

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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Marines Say Helicopter's Fatal Crash Preventable

It was a simple but deadly oversight.

Two Miramar-based Marines were killed in a May 5 helicopter crash **they forgot to tell** mechanics about a transmission cover that **wasn't fully secured**. The part flew off during their flight and struck the tail rotor, causing it to also break off and sending the Super Cobra crashing into the Cleveland National Forest.



The Marine Corps described the **preventable** tragedy in an investigation issued yesterday to The San Diego Union-Tribune, which had filed a Freedom of Information Act request for the report.

Capt. Jessica Conkling, 27, and 1st Lt. Aaron Cox, 26, died when the helicopter crashed at 11:45 p.m. about six miles east of Pine Valley. The Super Cobra and another helicopter were heading from El Centro Naval Air Facility to Miramar Marine Corps Air Station.

“Our deepest sympathies are with the Conkling and Cox families,” Maj. Gen. Terry Robling wrote in a letter accompanying the investigation.

On May 5, mechanics **removed** the Super Cobra's No. 2 **transmission cowling** after the helicopter crew couldn't start one of the engines. They didn't find any faulty wires.

One of the mechanics **only partially refastened** the transmission cover because at that point, he **assumed** the aircraft would remain at the El Centro base overnight for further inspection.

Later that same day, though, other mechanics discovered a malfunctioning engine starter in the Super Cobra. After learning that the starter could be replaced in 15 minutes, Conkling decided to proceed with the repair so she and Cox could fly back to Miramar along with the helicopter carrying their commanding officer.

Mechanics made the starter fix. But **they didn't fasten** the No. 2 transmission cowling any further because Conkling and Cox, the only people left at the base who knew that it had been removed earlier, **made no mention of it**. Conkling also declined an offer to inspect the mechanics' overall work.

“As the night progressed and the opportunity to recover the aircraft presented itself, the air crew **simply forgot** that the (cowling) had been only partially secured,” the report said.

This **oversight** led to “an uncontrollable flight condition for the air crew and put them in a situation that they were unable to recover from,” investigators wrote.

The report’s authors recommended no disciplinary action against the mechanics and said the commanding officer should retain his rank. They urged the Marine Corps to **establish clearer standards** for certain flight procedures so **mistakes** such as the improperly fastened cowling might be avoided.

Conkling, of Centre, Pa., was commissioned Dec. 10, 2004. She deployed last year in the Western Pacific aboard the Japan-based amphibious assault ship Essex.

Cox, of Pulaski, Ark., joined the Marine Corps on May 27, 2005, and became a first lieutenant two years later.

Human error and technical fault blamed for Spanair crash that killed 154

Human error and technical fault have been named as the cause of the tragic Spanair plane crash that killed 154 passengers at a Madrid airport a ago.

Victims died in a ball of fire as the Spanair MD-82 flight split in two after smashing back on to the runway just seconds after lifting off.

Official investigators found that the flight crew **failed to extend the aircraft's wing flaps and slats** when it took off from Barajas International Airport on August 20, 2008.

But an automatic warning system, which



would have alerted the pilot and co-pilot to their **mistake**, **failed to function**, says a interim report by the investigators published today - just two days before the anniversary of the crash.

The plane had been bound for Las Palmas in the Canary Islands. A total of 154 passengers and crew, including those on the flight deck, were killed and 18 people survived.

On the flight deck recorder the co-pilot could be **heard reading** the supposed positions of the flaps and slats, said the report. But examination after the accident showed that **they had not been extended**.

The warning device that would have told the flight crew that was the case **did not function**.

The Spanair disaster was not the first to have been caused by the same combination of **human error and technical faults**.

Almost exactly 21 years ago, a McDonnell Douglas MD-82 crashed on take-off at Detroit in similar circumstances on August 16, 1987. By coincidence 154 also died in that crash, with a four-year-old girl the sole survivor.

Yet recommendations made after that accident had still not been introduced by Spanair and a number of other airlines when the Madrid crash happened last year.

A total of 465 people have been killed in air crashes **with similar circumstances**, starting with the Detroit disaster and ending with the one in Madrid, according to Spanish newspaper El Pais.

It said that **49 aircraft** have been involved in such incidents since 1968. One involved an Austrian Airlines MD-83 which almost crashed in the same way as the Spanair flight at Madrid when it took off from Lanzarote, in the Canary Islands, in June, 2007.

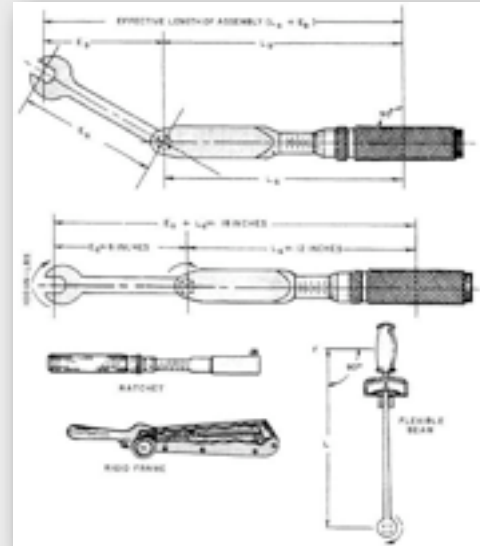
The crew had not extended the flaps and the warning system failed to function. But because of the power of the engine thrust, the wind direction and the fact that the plane took off from an airport at sea level, the pilot was able to get the aircraft up.

Because there was no accident the results of an investigation were never published and no recommendations made, the newspaper said.

Over-torqued Bolts Cause fuel Leak

Boeing 737-700. Minor damage. no injuries.

Shortly after reaching cruise altitude during a scheduled passenger flight Brisbane, Queensland, Australia, to Hamilton Island the afternoon of Aug. 13, 2007, the flight crew noticed a **fuel imbalance** and determined that fuel was leaking from the no. 2 engine. The crew shut down the engine and “diverted to Rockhampton, where a single-engine approach and landing was completed without further incident,” said the report by the Australian Transport Safety Bureau.



Examination of the engine revealed that fuel was leaking from a partial separation between the main fuel-return pipe and the oil/fuel heat exchanger. The components had been **disconnected two days before** the incident, during unscheduled maintenance involving replacement of the no. 2 engine’s fuel pump. Investigators found that while reconnecting the components, a maintenance engineer **had applied excessive torque** to the four bolts that are inserted through the fuel pipe flange, gasket and rubber seal into threaded inserts in the heat exchanger body.

The torque value used by the engineer was applicable to key-lock inserts used in a **modified heat exchanger** that was to be installed in the 737’s engines during their next overhauls; the applied torque was about **15 percent higher** than the maximum torque value specified for the threaded inserts in the no. 2 engine’s original heat exchanger. The excessive torque on the bolts had stripped the threads in all four inserts and had pulled the inserts partially out of the heat exchanger body. The report said that the gasket between the fuel pipe and the heat exchanger had prevented fuel from leaking during the **post-maintenance engine test run** and during three subsequent flights. However, vibration of the fuel pipe during these flights and the incident flight eventually resulted in the complete release of the inserts and the bolts from the heat exchanger, causing the fuel leak.

The report noted that the engineer **was not aware** of the different torque values and his supervisor had been involved in other tasks when the engineer reconnected the components.

Airline mechanic pleads guilty to use of fake credentials

An airplane mechanic in Casa Grande admitted to **false claims** about his credentials.

Wesley Glen Forsyth, 43, pleaded guilty to two felony fraud counts involving aircraft. He entered his plea Thursday, according to the U.S. Attorney for Arizona.

Forsyth claimed to have **completed training courses when he had not passed**. He inspected a small plane twice in 2008 that crashed. The pilot was not hurt, but Federal Aviation Administration investigations showed the fuel pump was not properly inspected. Forsyth allegedly used the credentials issued to another person.

He will be sentenced in December and faces fines and **up to five years** in prison.



When Shortcuts Become the Norm

Most workplaces require workers to follow a series of pre-defined when performing certain tasks. From time to time, workers **may stray from the established procedures and take shortcuts**. Unless there are negative consequences, the shortcuts get repeated until they eventually become the **"norm."** This situation, known as the "Normalization of Deviance," is a safety hazard **you must stop**.



Here's why and how.

The Normalization of Deviance Creeps Up On You

Initially, the deviation by workers from set standards is **incremental, barely noticed**, and is therefore easily accepted. In most cases, we only become aware of “Normalization of Deviance” when an incident results.

To demonstrate this phenomenon, let's use a Lockout/Tagout (LOTO) procedure for above 750 Volts electrical energy as an example.

General LOTO steps consist of:

- Isolating the electrical energy
- Tagging (and locking if possible)
- Testing for potential
- Applying worker's protective grounding.

Well-designed procedures allow for the **human element**. In other words, you should be able to miss a step in a well-designed procedure and one of the other steps should be the check.

In the case of the LOTO steps, in theory, if one of these steps were missed, one of the other steps would act as a check and there should be no consequence.

From Shortcut to Accepted Procedure

However, when a step is missed and there's been no negative consequence to the shortcut, it's now possible that **some workers – and supervisors** – actually view missing the step as a **positive**. Perhaps missing the step allows a worker to save time or maybe the sub-standard procedure requires fewer tools or fewer people. If this is the case, it's very likely that the same shortcut **will be repeated**, particularly in a pressure situation.

By repeatedly missing the step, the shortcut **gains credibility** and the outcome supports the experience. Over time, this leads to a belief that this **behavior** is now the “norm” or acceptable standard. In most cases, the result is positive.

The Slippery Slope of Shortcuts

However, in the worker's mind, what was once a four-step procedure has now become a three-step procedure. **The margin for human error has now increased**, since one of the steps/checks has been removed from the procedure, adding to risk of incident.

Now what happens if this same worker is **mentoring or training** an apprentice or inexperienced worker? He's now teaching a three-step instead of a four-step procedure, again increasing the risk of incident.

Let's take another example: Speeding. Most of us do not consistently go 20 miles an hour over the speed limit in one fell swoop. We start by going three or five MPH over the limit, as this seems to be an acceptable speed based on the other drivers around us who have already become "normalized". For many of us the speed slowly creeps upwards. Eventually the consequences catch up, leading to an incident (collision, speeding ticket) and then we **revert back** to the standard.

Conclusion

When we look at the regulations, **standards or procedures**, we realize that most were **"written in blood"** or designed as a result of a loss. Complying with those standards is the best way to avoid "Normalization of Deviance."

Air Safety Plunges in First Half of 2009

Passenger flights have grown safer each decade since the Wright Brothers first flew more than a century ago.

But the number of dead in crashes during the first half of 2009 **threatens** to this trend.

Experts say the number of **smaller accidents** appears to be increasing.

When it comes to safety, there are few success stories as glowing as that of the



aviation industry. That the accident rate would decline each decade on civilian airlines has become almost as much of a given as the fact that computer chips get faster with each new generation. This has been the rule since the Wright Brothers first took flight with their motorized airplane in 1903.

That long-lasting trend, however, **appears to have ended this decade**. According to the latest calculations by the trade publication Flight International, the time frame between 2000 and 2010 has seen a **stagnation** in aviation safety. Is "safety on the slide?" the British magazine recently asked, noting that many recent accidents could have been averted.

Of course, we have arrived at an extremely high level of flight safety -- and it is **harder these days** to improve it than it was in the past.

Nevertheless, few of the recent accidents actually happened because of incalculable factors like bad weather or bird strikes, as proved to be the case in the emergency water landing of a US Airways Airbus aircraft in January on New York's Hudson River.

When the era of jet aviation first began, **11 people were involved in accidents per 1 million flights**. Now that figure is **below 1 person**. Indeed, if the accident rate were the same in these booming times for air travel as it was back in the 1970s, Boeing officials have calculated, we would be **seeing one major crash per week**.

Still, for a major airline like Lufthansa, which has more than 2,000 takeoffs and landings per day, it is difficult to remain below that average accident rate. A single crash can push an airline above it.

Air France is a case in point. So far, according to the official figures collected by the International Air Transport Association, the French carrier has had an average accident rate of 0.9 percent -- very close to the global average according to IATA's statistics. However, if you look solely at the airline's fleet of Airbus aircraft, like the A330 involved in the recent crash on a flight between Rio and Paris, that figure rises.

An advisory committee to the European Union is calling for the accident rate to be reduced by a further **80 percent by the year 2020**.

During the first six months of 2009, however, the airlines didn't make much progress toward that goal. Indeed, it was a bad six months for flight safety. According to Flight International statistics, **499 people died** in accidents on passenger jets -- a greater number in the same period than any year since 2002 (when 716 died). And those figures don't even include

the recent Caspian Airlines and Aria Air crashes, both in Iran, during the month of June that claimed 184 lives.

These disasters will first be calculated during the third quarter. The reason for the exceptionally high casualties this year is the crash of two large jets -- an Air France plane and another from Yemenia Airways. For the first six months of this year alone, the accident rate is already **50 percent higher** than the total annual average in the first six months of the past 10 years.

Another contributing factor was the February crash of a Turkish Airlines plane in Amsterdam in February. A **faulty altimeter** incorrectly indicated the plane was just two meters above the runway, leading the aircraft's computers to reduce the jet thrust. The pilots **overlooked** the discrepancy -- perhaps because they had **blind faith** in the onboard computers. The Boeing 737 crashed prematurely into a field just short of the runway, killing nine passengers. Flight International is predicting a new security debate soon. "The issue of humans and highly automated aircraft will rise on the agenda," the paper predicts.

It will be difficult to compensate for the rapidly rising number of flights today with additional safety measures. The number of smaller incidents and near accidents has risen, says one safety expert at a major airline. For every crash or accident that results in human injury, according to the rule of thumb, **there are hundreds** of accidents with material damage as well as smaller incidents. "At this lower level, we are seeing a growing trend," the insider says.

The main cause is the loss of control of the aircraft -- a broad category with many subgroups of problems: The crew got **distracted**, was **disoriented** or was unable to get enough propulsion during a touch-and-go takeoff. It would be easy to write these things off as pilot error, but in many cases it has been proven that the pilots weren't given training for such situations.

The minimum standards required by legislators in pilot training, apparently, don't include all of these situations. And the ruinous degree of competition between airlines translates to a situation where many airlines are less motivated to invest in additional capabilities for their pilots.