FLYING LESSONS for April 26, 2012

suggested by this week's aircraft mishap reports

FLYING LESSONS uses the past week's 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 make and model airplane have little direct bearing on the possible causes of aircraft accidents, so apply these *FLYING LESSONS* to any 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:

It's not just the "little guys" who need to remember the basics. A reader sent this report on an Australian Airbus crew that caught themselves just in time:

> Confused Jetstar pilots forgot to lower the wheels and had to abort a landing in Singapore just 150 metres above the ground, after the captain became distracted by his mobile phone, an investigation has found. The Australian Transport Safety Bureau report on the May 27, 2010 incident on Flight JQ57, from Darwin to Singapore, reconstructed a scene of cockpit chaos.
>
> The captain, of more than 13,000 hours flying experience, was distracted by incoming text messages on his phone, while the first officer, of more than 4000 hours experience, was probably fatigued, the report said. The pair had lost their "situational awareness", leading to poor decision-making and hampered communications, investigators found.
>
> The problems aboard JQ57 began when the co-pilot, the first officer, switched off the autopilot on the 220-seat Airbus A320 to make preparations to land. Somewhere between 2500 feet and 2000 feet, the captain's mobile phone started beeping with incoming text messages, and the captain twice did not respond to the co-pilot's requests.
>
> The co-pilot looked over and saw the captain "preoccupied with his mobile phone", investigators said. The captain told investigators he was trying to unlock the phone to turn it off, after having forgotten to do so before take-off.
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> At 1000 feet, the co-pilot scanned the instruments and felt "something was not quite right" but could not spot what it was. At this stage the captain still did not realise the landing gear had not been lowered, and neither pilot went through their landing checklist.
>
> At 720 feet, a cockpit alert flashed and sounded to warn that the wheels still hadn't been lowered.
>
> At 650 feet, the captain moved the undercarriage lever "instinctively" but then a "too low" ground-warning alarm sounded as the plane sunk through 500 feet, indicating the landing gear was not fully extended and locked. The co-pilot was confused by the captain's action in lowering the wheels, as he was getting ready to do quite the opposite — to abort the landing and re-ascend to the skies, investigators said.
>
> Neither spoke to each other about their intentions.
>
> At 392 feet, the crew aborted the landing and powered up the thrust. At this time the pilots had lost track of their altitude, thinking they were much higher, at about 800 feet. A further piloting error occurred, with the wrong flap setting during the ascent.
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> When the mistakes were recreated in a simulator, investigators determined there were two minutes of descent, from 2800 feet to 1000 feet, where the pilots failed to take any necessary actions, including putting the wheels down.
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> Jetstar said it had incorporated the lessons learned from the incident in its pilot training.
>
> "Pilot distraction meant all the landing checklist items weren't completed before the aircraft passed an altitude of 500 feet, at which point a go-around was required under our operating procedures," said Jetstar's Chief Pilot, Captain Mark Rindfleish.
>
> "The combination of factors on JQ57 has provided new learnings and the opportunity to add to these safeguards, which we take very seriously."
>
> Changes introduced included completing landing checklists before 1000 feet and a reminder to pilots to

ensure their mobile phones are switched off before take-off, he said.

See www.theage.com.au/travel/travel-incidents/jetstar-pilots-forgot-to-lower-wheels-due-to-mobile-phone-20120419-1x9ed.html#ixzz1sXYTF0SS

A reader in Brazil sent this account of a brand-new Beechcraft King Air that ran out of fuel and ditched in the Atlantic:

> This morning a Beech C90GTi ditched about 17 miles north east of the northern coast of the island of Aruba. The two persons onboard (both from Brazil) survived the crash and were in a life raft when helicopters from the local police and the Royal Dutch Navy (a Lynx onboard HNLMS *Amsterdam*) arrived at the scene. Both crew were rescued by the Lynx helicopter and taken to the hospital on Aruba. The Beech was enroute from Fort Lauderdale Executive Airport to Hato, Curacao and reported in with the Aruban ATC with engine trouble and shortly thereafter issued a May Day call.
>
> From what I can make of the newspaper articles on a press conference (it's all in Papiamentu language) is that the Beech ran out of fuel.

See http://flightaware.com/live/flight/N8116L

An unpublished account sent to me on condition of anonymity states the crew had requested fuel at Fort Lauderdale and the aircraft had been fueled "about 20 minutes" later. It's unclear whether either pilot was present when the airplane was fueled.

After takeoff, according to the account, the crew "discussed that the fuel gauges appeared to read low" but continued on the trip, assuming the airplane had been fueled as requested.

Once the engines starved of fuel, to their credit and as the photo shows, the crew of the 10-hours-total-time King Air pulled off a textbook open-ocean ditching and evacuation.

Dramatic video of another King Air crash sent by the same Brazilian reader this week shows the rapidity with which control is lost when airspeed and angle of attack race to their extremes in single-engine flight. The video shows the King Air in a tight, low, fast and skidding turn from base to final. Just as the pilot must have thought he had the runway made, the airplane extremely abruptly rolls completely over and plunges into the earth, erupting into a fireball.

Our reader translates the report to state the King Air pilot reported an engine failure immediately after takeoff. After climb to and flying what witnesses say was a normal downwind leg, the pilot—perhaps overly anxious to get the big twin back on the ground—dove into his tight, skidding turn to final.

The rate of closure with the runway may in turn prompted him to pull back on the controls, loading up the wing and increasing angle of attack. The wing behind the "good" engine, with additional lift-generating air flow in the propeller blast even at idle power, continued to develop lift when the dead engine's wing stalled, with the almost impossibly fast result shown in the video.

What these examples tell us is that even highly experienced, professional pilots and flight crews are subject to distractions, fatigue and lapses in judgment.

This should throw up a bright-red warning flag to those of us flying as an avocation, for aviators who fly regularly but not as their primary job function, and even full-time, professional pilots: **we can all have a bad day**, so it's up to us (and if available, our crews) to:

- Remain current not only in routine flying, but also with regular, realistic and relevant practice of abnormal and emergency procedures, and
- Constantly check and recheck ourselves before and in flight to assure nothing critical is missed.

In any off-airport landing, survivability depends on touching down under control, with minimum impact speed and minimum rate of descent. Most airplane's structure, seats and restraint systems will protect the aircraft's occupants in a wings-level, controlled touchdown as long as there's no sudden stoppage (paradoxically, this is why it's so hard to certify shoulder harnesses and advanced restraint systems in older airplanes—the designer has to demonstrate the safe survivability, which can be very costly to prove and document).

A Beech Bonanza engine failure this week resulted in a picture-perfect off-airport landing. Widely circulated photos from a news account show whatever the cause of the failure, the pilot did a masterful job of landing in the grassy area of an industrial park. Given the limited nature of injury I suspect shoulder harnesses were properly worn.

See http://newyork.cbslocal.com/2012/04/20/small-plane-makes-emergency-landing-in-westchester-county/

After an engine failure, be a hero: land like a WUSS. Touch down **W**ings level, **U**nder control, at the lowest **S**afe **S**peed. A WUSS landing is almost always survivable. Anything else is almost always fatal.

A high-performance single-engine airplane apparently flew headlong at cruise speed into a thunderstorm this week, with fatal results. The FlightAware track appears to show that the pilot had been cleared for a left turn to a fix, then back toward his original route, as shown by a blue dashed line on the record. This and the radar overlay (which on FlightAware does not always reflect precise location and or intensity of cells at the time of an airplane's passage) suggest an attempt to deviate around thunderstorms reported in the vicinity at the time of the crash. Instead, the aircraft appears to have gone out of control, possibly inside a towering cumulus, until it descended fatally into terrain.

See http://flightaware.com/live/flight/N110EB

Most pilots know that there is a "turbulent air penetration speed" (V_{turb}) for their aircraft. Many have the number memorized. But relatively few know what the speed really means, or that it is not a fixed value, but a range of airpseeds with the "book" number usually representing the top end of that speed range. And I'd bet that almost nobody really knows when it is appropriate to use the turbulent air penetration speed.

V_{turb} is usually considered to be the same as V_A, the airplane's design maneuvering speed. So what is V_A? According to Advisory Circular (AC) 23-19A, which describes aircraft certification criteria:

a. The design maneuvering speed is a value chosen by the applicant. The loads resulting from full control surface deflections at V_A are used to design the empennage and ailerons in part 23, §§ 23.423, 23.441, and 23.455.

b. V_A should not be interpreted as a speed that would permit the pilot unrestricted flight-control movement without exceeding airplane structural limits, nor should it be interpreted as a gust penetration speed. Only if V_A = Vs will the airplane stall in a nose-up pitching maneuver at, or near, limit load factor. For airplanes where $V_A > V_S$, the pilot would have to check the maneuver; otherwise the airplane would exceed the limit load factor.

c. Amendment 23-45 added the operating maneuvering speed, V_O, in § 23.1507. V_O is established not greater than VSvn, and it is a speed where the airplane will stall in a nose-up pitching maneuver before exceeding the airplane structural limits.

In plainer language, V_A is the speed at which an airplane's wing will stall before reaching the structural load limits—but only under the conditions of V_A determination, usually at the airplane's maximum takeoff weight.

At lighter weights the wing *will* exceed design limits at V_A (or even lower speeds). So the actual V_{turb}, sometimes also designated V_B, will almost always be some amount less than the published V_A. How much less? It's approximately two knots less for every 100 pounds below

maximum certificated gross weight. *That's* the speed to which you should slow to penetrate turbulence.

But how much turbulence? In general, if turbulence meets the definition of "moderate" or greater, the airplane should be at or below V_{turb}.

See www.navyaircrew.com/blog/2009/08/30/light-moderate-or-severe-turbulencehow-are-they-defined/

And when should you slow the aircraft? This is the message, I believe, that most pilots don't get. To avoid overstressing the airplane you must be at or below V_{turb} *before you hit the first bump.* You can experience structural failure on the first gust of moderate or greater turbulence. You need to slow to V_{turb} or less if you suspect you will enter conditions where you *might* experience turbulence.

Coming up on a line of cumulus? Climbing or descending through an inversion? Descending into thermals, or when the surf ace winds exceed about 25 knots? Flying into areas of reported wind shear? Slow to the turbulent air penetration speed **before** getting into areas of suspected turbulence.

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

Questions? Comments? Let us hear from you…at mftsurvey@cox.net.

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