Stan/Eval Newsletter
CIVIL AIR PATROL
UNITED STATES AIR FORCE AUXILIARY
105 S. Hansell Street
Maxwell AFB, AL 36112

October 2023

Table of Contents

PUSH to Keep-em-Flying (LtCol F. Workley AZWG)

It was supposed to be a smooth flight, then something unexpected happened. You are out of your comfort zone. The problem requires a resolution. You need to react.

It could be an engine failure on takeoff or at any time. It could be a bird strike or a control failure. Getting behind the aircraft with an extremely high workload or some unexpected catastrophic changes are possibilities as well. Even Flying Visual Flight Rules into Instrument Meteorological Conditions because of deteriorating un-forecast weather can be a stressful situation requiring quick response.

The situations require Aeronautical Decision Making on your part. Aeronautical Decision Making (ADM) is the systematic approach to consistently determine the best response to a given set of circumstances. This requires you to develop a clear and comprehensive awareness of your situation.

Let's take an example. The engine just stopped developing power. Is it still running? Is it running rough? Is the propeller turning? Do you see any engine instrument indications that may give you a clue to the cause of the problem?

STOP!

Who is flying the aircraft? Push to maintain airspeed and Keep-em-Flying. Yes, maintain airspeed. Establish an aircraft configuration for and maintain the best glide speed. Identify a landing site. Maneuver toward a landing area. At 4000ft Above Ground Level, you generally can glide seven miles at best glide in no wind. Consider a spiral descent. Even with no power the airplane is still flying. Perform the loss of power checklist. If the engine starts great. If it doesn't, fly the airplane to a controlled landing. Maintain airspeed. Maintain airspeed. Maintain airspeed!

Did you give any briefings as to what may happen in an emergency per Federal Aviation Regulation 91.103? This includes alternatives available if the planned flight cannot be completed. Let's just jump in the airplane, light the fires, and go. We even dress to arrive not survive in an emergency. Have you set the passenger expectations? If the weather deteriorates, we will not go to our destination, but we will land safely somewhere else. Distraction from flying the aircraft can be fatal distractions if you stall and spin close to the ground.

Let GEORGE the autopilot, do it? Autopilot does not practice Aeronautical Decision Making. You must FLY the airplane. GEORGE can only help or hinder you.

What is the best solution to deal with emergencies? Something unexpected just happened. There is a startle effect. This has never happened before. It can't be happening to me!!! Total brain freeze. Turbulence has been moderate but for a long time. I'm hungry, dehydrated, and oxygen deprived to the point of being hypoxic. You may have mild cognitive impairment. You are not on the top of your game.

There may be a delay in reasoning. You may focus on one thing but the wrong solution. You never knew this could happen or you have forgotten your previous training. You have never taken

time to think through this emergency before and never practiced a response. There may be a short time to do something with limited options. No matter what, fly the airplane first. Technically debugging a mechanical problem may take some time. You must maintain situational awareness. The last thing you need now is loss of control, distractions, and diversions from your plan of action.

Controlled VFR flight into IMC results in accidents, most of which are fatal. Aviate, Navigate and Communicate. Maintain airspeed, attitude, configuration, and monitor altitude. If in doubt, PUSH don't PULL! This is no time for loss of control or Controlled Flight into Terrain or an unstable approach. Maintain situational awareness and fly the aircraft all the way to the ground.

We have a lot to think about. Do we have hazardous attitudes? Do we practice fuel "mismanagement". Do we know about the systems and configuration of the airplane recently new to us? Was your recent training in emergencies specific to this aircraft? Unexpected dynamic change can cause a brain burp in flight. Distractions and the "startle effect" along with a hazardous attitude, may throw Aeronautical Decision Making out the window.

How can you prepare yourself? Consider the hazards! Training for ever improving proficiency. We are concerned about being out of currency, but we should also be concerned about being out of proficiency. Go for proficiency not just currency. Situational awareness requires us to Prepare, Plan and Practice. Calibrate the aircraft so that you know airspeeds for each configuration. Practice maneuvers like a spiral to power off landing. Practice short field and soft field landings. Practice power off approaches and landings.

Remember the G force is always present. It is the force of gravity. We must use the 3 Ps: Perceive, Process and Perform to develop a clear and comprehensive awareness of the situation. Can you do this on the fly? DECIDE: D – Define the problem, E – Establish criteria, C – Consider all the alternatives, I – Identify the best alternatives, D – Develop and implement a plan of action, E – Evaluate and Monitor. All while flying the aircraft. If you can, you should climb, communicate, confess, and comply with instructions. But if you can't, because of the loss of power, above all maintain airspeed - PUSH, consider the best landing site, use the checklist, declare an emergency, Keep-em-Flying and execute the landing successfully under your control.

Tail Strikes

CAP has had a disturbing number of tail strikes over the past few years. Most, if not all of these, are very avoidable. Surprisingly, when a tail strike occurs, the crew is often unaware of its occurrence and only sees it on the post flight inspection (or worse it appears on the preflight of the next flight). Depending on the severity, it can be anything from purely cosmetic to bending metal requiring extensive repairs and long downtimes.

The tail tie down ring on this C182 is bent from a tail strike which occurred during landing. The damage appears to be limited to the tie down ring itself, but the mechanic's inspection revealed greater damage.

The repair required removal of the vertical stabilizer, rudder, tail cone and associated wiring/control cables as well as replacing a badly bent bulkhead.

Tail strikes occur when the aircraft is over rotated on takeoff or landing. The challenge is to understand why this might happen and train pilots to avoid situations that could end in a tail strike.

Here are some contributors to tail strikes that we need to be aware of:

- A tail-heavy condition. We often fly our CAP aircraft with only two folks in the front seat. With someone in the back we may misjudge the flare on landing or rotation on takeoff.
- We get slow on approach and begin to sink rapidly so we pull back on the yoke to arrest the descent resulting in over rotating and a tail strike.
- Excessive airspeed on short final inducing a porpoise on touchdown.
- Gusty conditions can cause instability on takeoff and landing resulting in overcontrol and over-rotation.

- Inappropriate technique when performing short field or soft field operations.

- Allowing a porpoise to continue with no corrective action.

So, what to do? A helpful observation for the C182T NAV III is to note that a tail strike occurs when the AI shows about 12 degrees up. For takeoff (or landing) it can be helpful to use the GA button to set 7.5 degrees on the AI (flight director). This is the attitude we should use as a target for both takeoff rotation and landing flare. Getting the attitude right goes a long way in preventing a tail strike. Even if you land hard (within reason), there is enough margin with a 7.5-degree attitude making a tail strike unlikely. Although this is specific to the C182T NAV III, we should figure out a target attitude for whatever aircraft we fly and be consistent using it.

As instructors, we should teach heads-up on landing and takeoff. We don't want the pilot focused on the PFD at the expense of looking down the runway. However, as instructors in the right seat, we can observe the AI on takeoff and landing and coach them to the correct attitude. We can also have pilots include the AI in their scan as they take off and land to help them get the attitude in the right place.

If we note pilots getting slow on short final, we should teach adding power to slow the descent and caution them about sudden pulls on the yoke near touchdown. Likewise, if we see pilots consistently coming in more than 5 knots above the recommended approach speed on short final, we should coach them on the proper approach speed. Adding a few knots on approach "for safety" just introduces additional risk including a porpoise and subsequent tail strike.

As often repeated, proper airspeed management is one of the critical skills for good landings. Too much or too little raises the risk of a tail strike.

Lessons Learned (2nd Lt. R. Carhart, MDWG)
I have excerpted salient points from a recent article originally published in FLYING LESSONS for 29 June 2023. You can google the internet for the complete article. There's a lot of wisdom in these points, writ large, and many CAP pilots would be wise to take them to heart.

"The causes of almost all accidents are very predictable. We're doing the same things again and again. The good news is this means most accidents are preventable if we heed the LESSONS learned from the unfortunate experiences of others."

This knowledge leads to some suggestions on ***how to avoid the vast majority of aircraft accidents***, especially those involving serious injury or death—sometimes luck is the only difference between the two. Some of my suggestions may sound overly conservative, but I bet the pilots who crashed thought they could get away with it too. You'll find these suggestions are not onerous, restrictive, or even expensive. They can easily become part of your standard operating procedure. History shows that implementing these few personal rules will make it far less likely that you, your passengers, or people over whom you fly will ever get killed, hurt, or make the evening news in the aircraft you love so much to fly.

First, some general tenets:

Know what the airplane is…and isn't. The airplane you're flying may have extraordinary avionics and equipment, but it is not an airliner. It is a recreational vehicle, personal transportation, or perhaps a business tool. It has not been designed, tested, certificated, or maintained to the same level as an air carrier aircraft. It doesn't have the performance, redundancy, or support of an airliner. However, it is very safe and very capable…if flown within its limitations.

Know what you are…and aren't. You are probably not a military, corporate jet, or air carrier pilot. Even if you are, or have been at one time, that experience does not fully prepare you for the workload of single-pilot operations in a less capable airplane. You almost certainly do not get the level of initial and recurrent training in light airplane single-pilot operations that a career pilot routinely receives. You won't be able to do everything that you could do as part of a jet crew. This is doubly true if you are retired, because like it or not, age takes its toll on endurance, reaction time and cognitive ability. ***Fly to your experience in type***, not to what you've done in a different aircraft in a completely different environment.

Evaluate and monitor the weather. The most common reason for airline delays is adverse weather. Your airplane is less capable of handling adverse weather than an air carrier airplane. Consequently, you will need to delay, divert, or cancel flights even more frequently than the airlines. I flew Beech Barons 250-300 hours a year for several years in the U.S. Southeast. I routinely diverted around weather, landed at an alternate to sit out the weather, missed approaches "for real," parked myself in holding patterns for showers to move on or for fog to finish clearing, and canceled trips and drove a rental car home because of long-lasting weather hazards. It's not "if", it's "when." The more you fly, the more you'll delay, re-route or cancel because of the weather.

If you are not the person who sets the schedule for events or meetings that create the need for your trip, or if there are adverse repercussions or lost revenue if you have to delay or cancel a flight, then plan to depart in time to delay, divert or cancel and still make it to your commitment by other means if necessary. This is especially true for the trip back home when you often have personal pressure to arrive on schedule. This sometimes means traveling to your destination a day earlier, or cutting your trip a day or two short, if the forecasts show the weather may close in on the last day of your trip. The adage is spot on: "Time to spare, go by air."

Fulfill all your roles. ***You*** are pilot-in-command: the captain of your aircraft. You are also the Dispatcher and the director of maintenance. You are the Aviation Medical Examiner, responsible for self-certification before and during flight. You are the chief pilot, questioning and evaluating your own performance. Plan each flight consciously thinking about the responsibility of all these roles. To paraphrase a self-help cliché, "if it's to do, it's up to you." Flying a cross-country aircraft is a profession, whether it's your chosen career or a compensated position. It requires the time and study and practice of a second job.

Now some specific suggestions based on actual mishap history:

Put time into training. One hour of flight instruction every two years is probably sufficient for the pilot of a very simple, VFR-only airplane flown locally outside the realm of Air Traffic Control. But it's not nearly enough for the cross-country pilot (even in visual conditions), the instrument pilot, and/or the pilot of a complex or high-performance aircraft. My years teaching multi-engine pilots at a simulator-based training facility convinced me biennial training alone is insufficient for a pilot to increase his or her capabilities in the practice of flying—it took all our time to ensure the biennial pilot could simply get back to meeting minimum standards. ***Pilots who trained twice a year tended to show up meeting standards and get even better over time.***

The less you fly, the more you need to train and practice. A corollary is that more flying time does not by itself replace the need to train. Two hundred hours of point A to point B probably won't protect you if an engine-driven fuel pump dies close to the ground, or if the weather moves in faster than forecast and low-level wind shear affects everywhere within the airplane's fueled range. ***Two hours of solid practice and/or challenging instruction of some sort two or three times a year is probably a better measure of the prepared pilot.***

Get very comfortable with angle of attack and stalls. Loss of control in flight ("LOC-I") is the cause of over 40% of all fatal general aviation events in the approach and landing phase of flight. Although aeromedical factors and partial panel flight are included, LOC-I is in most cases a euphemism for "stall." Many pilots are not comfortable flying an airplane at the slow end of its flight envelope, where you are on takeoff and go around, and where you need to be during landing. These are precisely the people who need more training in stall recognition, recovery and avoidance—***discomfort is a symptom of undeveloped or atrophied skill.***

Hand-fly the airplane—a lot. Fatal crashes often result from a pilot's inability to hand-fly the airplane in the event of an autopilot disconnect or failure. Often pilots lose control almost immediately upon a trim runaway or autopilot disconnect, when the pilot must instantly transition from automated flight to hand-flying with an airplane that is radically out of trim as a result of the failure mode. Be as comfortable and capable of hand flying, as you are using an autopilot.

Maintain mode awareness. The corollary to hand-flying is to be ***adept at the operation of your avionics and autopilot, so there's never any doubt about the mode*** in which its operating, or what the equipment is going to do next.

Practice partial panel. Half an hour of partial panel flying every six months may be worth more than a panel full of backup instruments. ***The hard part, however, is identification of a partial panel situation in the first place.*** Unless this has happened to you at night or in IMC (and you bucked the odds by surviving your first encounter), the only way to experience this realistically is in a flight training device or simulator. ***Seek out today's accessible simulation*** to prepare for the worst.

Maintain situational awareness. My informal review of the NTSB record suggests a noticeable decline in Controlled Flight into Terrain (CFIT) events that coincides with the widespread availability of cockpit moving map displays in general aviation aircraft.

That said, CFIT continues to be a problem, especially at night and during visual approaches in marginal visibility. Whether VFR or IFR, ***always know the lowest safe altitude for your current and next segment of flight.***

Know your EPs, short for Emergency Procedures. Why are airline operations so safe? In a large part it's because the crews are required to perform both normal and EPs in simulated scenarios every six months. So, when an actual abnormality or emergency arises (which is almost never "textbook" as presented in the simulator), the pilots have a recent wealth of experience with which to correlate to the situation at hand. If you've not been **practicing and reviewing EPs regularly,** you won't be ready on the unlikely but far from impossible day an actual emergency occurs.

Don't push it with fuel. It seems to be in vogue to talk about flying maximum range, requiring running all but your last tank dry and the last tank down to minimum fuel. Far too many people have died trying to make it home because that's where the cheaper fuel was or stretched the airplane's range to its limits to avoid the inconvenience of a stop, or simply to have a story to chat about online. When one tank is down to 1/8 full and the other is at ¼, it's time to be inbound on the approach or entering the traffic pattern. History shows that a great many fuel exhaustion mishaps happen within five miles of the intended destination—the pilot thought he could make it…and was almost right. ***Fill up based on fuel need, not fuel price, and carefully manage and monitor your fuel in flight, always being prepared to land for more if there's any doubt.***

Consider weighty matters. Calculating aircraft weight and balance isn't a training exercise that only applies to check rides and flight reviews. You need to ***know your airplane is always loaded within its control and performance flight envelope***. An overweight airplane (or one loaded at or beyond its design capability) will be harder to control under abnormal situations and perform less well when other conditions (density altitude, wind, etc.) adversely affect the aircraft. ***Fly at the lowest weight that meets the trip requirements with a generous fuel reserve***—the lighter the airplane the better it will perform, and the more options you'll have in an emergency. The availability of computer- and app-based W&B calculations makes it easy to be sure.

Stay within limitations. This means the **airplane's limitations** (there's no such thing as "a little overweight" or "a little over redline"). It means the **weather limitations** (no flying through "a little thunderstorm" or "a trace of ice," or flying "a little lower" to find the runway on approach to your home airport). It means **your limitations** (certificates, ratings, and currency). If you allow yourself to "fudge" the limitations, human nature says it's likely you'll soon be accepting more and more risk as "creeping normalcy" (or as Tony Kern of Convergent Performance says, "**normalization of risk**") sets in, and what was once unacceptable has gradually become your norm. It means the **mechanical limitations**. Follow the FARs about required equipment and inoperative equipment. Get familiar with the airplane's Kinds of Operation and Equipment Limitations (KOEL chart) if one exists for the aircraft. ***The regulations are a minimum standard…the very edge of appropriately managed risk*.** Where limitations are concerned, "no means no."

Employ SOPs. Standard Operating Procedures (SOPs) are the normal way you do things. Many of the **decisions are made before you're under stress**—which is another reason air carrier operations are so safe. Strive to take off and climb, fly an approach, and make your landings as close to the same way every time. This eliminates the need for many in-flight decisions (not eliminated, just decided ahead of time), and permits you to more easily detect and act upon variables like wind, traffic, equipment issues and other factors—you're not so busy with the basics of flying that you have no mental bandwidth for external stress. Knowing and using SOPs has one other advantage as well—in the very unusual case you need to do something different from your SOP, you'll know what "good" is, and be better able to judge how what you're actually doing compared to your expectations and needs.

Fly stabilized approaches. Unstable approaches, those where the airspeed, power and airplane configuration do not conform to an established and nearly uniform SOPs for the final approach segment until the flare, commonly correlate to airport environment crashes. Further, know and use the same power, attitude and configuration cues for approach every time, **and on final approach ask yourself three things**:

- Is the airplane **on-speed** (Vref +5 knots -0 knots) at the proper rate of descent (usually 500 to 750 feet per minute, except in an obstacle landing)?
- Is the airplane **on target** (proceeding at the proper attitude and glide path to touch down at 1000 feet from the runway threshold or in the first third of the runway, whichever is shorter)?
- Is the airplane **in configuration** (flaps and gear set correctly, power and attitude as expected?

If the answer to any of these is "no" when you're within, say, 500 feet of the ground, *go around*, set up properly and try again.

Get real about fatigue. Pilot fatigue is one of the great unknowns of general aviation air crash investigation. Yet even more so than in highly regimented airline operations, with maximum duty days and mandated sleep periods and time off, nothing stands between the pilot and command and his or her own judgment of their fatigue state. If you're a morning person, don't fly after work. If you dance or work the night away, don't plan on a 0600 departure. A Friday evening trip after a long work week, or a Sunday afternoon flight home after a whirlwind vacation or active vacation trip, is setting you up for bad decision-making…which may be a factor in as much as *80%* of all general aviation crashes.

Even more challenging: ***Evaluate not only how you feel for departure, but predict how you're likely to perform three or four hours later*** after bouncing around in turbulence, solid in IMC or at high altitude at reduced cabin pressure or on supplemental oxygen—and then faced with a missed approach or an abnormal or emergency condition.

Involve your family and passengers. Show your family (whether they're riding with you, or just expecting you to be somewhere at some specific time) and your passengers what it is you're looking for when you gather information and make informed decisions about appropriately managing risks. Ask them to concur with your go/no-go decision and give them the power to cancel or delay a flight or divert it while enroute if they feel uncomfortable. ***Often, it's real or perceived pressure from family or the passengers that leads a pilot to accept***

an unacceptable level of risk, usually because non-pilots have no idea what conditions you require to safely complete a flight. If those around you have some basic understanding of what is acceptable, and what is not, you may find you're under far less pressure to "go" into conditions that would normally cause you to decide against it.

Maintain your airplane. Normally it's decision-making that results in a crash. Sometimes, however, things break. The failure may not be complete, but the status and reduced capability will demand more of the pilot's attention, making it harder to appropriately manage risk in other areas. ***Pilots and airplane owners tend to interchange the words "maintenance" and "repair," but there is a vital distinction.*** Maintenance is to keep things from breaking; repair is to fix it once it's broken. Think about what "maintenance" means: it is what you do routinely, before something breaks or fails, to ***maintain*** the current level of system fidelity and functionality. ***It may be "safe"*** (appropriately managed risk) ***to defer some maintenance tasks for a time***, assuming that you step up the intensity and frequency of inspections to confirm the item has not yet shown signs of imminent failure. **You cannot defer repair**.

Going beyond recommended Time Before Overhaul of an engine or a landing gear motor, for example, may be safe, if it's legal for your operation under the rules of its governing authority. But you'll have more down time and spend more money on inspections to properly confirm it remains safe until the time comes that you need to overhaul or replace. ***Continuing to defer the maintenance task will soon reach a point of diminishing returns***, when the cost of more frequent and intrusive inspections could have been folded into the cost of the overhaul or replacement you know you'll eventually need.

If we all followed the tenets and suggestions I derive from 25 years of FLYING LESSONS, imagine how positively we'd change the record of general aviation accidents."

Articles for the National Stan Eval Newsletter:
These articles have been written to present ideas, techniques, and concepts of interest to CAP aircrews rather than provide any direction. The articles in this newsletter should in no way be considered CAP policy. We are always looking for brief articles of interest to CAP aircrews to include in this newsletter. CAP has many very experienced pilots and aircrew who have useful techniques, experiences, and tips to share. Please send your contribution to stephen.hertz@vawg.cap.gov

You can view past issues here.