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When the Best Made Plans GO AWRY

As any test pilot could tell you, the discipline of planning for both positive and adverse outcomes is one of the most essential elements in the mysterious mix that makes up the "right stuff" to be a pilot. The practice of planning is, accordingly, threaded through all aspects of aviation activity. Some of our planning, such as developing the information needed to file a flight plan and conducting a preflight inspection, is directed to ensure a normal outcome as we fly from airport A to airport B in a safe, legal, and expeditious manner.

The Scottish poet Robert Burns got it right when he wrote about the best made plans that can go awry. This is why we do contingency planning, such as reviewing emergency-action checklists and practicing engine-out landings and partial-panel approaches. This kind of planning is directed toward dealing with abnormal and emergency situations that we can readily imagine or anticipate.

Basic flight planning is about planning the flight in such a way as to ensure that it is perfectly normal and completely unremarkable.

But, as 19th-century Prussian general Helmuth von Moltke famously observed, even the best battle planning—essential though it is—rarely survives contact with the enemy. This is a wry acknowledgment that circumstances can sometimes produce challenges no one could have specifically planned to handle. The 1989 Flight 232 accident in Sioux City, Iowa, when a DC-10 lost all three hydraulic flight-control systems, provides a classic example of the curveballs that real life can throw at aircraft and pilots. That accident powerfully makes the point that pilots need to plan for the unplanned and have the tools necessary to handle scenarios considered too unlikely to merit a specific checklist.

Planning for a Normal Outcome

This issue's theme is handling abnormal and emergency situations associated with mechanical malfunctions. As the saying goes, the superior pilot uses superior judgment to *avoid* abnormal or emergency situations that would require the exercise of superior piloting skills. That's what basic flight planning is about: planning all aspects of the flight in such a way to ensure that it is perfectly normal and completely unremarkable.

The first step, of course, is ensuring the aircraft you fly is legally airworthy, which means it conforms to its type certificate and all required maintenance and inspections have been accomplished. Bad things sometimes happen to machines between required maintenance and inspection events, so the purpose of preflight inspection is to make sure the aircraft meets another airworthiness requirement: Be in condition for safe flight.

Because many preflight inspections find nothing amiss, it is dangerously easy to become complacent and, in essence, phone in the performance of your preflight inspection. Tempting as that may be, it is a bad call. Your best chance of avoiding an abnormal or emergency situation in the air is to discover the condition that might cause it while you are safely on *terra firma*.

If the same old routine is contributing to a less than thorough preflight, here are suggestions for jazzing it up. First, approach each item with a "something's wrong" mentality, much as you would do in one of the preflight inspection contests you see at air shows. In a contest, you know someone has rigged the airplane with squawks and you look more carefully. Real life should be no different. In fact, the incentive to find the broken or missing parts is far greater than in a contest.

One technique is to consider reversing the order of your preflight inspection. If you normally start on the left side, try starting on the right. Or, if you normally start at the baggage door and move next to the empennage, try going next to the nose—stopping, of course, to inspect the areas in between. Because it is less familiar, this technique will force you to pay closer attention than you normally might. Two cautions: Always use the checklist to be sure you have covered all necessary items and do not use this technique if mechanical considerations dictate

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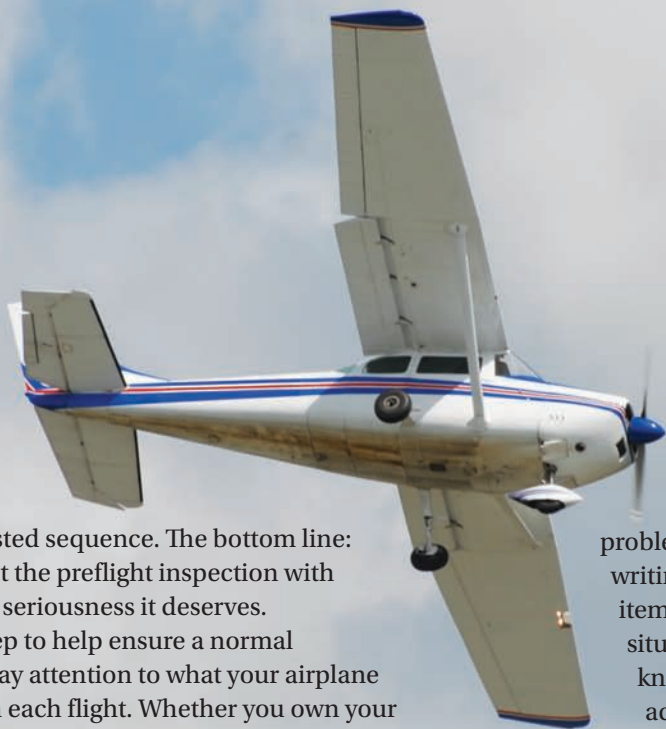
following the listed sequence. The bottom line: Ensure you treat the preflight inspection with all the care and seriousness it deserves.

Another step to help ensure a normal outcome is to pay attention to what your airplane is telling you on each flight. Whether you own your aircraft or rely on rentals, chances are good that you see the same equipment regularly. If you make a point to watch and note the various engine and system indications for each aircraft you fly, it will not take long for you to develop a good sense of what is normal. When you see indications outside those familiar parameters—even if they are still within the manufacturer's acceptable limits—it is time to start asking questions about why they changed.

Today's pilots have a huge advantage in terms of the many approved engine and system-monitoring devices available. These gadgets easily pay for themselves by helping you spot away-from-normal trends at the earliest possible stage. Early detection of the abnormal offers the best chance of avoiding an emergency situation that could eventually develop.

Planning for Abnormal and Emergency Situations

Even if you have done everything you can possibly do to ensure a normal outcome, stuff happens. Engines fail. Vacuum pumps malfunction. These are abnormal or emergency situations common enough to have driven the development of situation-specific checklists. You will find these checklists in the emergency section of your Aircraft Flight Manual (AFM) or Pilot's Operating Handbook (POH).

The key to handling these abnormal or emergency situations is—you guessed it—planning and practice. Your flight instructor probably required you to memorize the three to five boldface items that typically lead each emergency or abnormal procedures checklist. Do you remember those items and review them regularly? If not, this is a good place to start in your planning and preparation for handling abnormal or emergency mechanical problems with your airplane. Consider writing some of the emergency checklist items on index cards—one for each situation—and clip them to your kneeboard or tuck them into a readily accessible pocket for quick retrieval.

We can also prepare by borrowing the visualization technique that world-class athletes use to get mentally prepared. Test your mastery of the abnormal and emergency procedures checklists by closing your eyes and visualizing the onset of the problem. Say out loud what you will do and then reach out and "touch" the control or instrument you have just mentioned. If you do not want to imagine it all, try this exercise while sitting in your airplane.

Simulation is another great tool for planning and preparing yourself to handle abnormal and emergency situations. It can be one of the best tools, since you can safely try things in the simulator that might create a real emergency if performed in an actual airplane. Today's flight-training devices for general aviation offer a tremendous range of possibilities. With the assistance of a qualified instructor, you can experience engine failures after takeoff and see why the 180-degree turn (though tempting) is usually not a safe option. You can see for yourself how subtle a vacuum failure can be in a conventionally-instrumented aircraft or experience primary flight display (PFD) and/or multi-function display (MFD) failures in a simulated glass-cockpit aircraft. Your instructor can also give you practice with electrical failures, control-system malfunctions, and more.

"Do not try this at home" is a familiar warning, but there are some things you *can* try at home in this area. Flight simulation software can let you practice handling a variety of malfunctions and failures. Indeed, most of these programs will allow

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you to set up random failures during a flight and let you experience them much as you would in real-world flying. One of the biggest benefits of such practice is the ability to experience both sudden and subtle failures, become familiar with their early indications, and practice overcoming the natural human tendency toward denial ("this can't be happening to me") and rationalization ("it's probably just a gauge problem").

Finally, applications such as Google Earth™ offer a whole new world of opportunity for planning what to do in situations, such as an engine failure. By "pre-flying" your planned route over the Google Earth map, you can acquaint yourself with terrain, obstacles, city layouts, and, in case you need them, suitable off-field landing sites.

Planning for the Unplanned

Now you know how to plan for a normal outcome and how to prepare for certain kinds of routine abnormal and emergency situations. Yet, what, if anything, can you do to prepare for what we'll call Sioux City events, or those failures and malfunctions considered so unlikely they are not addressed in the AFM/POH emergency procedures section?

These are the times when all the other "right stuff" elements come into play. When circumstances conspire to create a Sioux City event, there is no scrap of knowledge or skill that cannot be put to use in meeting the challenge. For a good pilot, the right stuff includes solid training, regular practice, and the discipline to strive for proficiency and perfection on every flight. It includes understanding your aircraft's systems—how they work, how they fail, and how those failures could affect other systems or controls. Know as much as you possibly can—then learn more.

The right stuff also includes mastery of crew resource management (CRM), which is relevant and applicable even if you are a crew of one. A pilot with good CRM skills is one who has strong situational awareness of the aircraft and its flight path, and also of the range of resources, e.g., air traffic control, that can assist. Finally, the right stuff includes planning, which can make all the difference between normal and abnormal or emergency situations.

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