Thomas P. Turner's
Mastery of Flight

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FLYING LESSONS for September 14, 2023

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 most 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 in your success as the 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.**

FLYING LESSONS is an independent product of MASTERY FLIGHT TRAINING, INC. www.thomaspturner.com

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Construction of the new Mastery Flight Training website is under way! This edition will be added to the pdf archives when the new website launches in October. Thanks for your patience.

This week's LESSONS:

From the Aviation Safety Network:

> A Beechcraft 200 Super King Air…sustained substantial damage when it impacted heavily wooded terrain in Elk Grove Village, Illinois. The sole pilot onboard received minor injuries.
>
> The pilot **departed** Chicago-O'Hare International Airport (ORD/KORD), Illinois, **at 16:43 local time**, on a flight to Waterloo, Iowa. **Less than 50 minutes into the flight,** before reaching Waterloo Airport (ALO/KALO), Iowa, **the pilot encountered an unexpected situation** and was **cleared to return to his departure point** of Chicago-O'Hare International Airport (ORD/KORD), Illinois.
>
> On approach to runway 09L, he **initiated a go around** procedure then a turn to the left for a second circuit to land. While descending on final, he lost control of the airplane due to an **apparent fuel starvation event** (all engines powerless) then crashed into a wooded area located in Elk Grove Village, less than 4 miles northwest of O'Hare Airport at 18:41 local time.

ATC recordings posted do not indicate why the pilot chose to return to his departure point instead of continuing to Waterloo, or diverting somewhere close by or along the route back toward Chicago. The also do not reveal ***why*** the King Air pilot performed a go-around off O'Hare after his first approach, but the pilot says **tower "told me to go around"** for some reason. On the go the pilot reported **"minimum fuel."** Later when asked the flight conditions he repeated **"minimum fuel"** in his response.

A just-the-facts visual presentation of flight track combined with ATC audio is chilling. Sequenced for a second landing attempt, controllers warn the pilot he is turning inside traffic he was directed to follow. The pilot then radios **"we have a big-time problem, we're out of fuel,"** and then **"both engines quit"** and **"we don't have any fuel."** The pilot radios his decision to land on a road and controllers advise the location of a highway two miles away. Still a pro but with obvious grief in his voice, the controller reports **"radar contact lost"** and the big turboprop went down—but the pilot, alone in the aircraft, suffered only minor injuries.

See:
https://aviation-safety.net/wikibase/345368
https://archive.liveatc.net/kord/KORD1N1-App-North-Flow-Sep-08-2023-2330Z.mp3
https://www.youtube.com/watch?v=curjm2d8J0s

The pilot *told* us what happened. Quite fortunately for him, his family and friends, he not only survived but did so with minor injuries. So if there are *LESSONS* for the rest of us from *why* he turned around 50 minutes downrange, *why* he chose to return to O'Hare instead of diverting somewhere closer, *why* O'Hare Tower instructed him to go around, and *how* he let his fuel state get to where it was, we may learn them from the NTSB investigation and/or other interviews or statements the pilot may make.

Going from example to generalities and then to specifics for dealing with those generalities is somewhat circuitous, but it's the *FLYING LESSONS* way. What are three general *LESSONS* suggested by **what we know** happened in this case, and **what *might* happen** in similar situations?

1. Diversions

Long ago, when I was a simulator instructor, one of my scenarios began with a roughly one-hour flight in instrument conditions. About halfway along the trip, I presented a **system anomaly** requiring the pilot to detect and respond to a problem. In single-engine airplanes this was an alternator failure, in an era in which backup generators in that type of airplane powered only a limited (and poorly selected) fixed set of airplane equipment and was basically a battery extender to get the airplane on the ground as soon as possible. In twins I gave a low oil pressure/high oil temperature condition on one engine that called for a precautionary engine shutdown and single-engine flight.

I did this almost directly over a small, rural airport with no Unicom (only Multicom) service and (then) an NDB as its only approach. Weather there was near minimums, and it was not much better at the departure airport half an hour behind and the destination half an hour ahead. In four years of presenting this scenario I found **almost every pilot** either, in order of likelihood (1) **pressed on** toward the original destination; (2) **turned around** to the point of departure; or (3) tried to **slam-dunk** into the airport 7000 feet directly under the nose while dealing with the emergency.

Almost no one asked ATC for the weather at airports off the route (and this was before Garmin invented the magenta line to follow, child-like). If they asked, however, they'd learn a 12,000-foot runway at a tower-controlled airport less than 70 miles off their wing had marginal VFR conditions and airport rescuers just in case.

The *LESSON*: Faced with an anomaly or an emergency, **evaluate your options**. Ask ATC questions if you need information; controllers are happy to help. **Land as soon as practical** to sort things out. Conditions *might* be right for "practical" to mean return home, or press on, or dive to the closest airport. But **make the decision based on the facts**, not what seems will be most convenient *after* you get on the ground.

2. Fuel state

We've devoted many past *LESSONS* to fuel planning and inflight monitoring. This week we'll focus on when that planning didn't work. As a result of the landmark Avianca Flight 52 fuel exhaustion crash emphasis has turned to using precise language to describe specific levels of fuel-state urgency. In 2012 ICAO established internationally recognized terms for critical fuel states, specifically:

- **Minimum fuel.** Using this terminology tells controllers the "aircraft's fuel supply has reached a state where, upon reaching the destination, it can accept little or no delay. **This is not an emergency situation** but merely indicates an emergency situation is possible should any undue delay occur."

  ICAO continues: "Declare MINIMUM FUEL when committed to land at a specific aerodrome and any change in the existing clearance may result in a **landing with less than planned final reserve fuel**."

- **Mayday fuel.** Formerly "low fuel emergency," the more direct call ***Mayday, Mayday, Mayday Fuel*** makes it clear that "the calculated fuel on landing at the nearest suitable aerodrome, where a safe landing can be made, will be less than the planned final reserve fuel" remaining on board. In other words, **the airplane will run out of gas**.

This call *is* an emergency declaration, and "not only opens all options for pilots (e.g. available closed runways, military fields, etc.) but it also allows ATC added flexibility in handling an aeroplane."

If you had been flying that King Air, when might it have been appropriate to tell controllers you were at minimum fuel? At the beginning of the go-around, knowing the airplane was scant minutes from fuel exhaustion, would you have told controllers (repeatedly) you were at **minimum fuel** and accepted normal sequencing for the second approach? Or should you declare **Mayday fuel** and have everyone vectored out of your way for an immediate landing at O'Hare, nearby Chicago Executive, or some other immediate-vicinity airport?

See:
https://en.wikipedia.org/wiki/Avianca_Flight_052
https://www.ifalpa.org/media/2007/13atsbl01-icao-changes-for-minimum-and-emergency-fuel.pdf

3. Surviving the impact

When all else fails, everything depends on the pilot maintaining control of the aircraft as long as possible, and a certain amount of luck that this control takes the aircraft to a surface conducive to maintaining that control, decelerating smoothly and keeping at least the fuel tanks and aircraft cabin intact to resist fire and protect those aboard. I emphasize **WUSS:** touching down ***wings level, under control*** **at the** ***slowest safe speed.***

Although in the example that prompts this discussion fuel tank integrity may be moot. Despite what happened up to the point the King Air ran out of fuel, you've got to give him credit for bringing the big turbine twin down and flying it "as far into the crash as possible" to save himself and, had anyone else been aboard, given his passengers the best possible chance at survival.

Evidence strongly suggests that shoulder harnesses, installed ***and used***, are essential to surviving almost all off-airport landings.

See https://airfactsjournal.com/2016/08/stayin-alive-16-favorite-aviation-quotes/

I truly wish that **the *good* decisions**, the expertly planned and executed flights, were as well documented as accidents so we could learn from positive examples. Unfortunately crashes are what get reported. Sadly, there's never a shortage of events from which to draw new *LESSONS* and repeat the old. Let's take as many positives as we can.

Questions? Comments? Supportable opinions? Let us know at mastery.flight.training@cox.net.

Debrief: Readers write about recent *FLYING LESSONS:*

Reader (and generous **Website Phoenix** donor) Kendell Kelly writes about last week's *LESSONS* about gear up versus gear down in an off-airport landing:

> This is in reference to your discussion about Emergency Landings in [last week's] newsletter. From beginning to end I agree with the conclusions you have reached over time and with many years of experience and observance of results of emergency landings.
>
> The problem for most of us that fly with any regularity is that we really don't know how we'll react to a real emergency like total loss of power, or fire. Knocking of wood here, but with over 6800 TT most of which has been in Beechcraft Bonanzas or Barons I have never been exposed to a serious situation let alone an emergency. My belief is that if wither occur in the future that my experience, training, common sense, flying the airplane until it stops moving, plus God's intervention will help me make the correct decisions.

"We don't rise to the level of our expectations, we fall to the level of our training." These wise words were written about 200 BC by Archilochus, a Greek lyrical poet (an early term for "historian"). Time and again, pilots who successfully respond to major failures in flight affirm that their training made ***the*** difference in the outcome. In your words, it's a combination of experience, training and other factors. Experience comes from what happens to you. Common sense is arguably something you're born with or you're raised with, but once you're an adult the opportunity to earn it has likely passed. Divine intervention might be something you can work on. Flying the airplane until it stops is an outcome of training. But ***training*** **is the one area we all control** and can work on. I think you're on the right track, Kendell. Thank you.

Frequent Debriefer, instructor and past Pan American World Airways navigator and captain Lew Gage continues:

> Your thoughts regarding off airport engine out landings or attempting an on-airport engine out landing are probably right on the mark as being **the best plan under the existing situation**. Of course the end result cannot be accurately predicted due to the not often encountered actual engine out condition and unknown information needed in a very short time period. As I have stated before, if you have the choice of having great skill or having very good luck, TAKE GOOD LUCK.

I agree. In some ways we make our own luck, by being selective about the conditions in which we fly. For example, the engine any more likely to fail if we choose to fly night IFR over mountains in a single-engine airplane. But if it *does* fail, the consequences are far more dire if we've put ourselves in that position. Thanks, Lew, and enjoy the last of the great Reno Air Races.

I'll have a lot more Debrief items in next week's report. Thanks, readers, for all your input!

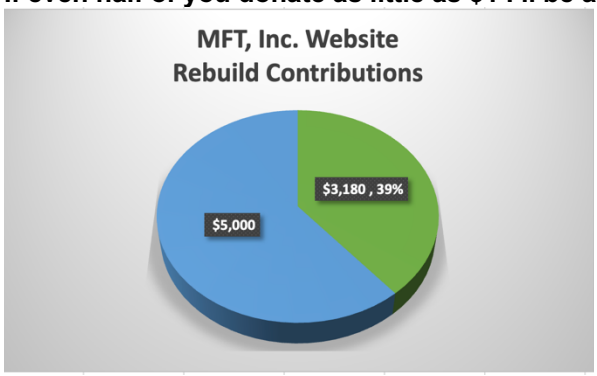
Readers, what do you think? Let us learn from you, at **mastery.flight.training@cox.net**.

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

Website Phoenix

Last week I gave you my tale of woe with my old website, a $10,000 mistake with unscrupulous designers, and asked your patience for a few weeks while I spend half that again to launch a new Mastery Flight Training website. I asked if readers might be willing—purely voluntary—to help cover not my past losses but only what it would take to get back to where MFT, Inc. had been.

If even half of you donate as little as $1 I'll be able to break even on what it takes to help us all be safer pilots. If you're so inclined **please donate through this secure PayPal link** that is independent of the old Mastery Flight Training website. It didn't help that I'd copied a test link last week, but **this week's link is correct**.



Overcoming that obstacle, this first week **20 amazing readers** donated a total of $3180, 39% of my goal, to help rebuild. This includes one $1000 contribution, and another $500 gift. ***Thank you!***

And of course I'm always grateful to my regular monthly contributors and other donors that cover most of the "normal" expenses of hosting and delivering the weekly reports. ***Thank you, too!***

I'm working now with an equally passionate web design team focused in the aviation space (I hope they like how I put that) to launch the new, even better website. **Thank you, readers,** for your patience as once again I power through the time and expense of this after-hours passion to make us all safer and better pilots.

See https://www.paypal.com/donate/?hosted_button_id=R5FFEHVEXGJ5C

Please help cover the costs of providing *FLYING LESSONS* through the secure PayPal donations link.

Or send a check made out to **Mastery Flight Training, Inc.** at 247 Tiffany Street, Rose Hill, Kansas USA 67133. Thank you, generous supporters.

Special thanks to these donors for helping the Mastery Flight Training Website Phoenix rebuild:

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2021 Jack Eggspuehler Service Award winner
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