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Upset Prevention and Recovery Training: From Skeptic to Convert

by **Patty Wagstaff**

I used to scoff at the idea that upset training was different than aerobatic training. I thought, what was the point? Why bother with something like “upset training” when you can just learn aerobatics? I discussed this stance with friends who teach Upset Prevention and Recovery Training (UPRT), and while they explained the differences, I was still somewhat skeptical. Teach them a loop I'd say, and they will learn all there is to know about energy management, linear control feel and recovery from a botched maneuver.

Let me explain. I'm a bit old school when it comes to aviation. I grew up primarily with pilots who were products of the WWII training environment. These men (I didn't know any WASPs - the women who flew in WWII - at the time) were taught basic aerobatics as part of their primary training. As a kid when I asked my dad what it was like to do a loop, he'd say, “Oh, it's no big deal. Fun stuff.” He and fellow pilots might not have continued to do aerobatics in their day-to-day flying, but they considered it a normal and expected part of learning to fly. Undoubtedly, they would have laughed at the concept of an “unusual attitude” or “upset.”

Fast forward a few years, and manufacturers were attempting to sell aviation to the public as a new, safe and reliable way to travel - advertising their airplanes as “easy,” “fast,” “drives like a car!” One 1956 Cessna 172 ad said, “You must “drive” this airplane to appreciate it!” Suddenly, the term “aerobatics” seemed a little crazy or dangerous, causing people to leave that to the stunt pilots and barnstormers. Besides, who would want to fly a perfectly good airplane upside down?

So, it's no surprise when most of us learned to fly, including me in the early 1980s, aerobatics was not a part of our private or commercial pilot curriculum. It's only a recent development that Certified Flight Instructors (CFI's) are required to have a modicum of spin training. I'm sure I wasn't unusual that in the back of my mind I wondered, "What if?" What if I get into a spin? What if I encounter wake turbulence? Will I know what to do?



There are unintended consequences in everything we do. Flying was meant to be safer with spin resistant airplanes, autopilots, thorough instrument training, and later, glass cockpits. But alas, pilots are still getting into trouble and Loss of Control In-Flight (LOC-I) is the number one cause of fatalities in aviation today.

Here are some sad and disturbing statistics:

- Loss of control – mainly preceded by stalls – accounts for the largest number of fatal accidents across the board in all facets of aviation;
- In the last 10 years, LOC-I has accounted for almost half of all fatalities in commercial aviation and general aviation (GA) worldwide;
- Between 2008 and 2016, there were about 1,000 fatal LOC-I accidents in GA;
- In 2017, there were 86 general aviation LOC-I accidents with 146 fatalities;
- 40 percent of corporate and business flying accidents over the last decade were due to LOC-I;
- Most LOC-I accidents are fatal.

Loss of control is usually preceded by an "upset." If an upset isn't counteracted with proper control inputs, the airplane is likely to stall and can lead to LOC-I. The FAA defines an "airplane upset" as an airplane in-flight unintentionally exceeding the parameters normally experienced in line operations or training:

- Pitch attitude greater than 25 degrees nose up;
- Pitch attitude greater than 10 degrees nose down;
- Bank angle greater than 45 degrees;
- Within the above parameters, but flying at airspeeds inappropriate for the conditions.

The leading causes of airplane "upsets" are environmental (e.g., weather related, turbulence), pilot induced (e.g., distraction) and system anomalies (e.g., instrument failure).

Can we blame the pilots of two of the truly tragic (and ultimately unnecessary) LOC-I accidents over the past few years – the high-profile Air France 447 and the Colgan Air crashes? I don't believe so. How can you blame pilots who haven't received enough training in the basics of Angle of Attack (AOA), deep stalls and the concept of unloading a wing to recover from a stall? After all, they flew with government-issued pilot certificates.

So, what is happening? Are airplanes just falling out of the sky? In my mind, loss of control conjures a pilot in a perfectly good airplane flying along and all of a sudden the airplane tumbles out

of control – which I would add, a certified airplane cannot do. Under FAA Airplane Certifications FAR's 23 and FAR 25, misbehaved airplanes are prohibited. Airplanes must have a "downward pitching motion when stalled."

A stall – what is it? Why does an airplane crash when it's subjected to this mysterious "force?" A: It is simply a loss of lift when the wing exceeds its critical angle of attack. A: Pilots have been doing it since the Wright Brothers. A: In a certified airplane, the stalled wing and its effects have been explored quite thoroughly. A: The recovery for a stalled wing is reduce the angle of attack and the wing will fly again. We do this by placing the elevator to the neutral or forward position. In other words, "Stop pulling back on the yoke."

To the inexperienced pilot, the nose dropping in a stall – subjecting the pilot to half-G or even 0 G – causes a "startle" response, which is to pull back on the yoke to get the nose back up. Because this is often followed by a large aileron input to counter any roll, the airplane transitions from an "upset" to a "stall-spin-crash-burn."

Let's talk about the startle factor; it's a universal human response. We have been walking around the planet earth a long time at 1 G. To a human, any sensation that is less than 1G equals falling. We don't like to fall. This response is so ingrained in humans that infants just moments old startle when subjected to less than 1 G. If the baby is held in the palm of the hand and gently dropped down, it will startle. It has a medical name – the Moro reflex. This is something a pilot must experience and be sensitized to while training in the cockpit. It cannot be experienced in a simulator.

What is the difference between Upset Prevention and Recovery Training (UPRT) and Aerobatic Training? While both types of training will train a pilot to recover from unexpected situations, the differences are in the focus, efficiency and length of training. Aerobatic training focuses on completing aerobatic maneuvers with precision and putting maneuvers together into a sequence utilizing energy management. Aerobatic training can last a lifetime. You can learn a lot in five or 10 hours, but trust me,

after 30-plus years of aerobatics, I'm still learning (and that's what I like about it). On the other end, UPRT focuses on awareness, avoidance and maintaining aircraft control by identifying a problem and then correcting it with proven recovery techniques. UPRT courses usually take between one and three days, and whether taught in a basic trainer like a Super Decathlon or a higher performance Extra, are transferable to any airplane you fly – assuming it has wings!

People often ask if UPRT taught in simulators is effective. While it certainly can't hurt, if simulators had properly prepared pilots for loss of control situations, then why are accidents still occurring? UPRT training, to be most effective, must be in-cockpit. Positive, negative and lateral G's and startle factor are near impossible to replicate in a simulator. Psychological effects (sweaty palms and fear) in the airplane can be significantly different than in a simulator. Simulator limitations mean upset recovery is not the same as in an airplane, and can result in a negative transfer of learning.

Sometimes to move forward, you have to go back to the basics. If you feel you are lacking in a skill that you didn't receive when getting your ratings, then it might be time for you to look for additional training. It is up to us, as pilots, to seek out additional and potentially lifesaving "upset" or aerobatic training. Doing the right thing isn't always required, like brushing your teeth, but you know it's the right thing to do. Wolfgang Langeweishe wrote the following in his classic book, "Stick and Rudder" in 1944:

"...there is much of animal training in our flight training methods...for you simply cannot go against your common sense, against your most powerful instincts, except by drill, and more hard drill..."

And nothing has changed since. 

Patty Wagstaff is a three-time U.S. National Aerobatic Champion, founder of Patty Wagstaff Aviation Safety, LLC and an international airshow pilot. Inductee of the National Aviation Hall of Fame, Patty enjoys teaching pilots how to be more skilled, confident and safe, and to ultimately get more enjoyment out of their flying. Learn more at www.pattywagstaff.com.

Confessions of a UPRT Instructor

by Jeff Rochelle, USAF Ret.



As a former fighter pilot, airshow pilot, helicopter pilot and biz jet pilot with a little time flying in the bush, I can honestly say my most rewarding experience in aviation is training corporate and GA pilots the finer points of Upset Prevention and Recovery (UPRT). Not only is this training valuable to the recipient, it is personally gratifying to have the opportunity to give back to the aviation community.

A life in aviation is one of continual education and improvement. We never stop learning and should always maintain or improve our skills. If we are true to ourselves, there is so much to experience and know in aviation in all its forms. To think one has it all figured out is, with a doubt, the riskiest mindset to have. Piloting skills depend on our best mental and physical abilities at all times. We owe it to ourselves and our loved ones to always do the right thing; that is, to maintain and improve those skills.

That is exactly what the pilots who come to fly at Patty Wagstaff Aviation Safety, LLC (PWAS) aim to do. Most attend because they recognize the reality of encountering an upset situation. Others realize the onset of "skill decay" after years of flying on autopilot. Each accepts the need to get back to being an aviator and not just a "flight systems manager." Some take the training because their chief pilot requires it – others because the aircraft manufacturer requires it. Some are excited and thrilled while others are filled with trepidation and anxiety. Regardless, every pilot completes the course at his or her own pace. They leave feeling confident and more capable than ever to fly safely and handle any unforeseen situation with the skills taught at PWAS.

The testimonials by our students and the known "saves" we are aware of speak for themselves. I encourage pilots at all levels to step up and "Do the Right Thing." Get some UPRT and be the most confident and capable pilot you can be.

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