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PRISM

A member of the SGS Group

FIXED WING NEWSLETTER

January 2024 | Volume XXIV | Issue I

SAFETYWIRE

Pilots Should Study Runway Condition Reports, Part 3

(Source:Patrick Veillette, Ph.D. August 25, 2023 , Aviation Week Network)

A runway excursion involving a Citation CJ4 in Utah.

Credit: Wasatch County Fire District

For obvious reasons it is important for a pilot to have an accurate report on the runway surface conditions to properly perform a Landing Performance Assessment. Unfortunately, the flexibility of business and EMS aircraft to operate into a wide spectrum of airports creates the distinct disadvantage of uncertainty in the runway surface conditions.

The Flight Safety Foundation's study of fixed-wing EMS accidents found that critical information regarding runway conditions was not transmitted to pilots in 14 of 36 accidents during landing.
One of those accidents occurred on Jan. 31, 1995, as the pilot of a Cessna 421 attempted to land at the remote airstrip in Chinle, Arizona. The airplane was dispatched in day VMC conditions and local police reported that the runway was dry, despite a recent snowstorm.

On touchdown, the pilot discovered that the runway felt softer than usual, and shortly afterward encountered a dip in the runway that sent the aircraft slightly airborne then off the runway through a barbed-wire fence. The three occupants were uninjured but the aircraft was substantially damaged. The NTSB report noted that although the runway surface appeared dry, there was dry dirt about 1-2 in. deep with a soft layer underneath.

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A Flight Safety Foundation study of business jet safety reviewed 287 NASA Aviation Safety Reporting System (ASRS) reports in which pilots noted problems with runway conditions. Poor runway conditions were cited in 33% of the 287 reports; lack of adequate runway condition reports was cited in 18%. It should be no surprise that contaminated runway conditions were present in 71% of the runway over-run accidents and incidents reviewed in the sample.

Unreported or inaccurate weather conditions and braking reports were factors in a landing overrun at Ohio State University Airport (OSU) airport by the flight crew of a Learjet 23. Light drizzle was reported by ATIS. No braking action advisories or reports were given. The Learjet touched down in the touchdown zone and the crew immediately applied thrust reversers and spoilers along with maximum braking. Much to their unwelcome surprise, the braking action was nil. As the jet neared the end of the runway, the crew secured the engines, and the aircraft came to a rest 75 ft. off the end. As the pilots waited for emergency vehicles to respond they noted that the ground became covered with clear ice due to freezing rain.

What can a pilot do to better prepare for a landing or takeoff given the possibility of uncertainty in the reported runway conditions? In an ASRS report, the Learjet pilot wrote: "If we had more information we would have acted differently. My recommendation is this: if there is any precipitation at all in the winter months, regardless of the temperature, plan on poor braking action at best, replan your landing distance and divert if necessary." (NASA ASRS Report No. 293469, January 1995.)

Experience can be an unforgiving teacher. The previous examples illustrate the pitfalls of relying on reports about the runway environment.   This conundrum also applies during dynamic changes in precipitation and winds during thunderstorms, or during heavy snowfall events. Runway conditions and wind direction can rapidly change from the conditions used to conduct a thorough Landing Performance Assessment just 20 min. prior.

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Consider The Uncertainties

Aviation training has failed to introduce pilots to the possibility of uncertainty in these reported values. In contrast, it is standard practice in engineering to include possible errors such as instrument error, position error, and reading error into a formal analysis of the uncertainty. A draft report would be (sternly) tossed back if an engineering apprentice failed to perform a formal analysis of the uncertainty.

It is also standard practice in engineering to include a safety factor for the unknowns. Our safety factors in aviation can quickly dwindle given the uncertainties and inaccuracies with reported runway environmental conditions. Yes, there are safety margins “sort of” built into the landing performance data for transport aircraft. I purposely use the caveat “sort of” due to the inherent differences in the techniques used by flight test crews to establish the landing distances versus the method used by proficient transport crews in normal flight operations.

Thus, as you can see, the accurate prediction the effects of wind, temperature and runway surface conditions on takeoffs and landings can be prone to varying degrees of uncertainty. Furthermore, at uncontrolled airports there can be a lack of credibly measured conditions. This further complicates the task of a flight crew attempting to get the most accurate information possible.

Astute flight crews should scrutinize the possible sources of uncertainty when planning a takeoff or landing, contemplate the possibility that the runway environment could be worse than reported, and consider applying prudent safety factors into their decision making.

Patrick Veillette, Ph.D.

Upon his retirement as a non-routine flight operations captain from a fractional operator in 2015, Dr. Veillette had accumulated more than 20,000 hours of flight experience in 240 types of aircraft—including balloons, rotorcraft, sea planes, gliders, war birds, supersonic jets and large commercial transports. He is an adjunct professor at Utah Valley University.

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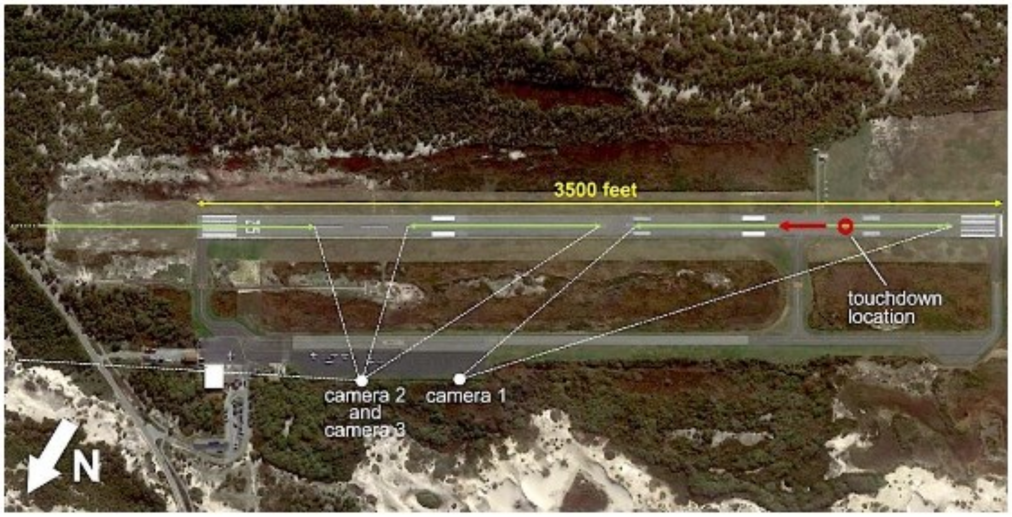
Deciding Too Late To Go Around, Part 3

(Source: Roger Cox October 12, 2023, Aviation Week Network)



Aerial view of Provincetown Municipal Airport showing camera angles.

Credit: NTSB

NTSB engineers investigating the crash of Cape Air Flight 2072 calculated that if the pilot had maintained the same level of deceleration while remaining on the ground, he would have stopped the airplane somewhere between 68 ft. before the end of the runway and 88 ft. beyond the end of the runway. The Cessna 402C probably would have experienced little or no damage and it is likely there would have been no injuries.

An additional analysis concluded that the accident flight would have cleared the trees if the pilot had maintained its liftoff speed rather than accelerating in an attempt to achieve its best angle of climb speed (Vx). The lowest possible airborne speed was 65 kts., stall speed with flaps 45° and gross weight 6,215 lb. (The flaps were probably retracted, so the realistic minimum speed would have been higher.) The highest speed possible was the speed of the airplane when it collided with trees. That was 84 kts., also Vx.

The investigation found that “N88833 was able to accelerate and take off from Runway 7 with the assistance of ground effect, but as the height above the ground increased and ground effect decreased, the airplane could not maintain both its acceleration and its climb.” If the lift-off airspeed had been maintained (without further acceleration), the airplane should have been able to achieve a flight path angle (*y*) between 6° and 8°, which would have been sufficient to clear the trees.

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The NTSB accident report did not recommend that anyone make a practice of climbing at less than Vx or Vy. As Cape Air noted in draft comments, “it is not common to train crews to climb at speeds below *V*x and *V*y in twin-engine reciprocating aircraft.”

The flight complied with the minimal requirements of 14 CFR 91.103, “Preflight Action,” in that the pilot was “familiar with all available information,” including the landing runway length and the airplane’s landing distances. No extra safety margin is required by that regulation. Adding a 15% safety margin to the required landing distance for a wet runway and a 5 kts. tailwind would still have allowed the flight to proceed. However, the stopping margin would have been less.

The 15% safety margin is recommended by the FAA in Safety Alert for Operators (SAFO) 19001, “Landing Performance Assessments at Time of Arrival.”

Conclusions and Comments

The NTSB found the probable cause of the accident was: “the pilot’s delayed decision to perform an aborted landing late in the landing roll with insufficient runway remaining. Contributing to the accident was the pilot’s failure to execute a go-around once the approach became unstabilized, per the operator’s procedures.”

The pilot bore full responsibility for the accident. However, his employer could have minimized the risk of his ill-considered go-around by implementing a commit-to-stop policy. To its credit, Cape Air did implement a policy after the accident. In a letter to the NTSB in 2023, the company described its new policies.

One of those new policies is: “Once the airplane has landed, the aircraft is committed to stopping, and a go-around will not be attempted.”

FAA Information for Operators (InFO) 17009 provided the agency’s reasoning for a commit-to-stop policy. It was based on NTSB Safety Recommendations A-11-18 and A-11-19. While the NTSB wanted to see commit-to-stop incorporated in airplane flight manuals, the FAA said, “operational factors are too numerous and varied to establish a single committed-to-stop point.

The FAA believes operators are in the best position to make this determination for their operation and type aircraft. Operators who establish committed-to-stop points would eliminate ambiguity for pilots making decisions during time-critical events.”

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The commit-to-stop guidance was aging but still valid. A Hawker accident that took place in 2008 and FAA guidance encouraging commit-to-stop was issued in 2017. InFO 17009 had been in effect for four years at the time of the Cape Air accident, and it was one of 21 InFOs issued by the FAA in 2017. If you weren't aware it was there, you might have trouble finding it.

The guidance was directed at turbine operators, so perhaps Cape Air officials didn't think it applied to the company. Or maybe that hadn't seen it. During investigations, I sometimes asked chief pilots and safety managers if they read InFOs and Safety Alert For Operators (SAFO). Too often, they said, "what's that?"

Advisory guidance that's not mandatory tends to be somewhat transient. For operators who read and apply the guidance right after it is issued, the InFO's safety message can be effective. For those who don't, increasingly those lessons are lost.

There is a remedy to indifference. The addressees mentioned at the bottom of the InFOs and SAFOs should read them and take them seriously. They don't have to wait for another accident to re-learn lessons that have already been taught.

Roger Cox

A former military, corporate and airline pilot, Roger Cox was also a senior investigator at the NTSB. He writes about aviation safety issues.

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NTSB Retiring Most Wanted List

(Source: Kerry Lynch December 15, 2023, Aviation International News)

Robinson Helicopter is among the manufacturers that have a cockpit video camera available for their models. NTSB is calling for the installation of systems such as these aboard all aircraft involved in passenger-carrying operations.

After a nearly 35-year run, the National Transportation Safety Board's (NTSB) Most Wanted List of Transportation Safety Improvements is permanently retiring at the end of the year. NTSB created the regularly updated list in 1990 to place a spotlight on what the agency considered to be the most pressing safety issues. But the Safety Board said moving away from the list will bring "additional flexibility" to its safety advocacy.

"The Most Wanted List has served the NTSB well as an advocacy tool, especially in the days before social media, but our advocacy efforts must advance,'' said NTSB Chair Jennifer Homendy. "Freed from the structure of a formal list, the NTSB can more nimbly advocate for our recommendations and emerging safety issues."

NTSB's list has hit on numerous areas of aviation safety, from fatigue to distractions in the flight deck to loss-of-control incidents in general aviation and Part 135 safety.

The most recent list includes safety management systems in commercial operations, crash-resistant recorders, and flight data monitoring programs.

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SAFETY MANAGER'S CORNER

Fatigue Risk Management

The advent of more capable aircraft flying long ranges and/or long days brings human capacity for endurance increasingly forward as the prominent limiter of safe operations. Fatigue is involuntary and not something any person can cleanse away without some form of rest. It makes perfect sense that crew fatigue is one of the most prominent hazards in today's aviation environment, and a necessary solution demands a systems approach. Although not directly a component of safety management systems, a fatigue risk management system (FRMS) deals with risk and therefore dovetails nicely with SMS concepts. In a business aviation operation it probably makes good sense to use your existing SMS process and procedures to execute FRMS requirements.

Simplified, FRMS is comprised of three major component areas: 1) policy and procedures; 2) education and training; and 3) measurement. There are abundant examples of policies and procedures examples and guidance available from a variety of relevant sources; Transport Canada has published some excellent guides describing boilerplate policy. In April 2014 the Flight Safety Foundation released new flight scheduling guidelines that provide very detailed procedures for crew scheduling and associated rest requirements. When developing your flight operation's FRMS, start with these items of industry guidance and evaluate how they fit with your company's existing work and scheduling demands. They may fit nicely right off the shelf, or a few tweaks could make it so. No need to re-invent the wheel but at the same time don't try to make something unworkable work.

There are also available plenty of training items for your company's employees. The PRISM website has several fatigue focused videos and presentations found in the Employee Safety Training menu. These training items provide excellent subject matter information, but don't forget to provide training on your company's specific fatigue policies and procedures as well.

That leaves measurement as the final element for the FRMS construct. Measuring the effectiveness of the fatigue countermeasure employed through procedures and practices provides validation and manifests adjustment. How do you know it's working? That's the question measurement will help answer. A fatigue report in the PRISM HazRep Program Tracker module provides an excellent solution for measurement and can be both proactive and reactive. For certain flights where fatigue exposure is anticipated, take sample measurements by asking the crew members to fill out a fatigue report, providing details about the effectiveness of FRMS procedures as they applied to their specific flight/duty day. Reactively, a report can also be submitted when a crew member encounters fatigue, noting the circumstances and describing the who/what/why. Collecting information proactively and reactively will measure the FRMS's effectiveness and provide context for adjustment.

Most importantly, remember system implementation doesn't happen overnight and cannot be accomplished by one person. An organized plan that uses stakeholder input is always the most successful path.

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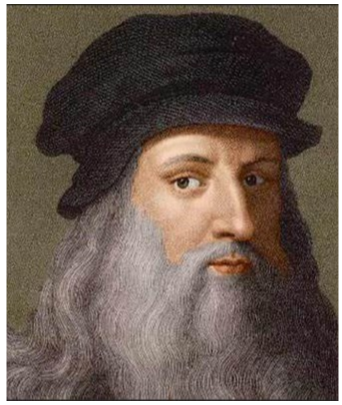
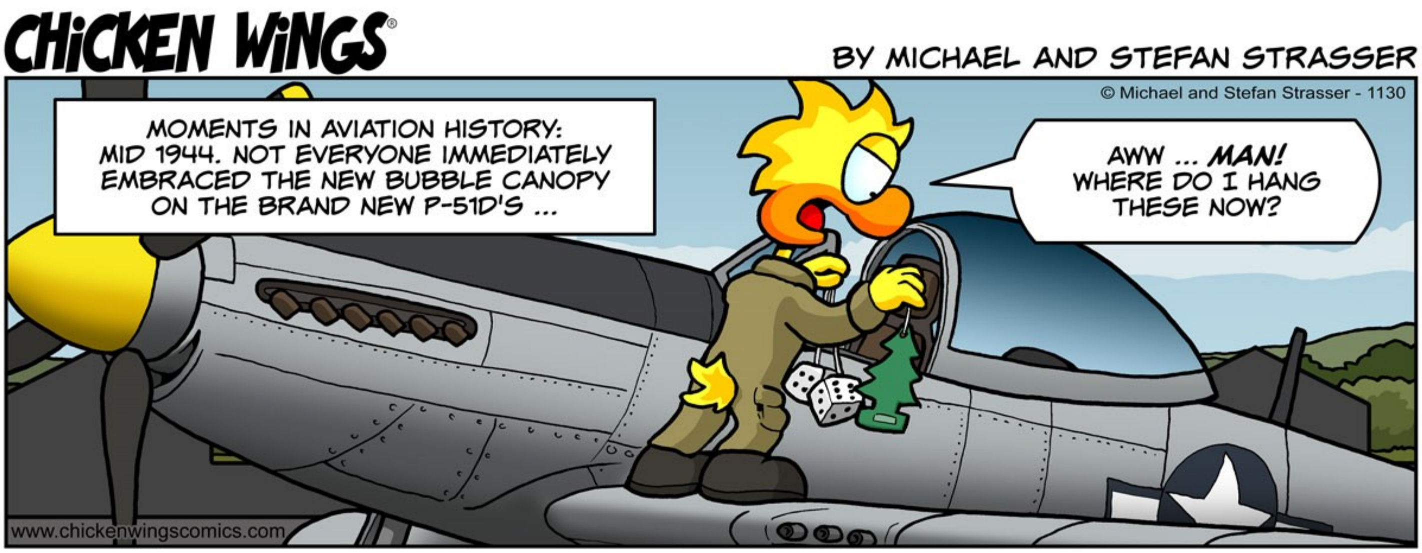
Quote of the Month

"I have been impressed with the urgency of doing. Knowing is not enough; we must apply. Being willing is not enough; we must do."

— Leonardo da Vinci



Accomplishment is measured by what is done, and not by what could have been done. What has your flight operation accomplished in the last year? What have you accomplished in the last year? Measurement defines these things and forms the basis for future objectives. You must build on accomplishments, not on shaky ground comprised of woulda, coulda, shoulda. Goals and objectives are step one– what are we setting out to accomplish this year? Then measure– what did we accomplish this year? Any gap may be clouded by the best of intentions; regardless if it wasn't done then the goal wasn't met. As humans, we need goals to move ourselves and our organizations forward in logical and harmonious paths. Goals allow us to strive for better performance, safer outcomes, and increased productivity. Make it a point to constantly seek improvement and apply skills. There are few things that feel better than a job well done while working in a highly reliable organization.



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UPCOMING COURSES

Jan 16 to Jan 18, 2024—PROS Course
V-ICAT Training
Virtual

Feb 20 to Feb 24, 2024—PROS Course
ALAT Training
Denver, CO

Apr 2 to Apr 4, 2024—PRISM Course
Safety Management System (SMS)
Denver, CO

May 15 to May 19, 2024—PROS Course
ALAT Training
Denver, CO

Go to Upcoming Training Classes to register.

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