundant equipment that partial panel ceases to be a threat, I **look for unusual but realistic scenarios** that may occur with the equipment in the individual airplane. It makes teaching partial panel more challenging...but it also helps the Pilot Receiving Instruction (PRI) prepare for the possibilities inherent with advanced avionics. Thank you, Mike.

See:

<https://thomaspturner.com/wp-content/uploads/2024/05/2024.0516-FLYING-LESSONS-1.pdf>

<https://www.pbpt.org>

Reader, instructor and decorated U.S. Army Aviator Mike Friel continues the discussion of checklists from the [May 16 report](#):

Sounds like you had quit a workout on your IPC [Instrument Proficiency Check] with Chris [Hope]. When I learned to fly in the U.S. Army **checklist use/nonuse was a pass/fail item** during flight evaluations. In a crewed aircraft reference to a printed checklist was a requirement. In a single pilot aircraft the Army allowed a pilot to complete the checklist from memory. The checks were required to be stated out loud for the examiner to hear during a check ride. **If any step on the checklist was missed when conducting a check from memory the resulting check ride would terminate in a failure.**

Sometimes, as you know, the in flight pilot workload gets very busy. Personally, **I’ve modified the Army’s single pilot check list standard for my personal flying.** I’ll offer climb, cruise, and before landing checks from my Beech Bonanza V35 as an example. Referencing the climb checklist I use the memory cue of MMP, power is listed as full and 27, or 25 and 25 in the

checklist. That's a given. Using MMP, I Monitor temps, set Power as indicated above, and adjust mixture. I know that's MPM, but MMP works for me.

In cruise I use MPC, it's easy for me to remember M.P.C. since the Army used to pay in Military Payment Currency, M.P.C. at certain locations. Even though MPC is my reminder, I do those checks in reverse order, Cowl Flaps closed, Power set, Mixture set.

For descent, again, MPC. Again for Altimeter set, C for Cowl Flaps, P for power, M for mixture. I usually deviate from the printed checklist here and add Select tank more nearly full to the descent check. Moving on to before landing, I have my seat belt on so I don't memorize that step. I selected the fullest tank during descent so I can just reaffirm that was done. Again, I use MPC, Mixture is set and adjusted as required during the descent, P now covers prop, C covers cowl flaps. Now that I'm landing I add L.L. Landing Gear and Lights. Airspeed is a given. I don't have electric trim so MPC-LL covers before landing without necessarily referring to a printed checklist.

If time permits reference to the written checklist is a good idea. In those instances where things are just happening too quickly I find the single pilot memory checklist aids work for me. I find that *having mnemonics that I can easily remember help me to complete the checklist items without reference to the printed checklist.* This makes it less likely that I'll forget an important step during a busy approach or when I'm distracted for some reason.

The more I do the memory checks the more of a habit it becomes making it even more unlikely those steps will be overlooked. **Each airplane is different and each of us is different.** Use mnemonics that work for you and your airplane. MMP, MPC, MPC-LL works for me in my airplane. It's a bit of a challenge sometimes when I get into a different aircraft. I have to either quickly come up with mnemonics that work for me or keep the written checklist handy.

I use mnemonics for operations close to the ground, and printed checklists for operations at altitude—perform the action from memory and then reference the checklist to ensure I've not missed anything. For emergencies I perform memorized "bold print" items that must be done—correctly—quickly or when I'm too busy to reference the checklist, and then use the checklist to back up those actions and perform less time-critical items once the initial emergency is met.

No matter how you use checklists and mnemonics, as you suggest **it's training and practice with checklists that makes safety possible.** Thank you, Mike.

Reader Jack Spitler takes us back to the [April 25 FLYING LESSONS Weekly](#):

On the subject of **immediate landing decisions**, a few events come to mind. **First**, for single engine equipment, a fire will breach most firewalls sooner than anyone wants. In the Navy T-28, the firewall was held closed with Dzus fasteners and intrusion into the cockpit was assured, but we had a parachute...never had to use it.

Second, while working for a major Express carrier, I did some MD-11 training at (then) Swissair in Kloten (Zurich) in 1997. During that time my company contracted to buy the dozen or so MD-11s owned by the Swiss. Before the deal was consummated, [the Halifax loss](#) occurred, Swissair went bankrupt, and we lost control of the contract, eventually capturing only half of the original number of aircraft.

You may recall that in "following procedures", a Swiss check captain insisted on running the "Fire and smoke of unknown origin" checklist, a lengthy one, with a fire in the overhead above the forward cabin and cockpit. Already feet wet [over the ocean], Halifax was the closest and close enough, but **the captain entered a hold to run the checklist.** As I recall, 17 minutes later the aircraft crashed into the ocean with one crew member not even in the cockpit, as his seat was being consumed by fire. (Lost friends in that one). **Our recurrent training for the next year included responding to this exact scenario**, including aircraft position, altitude, and direction of flight in order to emphasize the criticality of expedition in these circumstances. Best performances over hundreds of crews over the span of the year resulted in times between 14 and 15 minutes to on deck Halifax...presumed to be survivable.

Most recently [a DC-4 dedicated fuel freighter was lost](#) in Alaska due to fire of as yet undetermined origin in the number 1 engine, which breached the firewall and exploded the number 1 fuel tank aft of it, separating the engine and outboard wing and resulting in loss of control...all this within a few minutes of takeoff. The crew successfully avoided housing in its path. The investigation will take awhile, but the takeaway is that, in multi engine aircraft, **spar failure is possible with any engine fire on the wing**, so the **lack of flames in your face** that the single engine folks are tasked with **does not justify a warm and fuzzy in multis** and timeliness is still important. (Lost friends in this one too...)

These comments are made to inform thoughts and discussions on safety and decision making rather than to reflect on individuals who were involved. In all cases, they were present for the outcomes. Perhaps you can summarize these concepts for your readers without including the whole. I wanted to give you fuller context for your consideration.

I think your comments as sent to me are objective and respectful—I included your note that you knew people in both events as a reminder to us all of the terrible cost of aircraft mishaps. **Any indication of overheating, smoke or fire in flight is reason to act swiftly**...if only to cool down an overheated iPad (I know if one A36 Bonanza that was totaled when an overheated iPad burst into flame while the airplane was thankfully unoccupied on the ground), and of course to get the airplane on the ground if the indication occurs in flight. Thank you for the reminder, Jack.

See:

<https://thomaspturner.com/wp-content/uploads/2024/04/2024.0425-FLYING-LESSONS-1.pdf>

https://en.wikipedia.org/wiki/Swissair_Flight_111

<https://www.globalair.com/articles/burning-engine-falls-off-douglas-dc-4-moments-before-deadly-crash-in-alaska?id=7362>

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NEW THIS WEEK: Donald Bowles



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Flight Instructor Hall of Fame Inductee
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