

# Aviation Human Factors Industry News

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*From the sands of Kitty Hawk, the tradition lives on.*

Hello all,

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## FAA's Bill Johnson Receives FSF-Airbus Human Factors in Aviation Safety Award

Bill Johnson, Ph.D., the U.S. Federal Aviation Administration's (FAA's) chief scientific and technical adviser for human factors in aircraft maintenance systems, was honored recently with the Flight Safety Foundation–Airbus Human Factors in Aviation Safety Award.

The award, presented on the first day of the Foundation's 71st annual International Air Safety Summit (IASS), praised Johnson's "extensive work in, and significant contributions to, human factors research and development, with a focus on human performance in the maintenance and repair of complex systems." The presentation was made by Craig Hoskins, vice president safety, security and technical affairs, Airbus Americas, and a member of the Foundation's Board of Governors.



"A major contribution to continuing flight safety is our keen focus on the human in the system. Examples include the design of the aircraft and support equipment, attention to process and procedures, work scheduling, fitness for duty, and the diligent attention to trying to do things right, all of the time. I am delighted to play a part in assuring that we maintain the important human factors focus. Thank you for this award."

Johnson joined the FAA in 2006 and since then has guided research related to human factors challenges in aviation maintenance, identifying practical ways to ensure safe and efficient human performance in maintenance and engineering.

His research has extended into many domains, including civil aircraft, military helicopters, space vehicles, military electronics and the electric power industry. One of his best-known efforts involved developing and conducting advanced technology maintenance human factors training for Lufthansa Technik and its 10,000 employees and 30,000 external customers worldwide.

A prolific writer and public speaker, he has influenced safety programs around the world.

Johnson, who earned a bachelor's, master's and Ph.D. in education from the University of Illinois, has more than 40 years of experience in applied research and development. He also has been a licensed pilot and a licensed airframe and powerplant mechanic for more than 50 years.

## **One Turn of the Wrench Exposes SMS Flaws**

While **safety management systems** (SMS) are powerful tools that are now seeing widespread adoption throughout the aviation industry, if not fully utilized and embraced from the top to bottom of an organization, and without proper reporting, any “near-misses” can go unchecked until disaster strikes. A U.S. Navy aircraft mechanic, **who was seriously injured in a maintenance accident**, went on a crusade to find out how the root-cause of such a situation, which previously harmed four others, had slipped through the cracks in the Navy's SMS. Topics the episode will cover:

- Safety Management Systems
- Communication breakdowns
- Blameless culture
- The value of incident reporting



[https://www.ainonline.com/podcast/air-transport/2018-11-16/one-turn-wrench-exposes-sms-flaws?utm\\_campaign=Podcast&utm\\_source=hs\\_email&utm\\_medium=email&utm\\_content=67576128&\\_hsenc=p2ANqtz--ewUl1oJ8cZxdFnGQGRJX16fTXGp3w-2z8tcRqJ79TjdmEqmf\\_8z0\\_nYtbGeYADsBhZ5a\\_F8YSL66YbSuR6Dc0OYndG45g4r0QgToU3\\_2E0qRStmY&\\_hsmi=67576128](https://www.ainonline.com/podcast/air-transport/2018-11-16/one-turn-wrench-exposes-sms-flaws?utm_campaign=Podcast&utm_source=hs_email&utm_medium=email&utm_content=67576128&_hsenc=p2ANqtz--ewUl1oJ8cZxdFnGQGRJX16fTXGp3w-2z8tcRqJ79TjdmEqmf_8z0_nYtbGeYADsBhZ5a_F8YSL66YbSuR6Dc0OYndG45g4r0QgToU3_2E0qRStmY&_hsmi=67576128)

## The deadly Portland plane crash that changed airline industry

You're safer today because of that crash landing in a neighborhood 40 years ago

### *The Crash*

***Dec. 28, 1978 was a cold night in Portland. United Airlines Flight 173 was on its way into town from Denver. It was the week between Christmas and the New Year. It seemed like any other holiday flight -- until something went terribly wrong.***



“There was a huge jolt and a loud noise... hard to explain what that noise is, I’ve often explained it as a thud.”

Aimee Ford Conner, a 17-year-old Minnesota native traveling to school in Washington state, was on the plane at the time. She said the aircraft circled for a while as the captain [tried to figure out what went wrong](#).

“The pilot got on the intercom and said ‘We thought we were going in for a landing, we don’t know what’s going on, something with the landing gear... we’re going to circle the city, try to figure it out,’” Ford Conner recalled.

“I don’t even remember the timeframe from the time of that first noise ‘til we crashed.”

It appears Capt. Malburn McBroom [had been losing track of the time, too](#).

"They were so focused on the landing gear that they weren't paying attention to the fuel," survivor Norman Jean Germond told KOIN 6 News in 1993.

The plane eventually ran out of fuel and its engines flamed out -- just six miles southeast of PDX.

At 6:15 p.m., United Airlines 173 fell from the sky and crashed into an East Portland neighborhood.

A total of 189 people were on board that night. Two crew members and eight passengers were killed. Several more had serious injuries. Capt. McBroom was among the survivors.

### ***Survival***

Aimee Ford Conner said she remembers everyone being calm before the crash, especially the flight attendants, who helped passengers prepare for all possible scenarios. Forty years later, she can recall very little about what happened when the plane hit the ground.

"I have very little memory of impact, I just don't," Ford Conner said. "It's... the memories I have are... I don't know."

After the crash, she remembers that the floor had buckled and she was pinned into her seat by the seat in front of her. People were still surprisingly calm, especially because the [plane didn't catch fire upon impact with the ground](#). Passengers made their way out of the emergency exit since the wing was sheared off in the crash. Some people thought the pilot had made a hard landing at PDX. They didn't realize they were in a neighborhood.

"You walk out of the plane - you're not at the airport," Ford Conner said with a laugh. "There were houses there. The trees we landed on had become so compressed so thoroughly that we were walking on needles and branches several feet above the ground."

She remembers getting out of the plane and not knowing where to go. She said there was an ice storm; it was freezing cold outside. People living nearby brought out hot drinks and blankets. They let survivors into their homes to use their phones.

In the coming days and weeks, people had to learn how to get back to normal life again. Ford Conner had to fly again to go to school. She enjoyed the flight to Wenatchee from Portland days later, despite what she had just been through. There was turbulence -- and other passengers weren't so confident about the flight.

"Somebody across the aisle from me said 'Didn't you hear about the plane crash in Portland? Aren't you scared?'" Ford Conner recalled being asked.

She told the fellow passenger, "I did hear about it, and no I'm not."

But she recalls that being her last pleasant flying experience. She suffered from PTSD at a time when people didn't know much about it. She has tried therapy, drugs, hypnosis -- but nothing has helped her feel confident about flying again. She travels by car and train now. Her last flight was in 1985.

Still, Ford Conner is grateful for her survival and for the last 40 years.

"I have grown and moved in ways that I never would have otherwise," Ford Conner said of that night. "It was a miracle in the midst of a tragedy."

### ***Crew Resource Management***

The National Transportation Safety Board determined that the probable cause of the accident "was the failure of the captain to monitor properly the aircraft's fuel state and to properly respond to the low fuel state and the crew member's advisories regarding fuel state. This resulted in fuel exhaustion to all engines. His inattention resulted from **preoccupation** with a landing gear malfunction and preparations for a possible landing emergency."

At first blush, it appears that the captain was solely responsible for the decisions that led to the crash. However, at that time in the airline industry, there weren't established systems yet **to make sure all the crew had a strong enough voice in emergency situations**. The NTSB continued in its synopsis of the crash:

"**Contributing to the accident** was the failure of the other two flight crew members to fully comprehend the criticality of the fuel state or to successfully communicate their concern to the captain."

Julie Whipple is the Portland-based author of the **book *Crash Course: Accidents Don't Just Happen***. Her father was an attorney who sued United Airlines on behalf of a little girl whose family died on the flight. Through that process, Whipple saw how changes evolved in the airline industry.

“This crash that happened right here in Portland, Oregon **really did change the aviation industry.**”

She said the pilot was only doing what he thought was right on the night of the crash.

“He was caught in the moment of an emergency... he did not know what his landing gear was going to do when he put that plane on the ground,” Whipple said. “He was very concerned that it was going to veer either into the river or into the terminal.”

She said McBroom ended up taking the blame, and **it destroyed his career and his life after that moment.**

“The people who were blamed -- i.e., the pilot -- really didn't deserve the entire weight of the responsibility that he was given,” she said. “It was a huge burden to bear.”

**As a result, the NTSB issued this recommendation to all airlines:**

*“Issue an operations bulletin to all air carrier operations inspectors directing them to urge their assigned operators to ensure that their flight crews are indoctrinated in principles of **flightdeck resource management**, with particular emphasis on the merits of participative management for captains and assertiveness training for other cockpit crew members.”*

In other words, airlines needed better processes to make sure the viewpoints of all crew members could be considered during emergencies.

“They did not have protocols in place with the rest of the crew so that they would speak up forcefully enough -- and they didn't,” Whipple said. “They made comments, but it wasn't anything like ‘This is an unsafe situation; we need to get this plane on the ground.’”

That sentiment was echoed by **Matthew Syed** in his book "**Black Box Thinking**," in which he explores how much of an impact Flight 173 has had on not only aviation safety, but also [how companies learn from failure](#).

"United Airlines 173 was chosen as a vehicle to explore the aviation system... it was a [watershed event](#) in aviation safety," Syed wrote. "That much is widely acknowledged."

"Ten people died on United Airlines 173, but the learning opportunity saved many thousands more."

Following the crash of Flight 173, experts took a closer look at aviation safety. They implemented what's called "[Crew Resource Management](#)" -- which helps a team work together when a problem arises. It's now a practice used in industries all across the world.

"It really did change the way we operate in a crisis or in a high risk situation," Whipple said. "Nowadays you're trained to speak up and be forceful when it comes to a feeling of unease... there's almost a script that people are taught to use, beginning with 'I'm concerned.'"

"Everybody's important -- [every single voice needs to be heard](#)," Ford Conner said. "Especially the ones you don't usually pay attention to because they often notice the stuff that you miss."

"It's sad that it has to come out of tragedy -- but it's another one of those hidden gifts... you've got to take what you can learn and change things," Ford Conner added. "It's a good thing."

According to the BBC, 2017 was the safest year in history for commercial airlines. And that success in safety is [partly due to the lessons learned from Portland that fateful December night in 1978](#).

It's pretty amazing -- and I think people don't understand what kind of an impact United Flight 173 has had on safety," Whipple said.

In 1998, Aimee Ford Conner wanted to organize a 20th anniversary reunion to focus on recovery after the crash. She especially wanted one person in particular to be

there: Malburn McBroom. When she called him, he told her he was scared to come; he requested to bring family. But he said that if they wanted him to be there, then he felt obligated to show up.

[“The man who came to the reunion was very broken,”](#) Ford Conner said. “He was so brave to show up that night.”

Despite his fears, it appears that his presence was welcome at the reunion.

“Many of the 150 survivors sprang to their feet in appreciation,” KOIN 6 News reporter Eric Schmidt said at the time.

“It was a bloody damn traumatic experience for all of us, and if I can assist in that just by being here and talking to some folks, you bet,” McBroom told KOIN 6 in 1998.

Ford Conner agrees with Whipple that the crash was the result of a [flawed system -- and that the pilot wasn't to blame.](#)

“I don't think he did anything wrong, the more I know about about it the more i'm convinced of it,” Ford Conner lamented. “I just wish he were here to hear it.”

Capt. Malburn McBroom died in 2004.

Other survivors have also gone over the past 40 years. There are fewer left who share memories of that night. There's no lasting memorial for the victims; the area is now surrounded by apartments and MAX tracks. The only thing that remains is an empty lot with a divot where the plane came to rest in 1978. Ford Conner is hoping the remaining survivors and their families will stay in better touch now and in the future.

“I would like to see a little more healing and a lot more connection,” Ford Conner said.

She and Julie Whipple have created an email for the occasion -- [\*\*flight173@yahoo.com\*\*](mailto:flight173@yahoo.com) -- and they're planning to visit the crash site in the coming weeks to get some perspective on how much life has changed in the last four decades.

“You can turn a tragedy into something good,” Ford Conner said. “You can do that.”

<https://www.koin.com/news/special-reports/the-deadly-portland-plane-crash-that-changed-airline-industry/1590673752>

<https://www.powells.com/book/-9780692070406>

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1 [AAR-79-07](#)

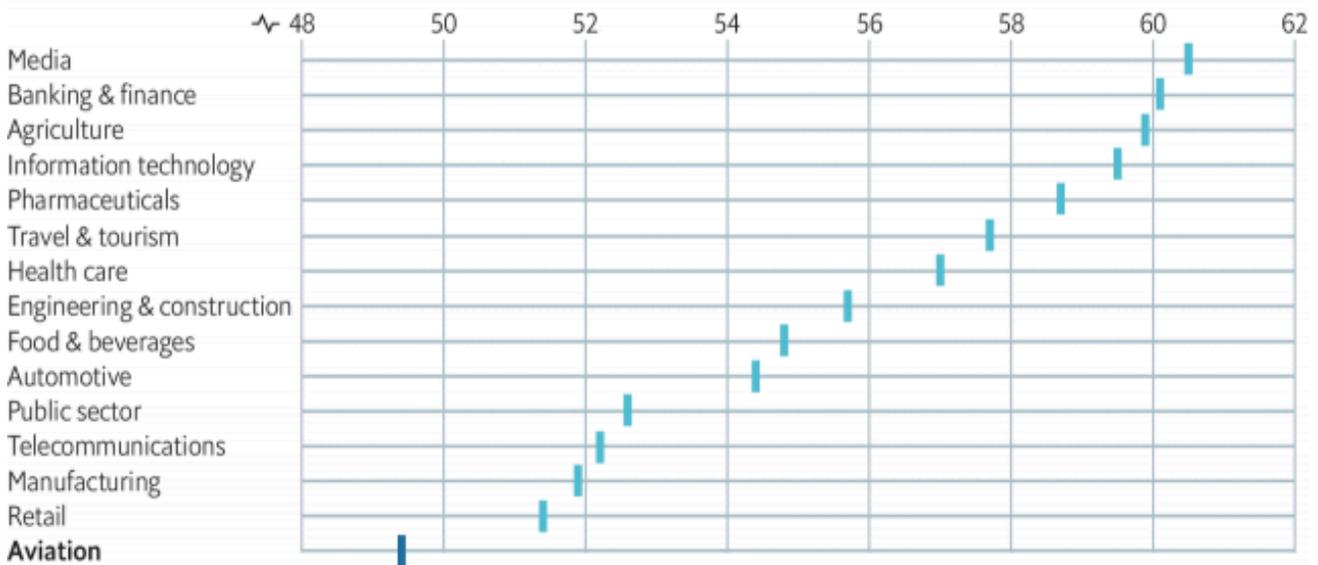
## **Pilots are not high-flyers when it comes to English proficiency**

*The aviation industry performs worst in a new ranking*

ENGLISH, non-native speakers are often told, is vital for a high-flying career. Once necessary only for over-achieving, globe-trotting professionals, fluency in the modern lingua franca is now required for a wide range of jobs. Yet the proficiency of people who use English as a second language [differs substantially by country and industry](#).

## Lost in translation

English proficiency score\* (100=best), by selected industry, 2018



Source: EF English Proficiency Index

\*1.3m test scores across 88 countries

The Economist

A recent report from EF Education First, a language school, attempts to measure these differences. EF's English-speaking proficiency index uses test-score data from 1.3m non-native English speakers across 88 countries that have been assessed using its software. The index equally weights reading and listening tasks to classify test-takers' English-language abilities on a scale from zero to 100.

Between 2016 and 2018 the EF index shows that the English-speaking abilities of test-takers [have improved little](#) in two years. Yet it is the differences between industries that are most striking. The gap between that of the highest-ranked fields, such as media and finance, and that of the lowest, such as retail and [aviation](#), stands at a full ten points.

In most industries English-language skills are not a matter of life and death. [This cannot be said of aviation](#). Nonetheless, pilots come in at [a lowly seventh](#) among the ten listed aviation job categories. Their average test scores were some 2.5 points below that of marketeers, the best performers, in 2016. [Cabin crew fare the worst by far, while air-traffic controllers perform somewhat better than engineers](#).

How have pilots managed to slip under the radar? The International Civil Aviation Organization recommends using "[aviation English](#)" as the standardized language, employing set phrases and protocols in the hope of preventing miscommunication and accidents. However, aviation English has not been adopted as an official standard, and tests are not compulsory.

In 1996 two planes crashed in mid-air near Delhi, India, after one of the pilots, a non-native English speaker, [failed to understand instructions regarding his plane's flight level](#).

## **Omitted pin led MD-11F to shed nose-wheel at Buenos Aires**

Argentinean investigators have concluded that [omission of a pin](#) following a Boeing MD-11F nose-wheel replacement led the aircraft to shed the wheel upon landing at Buenos Aires' Ezeiza airport.

As the Lufthansa Cargo freighter (D-ALCM) landed on runway 29, the left-hand nose-wheel detached, bounced and repeatedly struck the fuselage, causing considerable damage to the aft underside and the centre landing-gear.



The inquiry by Argentinean investigation authority JIAAC says that the wheel had been replaced in the Senegalese capital Dakar on 9 November 2016 – [the day before the incident](#) – following detection of foreign-object damage.

After the replacement, the aircraft conducted five flights including the Curitiba-Buenos Aires service that ended with the wheel's detachment.

Search parties, aided by unmanned aerial vehicles, took 10 days to find the missing wheel, which was eventually located in bushes 1,100m from the threshold of runway 29 and 180m left of the centerline.

Examination of the wheel assembly determined that [a fixing pin on a separator, designed to stop it rotating, had not been installed](#). The inquiry attributes the incident to [improper maintenance, and inadequate quality control](#) during the work carried out at Dakar, pointing out that the absence of the pin can lead the anchor nut of the wheel to unscrew and detach.

## **Failure to add oil after oil change fatal**

Earlier on the day of the accident, the pilot/mechanic flew the Cessna 172 from its home base airport to another airport to perform scheduled maintenance.

Airport security video captured the entire maintenance event and showed the pilot/mechanic removing the engine cowling, draining the engine oil, and inspecting the spark plugs, air filter, and other components. [The video did not show him adding engine oil before reinstalling the engine cowling and departing on the accident flight.](#)

Shortly after takeoff, the pilot reported to an air traffic controller that the airplane's engine was losing power and that he was returning to the airport.

Witnesses reported that the airplane began to fly erratically, rolled into a steep bank, and hit the ground about a mile from the airport in Laytonsville, Maryland.

The witness observations were consistent with the pilot failing to maintain airspeed



following the loss of engine power, which resulted in the airplane exceeding its critical angle of attack and experiencing an aerodynamic stall.

Post-accident disassembly of the engine revealed **catastrophic failure of internal engine components and signatures consistent with no lubrication and high heat.**

Probable cause: The pilot/mechanic's failure to maintain airspeed following a loss of engine power, which resulted in the airplane exceeding its critical angle of attack and experiencing an aerodynamic stall. Also causal was the pilot/mechanic's failure **to service the engine with oil following maintenance**, which resulted in the total loss of engine power.

NTSB Identification: [ERA16FA329](#)

This September 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.

## **NTSB CFIT Safety Alert**



**NTSB**

***SAFETY ALERT***

National Transportation Safety Board

**★ Controlled Flight Into Terrain in Visual Conditions ★**

***Nighttime Visual Flight Operations Are  
Resulting in Avoidable Accidents***

[https://  
www.nts.gov/safety/safety-alerts/Documents/SA\\_013.pdf](https://www.nts.gov/safety/safety-alerts/Documents/SA_013.pdf)

## Maintenance Errors Preceded Horrific WC-130 Crash That Killed 9

# A WORRYING TREND

The Air Force WC-130H aircraft veered to the left on the runway, almost rolling into the grass before the crew was able to get it airborne.

The pilot quickly made the decision to return to the Georgia airfield they had just departed. The pilot directed the shutdown of engine one, operating on the remaining three.

"Coming back," the pilot repeated five times over the next 30 seconds.

Investigators said that within those few seconds the pilot [improperly applied nine more degrees with the left rudder](#), "which resulted in a subsequent skid below three-engine minimum controllable airspeed, a left-wing stall, and the [mishap aircraft's] departure from controlled flight."

No other "meaningful direction" was given to the crew other than an order to "brace" just before impact.

The plane was airborne for two minutes overall before it crashed down into Georgia State Highway 21 roughly 1.5 miles northeast of the Savannah/Hilton Head International Airport, [killing all aboard](#).

A newly released mishap report determined that the WC-130 crash that claimed the lives of nine members of the Puerto Rico Air National Guard earlier this year was largely due to pilot error.

[But troubling engine and maintenance issues documented](#) in the aging aircraft raise more questions about the cause of the catastrophic May 2 mishap.

The WC-130, which belonged to the 156th Airlift Wing, Muñiz Air National Guard Base, Puerto Rico, [had recurring issues](#) with its first engine, according to the Aircraft Accident Investigation

Board Report released Nov. 9. The issues were documented [a month before](#) the aircraft's final flight, as well as the day of the deadly crash.

The report, authored by Brig. Gen. John C. Millard, ultimately concluded that the aircraft crashed due to pilot error.

The crew should have [more closely followed emergency procedure](#) and called for immediate action after discovering one of the aircraft's engines was malfunctioning, Millard said. Instead, the malfunction led to loss of control of the plane, causing it to crash, the report found.

Experts who spoke with Military.com, however, pointed [out that lapses in maintenance deeply disadvantaged the crew](#) even before the aircraft left the runway. The plane, which had been in service more than 50 years, was on its final journey to the "boneyard" at Davis-Monthan Air Force Base, Arizona when it went down.

["The engine malfunction is most definitely large factor and I would say the catalyst for the events that unfolded,"](#) said an Air Force instructor pilot who flies a mobility aircraft and agreed to speak to Military.com on background about the report's findings. "It appears the [report] narrowed in on a particular piece of the engine ([the valve housing assembly](#)) which had intermittent issues with [revolutions per minute] over its lifetime with multiple different engines."

The Air Force ordered an immediate investigation into the accident. Days later, after Military Times published an in-depth report showing that military aviation accidents have increased over the last five years, the service directed its wing commanders to hold a one-day pause in order to conduct a safety review with airmen, assessing trends and criteria that may have led to the recent rash of crashes.

## Unsolved Maintenance Problems

The newly released investigation shows that the plane was cleared for flight **even though** the recorded oscillation data of the plane's outermost left engine did not match its intended performance.

The WC-130 made its ferry flight from Puerto Rico to Savannah, Georgia, on April 9. And the flight crew operating the [mishap aircraft] "experienced an RPM issue with engine one, and reported the incident for troubleshooting and repair," the report said.

While the crew found a fix, maintainers struggled to replicate both the in-flight operations and the solution the pilots used to better understand the what went wrong. **They found they couldn't recreate the crew's original solution**, which was to switch "on the propeller governor control to mechanical governing," to see if that rectified the issue, it said.

According to post-mishap interviews, during a second maintenance engine run, the "mishap maintainers observed engine one produced 99% revolutions per minute," the report said.

**But the digital flight data recorder (DFDR) said otherwise.**

The DFDR indicated "engine one never reached sustained RPM above 96.8% and had significant oscillations between 95% and 98%," it said.

The Air Force investigators said that when performing an engine run, the [technical order] requires a range "of 99.8% to 100.02% RPM, as displayed on a precision tachometer, to verify an engine is operating properly at 100%.2."

**The maintainers, who failed to use a precision instrument, missed a chance to diagnose a fluctuating, weaker engine.**

## "Good enough" mentality

The maintainers should have noted these red flags, the instructor pilot who spoke with Military.com said.

"The maintainers... [failed to properly conduct the inspection of the engine,](#)" the instructor pilot said. "The crew likely would have never stepped to the aircraft that day, at least not without the engine being verified to have reached the required power threshold, versus over 2 percent lower than the minimum."

In the report, maintainers are faulted for having a ["good enough" mentality](#) about the aircraft's condition.

Twitter user [@MikeBlack114](#), a self-identified Air Force aircraft maintenance officer, also faulted the ["good enough" mentality](#) as a reason mistakes were made in a tweet thread. Furthermore, leadership should have paid better attention, he said.

"I'll let someone with wings address the aircrew piece, but the mx [maintenance] portion is almost unfathomable," Black said in a Twitter thread. "If you're in a leadership position of an organization involved with flying and you aren't uncovering [the skeletons](#) (believe me, they're there, just a question of how severe they are) you aren't looking hard enough."

Another problem, according to the report, was the maintainers observing the aircraft [did not use a tachometer to justify the data.](#)

The report noted that they had conducted the engine test runs without the instrument [because the compatible adapter plug to connect the precision tachometer to the aircraft was not available.](#)

"During the engine runs and without the use of a precision tachometer, [mishap maintainer one] and [mishap maintainer two] knew that 100% RPM was the speed the engine should operate at, but believed 99% was sufficient to conclude their maintenance because of the wider gauge range provided in the [technical order]," the report said. ["Thus, the mishap maintainers never corrected the engine one discrepancy and did not resolve the RPM issue."](#)

On May 2, engine one's RPMs once again revealed an anomaly.

During takeoff, engine one's RPMs fluctuated and couldn't be stabilized when the first mishap pilot "advanced the throttle lever into the flight range," according to the report.

"Engine one RPM and torque significantly decayed, which substantially lowered thrust," investigators added.

While the banked turn the pilots made into the failed engine "was well below the minimum air speed needed for proper control of the aircraft, the [mishap aircraft] did still have enough airspeed to maintain flight," the report said.

"The crew put the aircraft [in a disadvantageous energy state](#) by rotating (lifting off) 5 knots early and failing to accelerate as required by the procedures," the instructor pilot said. "Unfortunately, this was not an unrecoverable situation by any means, and one crews in all airframes train to regularly."

### Transparency needed

Millard, the investigator, said in the report there were no outstanding time compliance technical orders that would have restricted the plane from flying.

Still, there should have been more transparency, the instructor pilot said.

"As an aircraft commander, there's a ['trust but verify'](#) mentality with the maintenance crews, but our knowledge is limited. So when a crew chief hands me the signed forms," he said, "I have to trust those procedures and previous discrepancies have been fixed in accordance with the maintenance technical orders."

<https://www.military.com/daily-news/2018/11/11/report-pilot-error-cause-deadly-military-plane-crash.html>

<https://www.militarytimes.com/news/your-military/2018/04/08/the-death-toll-for-rising-aviation-accidents-133-troops-killed-in-five-years/>

## Airbus A340-313 - Ground Damage - (Turkey)



A Turkish Airlines Airbus A340-300, TC-J11, was hit by a fuel truck. The driver attempted to drive underneath engine no. 4 but the truck became stuck after hitting the underside of the engine cowling.

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## **Ted Talk: Ideas Worth Sharing**

On January 17, 2009, at 3:24pm, Flight 1549 took off from New York's LaGuardia Airport as normal. Five minutes later, it had crash-landed in the Hudson River. While the heroic landing of Captain Chesley "Sully" Sullenberger has become the stuff of aviation legend, during the white-knuckle landing his passengers had no idea whether they would survive or die on impact. [Ric Elias](#) was sitting in the first row of the plane, and at TED2011 he shared for the first time [the thoughts that went through his mind in those minutes](#) — both the terrifying and mundane — and how the event changed his life forever.



<https://blog.ted.com/tedweekends-asks-what-if-your-life-were-to-end-today/>