FLYING LESSONS for January 27, 2011

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.

If you wish to receive the free, expanded *FLYING LESSONS* report each week, email "subscribe" to mastery.flight.training@cox.net.

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First, an experiment: Watch this week's lessons in a video format. Would you like to "see" and "hear" more *FLYING LESSONS*? Let me know, at mftsurvey@cox.net.

See www.youtube.com/watch?v=xzdDTDzE_tc.

This week's lessons:

The "touch and go" is a staple of flight training. A landing with just enough time on the ground to reconfigure the airplane for another takeoff, the purpose of a touch-and-go is to compress more landings (and takeoffs) into a flying lesson. But given the high correlation between accidents and touch-and-go practice, are touch-and-goes worth the risk?

To evaluate the risk level of flying touch and goes (as opposed to full stops), take a look at just what the pilot-in-command has to do, in a very short period of time, when flying a touch and go (T&G):

- **Directional Control:** A T&G is a very workload-intensive maneuver, and often the pilot is overloaded to the point he/she does not adequately compensate for the winds or the turning tendencies of the airplane's spinning propeller. In many T&G accidents the airplane drifts into an obstacle in even very light surface winds. The T&G pilot has to maintain directional control starting with the idle-power, crosswind-correcting (as necessary) control inputs of the flare, through the touchdown, and then counter torque during power re-application and transition to initial climb. Directional control is usually lost not when the winds "outblow" the pilot's ability to correct, but when the pilot is distracted during takeoff or landing.
- **Power:** The T&G pilot has to quickly *and correctly* manage the power controls to get full thrust for the takeoff portion of the maneuver. Power for most piston pilots consists of up to four control inputs -- throttle, propeller speed, fuel mixture, and/or carburetor heat. All that potential flailing of hands in the cockpit can (and sometimes does) lead to undesirable results (especially at high density altitudes, and/or in retractable gear aircraft). The thoughtful pilot realizes he/she can pre-configure some of the controls so as not to require movement during the short run on the ground. A variable pitch propeller control, for instance, can be placed in the full-forward position on final approach, ready for the next takeoff without requiring movement on the ground. Same often goes for mixture control, depending on the engine type and the field elevation.
- **Flaps:** Most pilots land with full (or near-full) flaps, and take off with little or no flaps extended. The change has to happen quickly during a touch and go. The sequence of your actions (adding power first, or first retracting flaps) depends more on airplane design, the speed of flap travel, and individual technique -- but the sequence may be *critical* to safely taking off again. Many designs can't climb with full flaps extended—especially at high density altitudes—and other types will have seriously degraded climb performance. Some designs, notably heavier, multiengine aircraft, may not achieve

acceptable climb performance without some amount of takeoff flap extension. Follow the Pilot's Operating Handbook's advice, but more importantly, be certain it's the flap handle you're moving, and not something else ... especially in retractable-gear airplanes.

- **Trim:** The amount of trim change from landing to may be negligible, or it may be substantial—but it will affect controllability and performance. Change the power and change the flap configuration, and chances are you'll have to change the airplane's trim. Regardless of the airplane, the trim will likely require at least some adjustment during a T&G, something more to do, and yet another potential distraction, in that very short period of time.

There's no doubt that T&Gs let us log more landing practice per flight hour than the full stop and taxi back. More time in the flare and landing means quicker and more economical flying lessons. In many parts of the globe there are other financial inducements favoring touch and go landings, but avoiding landing fees attached to each full-stop landing.

T&G practice also prepares the advanced student and certificated pilot a technique for an emergency go-around should he/she detect a runway hazard after touching down—such as an animal or another airplane on the runway, or the inability to meet a "land and hold short" requirement.

Alternatives to the touch-and-go include:

- **Performing only full-stop landings**. This not only avoids the risk of T&Gs, it positive reinforces the proper sequence of events for both landing and takeoff. In fact, T&Gs tend to reinforce *improper* techniques, such as focusing inside and not outside the airplane during landing, “cleaning up” the airplane while still on the landing roll, and taking off without completing a Takeoff checklist, that can get a pilot in trouble when otherwise distracted.
- **Performing "stop and go" landings**, where the airplane is brought to a complete stop, calmly reconfigured for takeoff, and then makes a normal takeoff from the point where it stopped on landing. Do this only with adequate runway length, and after coordination with Air Traffic Control and/or other pilots at non-towered airports.
- **Exercising cockpit management** with your instructor. Assign him/her the tasks of reconfiguring the airplane (flaps, all power except throttle, and trim), so you, the Pilot-Flying, need only add power and fly the airplane.

In my opinion T&G discipline should dictate:

- Touch and go practice only after the student/pilot has mastered full stop landings and takeoffs.
- Prohibiting primary students from flying the touch-and-go while flying solo, at least until very near the checkride preparation stage.
- Teaching T&Gs, very carefully, emphasizing the technique as an emergency go-around maneuver.
- Prohibiting touch-and-go practice in all retractable gear airplanes, except for such emergency training.
- Proper use of the instructor as a cockpit resource with a pre-briefed division of duties, if conditions or the operating environment require T&G practice.
- Prohibiting T&G practice in tailwheel airplanes or any airplane at night—you can't log a T&G as a landing for currency under those conditions anyway.

Comments? Questions? Tell us what you think at mastery.flight.training@cox.net.

We've been reviewing the 10th most common cause of fatal general aviation accidents, as determined by the U.S. National Transportation Safety Board. This month *FLYING LESSONS* highlights low-altitude maneuvering…and has tasked readers with coming up with changes to the initial and recurrent training syllabus aimed at making a real reduction in the fatal accident rate.

Reader David Heberling volunteers his comments on the low-altitude scenario. Thanks, David, for your time and insights:

Doing low level maneuvers without familiarity of the area is asking for disaster. Power lines themselves are hard to see from the air, [and] you have to look for the towers. Looking at a chart can help identify such hazards, but not all hazards are always indicated. I believe that much of the attraction for low-level flying is the "buzz" one gets from the sensation of speed. By flying below the canyon walls [in the sixth scenario from the January 13th *FLYING LESSONS*], this pilot is limiting his options in case of engine failure. While it is a good idea to fly down one side of a canyon (to allow a 180 degree turn if needed), there is such a thing as being too close to the canyon wall. This is another case of someone being careless and reckless at the expense of his passenger(s). When dealing with a pilot who is a thrill seeker, it is hard to dissuade them from such activities. Decision-making is a critical skill that pilots need to keep them out of trouble. I just wonder if education would stop this type of individual.

I was 13 when I started learning how to fly. It was 3 long years before I was old enough to solo. It would be another year before I would get my [Private Pilot certificate]. You would think I would have been thinking about that checkride coming up, but I was bored stiff. Actually, one of my many instructors was bored with teaching me maneuvers I already knew, [so] he decided to show me how to roll a [Piper] Cherokee. I thought that was cool as could be, never mind the illegality of the entire enterprise. The next time I went flying, I flew a circuitous low-level route to arrive over my parent's house to show them my new-found skill. Unfortunately, their house lay under the ILS to runway 28 at [Rochester, NY]. Another pilot listening to their scanner heard all of the hullabaloo on the approach control frequency and used [his] binoculars to identify my [Cherokee's] N-number. When I got back using another circuitous low-level route, there was hell to pay. I ended up having my student pilot license suspended for 90 days. It seemed to take forever. Actually, the whole experience left me extremely reticent to break another FAR. I have not (to my knowledge) broken another one since. So, the heavy-handed approach does work.

If you're like me, throughout my first read of David's experience I was most appalled at how a flight instructor enabled and encouraged this kind of operation. Flight instructors are the gatekeepers and quality control to general aviation safety. A recent AVweb podcast with video instructional legend John King makes the very point that positive change to the fatal accident rate will occur only if it is solved by a culture shift led by the flight instructor force. It's worth taking the time to listen.

See:
www.mastery-flight-training.com/20110113flying_lessons.pdf
www.avweb.com/podcast/podcast/AudioPodcast_IFRMagazine_JohnKing_RiskManagementTraining_204006-1.html

Next week, workload permitting, *FLYING LESSONS* will draw some conclusions to the 10th most common cause of fatal general aviation accidents, low altitude maneuvering, including suggestions for changes to the initial and recurrent flight training syllabus to provide specific life-saving guidance.

Debrief: Readers write about recent *FLYING LESSONS:*

Frequent debriefer Dave Dewhirst returns to last week's discussion of GPS familiarity:

> This week's discussion reminded me of one more thing. Instructors flying a number of different airplanes need to be alert for differences in the boxes, even of the same brand. Not all owners keep up with the latest software revisions. Not all avionics shops have correctly set up the installer-selected functions. For example, the KFC-225 autopilot needs to have an additional menu item added to the PROC page to work with the Garmin 430/530 family when the WAAS upgrade is made. The automatic switch from GPS to VLOC is also selectable. Therefore, not all boxes, even of the same family, will be seen to work the same way. Further, an owner may not even discover that his box is not set up correctly unless he works with an instructor familiar with the variety of issues.

Thanks, Dave. Reader Justin Graff adds:

> Just read *FLYING LESSONS Weekly*. I, too, have been working on making an approach checklist this week. Your discussion last week of the GPS/VLOC was what got me motivated to purchase the Foreflight Checklist Pro app for the iPad a week ago. I thought it was a good idea to go through all my pre-printed checklists and make up a digital one that took the best from the BPPP [Beechcraft Pilot Proficiency Program]-approved checklist and the POH. While working on that, I noticed I did not have an instrument approach checklist and clearly to make a coupled GPS approach these days takes a lot of button pushing, monitoring of the autopilot, and pressing buttons at the right time.
>
> I've got a [Garmin] 430W, Aspen, and an S-Tec 60-2. Would you email what you've used in the past for your approach checklist?
>
> Have any subscribers sent you checklists they are using? Perhaps someone is also using Checklist Pro. If that is the case, there is a provision to share checklists.
>
> I think a key area where one could make a mistake on an approach with a bad outcome is hitting OBS too early on the missed approach, and going straight to the MA fix, rather than following the written instructions to fly a certain HDG for a distance, then go to a fix.

Thanks, Justin. I hope to have the time to post some sample checklists in the new future. Readers, if you have any you're willing to share, send it in. I can remove all identification on request.

Another regular in *FLYING LESSONS Weekly*, Bob Siegfried, writes about glidepath control, landing distances, and last week's discussion about touchdowns and landing aborts:

> A message dear to my heart! I often recommend planning long landings for various reasons, but the key is to plan the approach FOR that shorter section you are using Don't try to land in the last two thousand feet of a six thousand foot runway unless you feel very comfortable landing in the existing conditions on a two thousand foot runway!
>
> I like your comment on the go-arounds as well. I might emphasize two things more strongly though. Get the power on smoothly and deliberately. We don't want any surprises and there really is no extra rush needed. If you are running [the engine] lean of peak [exhaust gas temperature], you can add half throttle or more before you add the mixture then add the rest of the throttle (I do not recommend going to full rich for the approach) followed by a rich mixture and full RPM.
>
> Get rid of the flaps as soon as you have added the power. As long as you rotate to hold the best climb airspeed (or angle of attack if you are fortunate enough to have that data) and get out of Dodge.
>
> Lots of technique involved in doing it correctly, but lots of safety added if it is all done right. Just don't rush the process.

Thanks, Bob. I *do* go full rich or as appropriate for approach, but as we know that's a matter of technique, not dogma. I always appreciate you taking the time to add to *FLYING LESSONS*.

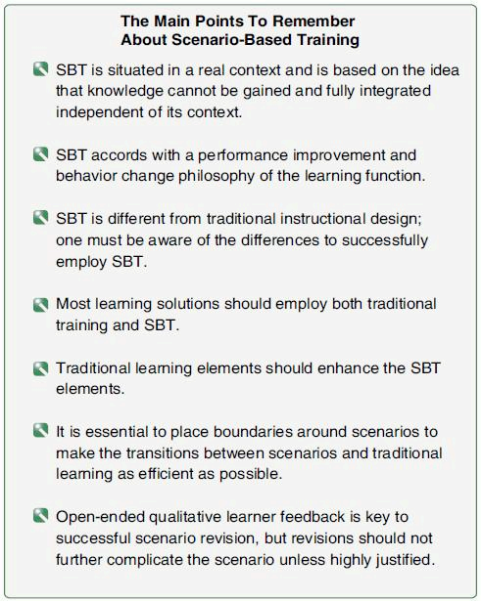
Reader Chuck LeMasters chimes in on recent *FLYING LESSONS* on crosswind control during takeoff and landing:

> Awesome to see someone talk about proper aileron usage when on the ground. As a lover of tailwheel aircraft and [a] tailwheel CFI I think [aileron position on the ground] is possibly the most overlooked and ignored aspect of flying in both tailwheel and nosewheel aircraft. I am convinced that almost 100% of ground loops are caused by improper aileron inputs.

Thanks, Chuck!

What's your opinion? Tell us at mastery.flight.training@cox.net.

A past Question of the Week focused on Scenario-Based Training (SBT), and how the need to practice basic flight maneuvers (such as slow flight, stalls, steep turns and other airmanship maneuvers, what I call START, for STick And Rudder Training) may or many not be met by a SBT-intense training syllabus that has the student taking cross-country trips from the very beginning. Now, I'm a huge fan of introducing pilot decision-making scenarios in training as much



as possible. But like a concert pianist who can't play a concerto before he or she has practiced scales for hundred of hours, so too must pilots master the basics of climbs, turns, descents, straight-and-level flight, and airspeed/angle of attack control before they can safely combine these skills into a safe cross-country experience.

(left) *Combining SBT and START (from FAA-H-8083-9A)*

We received comment on both sides of the issue—with good justifications both for START basics and realistic SBT scenarios from Lesson One. But as is usually the case, the answer lies somewhere in between. I was recently reviewing FAA Handbook 8083-9A, the *Aviation Instructor's Handbook*, and found a reminder that good flight instruction (whether initial Private or Light Sport training or recurrent training in high-performance aircraft) involved a combination of SBT and START. Include both in any instruction you give (including proficiency flying you "teach" to yourself), and insist on SBT *and* START in all the training your receive.

See www.faa.gov/library/manuals/aviation/aviation_instructors_handbook/media/FAA-H-8083-9A.pdf

Airframe ice and stalls

The U.S. Federal Aviation Administration (FAA) has this week issued Special Airworthiness Information Bulletin (SAIB) CE-11-18, advising of the unpredictable nature of angle of attack and airplane stall characteristics when contaminated with airframe ice. The SAIB notes that:

> In order to identify precursors to accidents, the FAA studied icing related non-fatal incidents dating back 25 years. The FAA found evidence of stall events during flight in icing conditions on different airplane models in which either the pilot or passenger explicitly stated the stall warning system did not activate. In some of these events the pilots attributed "shudder" or buffet to either the engine or propeller icing but not an impending wing stall. These reported events occurred in the cruise phase of flight, in some cases with the autopilot engaged; during landing approach; and on landing.

…and that the rules for "known ice" certification have changed over the years:

> Prior to 2000, a clear and unambiguous buffet was accepted for stall warning in icing conditions, even if the airplane was equipped with a stall warning system and a heated stall warning sensor. Prior to 1973, there were no requirements to test part 23 airplanes in icing conditions. Part 23 airplanes were "approved" for flight in icing conditions if they were properly equipped. Many of these airplanes remain in the fleet today.

The SAIB concludes with a series of recommendations for pilots flying FIKI (Flight Into Known Icing) and non-ice certified airplanes alike…recommendations that are your reading assignment homework for this week's *FLYING LESSONS* report.

See http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgSAIB.nsf/0/EB2E63F033AA98AD8625782200586295?OpenDocument&Highlight=ce-11-18

"I have been shot at in combat and have had ice on a light aircraft. I would much rather be shot at in combat!"

--Kent Ewing, Captain USN (ret.), Naval Aviator fighter and test pilot, former Commanding Officer, *USS America*, highly active general aviation pilot and instrument flight instructor…and *FLYING LESSONS* reader

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

Fly safe, and have fun!

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
