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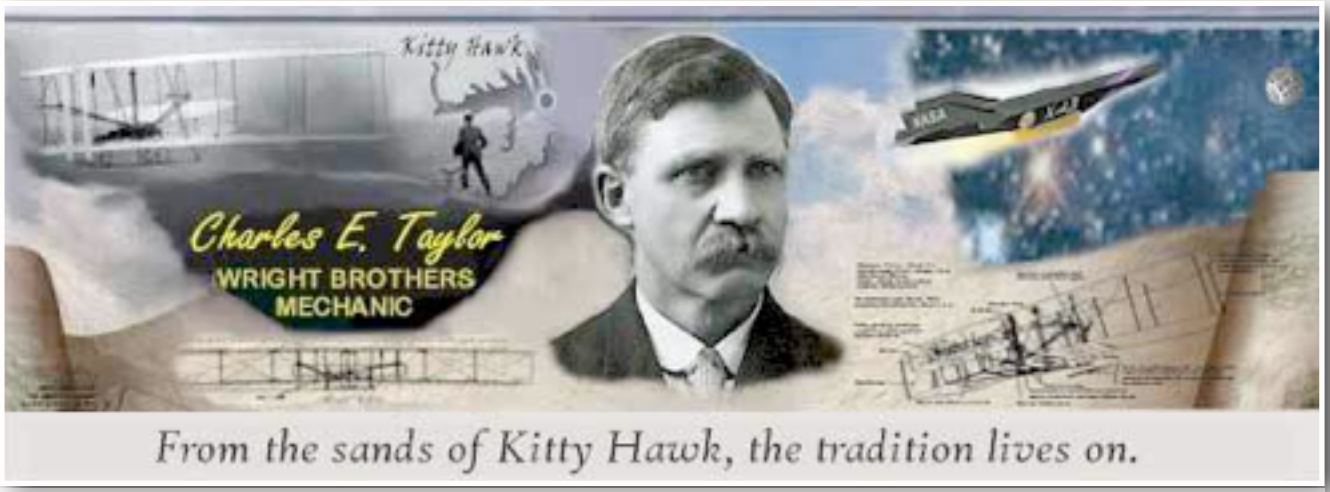

Hello all,
To subscribe send an email to: rhughes@humanfactorsedu.com
In this weeks edition of *Aviation Human Factors Industry News* you will read the following stories:

Follow Procedures Training Launched: Now Your Work Begins

BY DR. BILL JOHNSON

FAA just posted the "The Buck Stops Here" web-based training on the human factors website. A website training system, alone, will hardly impact the No. 1 challenge in aviation maintenance: the design and adherence to technical procedures. The new training merely offers a vehicle to increase attention to procedural compliance. Now, you have another tool to address procedural noncompliance. Dr. Bill offers a few implementation ideas for your consideration.

Background

For the past few years, the FAA Maintenance Human Factors research team, mostly at the FAA Oklahoma City Civil Aerospace Medical Institute, has been revisiting the challenges associated procedural compliance in aircraft maintenance. It is not a new topic**.** It is a continuing challenge that affects every aspect of aviation. The issues/questions seem straightforward. Why is it so difficult to follow procedures? Why does procedural noncompliance remain as a significant contributing factor in most negative events in aviation maintenance? What actions can alleviate the challenge?

In the January/February 2018 issue of *Aircraft Maintenance Technology* Johnson described some of the empirical work that was the basis for the new web-based Follow Procedures training. The team conducted about 175 90-minute interviews with AMTs, supervisors, and those who wrote maintenance procedures. The interview topics were based on an extensive review of NTSB procedure-related accident reports and on hundreds of voluntary submissions from the NASA Aviation Safety Reporting System. The interviewers asked mechanics to tell stories about negative events where procedures were not followed. A combination of the accident documents, the voluntary reports, and interview stories help define the training.

The important finding was that procedural noncompliance was not from a lack of knowledge but from an industry culture of completing perceived safe and quality work as quickly as possible.

Thus, the research team surmised that the best way to address the procedural noncompliance was to address the culture.

The rest of this article talks about the training and what individuals and organizations can do to address the challenge.

The Follow Procedures Training Described

The 45-minute web-based training program, with all files, can be downloaded from the training section of www.humanfactorsinfo.com. The web-based training module also runs from the FAAST website (www.FAASafety.gov, free registration required). We recommend the FAAST site since it includes a post-training exam and it issues a completion certificate. Early users have already given the training good reviews.

The training is a multimedia mix with animations and short quizzes along the way. There is audio for selected portions of the training. To keep things moving at the user's pace, some of the materials require reading. Figure 1 shows a screen from the training that presents key attributes: Safety Champion. The training reinforces these champion attributes.

At the end of the training, learners are strongly encouraged to download and use the before and after checklists. There are different sets specifically designed for mechanics, managers, or procedure writers. Figure 2 shows the job cards for managers. The training ends by asking users to sign a "Safety Pledge," shown in Figure 3, to be a champion of an improved workplace culture of following procedures.

Again, the training is a start but it must be only one part of the campaign to change the culture of procedural compliance. What should you do now?

Actions for Government, Organizations, and Individuals

FAA Action

Government research usually does an excellent job with research and development. Government scientists/engineers/psychologists are great at collecting data. They usually validate the data by talking to workers/citizens, and then write detailed research technical reports. In many cases the research results in development of guidance materials and/or software tools. The FAA Maintenance Human Factors website (https://www.faa.gov/about/initiatives/maintenance_hf/) contains many such reports, advisory documents, software, media, and training support materials.

Government, because of funding design and the regulatory mission priority, often drops the ball when it comes to fielding and supporting the research projects. Commercially that includes marketing, sales, product support, and customer service. These activities are seldom the forte of government. The new web-based follow procedures training must be supported by government! This article and promotion by the FAA Safety Team, are example steps in product promotion and support direction.

The timing is right for customer support of the procedural compliance training initiative. FAA oversight, over the past few years, has changed from a policy of strict administrative enforcement to one of applying cooperative measures to achieve increased safety and regulatory compliance. When individuals or organizations must respond to an FAA discovery of procedural noncompliance, the new training imitative, with supporting activity, can be an ideal suggestion to address the issue. Propose to change the culture of procedural noncompliance with the FAA web-based training as a key component of the potential cultural change. Your FAA inspectors are likely to see the value and accept the training as a way to improve procedural compliance. FAA inspectors have “walked the walk” of being mechanics. They can offer other ways to help increase procedural compliance.

Organizational Action

Organizational action is critical when it comes to affecting culture change. Everyone must buy in to change. Top executives must demonstrate the commitment to procedural compliance in words and actions. And recognize that 100 percent compliance may take a bit more time. It is also likely to reduce delays from rework. It will reduce expensive errors and worker injury. Leaders must accept the tradeoffs. The executive must convince middle managers that increased procedural compliance is a renewed top priority. Selected organizational performance measures must be cognizant of all issues associated with 100 percent procedural compliance. Higher compliance assurance must have similar value to high on-time departure and other reliability rates.

Procedural compliance must be important on the list of key performance indicators. It can renew the commitment to the corporate fiduciary responsibility to flight safety of customers.

Strong words from the top can set the general tone, but actions from middle management have greater impact on the daily maintenance work. Continuing safety and low error rates must not be a justification for past procedural noncompliance (“past sins”). Workers must be encouraged, every day, that 100 percent procedural compliance is the goal. Procedures that are unnecessary, complicated, incorrect, incomplete, or unavailable must be documented and addressed, prior to continued work. This action will help correct or eliminate poor procedures, thus raising compliance.

What are immediate actions to accompany the training?

1. Written statement from top management that the organization is recommitting to 100 percent procedural compliance. Management recognizes that this is team effort.

2. Written statement of commitment from labor leaders, in support of management letter.

3. Written statement from Engineering Department committing to rapid response to mechanic recommendations regarding problematic procedures and/or procedure use issues.

4. Statement from local FAA inspection team that they will assist/cooperate with renewed commitment to 100 percent procedural compliance.

5. Personal individual commitment from every person in the organization to champion the culture of 100 percent procedural adherence.

6. Use shift meetings to launch and reinforce the Follow Procedures training.

7. Consider paying an incentive to every worker that submits a training completion certificate from the FAA website.

8. Distribute the Before and After Procedure Following job cards (Available from training program or FAAST representative).

Individual Commitment and Action

Workers must commit to become champions of the procedural compliance culture. That means that workers must be not only introspective of their own behavior but also apply appropriate peer pressure. Remember that every time a procedure is not followed, and there is no immediate safety consequence, it is positive reinforcement to not follow the procedures. That must end!

Workers should engage with the Follow Procedures training in a serious way. Use the 45 minutes of training to question your own work behaviors and to recommit to 100 percent procedural compliance. Such behavior is beneficial to the aircraft, passengers, the organization, and to worker health and safety. Full procedural compliance will be achieved only when workers take individual personal and professional satisfaction with the knowledge that they followed procedures 100 percent.

The Bottom Line

The very start of the training uses the graphic in Figure 4. It explains that: “Everyone is part of the procedural compliance challenge. Therefore, everyone is part of the solution.”

Enough said.

BEFORE the task
PROCEDURE FOLLOWING

Manager/Supervisor's Commitment Checklist:

- ☐ I will support organizational adherence to following procedures.
- ☐ I will ensure that current procedures are readily available.
- ☐ I acknowledge that it takes time to use procedures.
- ☐ We will take fast action to fix unsuitable procedures.
- ☐ I will minimize worker distractions.
- ☐ I will ensure required double inspection.
- ☐ I will minimize worker stress – both physical and psychological.
- ☐ I will nurture a culture of procedure following.

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AFTER the task
PROCEDURE FOLLOWING

Manager/Supervisor's Commitment Checklist:

- ☐ I supported organizational adherence to following procedures.
- ☐ I ensured that current procedures were available.
- ☐ I acknowledged that it takes time to use procedures.
- ☐ We took fast action to fix unsuitable procedures.
- ☐ I minimized worker distractions.
- ☐ I ensured required double inspection.
- ☐ I minimized worker stress – both physical and psychological.
- ☐ I nurtured a culture of procedure following.

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http://www.humanfactorsinfo.com/

http://www.faasafety.gov/

https://www.faa.gov/about/initiatives/maintenance_hf

New surveillance techniques for drones

Marcos Fernandez

Space Sciences PhD student at UND
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The new FAA rules for drones

14 CFR Part 107 of the FAA establishes some rules for the operation of small unmanned aircraft systems in the US. This part covers unmanned aircraft (UA) as long as they weigh less than 55 lbs.

It establishes several requirements on UAS operations and remote pilots' certifications that the UA operators have to comply with before flying their platforms.

Before last October 10, the situation was as follows: If you were flying a model aircraft for recreational purposes you could be protected by section 336 of the FAA Modernization and Reform Act of 2012. A clear definition of recreational purposes was not included in the final text, thus giving a UA operator the opportunity to skip most of Part 107. Furthermore, section 336 expressly prohibited the FAA to promulgate any regulation regarding a model aircraft flying for recreational purposes. Section 336 was also more permissive for a UA flying within 5 miles of an airport, their operators being only responsible to give prior notice to the airport authority and the air traffic control tower. (Notice that giving prior notice is something quite different than receiving prior authorization before entering a certain airspace).

However, on October 10 the FAA Reauthorization Act became Public Law No: 115-254. Section 349 of this law establishes that a small UA can be operated without specific certification provided that it adheres to a list of limitations among others, that the aircraft is flown (strictly) for recreational purposes and the aircraft receives prior authorization from the Administrator before operating in class B, C, D or E airspace designated for an airport. Thus, the rules have changed significantly now: Prior notice is not sufficient anymore and the UA operator has to receive explicit authorization from the Administrator before entering controlled airspace. In other words, although UA for recreational purposes do not fall under Part 107, they still need to comply with more stringent requirements than those established previously by section 336. In order to avoid contradictions, section 336 has been repealed and replaced by part 349.

New safety requirements coming around

Furthermore, section 349 indicates that the Administrator can promulgate rules generally applicable to unmanned aircraft, including those related to standards consistent with maintaining the safety and security of the national airspace system.

This seems like a wake-up call for both UA operators and manufacturers: UAs will sooner or later share the airspace with manned aircraft, and in that moment a robust surveillance system will be of great help to prevent a hazardous situation from happening.

The FAA is clearly supporting ADS-B surveillance techniques for manned aircraft (see my previous article). Should UA be equipped with ADS-B transmitters (assuming manufacturers overcome current limiting issues such as the weight or price of said devices), we need to guarantee that new users in already saturated frequencies (1090MHz for ES or 978MHz for UAT) do not alter ADS-B performance in a harming way for GA pilots and carriers. Maybe it is time to begin thinking on alternative solutions for ADS-B message transmissions. Who knows? Just keep an ear to the ground, and both eyes up above!

For more information:

CFR14 Part 107.

FAA Modernization and Reform Act 2012.
Section 331-336.

FAA Reauthorization Act of 2018.

More from Marcos Fernandez
2 articles

Canada introduces new regulations on flight crew fatigue management

Transport Canada announced changes to flight crew fatigue management as laid down in the Canadian Aviation Regulations.

The changes introduce:

1. Prescribed flight and duty time limits that respect modern fatigue science and international standards to limit the amount of time a crew member can be on the job; and
2. Fatigue Risk Management Systems that will allow operators the flexibility to set flight hours based on their unique operations if they can demonstrate that alertness and safety will not be affected.

The new regulations apply to commercial transport services in Canada, which include major Canadian airline operators (subpart 705 of the Canadian Aviation Regulations) and smaller and regional operators (subparts 703 and 704 of the Canadian Aviation Regulations).

One example of the old vs. new regulations:

Previous regulations (1996)

- 1,200 hours in any 365 consecutive days
- 300 hours in any 90 consecutive days
- 120 hours in any 30 consecutive days
- 40-60 hours in any 7 consecutive days

New regulations

- 1,000 hours in any 365 consecutive days
- 300 hours in any 90 consecutive days
- 112 hours in any 28 consecutive days

More information and additional details on various changes:

- Overview of the new regulations on flight crew fatigue management

"Remember to Close the Latches."

On November 30, 2018, an Airbus A320-214 operated by Frontier Airlines lost the fan cowl doors of engine no.2 upon takeoff from Las Vegas-McCarran International Airport, Nevada, USA.

This incident was at least the 45th fan cowl door loss event involving an Airbus A320-family aircraft.

A common safety issue among these incidents is the fact that the cowl doors were not closed and latched following maintenance. This was not detected by the engineers, or by flight crewmembers during the walk-around check. The design of the fan cowl door latching system, in which the latches are positioned at the bottom of the engine nacelle in close proximity to the ground, increased the probability that unfastened latches would not be seen during the pre-departure inspections.

Investigation reports into these incidents have found a multitude of human factor disturbances to be the main contributing factors. Fatigue, Pressure, Distractions, Compliancy and Back Check inspections not accomplished.

In 2010 Gary Burch of Crucial - Knowledge, developed a CBT program entitled "Remember to Close the Latches" in response to this human error failure which is still pertinent today.

Gary stated that the NTSB, Airbus, FAA and Transport Canada continue to hammer out defenses against the ongoing problem of in-flight fan cowl loss incidents due to latches being left unlatched. Since 2001, there have been 33 fan cowl loss incidents involving Bombardier CL-600 aircraft, with six incidents in 2007 alone. This 15-minute video provides methods and techniques to help all people remember the importance of assuring that the latches are closed.

Thank you Gary for allowing readers of our newsletter to view this training CBT free of charge. Once your on the Crucial - Knowledge website, you will see an announcement for HFIndustry News readers to CLICK onto the CBT. Use guest for the ID and Howdy for the password.

http://www.crucial-knowledge.info/index.htm

Human Factors articles by Gordon Dupont

Gordon Dupont, known at the father of the Dirty Dozen, precursors to human error has authored articles on each of these human factors for the Director of Maintenance (D.O.M.) magazine. Gordon is a master in providing human error content as well as safety nets that break the chain of causation to incidents and accidents. There are two ways you may recover back issues / articles. Either go to www.DOMmagazine.com or to Gordon's website www.system-safety.com. On Gordon's home page, click on the **Articles** icon . These articles would be well served if they were placed into a rugged folder and distributed to technician and pilot ready rooms. So many lessons learned waiting to be shared for all those who work in the Region of Risk.


THE HUMAN ERROR

LESSONS FROM MY FATHER

BY GORDON DUPONT

The lessons in life that my father taught me have been a guide for me when dealing with human error —mine and others. The old saying, "Like father, like son," has a lot of truth in it. If you go back to the October 2018 Attitude issue you may recall that the first and most important attitude age was the 0 to 7 years old stage where the parents are the major influence. My father was a major influence on a "know it all kid" a lot of years ago, and I have a lot to thank him for. One of his favorite means of imparting values and meaning of life was to use sayings that were easy to remember but had a valuable message. I'd like to impart some I remember that guide

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Mechanic's error blamed for 2017 German helicopter crash in Mali

A mistake during maintenance work caused last year's Bundeswehr helicopter crash in Mali while on a UN mission, claims Germany's armed forces. The Airbus UH Tiger plunged uncontrollably, killing its two pilots.

German media cited a Bundeswehr inquiry on Wednesday as concluding that human error on the ground ultimately led to a fatal helicopter crash near Gao, a desert city in northern Mali, on July 26, 2017.

A mistake configuring the rotor blades led to the autopilot automatically turning itself off when the pilot pointed the Eurocopter Tiger's nose towards the ground. This caused the disintegration of the main rotor blade, leaving the crew with "no chance to avoid the accident," according to the report.

Airbus Helicopters, which had serviced the chopper, said "immediately implemented precautionary measures" were taken after the crash, in order to "ensure that such an incident can never again repeat itself." It ruled out a construction flaw in its high-tech UH Tiger.

Read more: Numerous Bundeswehr weapons systems not ready
Citing the previously secret Bundeswehr report, the German news agency dpa and Reuters asserted that the error was made by an Airbus team at Fritzlar, a Bundeswehr airbase, near Kassel in Germany's central regional state of Hessen. The combat helicopter had already booked 150 flying hours.
Deployed to Mali, the experienced pilots had tested their controls before liftoff, but had not noticed that the blades' airflow angle had been wrongly set and assumed the Tiger's basic settings were correct.

Negligent homicide investigation

Following the media reports, German prosecutors said they opened a probe of negligent homicide against three individuals connected to the helicopter's maintenance. "A case on the suspicion of negligent homicide has been opened against three people who are said to have carried out" work on the Airbus helicopter, prosecutors in the town of Kempten said.

Critical moment

At the critical moment, while flying at 250 kilometers per hour (155 miles per hour) and 500 meters (1640 feet) above ground, the Tiger's autopilot switched itself off believing that it had recognized a manual override, leading the helicopter to tilt forwards abruptly.The main rotor disintegrated under the massive surge in air pressure and within just three seconds, a nosedive crash became unavoidable.

Familiar Departure, Busted Altitude

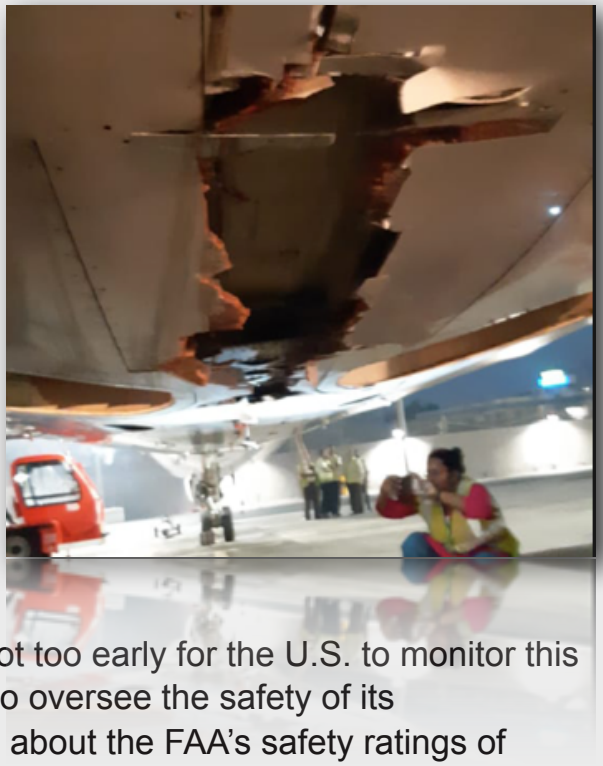
After an unanticipated en route stop-over throws a curve to an experienced crew, they fall victim to an error of omission that could have been disastrous.

Leaving Denver International Airport for their homeward leg, they trip up on what has become an alarmingly common problem: pilots not briefing for altitude restrictions on standard instrument departures, or SIDs. Fortunately, an alert controller catches the error in time to avoid an imminent traffic conflict. The Gulfstream pilot in this episode owned up to his mistake. This is a larger systemic problem than you might think, a team of aviation experts concurs.

https://www.ainonline.com/podcast/business-aviation/2018-12-18/episode-15-familiar-departure-busted-altitude-ains-tales-flight-deck-podcast?utm_campaign=Podcast&utm_source=hs_email&utm_medium=email&utm_content=68431973&_hsenc=p2ANqtz-8Gx8NKbEAtUiGLg_IKcdBSRNcldBRJA2VVdfLnoH1AzGvGaUlv6rigC_x4-bmL4epRhg-uWVh4Sz110cafSDCQg7Xu0wr1vPCXODKqz9JsEveduXI&_hsmi=68431973

Air India's Near Disaster Should Be Wake Up Call for U.S.

by John Goglia



As I sit down to write, news reports are highlighting a near disaster in India involving an Air India Express flight carrying 130 passengers and 6 crewmembers in a Boeing 737 that hit a brick airport boundary wall and then—incredibly—kept going for more than four hours, even after being informed by airport authorities of the collision. Like many disasters and near disasters, this event raises questions beyond the aeronautical judgment of these particular pilots. And, yes, a full investigation is needed to determine exactly what happened and why. But it's not too early for the U.S. to monitor this event for its implications for India's ability to oversee the safety of its airlines.I've written before on my concerns about the FAA's safety ratings of foreign countries; India in particular.

What triggered my concern in 2012 were media reports that Air India pilots and those at other Indian airlines were not getting paid. Clearly, multiple major airlines not paying their pilots was a sign of their significant financial distress that should have been worrisome to India's civil aviation regulator, known as the Directorate General of Civil Aviation (DGAC). Yet, the situation had been ongoing for months and months and the airlines kept on flying with their pilots unpaid or not regularly paid. Certainly, the situation also should have been a concern for the FAA, which rates whether countries whose airlines fly into the U.S. or want to fly into the U.S. meet the standards established by the International Civil Aviation Organization. (The FAA does not rate foreign airlines but their government's ability to perform safety oversight functions under ICAO.)

As far as I could figure out, the failure to pay pilots did not trigger an FAA review of India's Category 1 rating, although I believe it should have. However, a 2012 ICAO audit that identified a number of safety deficiencies did. The FAA thereafter conducted its own safety audit and, in 2014, downgraded India to a Category 2 based on its findings that "India's civil aviation safety oversight regime does not currently comply with the international safety standards set by ICAO." With a Category 2 rating, India's carriers could continue existing service to the U.S. but could not establish new service. Surprisingly enough, in just over a year, the FAA announced that it had upgraded India once again to Category 1, albeit with conditions.

REASONABLE CONCLUSIONS

With FAA inspectors reportedly once again mulling India's ability to oversee its air transport system, the FAA should seriously consider what Air India's near disaster says about the country's ability to enforce international safety standards. While a single incident may not normally implicate a country's oversight ability, the situation with Air India is different in a number of respects.

First, here is what various Indian and foreign media reported about the incident. On October 12, an Air India Express flight in a Boeing 737 took off from Tiruchirappalli International Airport in Tamil Nadu, on the southern tip of India en route to Dubai in the United Arab Emirates. (This is a flight of almost 2,000 miles, much of it over the Indian Ocean.) On takeoff, the Boeing 737 hit a localizer antenna and then a brick boundary wall.

The airport director stated, "We informed the pilot about the hit. The pilot said nothing was wrong with the plane as the systems were functioning normally. But we found some parts of the plane, like an antenna, on the ground." I assume this sends chills down your spine, too.

Two hours into the flight, the airline apparently finally got cold feet and turned the aircraft back to India for an unscheduled landing in Mumbai—four hours after takeoff. Photos of the aircraft on social media showed a gash in the belly, and the landing gear had fencing wrapped around it.

I find it inconceivable that the crew was not aware that it had hit a brick wall even though they may not have known the extent of the damage. Of course, it's not knowing the extent of the damage that should have driven their decision-making. And, if it's true that the crew relied on their cockpit instruments in deciding to continue the flight, they clearly should have known that those instruments would not necessarily give them a complete picture of the potential damage. There could have been damage to the tires, the hydraulic brake lines, the landing gear retraction and extension system; any of which could significantly affect the safety of flight but not show up on the flight deck. Once the aircraft hit an object, the crew would also not know if any other areas of the aircraft were affected, including flight controls, or whether even minor structural damage would propagate and become catastrophic with continued flight.

It's not just the flight crew that bears blame here, although they have primary responsibility. It seems hard to believe that no one at the airline was aware of this situation after the airport authority notified the crew. It's certainly disturbing that it took two hours for the crew, the airline or someone in the Indian government to come to their senses and turn the aircraft back.

While this event would be an indictment of the safety culture of any airline anywhere in the world, because of the relationship between Air India Express, Air India and the Indian civil aviation authorities, the handling of the event, in my opinion, implicates the competence of India's aviation safety oversight. According to its website, Air India Express is an international low-cost carrier headquartered in Kochi, India, and a wholly owned subsidiary of Air India. Two of the airline's directors are high-ranking officials of India's Civil Aviation Ministry, as are two directors of the parent company, Air India. Air India is not a private airline but, in fact, a government-owned corporation.

With high-level Civil Aviation Ministry officials on the Board of Directors of both the parent and subsidiary airlines, it seems to me that the failings of Air India Express are likely not just "typical" airline failings but also fairly attributable to failings of the Indian government in its oversight responsibilities.

It seems even the Indian government has concerns. According to an Indian news website, the Civil Aviation Minister tweeted, “In a recent review on airline safety, I have ordered to put in place a third-party professional organization to look into various safety aspects @airindia.” I’m not sure what “third party professionals” means but it seems to me to indicate a lack of trust in the ability of the DGAC to perform its functions.

In any event, the reasons why the FAA began international inspections of foreign governments’ airline safety oversight capabilities remains as necessary today as they were in the wake of the Avianca Airlines disaster that led to these audits. U.S. travelers should have confidence that foreign airlines operating in and out of the U.S.have proper safety oversight by their home governments. I don’t think U.S travelers should have that confidence in either the Indian government's oversight of its airlines or the FAA’s handling of the international audit program.

Overweight plane crashes on takeoff

The airline transport pilot, who was the pilot flying, and a commercial pilot, who was the pilot not flying and was acting as a safety pilot and was not expected to know the airplane’s systems, limitations, or characteristics, were preparing to depart for a personal flight with eight passengers on board the Beech 100.

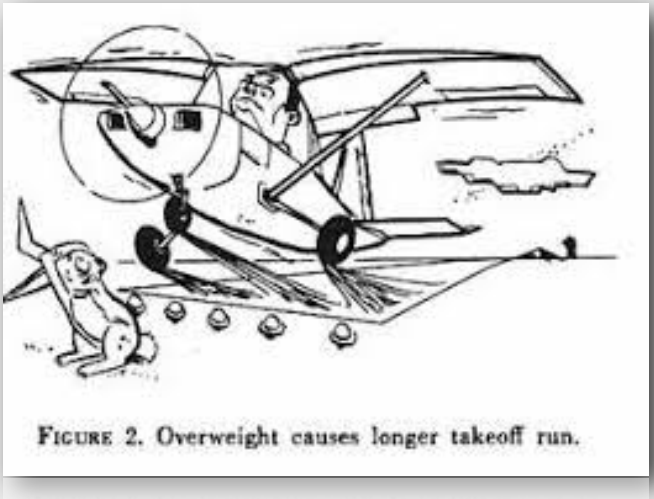


FIGURE 2. Overweight causes longer takeoff run.

When the pilot arrived at the airport in Jeffersonville, Indiana, he determined that the airplane had 900 pounds of fuel onboard. He instructed the lineman to fuel the airplane with 211 gallons of fuel (1,413.7 pounds) for a fuel total of 2,313.7 pounds.

The pilot reported he was aware that the total weight of the eight passengers, their bags, and the fuel caused the airplane to be overweight, but that he did not complete a weight and balance form or determine the expected takeoff performance before the flight.

He informed the other pilot that the flight would be heavy, but he did not tell him how much the airplane exceeded the airplane's maximum gross takeoff weight.

After the accident, the pilot determined that the airplane was 623 pounds over the maximum gross takeoff weight.

The airplane's flight controls and engines were operating normally during the pre-takeoff check and that the elevator pitch trim was positioned in the "green" range.

The pilot taxied the airplane onto the runway and applied the brakes and increased the throttles to takeoff power before releasing the brakes for the takeoff roll.

However, he did not confirm the power settings that he applied when he advanced the throttles. The airplane did not accelerate as quickly as the pilot expected during the takeoff roll.

When the airplane was about halfway down the runway, the airspeed was 80 knots, so he continued the takeoff roll, but the plane was still not accelerating as expected. He stated that he heard the other pilot say "redline," so he decreased the power.

At this point, the plane had reached the last third of the runway, and the pilot pulled back on the control yoke to lift the airplane off the runway, but the stall warning sounded. He lowered the nose, but the airplane was near the end of the runway.

He added that he did not get "on" the brakes or put the propellers into reverse pitch and that the airplane then departed the runway.

The pilot veered the airplane right to avoid the instrument landing system antenna, which was 500′ from the end of the 5,500′ runway, but the left wing hit the antenna, the left main landing gear and nose gear collapsed, and both propellers contacted the ground. The airplane then skidded left before stopping about 680′ from the end of the runway.

The evidence indicates that the pilot decided to depart knowing that the airplane was over its maximum gross takeoff weight and without determining the expected takeoff performance.

During the takeoff roll, he did not check his engine instruments to determine if he had applied full takeoff power, although the acceleration may have been sluggish because of the excess weight onboard.

The other pilot was not trained on the airplane and was not able to provide the pilot timely performance information during the takeoff.

Neither the pilot nor the other pilot called out for an aborted takeoff, and when they recognized the need to abort the takeoff, it was too late to avoid a runway excursion.

Probable cause: The pilot's inadequate preflight planning, his decision to take off knowing the airplane was over its gross takeoff weight, and his failure to abort the takeoff after he realized that the airplane was not accelerating as expected, which resulted in a runway excursion.

NTSB Identification: CEN17LA029

This October 2016 accident report is provided by the National Transportation Safety Board. Published as an educational tool, it is intended to help pilots learn from the misfortunes of others.

Night Shifts Plus Unhealthy Lifestyle May be Recipe for Diabetes

Women who work rotating night shifts and also have unhealthy lifestyle habits may be much more likely to develop diabetes than peers with only one of these risk factors, according a large study.

In the study of female nurses, every five years of working a mix of night and daytime shifts was associated with a 31 percent increase in risk of developing diabetes. Each of four unhealthy habits – drinking, smoking, failing to exercise and eating poorly – was associated with a more than doubled diabetes risk.

Working at night and sleeping during the day can impair the body's production of melatonin, which may in turn compromise the body's ability to use the hormone insulin to control blood sugar, Gilbert-Ouimet, who wasn't involved in the study, said by email. High blood sugar can lead to diabetes.

"If we add unhealthy behaviors to the equation, an amplification of the risk can be expected considering the increased vulnerability of these workers," Gilbert-Ouimet said.

Get the full story at uk.reuters.com