FLYING LESSONS for November 1, 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:

How seriously do you take your preflight inspection? Is preflight a mere formality, a ritual you go through because you're *supposed* to? Or do you pay attention and take the time you need to truly check the condition of the airplane?

Take this account reported this week on *AVweb*:

> On July 28, a Piaggio Avanti…flew two legs (one with passengers) without a left elevator, and now the company has grounded its entire fleet as it works with the FAA through a safety review…. According to the NTSB, the incident aircraft departed Camarillo Airport in California, travelled to San Diego, where it picked up two passengers, and then flew to Henderson Executive Airport in Nevada. The missing elevator was discovered by airport personnel at Camarillo, three days later. The pilots did report some peculiarities.
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> According to the NTSB, after the crew landed the plane in Nevada they had a look at the tail and discovered that the left elevator was missing. The Avanti has three lifting surfaces: the main wing, a forward canard and a lifting stabilizer mounted atop the vertical fin at the rear of the aircraft. The crew reported to the NTSB they had some control issues, including the need to apply more-than-normal back pressure during landing in Nevada, but said there didn't appear to be anything unusual about the San Diego leg.

See www.avweb.com/eletter/archives/avflash/2358-full.html#207579

I've seen pilots who do extremely brief preflights (a near-jog around the airplane), pilots who appear to be taking a thoughtful look at the aircraft (usually, less experienced pilots planning on taking a checkride soon), pilots who kind of gaze at the airframe, seeming not to know precisely what to do, and pilots who walk (or drive) out to the airplane, climb right in, fire up and go.

Most frequently, however, I see pilots who do fairly complete walk-around, but do so with distractions—talking to passengers, looking at other airplanes on the ramp or in the pattern, or most commonly these days, talking on their cell phone or reading and answering texts messages or email while purportedly inspecting the airplane.

Knowing the fast-paced world of Part 135 on-demand charter and Part 91 Subpart K (fractional ownerships, which have near-Part 135 requirements), I'd bet the crewmember that preflighted that Piaggio was a junior copilot who was also filing flight plans, coordinating future schedules or ground transportation, or doing who knows what else besides truly looking at the airplane while he/she did the walk-around.

Two very human responses can conspire to make you do something as seemingly impossible as to take off in an airplane with a missing elevator. The first factor is expectation bias. **We see what we *expect* to see**. Look up at the tail of a big turboprop and you expect to see an elevator attached.

The second is rationalization. We seek to explain away things that don't look right, or feel that conditions that are patently wrong are somehow "right" for us. Can't see the elevator on the T-tail? It's probably the sun, or the way the control surface is deflected. It can't possibly be

missing….

Of course, there's always the possibility the crew never looked up at the tail at all. And what about the mechanic that last returned the airplane to service?

When was the last time you actually canceled a flight because of something you found during a preflight inspection? I know I've done so twice this year: once when the GPS database for a rented airplane was out of date before a planned IFR flight (yes, you can argue the legality, but I'm talking highly principled preflights here), and a different time when a tiny landing gear uplock spring was missing as I preflighted an A36 Bonanza with a customer who was understandably disappointed but thankfully agreeable that we needed to delay the training flight until a part could be ordered and a repair made the next day.

Preflights are meant to find problems that need to be addressed before flight. Almost always they reveal nothing that will delay or cancel the flight. That does not negate the need to look closely, without distractions or preconceptions, at the airplane as you determine its fitness for flight.

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

Debrief: Readers write about recent *FLYING LESSONS:*

There's a great deal of Debrief material in the in-box this week, so let's get to it….

Frequent Debriefer/airline and general aviation pilot David Heberling writes about last week's *LESSONS* about gear-up landings and Mastery Flight Training's research into landing gear-related mishaps (LGRMs):

> I want to thank that pilot who landed gear up for talking to you [and therefore, us—TT]. We all are potentially in the same boat as long as we fly airplanes with retractable gear. As you said, any distraction is in itself, a reason to reassess the situation and go around if necessary. As for the horn that sounds below a certain MP with the gear not down, I have a theory about that. For those folks that make a habit of descending from downwind abeam the threshold at idle power to touchdown, the gear horn has to be blaring until the gear is lowered. If one gets used to hearing that horn blare, it then becomes so much background noise as to become useless. Also, a diving final is not conducive to a stabilized approach and inasmuch he was part of a formation flight, performing the formation was the main task at hand. This does and will detract from the real job of getting slow enough to lower the gear and configuring for a safe landing.
>
> This brings to mind a recent experience I had when returning at night from KBHB (Bar Harbor, ME) to KESN (Easton, MD). While it was clear up in Maine, the weather deteriorated as we approached Maryland. The temperature/dewpoint spread had narrowed significantly and the ceiling dropped as a result. By the time I got to KESN, the ceiling was down to about 400 MSL. Since we were going to have to land in the opposite direction, I kept my speed up to [reduce time spent on] the downwind vector. Unfortunately, the controller turned me in early with no chance to slow down. **As I was coming down the glide path, my discomfort was increasing by the minute.** By the time I was down to 500 feet, I decided I had no business being there as my speed was still too high to put the gear down. We declared the missed approach and were vectored around for another try. This time, I slowed down to well below the gear extension speed. At the outer marker, I lowered the gear and partial flaps. This worked out much better, and we landed uneventfully.
>
> As the pilot of [last] weeks mishap said, **he knew something was wrong but could not put his finger on what it was. This is the point where all pilots need to start asking themselves questions: "What am I doing?"** "**What is the most important task associated with this operation?"** It always pays to do the GUMPS [Gas, Undercarriage, Mixture, Propeller] check once again. There are so many things that can go wrong, as we see in each week's Mastery of Flight report. It does not hurt to be a little paranoid and recheck things you think you have already done.

Thanks, David. We'll be hearing more from Dave later in this issue.

See:
www.mastery-flight-training.com/20121025flying_lessons.pdf
www.thomaspturner.net/LGRM%20ongoing.htm

The "Unknown Aviator" anonymously opines:

> The scenario [in last week's report] matches mine perfectly; interrupted by NORDO aircraft cutting me off in the pattern at an airport near my home field stopped me from lowering the gear as would have been normal. When the intruding aircraft quickly exited the pattern my way ahead was again clear and, since I was already slowed to final-approach speed, [and] since the runway threshold marks were at the perfect spot in my windshield, I proceeded....and, too late, noticed we were closer to the ground than we'd ever before been an eye-blink ahead of the prop tips starting to hit.
>
> Fortunately, the [insurance claims] adjuster later told me, I resisted the urge to try to correct the problem by flipping down the gear switch. Doing would have added even more damage, to gear doors, struts and attach structure.
>
> A new habit emerged from this heartrending event: a repeat of the GUMPS chant --with appropriate hand touches of controls -- on the last 250 feet of the landing descent. It's enough time to discover a gear-up situation and initiate a go-around...but just. Thanks! Another solid *LESSON*!

Thank you, Anonymous. Australian reader Mark Peterson adds:

> My own landing gear margin of safety involves:
>
> 1. Sterile cockpit within 8 nm [of the airport]
> 2. All [Before Landing] checks complete by crosswind
> 3. Re-check GEAR DOWN as part of downwind, base and finals lists
>
> Distraction and unforeseen interruptions are the most likely cause of non-gear selection.

Absolutely. As several have said, a gear position check on short final is a MUST in any retractable gear airplane. It's your last chance at a go-around, and if done without fail will compensate for any other distractions or forgotten configuration steps anywhere else in the pattern or on your approach. Thanks, Mark.

The "sterile cockpit rule" was created in response to air carrier crashes where the Cockpit Voice Recorder (CVR) revealed the crew was discussing things not directly related to flying the airplane in the minutes before and up to the point of impact. In general, under U.S. rules air carrier crews are prohibited from such extraneous discussion any time the airplane is below 10,000 feet of the ground.

10,000 AGL is a bit extreme in the case of most general aviation flying, but there are times you indeed need to focus on flying the airplane, avoiding unessential conversation as well as extraneous tasks that can be deferred until the airplane is further from the ground and out of a high-pilot-workload condition. When should you evoke the sterile cockpit rule in general aviation airplanes? When in what I call an *altitude critical area*. Read my article "Big Ground Theory and the ACA Defense" on www.ipilot.com (you'll have to register for free and log in to read the article).

A critical part of the sterile cockpit rule is pre-briefing your passengers that there are times of the flight—takeoff, leveling off, descent and landing—when you need to focus on the procedure at hand, and that they must avoid interrupting you or speaking to you unless they see something that presents an immediate danger (a nearby airplane, and anything else you may define). Blame it on Air Traffic Control if you think this explanation makes it seem like you're not confident in flying the airplane—non-pilots who listen to the radio will immediately agree to your ruse that it's hard to understand what's being said, and you need to be completely uninterrupted to communicate. Flying in an ACA is a good time to use your intercom's Pilot Isolation feature too, and to turn off music and other distracting, non-operational feeds into your headset.

See www.ipilot.com/index.php/learn/8-continuing-educaton/586-the-big-ground-theory-and-the-aca-defense

And reader Alan Davis further contributes:

> Regardless of the use of checklist(s), which I heavily endorse, or any other "procedures", the one thing that I ALWAYS do is a GUMP check on short final - in fact I've been known to do it more than once. First, one needs to understand that I almost never use the words ALWAYS or NEVER - I am infamous for using "ly" words or clarifiers like I did in this sentence - "almost never". So, when I say always, it IS ALWAYS. This covers a multitude of sins - using the GUMP on short final - including any errant departures from a checklist or an established procedure. And, it MUST be an ALWAYS - with NO EXCEPTIONS - which means IF the GUMP has not been done - GO AROUND! If you are not sure you did it, do it again - or GO AROUND!
>
> Fortunately, I have not had any situations (yet) where gear was forgotten, but there have been one or two fuel (G) situations that were caught. The big one for me was what almost became a real forced landing in a field. We were doing a simulated engine out, and when I told the student to go ahead and go-around at about 700' out in the middle of northeast Colorado, he applied the throttle and go no response. At that point, we agreed that I would fly while he troubleshot the airplane - all the while losing altitude, of course. As I set up for the final approach to the selected farm field, and he had checked fuel, pumps, etc., by force of habit I did a GUMP. It was the "P" that kept us from the forced landing. When the prop was moved forward there was a very slight increase in RPM - and suddenly the engine came back! It turned out that the flapper door in the intake was defective and had been vibrated open with the RPM to allow for airflow - it was found the following day when his mechanic checked the airplane over.
>
> Moral - GUMP as a part of EVERY short final can save a lot of grief later - even if you "think" everything is alright and you "think" that you have completed all the lists and items. What you "think" is not always the case, and GUMP can save your tail!!

Thanks, Alan!

Reader Tom Allen comments on recent *FLYING LESSONS* about maintaining instrument proficiency:

> An excellent article on Instrument Proficiency. My views on this have evolved quite a bit since I got my Instrument rating. Given my personal experiences, I believe **there is a strong case for proficiency vs. currency.** Since I have received my Instrument Rating, I have found that the weather is always a wild card and is often worse than forecast (I was vectored over 100 miles once because of a squall line where VFR was forecast). I am on vacuum pump #3 with failures at inopportune times, an autopilot that spontaneously disengages, VORs that on occasion have been off by more than 40 degrees [which makes the airplane unairworthy for IFR flight under U.S. FARs requiring 30-day VOR checks even if VORs are not the primary navigation system used—TT]. These days I do not waste my hundred dollar hamburger time droning around, I fly two approaches a month alternating with and without the autopilot.
>
> I think a big problem is the number of amendments issued around high traffic areas while IMC. I fly out of the DFW [Dallas/Fort Worth, Texas] area. I never get cleared “as filed,” so there is an amendment before taxi. Upon being switched to Regional there is always an amendment or two, more than just heading and altitude changes, before departing the area. The same is true upon arrival, changing the STAR [Standard Terminal Arrival Procedure], direct to intersections, etc. with very little time. I was talking with a high time, Beechcraft-specific instructor who said the same thing happens to him and suggested “It is an accident waiting to happen.”
>
> Seems there is something there with **a difference between how we train vs. how we fly**. Again I really appreciate the article.

Thank you, Tom. More on past *LESSONS* from David Heberling:

> I can certainly identify with the VFR-only pilot on top of a solid overcast. A long time ago, I too was a VFR-only student pilot (16 years old) on a solo cross-country flight from Rochester, NY to Skaneatles, NY. As I approached Seneca Lake, I saw a solid overcast ahead of me. I made a precautionary landing in Seneca Falls, NY to wait and see what the weather would do. After a couple of hours, I launched for Skaneatles again up and over the overcast. As I approached where I thought Skaneatles Lake was, I looked for a hole to descend through. I found one and found myself along side Skeanealtes Lake about 800' AGL. It was very murky under the clouds as I made my way to the airport. I saw what I thought was the runway, but was confused when I saw a car drive across the far end. This airport has a runway that crosses a road. There is a fence with a gate that is pulled across the road when aircraft are approaching.
>
> My story ended safely on the ground. I ended up staying overnight to wait for better weather. The weather the next day was much better. I swore I would never put myself in that situation again. Even though what I did was successful, **I did not like the uncertainty of it and how it felt**. I never did do anything like that again.

There's a line uttered by one or another of the characters in all six of the Star Wars movies: "I have a bad feeling about this." Pilots often report a similar sensation of foreboding or confusion after they have been involved in a mishap, or have (as did Dave) extricated themselves from a developing catastrophe. If you think something might be wrong, chances are good something is. Double-check everything with a cockpit flow check and a printed checklist. Reconsider the decisions that got you to that point, and the options available to you besides the *easy* decision to stick with your original plan. Resolve the discrepancies and get rid of that bad feeling, even if that means landing right away and sitting it out when you *think* you *might* be able to make it. Don't fly around with "a bad feeling about this."

In past week's *FLYING LESSONS* has also looked at engine failures on takeoff in single- and multiengine airplanes. Reader and corporate pilot Stuart Spindel writes:

> For several years, [a] group of Beechcraft Baron pilots have been annually training together at SimCom Orlando, using their two Baron Flight Training Devices (FTDs, or "simulators"). One part of our training gives each pilot a double engine failure shortly after liftoff. After crashing, the pilot is given the information that he will suffer another double engine failure after the next liftoff. Even armed with advance knowledge, most of us crash. That an unprepared pilot would successfully land his high performance single engine airplane following an engine failure soon after liftoff is doubtful. **With a thoughtful pre-takeoff self-brief, his odds would improve.** For one, he would be less inclined to use maximum performance techniques with his high performance airplane.

That confirms my oft-reported experience as a former simulator instructor using an FTD mimicking Beechcraft Bonanza and Baron airplanes. You raise an interesting point not frequently addressed in training: when is it appropriate to use which of these techniques for takeoff:

- V_X (Best Angle of Climb) departure
- V_Y (Best Rate of Climb) departure
- V_{YSE} (Best Rate of Climb—Single-Engine) departure, in multiengine airplanes
- V_{CC} (Cruise Climb) departure, at a faster-than-V_Y or V_{YSE} speed

In general, the answer should be V_{CC}, cruise climb departure, any time the conditions do not specifically require departing at V_Y (or V_{YSE} in twins) or V_X. Why? Because pilots naturally tend to delay reacting to unexpected status (the "surprise" and "denial" phases of aircraft emergencies), then tense up (the "oh [expletive deleted]" phase) before, hopefully, they respond appropriately to the situation. During the roughly three seconds it takes (according to human factors research) for the pilot to fly through this realization and do the right thing, the airplane will be decelerating rapidly—getting closer to a stall and, in multiengine airplanes, approaching a V_{MCA} loss of control on all three axes.

The conventional wisdom (and I used to teach it too) is that V_X is the appropriate first attitude to hit on takeoff regardless of conditions, with a lowering of pitch attitude to V_Y once any obstacles are cleared or the airplane is some (arbitrary) distance above ground, and then a transition to V_{CC} usually at 1000 AGL. The idea is to get altitude as quickly as possible, for options in emrgencies.

The prevalence of stalls on takeoff with even partial power losses, however, suggests that if "altitude is your friend" then "airspeed is your BFF" ("best friend forever" for the teenaged texting impaired). As *FLYING LESSONS* has stated many times before, surviving an off-airport landing is a function of wearing shoulder harnesses and landing **under control** with wings level at the lowest safe airspeed. In multiengine airplanes, surviving an engine failure on takeoff means keeping the nose **down** to maintain airspeed, and therefore airflow over control surfaces to have enough authority to overcome the effects of asymmetric thrust. In both cases, control means adequate speed; losing speed absolutely means losing control, and therefore almost certainly losing your life (along with those of anyone with you or beneath the airplane when it impacts).

So unless an obstacle or the runway length requires a short-field takeoff, don't aim for V_X at liftoff. Unless you have an operational need to climb rapidly, don't use V_Y as your initial target speed. Ease the airplane off gently and let it accelerate to V_{CC}, to have a buffer of airspeed to fly through denial in the unlikely event of an engine failure immediately after takeoff.

See www.simulator.com

Comments? Questions? *LESSONS* of your own? Email mastery.flight.training@cox.net

Back to Basics

We haven't heard from *FLYING LESSONS* reader and frequent Debriefer Tony Johnstone lately, but Tony's still out there taking it to the streets (runways?). Every 10 years or so the FAA unveils a "back to basics" program, because all the advances we've seen over the decades have not given us the ultra-low-risk flying environment new technologies have promised. Loss of Control is by far the most common factor in fatal general aviation accidents, and Tony is addressing the problem head on with a presentation for the Society of Aviation and Flight Educators (SAFE) he calls "Stick and Rudder Skills in a Glass Cockpit World" (which Tony first delivered at a Wichita Winter Wings meet I put together a few years ago).

Flying Magazine's online edition reports on Tony's efforts this week. Columnist Stephen Pope points out that the myriad of technologies have the potential to greatly reduce the rate of fatal crashes, but *potential* is not enough. "The problem seems to lie with us pilots and — more to the point, say many safety experts — how we're being trained," writes Pope. "We're struggling to understand and properly manage the technology in our cockpits while simultaneously experiencing a critical erosion of our basic **stick-and-rudder flying skills**. We lack proficiency with the knob-twisting and button-pressing needed to make the avionics do what it's supposed to, and at the same time we haven't maintained — if we ever learned in the first place — the fundamentals needed to safely hand-fly our airplanes in all flight regimes."

The need for Stick and Rudder Training (START) in all phases of initial, transition and recurrent training, **in addition to** time spent on avionics and automation-dependant flight, is a common theme of mishap and crash reports discussed in *FLYING LESSONS Weekly*. Thank you, Tony and Stephen, for carrying the torch.

See:
www.safepilots.org
www.flyingmag.com/technique/proficiency/getting-back-hand-flying
www.flyingmag.com/technique/proficiency/what-happened-stick-and-rudder

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