FLYING LESSONS for March 8, 2018

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:

Supplemental Training

A client of mine recently contacted me. She and her husband have acquired a Beech A36 Bonanza (with me it's always a Beechcraft!). I had provided her checkout training in the type already and expect to conduct his shortly as well. They were picking up their airplane after the installation of auxiliary "tip" fuel tanks.

One of the features of these new tanks is approval to operate the airplane at increased weights above the original 3650 pound maximum. That maximum gross weight (MGW) is set by the Type Certificate Data Sheet (TCDS) for the later-model A36. The TCDS is the document that sets the design, approved equipment and limitations for a specific aircraft model. The TCDS describes the Type Certificate (TC)—in this case, that which makes an A36 an A36.

To change anything listed in the TCDS requires its own approval, a Supplemental Type Certificate (STC). An STC modifies a Type Certificate (hence the word *supplemental*). The STC for this particular brand of tip tanks permits a MGW increase to 4024 pounds. That's about a 10% increase, which will have all sorts of implications for reference speeds and airplane performance.

Not my client's Bonanza, but the tip tank-equipped A36 of good friends Keith and Kerry Duce, who showed my wife, son and me around the Australian Outback many years ago in this aircraft they call "Life Is Good."

My client knew she would see some changes as a result of the tip tanks and the possibility of operating at higher weights (as it turns out, a primary reason they added the tips). I suggested a few discussion topics that (I think) told her for the first time that it wasn't simply a matter of adding the tanks and flying at higher weights (and with more gas to boot). Now, she is an accomplished lightplane pilot and very in tune with professional-grade flying—she's not a novice. I just don't think anyone in the tip tank marketing, sales or installation process pointed out just how many things change when you take advantage of the benefits of this modification. She immediately said she liked my outline and scheduled a time to get together for some instruction. I turned this outline into a detailed bullet-point syllabus covering the total operational impact of the upgrade, and including some personal recommendations for using the equipment and operating above the original maximum weight from my experience and that of other pilots, mechanics and instructors.

See http://www.mastery-flight-training.com/tip-tank-outline.pdf

An STC is a combination of technical writing and engineering drawings. The translation into pilot-speak is the STC's Pilot's Operating Handbook (POH) Supplement. The Supplement mirrors the POH in design—it has entries for each of the sections found in the POH itself:

- General Description
- Limitations
- Emergency Procedures
- Normal Procedures
- Performance
- Weight and Balance
- Systems Description
- Handling, Servicing and Maintenance

More recent Supplements include Instructions for Continued Airworthiness (ICAs)—a schedule of inspections, overhauls, actions and/or replacements that are required (like Limitations) for the STC to remain valid over time.

Each section of the POH Supplement provides information that is changed from the original POH for that serial number of aircraft—for example, an autopilot Supplement might describe a Before Takeoff checklist for that device and Limitation requiring the autopilot to be disengaged in moderate or greater turbulence. The Tip tank STC Supplement includes instructions for transferring fuel, the new weight Limitations, and a requirement to turn off an autopilot if the fuel load is more than five gallons more in one tip tank compared to the other—among many other things.

The POH Supplement is *required* to be carried aboard the aircraft primarily because that's where the equipment's Limitations are documented. Like the POH itself, the Limitations section is the only part of the POH that carries the force of regulation. Everything else is recommended best practice as determined by the manufacturer, but it is not mandatory.

As it turned out we did our tip tank ground school by telephone—the Wichita winds were really whipping on the scheduled day, gusting above 55 knots at times. The good news is that this meant my client's husband could also participate in the *LESSON*.

Completing my syllabus and answering questions took 45 minutes…and that was speaking rapidly. When we were done I believe both pilots were very familiar with the design, operation, management and Limitations of the tip tank system, and the operating considerations, expectations and hazards when taking advantage of the higher maximum weight. They also heard my personal experience with the modification and my suggestions for easing into the new capability instead of suddenly trying to go from *current* maximum to *new* maximum in one step.

Could they have gleaned most of the information (minus my suggestions) by reading the POH Supplement themselves? Sure. I often quip that if pilots would only read their POHs, especially the Limitations, the entire Emergency Procedures section, and the Systems Description, that I'd be out of a job.

But I don't fault them for not doing so. This sort of thing isn't stressed in the civilian pilot training pipeline, especially away from university flight programs. I doubt most pilots are taught to read much of the POH except some of the Normal and Emergency checklists, and develop a passing familiarity (i.e., it passes after the checkride) with the Weight and Balance and some of the Performance section. ***It's just not in our culture*** to demand in-the-books study like it is in turbine and military flying circles. Even military and airline pilots tend to skip the POH study when they fly a light airplane, at least in my experience. It's just not in our culture.

Many people (especially adults) learn better by telling, or showing, or doing, than they do from seeing (reading) alone. Adjusting for various adult learning styles is a big part of being a successful flight instructor. Knowing how you learn best, arranging learning opportunities that best fit your personal style, and finding an instructor who can present in the way you learn are all parts of being successful as a student of flight.

Plus, I like to teach. A lot of other instructors, even some young ones, like to teach as well. I'm not trying to drum up business (I don't have enough time as it is); I *do* want you to know there are many resources available to help you better understand and fly your airplane.

Here's your chance to become far better than the average pilot. **Read your POH**. And, **read your POH Supplements**. If your aircraft has a modification and you can't find the Supplement then contact the STC holder (the company with rights to that modification) because…

a) it's required by regulation to be in the aircraft; and more importantly

b) so you'll understand the operation and Limitations of that equipment's use, and how ***changes in your aircraft often require changes in the way you fly***.

After you've read the Supplement for a modification, ask around for others who have flown with it. They don't have to be instructors, as long as they have good information for you. Get on the chat lines and ask around, being certain that those you listen to actually have the modification in an airplane that is within a few model years of your own before you take everything they say as applicable to your airplane. If you want (or need) ground or flight instruction to fully understand the equipment, then ask around to find someone who meets your needs.

If your airplane's performance or Limitations change with the modification, develop experience with the new capability or requirements slowly. Don't go from 3650 pounds one day to 4024 the next, with your family on board, or on a hot day, or at a high density altitude airport. Change variables gradually, and don't change more than one at a time. Look at the last section of my tip tank syllabus:

> **Mastery Flight Training general recommendations**
>
> Gain experience gradually
>
> - Limit yourself to 3650 pounds until you have a feel for that performance
> - Long runways
> - Low obstacles
> - Cooler temperatures
>
> Expand your personal envelope with deliberate changes
>
> - Change only one variable at a time:
> - Increase eight in 200-pound increments
> - Decreased personal minimum runway lengths
> - Operation at temperatures more than 10°C above standard
>
> Deliberately estimate takeoff, climb and landing performance, and compare to actual
>
> - Developing a feel for the operation of your specific airplane under a range of conditions
> - Creating the ability to predict and monitor performance
> - Be ready to abort or go around at any time
>
> After you are familiar with the entire envelope, accept only TWO of these options at any time:
>
> - Airplane weight above 3650 lbs
> - Runway length less than 4000 feet
> - Temperature >10°C above standard for that altitude

See http://www.mastery-flight-training.com/tip-tank-outline.pdf

Get full use, and mastery the capabilities of your aircraft while you work safely within its Limitations. Take time to study your POH Supplements.

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

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You are doing all of us pilots a great service. I always find your analysis, recommendations and instruction spot on. Thanks! – Anthony Crescimanno

Thank you very much, Tony. You, and all our generous supporters.

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Or send a check to **Mastery Flight Training, Inc.** 247 Tiffany Street, Rose Hill, Kansas USA 67133.

Debrief: Readers write about recent *FLYING LESSONS:*

Reader Tony Crescimanno writes about the "go" mentality:

> I have often felt pressure to accomplish a flight in both General Aviation and Commercial Aviation operations. Most of us have experiences they can relate. I have flown paying passengers, family members and friends. I've flown my own airplanes and those owned by others. **It was and is my responsibility, obligation, [and] duty to conduct every flight adhering to the highest level of Safety**. Being trusted with human lives prohibits us from doing anything less.
>
> Whenever the situation developed requiring a deviation from the flight plan i.e. a diversion, delay, Go Around, cancellation [etc.], my reasons for doing so were based on what I considered to be the Safest course of action to take in dealing with that situation. ***The greatest pressure I feel now is to provide flight without injury or destruction of property.*** It's the only pressure that should matter.

Great advice, Tony.

Reader Mike Dolin asks what *might* seem like a rhetorical question prompted by my recent *LESSONS* from an Instrument Proficiency Check (IPC) I took at KUKL, but one that's really not rhetorical at all:

> I don't comment often on your *FLYING LESSONS Weekly*, but want to say I'm a faithful reader. Keep up the good work. I guess I'm in your neighborhood, living in KC and flying to breakfast fairly often at 1K1.
>
> Last Sunday I flew the RNAV GPS 18 practice approach to UKL. The airplane is a simple Comanche 250 that I've owned for 44 years now. Even after flying for 51 years and having a current instrument rating since 1970, I still made two mistakes: One was a trim error, the other, an altitude violation between EBJEL and ARYAR. I discussed this with my safety pilot over lunch. He told me not to beat myself up over them, but ***if you don't try to make it right, how will you ever do it in the clouds?***

Professionalism is the relentless pursuit of excellence...and constant Debriefing to learn from our experience. Thank you, Mike.

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

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Taking a Fix

NTSB Member (and *FLYING LESSONS* reader) Dr. Earl Weener writes in a blog this week on the status of the aviation-related NTSB Most Wanted List (MWL) focus areas for 2017-2018. Dr. Weener's mid-course navigation fix on progress toward these goals notes:

> While we celebrate the safety gains made across the commercial aviation industry, there is still work to be done across all sectors, especially in GA [General Aviation].

He focuses on Loss of Control – Inflight ("the only aviation-specific issue on the MWL"), citing government/industry committee progress and (re)announcing a LOC-I Roundtable discussion to take place on April 24th. The Roundtable will be webcast and then available online afterward.

See:
https://safetycompass.wordpress.com/2018/03/05/most-wanted-list-progress-report-aviation-safety/
https://ntsb.gov/news/events/Pages/2018-loc-rt.aspx

I thought it might be interesting to see what commonalities, if any, exist between the NTSB's Most Wanted List and the National Business Aviation Association (NBAA)'s Top Safety Focus Areas for 2018.

See https://www.nbaa.org/news/pr/2018/20180216-016.php

The table below lists the NBAA emphasis on the left, and the NTSB MWL on the right (minus those MWL items that clearly do not apply to aviation—remember that aviation is only *one* of the transportation systems investigated by NTSB). So…are there any overlaps? Let's see:

NBAA Focus Areas	NTSB Most Wanted List
Loss of Control Inflight (LOC-I)	Prevent loss of control in flight in general aviation
Runway Excursions	
Single-Pilot Operation Safety	
Procedural Compliance	
Ground Handling and Taxi Incidents	
Distraction Management	Eliminate distractions
Scenario- and Risk-Based Training and Checking	
Positive Safety Culture Promotion	
Inflight Aircraft Collision Risk	Increase implementation of collision-avoidance technologies
Workforce Competency and Staffing	
Safety Data Sharing and Utilization	Expand recorder use to enhance safety
	Reduce fatigue-related accidents
	Strengthen occupant protection
	Require medical fitness
	End alcohol and other drug impairment in transportation

It seems there are indeed four areas both NBAA and NTSB feel present the greatest hazard to aviation safety, and therefore also provide the greatest opportunity to reduce the fatal accident rate. Perhaps NBAA, NTSB and others can combine their efforts on these four areas to maximize their effectiveness, and also to avoid duplication of effort by addressing these areas on their own.

Comments? Questions? Ideas? Let us learn from you. Email your input to mastery.flight.training@cox.net.

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

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Thomas P. Turner, M.S. Aviation Safety
Flight Instructor Hall of Fame 2015 Inductee
2010 National FAA Safety Team Representative of the Year
2008 FAA Central Region CFI of the Year
Three-time Master CFI

