

FLYING LESSONS for February 16, 2012

suggested by this week's aircraft mishap reports

FLYING LESSONS uses the past week's 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 make and model airplane have little direct bearing on the possible causes of aircraft accidents, so apply these *FLYING LESSONS* to any 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:

Airplanes are fast...but life is faster, and sometimes pilots don't seem to take the time required to become thoroughly familiar with their airplane's systems, and the consequences of relatively minor failures that can lead to airplane-grounding disappointments.

I'm not talking old-school engineering-level systems knowledge, of the type that has the pilot memorizing temperature limits (as opposed to green arc vs. yellow arc vs. red arc) or how many foot-pounds of force the flap motor uses to extend lift devices, or how many screws hold a particular access panel to the airframe...that World War II, military model isn't nearly as relevant as knowing what normal looks like, what abnormal looks like, and what capability you have remaining in an abnormal situation. *That's* the level of systems knowledge that will keep you, your passengers, and the people you fly near and over safe.

Take for instance [this account](#)—preliminary, to be sure—that is highly suggestive of incomplete systems knowledge (and if the account is complete, an abysmally poor initial checkout in type). From the NTSB preliminary report:

...the [pressurized] twin-engine airplane...was equipped with one alternator per engine, and a loadmeter and [Alternator Out] annunciator light for each alternator. When the airplane was in the vicinity of Catalina [Island, off California], the two "ALT" annunciator lights on the instrument panel illuminated, and the loadmeters indicated that the alternators were not providing electrical power to the airplane. The pilot powered off some electrical equipment, and ran his hand across the circuit breaker panel to ensure all breakers were in; he did not notice any breakers that were out. He then recycled both alternator switches; the ALT lights extinguished, and all other indications returned to normal. The pilot did not know the underlying reason for the problem, and was concerned, since nightfall was approaching. He then headed for [his home airport, near the coast]. On final approach, he deployed flaps and landing gear, and did not notice anything unusual until he was on short final, when he observed that none of the three green landing position annunciation lights were illuminated. He communicated this information to the air traffic control tower controller, conducted a go-around, circled back, and landed [gear up]...the pilot... held a private pilot certificate with multiple ratings. He reported a total flight experience of about 1,000 hours, including about 50 hours multi-engine time, all of which was in the accident airplane make and model.

See www.nts.gov/aviationquery/brief.aspx?ev_id=20120206X15258&key=1

FLYING LESSONS isn't all about retractable-gear airplanes (although sometimes it seem like it is, because so very many RG airplanes have landing gear-related mishaps). But it is about knowing your airplane, the environment in which it flies, and most importantly, your own abilities and attitudes. Anyone who flies an RG airplane knows there will be some sort of alternate landing gear extension procedure (I hesitate to even call it an "emergency" extension, because a failed gear extension drive system is not in itself a real "emergency"). Any pilot who gets checked out in a new type should practice the alternate extension procedure unless there is a specific warning in the Pilot's Operating Handbook or Flight Manual against using the alternate except under "real" failure circumstances—and every instructor providing such a checkout should include this type of practice. I know the specific type of airplane involved in the cited event, I've practiced actual manual extension in the type many times—and I've presented it in flight to many, many pilots in that type of airplane. It's something the pilot should have known.

Did the pilot not know the manual gear extension procedure exists? Now, I apologize if there was some unreported or extenuating circumstance that made a low pass and an immediate, intentional gear-up landing the best choice in this instance. But was that so? Was the pilot so unfamiliar with his airplane that he forgot the manual option was available in the event of electrical failure? Did he panic in the moment, blanking out the possibility of manually extending the wheels (panic usually being the result of lack of training and preparation)? Did he think it was the better choice to tell ATC he was going around because the landing gear wasn't down, then intentionally land gear up...instead of getting away from the traffic pattern, cranking down the landing gear and then returning for a landing?

We don't know, and maybe we'll never know. It's not really important that *FLYING LESSONS* sees this particular case "solved." What **is** important is that readers get into their airplanes' handbook, including supplements for optional equipment, and be able to answer these seven questions about every system in the aircraft:

1. What indications exist when the system is working normally?
2. How do I operate the system under normal circumstances?
3. What indications exist when the system is acting abnormally?
4. How do I operate the system under abnormal circumstances?
5. What indications exist when the system is under emergency conditions (i.e., imminent danger to occupants or the aircraft)?
6. How do I operate the system under emergency circumstances?
7. If a system is in an abnormal or emergency condition, what impact does that have on other aircraft systems?

You don't have to know how to build the airplane, or how to repair it after you've recovered and landed. The old-school airplane systems instruction approach may be overkill.

You do need to know, however, the answer to all seven questions about every system on board your airplane. A pilot in the sample circumstance should confidently state: "My electrical system is acting up. Therefore my flaps and landing gear won't work normally. I can't do anything about the flaps, so I'll execute a zero-flap landing. I can, however, manually crank down the landing gear. This will take some time, so I'll go ahead and do it on the way to my home airport, so it will be down and locked before I enter the pattern." You need that level of knowledge and confidence in the airplane you're flying.

You need a thorough initial checkout (even if you have experience in the type) if you did not get an expert checkout to begin with. Afterward, a quick, regular review of all checklists and the Systems Description section of your POH or AFM will help you remain current between more formal instructional flights.

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



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Debrief: Readers write about recent *FLYING LESSONS*:

Reader Al Demarzo comments on last week's *LESSON* regarding the need for mechanics to ensure nothing is left behind after working on an airplane:

When using tools or other devices one must be diligent and always be aware of the inventory. Arranging tools in a neat and logical manner in the main toolbox helps. Using either manufacturer's packaging, such as the plastics that Snap-On uses for their screwdriver sets or aftermarket "holders" like those available for wrenches and sockets, can also help. Work with only what is the necessary to keep count. Finally, realize that **disassembly is a must if a tool goes unaccounted for**.

Thanks, Al. Reader Mike Busch adds:

Tom, your stubby screwdriver writeup reminds me of a story that happened about 20 years ago when I signed off a really nervous instrument student to take his instrument rating checkride with the local designated pilot examiner. The student had demonstrated excellent instrument pilot skills, but he was clearly terrified of the upcoming checkride. I did all I could do to reassure him that he'd do fine.

My student aced his oral, at which point the DPE told him to go out to preflight my student's Cessna 182 for the checkride, and that the DPE would be along shortly after he did a little paperwork. My student figured the DPE would be watching him from his office window, and decided to impress the examiner by doing a really thorough preflight.

One of the things he'd been taught was to vigorously rock the wings of his Skylane before draining the fuel sumps (because of problems those aircraft have had with water being trapped by fuel bladder wrinkles). When he rocked the right wing, he heard a loud "clunk" that definitely did not sound right. He did it again, and got another loud "clunk."

About this time, the DPE ambled over, and my student demonstrated the "clunk" to the examiner, who agreed that this didn't sound normal. The DPE was also an A&P/IA, so 30 seconds later he was back with his trusty Makita and pulled the plastic wingtip to reveal a truly formidable four-D-cell Maglite flashlight! The DPE removed the hefty flashlight and reinstalled the wingtip. He thought it was rather funny that some mechanic would lose a prized Maglite in this fashion, but my student was such a nervous wreck at this point that he decided to reschedule the checkride for the next day. He did pass.

If memory serves, the DPE kept the flashlight. ;)

Thanks, Mike!

Reader Don Ward addresses last week's *LESSON* about the theory of shared risk, i.e., aircraft insurance, and what we must do to ensure it remains available at a price we can afford. Writes Don:

Your response to the reader who questioned the current insurance situation did a good job explaining the "why" of rates and coverage. However, I believe you missed an opportunity to elaborate on "how" a low time pilot can accrue the time and experience necessary to qualify for coverage. Providing an affordable and achievable path to secure these endorsements is another of the challenges facing aviation.

In my situation, I started flying late in life, but I knew I wanted to end up in a high performance retractable [gear] plane. After obtaining my private license, I went straight into instrument training for two reasons: first my aviation-savvy wife said she wouldn't fly with me without one, and second, I knew it to be a requirement for insurability in most high performance retractables. Fortunately for me, my flight school had a Cessna Cutlass RG, so as a part of my IFR training, for \$20 more per hour I was also gaining retractable time.

After gaining 50-75 hours in the Cutlass, I had a friend with a Piper Lance who graciously let me get my high performance endorsement in it and fly left seat with him on some of his trips. So when the time came to buy my Bonanza I had over 100 hours in retractable time and 20-30 hours of high performance time. Insurance was expensive the first year, but obtainable. While others with more knowledge and facts may differ, in my opinion the greatest insurance risk a low-time pilot [of a retractable gear aircraft] must overcome is proving they [sic] can consistently lower the gear at the right time. **Gaining retract and high performance time is possible, but requires a plan, and many times must patiently be taken in stages.** I am sure your other readers will have additional strategies to offer. Thanks for all you do to help us fly safer.

Great approach, Don. Yes, I missed the opportunity to revisit the idea of submitting a *transition plan* to insurers. Put yourself in the underwriter's place for a moment—they know nothing about

you besides the basic information on the Pilot History Form you filed with your insurance application. You met (at least) minimum requirements to pass your checkrides, but as reader Dr. Bill Rhodes points out, virtually every pilot who dies in an airplane crash met that standard at one point as well.

What that means is that, if you don't fit the insurance company's idea of an extremely qualified pilot for the type of aircraft you wish to insure, then **it's up to you to sell yourself** as a much safer pilot than what is inferred by the Pilot History Form alone. List the additional training you've taken that illustrates an attitude of continual learning. Like Don, seek out experiences that enhance your qualifications to insure the type of aircraft you're aiming for—note that it cost a little more up front, somewhat counter to the common call for flying as inexpensively as possible. When you're in experience-building mode (in order to insure your "dream aircraft"), part of what you're doing is investing in your aeronautical future.

Talk to your insurance agent. Ask him or her what minimum experience is required to get insured in your goal airplane, then ask what you can do to demonstrate you are a better risk than the bare numbers in your logbook might suggest.

Reader Efrain Gonzalez writes about a very common *FLYING LESSONS* topic, avoiding gear-up landings in retractable-gear airplanes.

Thanks for the excellent discussions on this site. They have helped me immensely during my continual training. As a very new VFR [Beech] Bonanza pilot, one of the highest priority items for me is to avoid having a gear up landing. My instructors drilled into me the multiple checking of the GUMPS [Gas, Undercarriage, Mixture, Propeller, Switches] list on the approach to landing, which so far has served me well.

Regarding the verification of proper gear operation, my check is a multi-faceted one, which includes the following: When abeam the tower on downwind (and assuming I don't have to extend due to traffic), I activate the gear lever. Immediately I can feel the cabin pressure drop momentarily as a slight vacuum is created when the gear doors open, and this is accompanied by that lovely sound of the gear motor located below the pilot's seat. **So, even before I glance down at the gear indicator lights, I know that something is happening** below. Following...comes a change in attitude and speed resulting from the added drag from the gear extending, and this begins my descent. Not feeling, hearing, and seeing these different signals would be an immediate cause for concern. At this point I do my first GUMPS check and look down at the gear indicator lights to verify all three lights are indicating down and locked. I then do my GUMPS check twice more, one on base, and lastly on final as a form of habit.

I know that when I begin my IFR training the approach to land will be much busier than what it is now but I believe that this habit will help me manage the last phase of flight a lot better and help insure the gear is down for landing.

Keep up the great work!

You too, Efrain! You've learned the *LESSON* well...gear position verification is much more than just looking at green lights.

Frequent Debriefer Lew Gage comments about last week's *LESSONS* about hand-propping an airplane with a starter system:

Regarding hand propping an engine, I would say one should never try to hand prop a six-cylinder engine. Although I know this has been done, even eight cylinder ones, that was way back in the days when a great percentage of airplanes did not have electrical systems or starters. And those doing that task did it daily and knew what they were doing.

My first airplane, a 1940 Taylorcraft that had no starter installed and so I became quite adept at hand propping. My primary instructor was from the early 1930 era and made sure I mastered that chore during the first lesson. But it was a four-cylinder engine and the prop could be "flipped" over the cylinder on the compression stroke before the next cylinder started the compression stroke. Not so for a six-cylinder engine. Six-cylinder engines, especially large bore (five inches or larger) are very difficult to prop, even for a big man that has some experience at the job.

I have seen a Mooney at Stead Airport, Reno, Nevada get totally demolished and the guy propping the engine nearly killed when the "instructor" was giving a demonstration of how to hand prop to get a start. This

happened even though this was a four-cylinder engine. This airplane jumped the chocks with the throttle open to a fairly high RPM setting and no person at the controls. It hit a 3-inch diameter heavy pipe fence post that was tougher than the airplane and engine.

I have also talked to [a pilot] who claimed he was "just pulling the engine through" that was nearly hit by the prop after the engine started and the airplane started moving, demolishing the airplane, an automobile and a hangar door. Pure unadulterated luck kept him from being killed!

At some fly-ins I see many people propping small home built airplanes that address the prop with the wrong body position, one that may cause them to bend or fall into the arc of the prop. It is probably a miracle that there are not more of the fatal accidents occurring while doing that maneuver.

Reader Richard Graham adds:

Reading your recent *FLYING LESSON* on hand-propping brought to mind an incident that happened recently at a local airport. The pilot was giving "scenic tours" of Christmas lighting for individuals at night. After landing with one group onboard, he kept the engine running and supposedly instructed everyone to be sure to step to the back of the plane once outside. For some reason one lady deplaning ended up in front of the plane and decided to go back to thank the pilot when the unthinkable happened...she walked directly into the propeller. Fortunately, she lived, but badly scarred and with the loss of an arm. Day or night, pilots need to consider a rotating prop a lethal weapon and treat it as such. *LESSON* learned...shut down the engine before transferring passengers or deplaning.

One of my student pilots recently questioned why I have them yell out the window "PROP CLEAR" prior to engine start. I asked him how long his head has been focused inside the cockpit doing the "Before Engine Start" checklist, and how many people/children did he see outside near our plane. He had no idea if anyone was near the propeller he was about to crank up. He now understands why I have him yell "PROP CLEAR," look outside and wait a few seconds before cranking.

Thanks, gentlemen. Good warnings. As I wrote last week, "prop"erly propping an airplane requires training (recall the suggestion to contact your local EAA Chapter) and safety precautions. More to my point, however: there is no reason to hand-prop an airplane equipped with a starter system, even if the starter (or the battery that rives it) is inoperative. Why, because the failed start mechanism is a symptom of some other problem, one that may cause more trouble later in flight...perhaps catastrophically.

In other words, we shouldn't spend time talking about how to manually start an airplane with a failed starting system, when flying after that start isn't really safe anyhow. **Don't prop it, fix it...then fly.**

Readers, tell us what you think...at mastery.flight.training@cox.net.

Share safer skies. Forward *FLYING LESSONS* to a friend.

Flying has risks. Choose wisely.

Thomas P. Turner, M.S. Aviation Safety, MCFI
2010 National FAA Safety Team Representative of the Year
2008 FAA Central Region CFI of the Year



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