



FLYING LESSONS for April 18, 2019

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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:

The image of a Cessna 172 partly suspended by power lines in the back yard of a New York City neighborhood, the airplane's right wing nearly severed and peeled back just outboard of the wing strut attachment, has appeared frequently on websites and online news reports this past week. Miraculously the three persons aboard the Cessna survived running out of fuel at night, in fog, over an urban area after reports of as many as six attempted instrument approaches and over four hours of time in the air. [AVWeb's Marc Cook reports:](#)

Three occupants survived the crash of a Cessna 172 into a Long Island suburb Sunday night, according to reports in the *New York Post*. The 1977 Cessna 172N was on a flight from Niagara Falls, New York, to Republic Airport in Farmingdale, New York. According to FlightAware.com, the Cessna took off at 5:12 p.m. and was flight-planned to land at FRG by 8:30.

According to reports, the aircraft was rented from a flight school at FRG by [a 27-year-old pilot. The pilot] was returning to Republic but could not land in the fog. "They attempted to land at Republic Airport, they missed the runway four times, they were redirected into Kennedy, they missed the runway twice at Kennedy—as they came around, they ran out of fuel," police commissioner Patrick Ryder said.

The [FlightAware track](#) suggests the ill-fated 172 made three attempts at the Republic ILS RWY 14 approach before being sent westward to try again at JFK. The Cessna appears to have attempted one approach and then ran out of fuel on the second attempt at Kennedy. It had been airborne for a bit more than five hours.

Weather at Republic around the time of the approaches was 1/4-mile visibility in fog, ceiling variable at 200 feet. Kennedy wasn't much better, and two airports to the east, Islip and Brookhaven, were both fogbound. The Cessna came down on Clarendon Drive in densely populated Valley Stream, New York, just 3 SM from JFK. No one on the ground was hurt and, as expected, there was no post-crash fire.

See:

<http://flash.avweb.com/eletter/4316-full.html?ET=avweb:e4316:227136a:&st=email#232650>
<https://flightaware.com/live/flight/N5296H>

The crash came at the end of a long day for the pilot and his passengers. Again according to Flightaware.com, they departed Republic (KFRG) at 7:26 that morning and flew three hours and 38 minutes to Niagara Falls. Presumably the trio toured the falls for a few hours before departing for home. The planned day was even longer; the pilot had filed to take off at 6:40 am and to begin the return trip at 5 PM.

It's possible—though not probable—that the pilot took a nap to refresh before flying home. Maybe one of the passengers is also a pilot and flew the outbound trip. Chances are, however, that fatigue was at least a factor at the decisions he made that night. At 27 years of age I certainly

thought I could handle long days too, but in retrospect a lot of those late-night drives home from Kansas City when I was a young Air Force officer were pretty risky (even though I was the designated driver). Being tired can be as bad as being drunk...I'm not suggesting that alcohol was a factor, just the potentially similar effects of lack of recent sleep.

Putting aside the fatigue factor, the pilot was likely under a lot of pressure, much of his own doing. The KFRG weather at the time they departed Niagara (2212Z) was ¼ mile visibility in fog, vertical visibility 300 feet, with a light southerly wind (off the water) and the temperature and dew point both at 14°C. And it wasn't going to get any better. The METAR about the time of arrival in the KFRG area was about the same except the moisture-bearing winds were greater, 17 gusting to 24 knots.

These conditions require the pilot file an IFR alternate. Regulations require filing an alternate following what's called **the 1 – 2 – 3 Rule**: if ± 1 hour of the estimated time of arrival (ETA) the ceiling is forecast to be less than **2000** feet and/or the visibility less than **3** statute miles, the pilot must declare an alternate on the flight plan. He/she must depart with enough fuel to fly to the planned destination and then to the alternate at normal cruise fuel burn, and still have no less than 45 minutes of fuel remaining upon arriving at that alternate.

The declared alternate must be forecast to have no less than a 600-foot ceiling and two miles visibility ("**600 and 2**") at the planned time of arrival at the alternate, if the airport is served by a precision approach; 800-foot ceiling and two miles visibility ("**800 and 2**") if served only by a nonprecision approach; or permit a **descent in visual conditions** from the minimum IFR enroute altitude for the area if the airport does not have an instrument approach.

I don't have access to the Cessna's filed flight plan, but John F. Kennedy Airport (KJFK)'s weather was not substantially better than KFRG's. Of course (1) the forecast may not have been accurate and, at the time of departure from Niagara the forecast weather in New York City may have been better; and/or (2) an IFR pilot is required to declare an alternate under 1 – 2 – 3 conditions, but once in the air is not required to go to the declared alternate in the case of a diversion. He/she can elect to go somewhere else.

From the evidence available so far, and knowing that most C172 pilots avoid major international terminals like New York/John F. Kennedy, I suspect KJFK was not the pilot's planned alternate. Instead it was probably an "airport of convenience," the nearest port in the storm as it were, once he determined he was not going to get into Farmington and the Cessna's fuel state was becoming critical.

We don't yet know what happened in this particular case. Happily this is a rare situation where the pilot is still around to tell investigators. But if you found yourself in Niagara Falls and contemplating a nearly four hour flight homeward at night, what factors might you consider?

- **Fatigue.** As previously noted, the pilot had a long day. The hardest part of making a fatigue determination isn't deciding whether you're rested enough to take off, it's **whether you'll still be alert enough to fly at the end of your flight**, and especially after missing an approach (or four) in low Instrument Meteorological Conditions (sometimes called Low IFR, or LIFR) at night. The near impossibility of making a sound judgment on this issue is why I follow the National Business Aviation Association's (NBAA) recommendation on duty time, limited to more than 14 hours per day. I consider this to be **14 hours from alarm clock to engine shutdown**. If my estimated in-the-chocks time after diverting to an alternate is more than 14 hours since I woke up, I'll delay the flight until after I've had more rest. It's tempting to go "just a little longer," but the longer it's been since you've slept the less capable you become of making a good fatigue management decision. A hard-and-fast 14-hour rule eliminates guesswork.
- **Autopilot.** The Cessna, a 1977 model, probably had only a very rudimentary autopilot or, more likely, none at all. This coupled with a planned 3.5 hour flight at night into LIFR makes the fatigue evaluation even more important.

- **Fuel.** The flight was near the limits of night and/or IFR endurance even before the first missed approach. If the foggy conditions were limited to coastal areas, perhaps the pilot might have flown east a couple of hours, landed for fuel, and then arrived in the New York City area with a couple hours of fuel remaining on board.

Another note: the FAA fuel minimums require planned fuel to destination, then to the alternate. It does not mention the fuel to fly the approach at either airport...and certainly not multiple approaches. You might want to add this fuel to your reserves as well, especially if you're already flying near the maximum range of the airplane.

- **Selecting an alternate.** Notice that the rule requiring an alternate—the 1 – 2 – 3 Rule—describes fairly good visual weather conditions, while the minimums for the alternate itself—600 and 2 or 800 and 2—are fairly low IFR weather. The idea is that **if there's even a chance you may have to fly an approach at your destination, there's a chance the weather will worsen and you'll need to miss the approach.** In that case you need a backup plan that gives you at least a decent chance the weather **there** will be above minimums.

It's common to choose an alternate airport that is very near the intended destination. In part this is because of the range limitation placed on a flight if the declared alternate is far away. I caution you, however, to avoid planning on an alternate that is under the influence of the same weather conditions that apply to your planned destination. Sure, if you have to miss the approach and somewhere closer works at that time you can go there instead. But at least **plan on having to get away not just from your intended destination, but from the weather that is influencing that area as well.**

- **Beginning an approach.** Air carrier pilots, that is, those flying Part 121 (airline) and Part 135 (on demand charter) operations can only begin an instrument approach if there is local weather reporting, and only then if the current, reported weather is at or above minimums for the approach in use subject to the aircraft equipment and the qualifications of the pilot. The weather at KFRG did not meet approach minimums. That said, noncommercial (Part 91) operations permit a pilot to fly an approach in *any* weather. It makes sense—as long as the pilot flies the procedure precisely, including the missed approach if needed, the operation is not unduly risky. **But there is still added risk**—and when combined with other factors (fatigue, pilot experience, etc.) it may be wiser to hold yourself to the commercial standard.
- **Multiple approaches.** Similarly, intellectually there's no additional hazard to repeating the approach procedure again and again if the runway environment doesn't come into view at minimums and you correctly fly the missed approach procedure. At least, as long as there's gas in the airplane. In reality, however, every time you go around and come back for another approach you're a little more fatigued, and probably a lot more stressed, and more likely to fly sloppily or (even if you're precise) go "just a little lower", intentionally or not, to try to break out of the clouds and land. I recorded and wrote about the human factors risks of flying multiple approaches in this past PilotWorkshops.com "[Tip of the Week](#)."

See <https://pilotworkshop.com/tips/multiple-missed-approaches/>

In that Tip I suggest the following Best Practices for flying multiple attempts at the same approach:

If you miss an instrument approach, do not attempt the same approach again unless one of these three conditions exists:

1. You have good reason to believe that the weather conditions that required you to miss were temporary and that they'll improve in time for your second attempt.
2. You can identify a specific technique or part of the procedure you flew incorrectly that caused you to miss, and which you can honestly say you'll get right the next time.

3. You're facing a true emergency and because of equipment failure, unforeseen weather conditions or your own poor planning you have no better options within your remaining range and you must try again before you run out of fuel—a truly dire scenario.

If none of these three conditions apply and you attempt a second approach anyway, you're just wasting time and the fuel you need to get somewhere else with better conditions or lower approach minimums.

In retrospect I'll replace condition 3 above with this, and move the *dire scenario* to condition 4:

3. You compute fuel remaining and can positively determine you will still have no less than your required or personal minimum of fuel remaining, whichever amount is *greater*, after the second attempt and then proceeding to your alternate.

In fact, adhering to the new “fuel remaining” condition pretty much assures you won't ever get to the “true emergency” situation.

And in all cases, I propose this additional Best Practice: ***if conditions permit you to attempt an approach a second time and once more you miss the approach, proceed to a better alternate.*** It's highly unlikely your third attempt will result in landing when the first two did not, and you're just wasting precious fuel you need to get to your alternate.

I can only imagine the horror aboard the airplane as first the pilot and then the passengers become increasingly aware that they cannot land at the selected airport in the darkened skies, and the likely panic when the fuel ran out and the only sound was the rush of wind as they descended blindly into the fog. Amazingly, as news sources report, they snagged onto a power line that broken their fall and lowered them almost all the way to the ground. Truly amazing.

The flight was legal. Duty day limits do not appear in the regulations for private flying. It is permissible to attempt an approach in weather well below minimums. There is no regulatory limit on the number of times you can attempt an approach. And (at least in the U.S.), the regulatory fuel requirement is for flight planning purposes only, and valid only at the time of departure—it is not a violation to go below the required minimum fuel once you are in the air.

Ultimately, however, the legal status of the flight did nothing to affect its outcome. The pilot didn't even lose control of the airplane, which is often the outcome in these stressful human factors experiments. All indications are he did a good job of flying approaches again and again, then switching to a nearby second airport when the third try at the first didn't work, and even maintained control of the aircraft after the fuel ran out—all the way through a glide into the fog and a serendipitous “arrestor cable” in the form of a power line.

Still, considering the risk factors of this momentarily famous flight can help us all avoid being in a similar situation that would almost certainly have a far less happy outcome.

Questions? Ideas? Opinions? Send them to mastery.flight.training@cox.net



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