

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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The Downside of Upside Down

One of several versions of the origin of "Murphy's Law" contends that the Law's namesake was Captain Ed Murphy, an engineer at Edwards Air Force Base in 1949. Frustration with a transducer which was malfunctioning due to an error in wiring caused him to remark that—if there was any way that something could be done wrong, it would be.

Recent ASRS reports indicate that Captain Murphy's Law was in full effect when several aircraft components managed to get installed upside down or backwards.

Without detailed instructions and clear notation, nearly symmetrical parts can be installed incorrectly. Faced with the replacement of such a part, this CRJ 700 Maintenance Technician wound up with a case of component "mis-orientation."

- The aircraft returned to the field due to the landing gear not retracting. Previously, the nose landing gear torque links had been replaced to fix a nose wheel shimmy problem. While installing the torque links, the lower assembly was installed upside down. The lower torque link assembly looks similar upside down to the way it does right-side up. The Maintenance Manual does not specify anything about the orientation, nor is there any indication on the part itself. I feel that if there had been a specific note that the part is able to be installed upside down, I would have paid closer attention to the orientation. The operational check of the installation did pass, but it does not require a gear swing. A note should be added in the installation task noting that the part is able to be installed incorrectly and that it looks close to the correct installation.*

FAA Team Maintenance Safety Tip

The Road Trip

You walk in on Monday morning and your boss informs you of an engine problem on an airplane recently maintained by your shop. The customer was traveling over the weekend and got stranded just a few hours away. After several phone calls and some verbal troubleshooting, you determine [it will be necessary to travel to the airplane](#) and do some maintenance.

Before you leave, consider the following:

- Do you have the training required to perform the maintenance needed?
- Are you qualified to run and taxi the aircraft if required? Some airports are a challenge even for pilots; are you up for it? If not, don't be ashamed to ask for help! Remember SAFETY is the key -- if you can't do it, DON'T DO IT.
- Do you have the tools required to perform the needed maintenance?
- Do you have current FAA approved or accepted Technical Data?
- [Look at your human factors checklist; don't be your own worst enemy.](#)

Perform the maintenance in a safe, professional manner, document the maintenance as required and return the aircraft to service only if you feel confident about the work that was done. Remember -- the same standards apply no matter where the work takes place.

Take the lessons you learn on this road trip and file for later use.

GAO Examines "Concerns" About Composites

In a report (PDF) completed last month, the U.S. Government Accountability Office examined ["safety concerns"](#) about the use of composites in commercial aircraft. Based on research and interviews with experts, GAO investigators identified four key safety-related concerns with the repair and maintenance of composites in commercial airplanes, but added that none of the experts they

talked to believed these concerns were insurmountable or posed "extraordinary safety risks." The FAA is taking action to help address its concerns, the GAO, but that "until these composite airplanes enter service, it is unclear if these actions will be sufficient." **The four concerns cited by the study are:** (1) limited information on the behavior of airplane composite structures, (2) technical issues related to the unique properties of composite materials, (3) standardization of repair materials and techniques, and (4) training and awareness.

Boeing's 787 is the first mostly composite large commercial transport airplane to undergo the FAA certification process. Since existing safety standards are often based on the performance of metallic airplanes, the GAO said, the agency was asked to review the certification process used by the FAA and EASA. The 787 is about 50 percent composite by weight, not counting the engines, according to the report.



<http://www.gao.gov/new.items/d11849.pdf>

Navy officials take needed steps to correct hangar safety issues

Navy officials say **that despite warnings**, supervisors at the National Naval Aviation Museum failed to keep up with worker safety and training regulations, forcing the shut-down of the aircraft restoration hangar last week. The Navy said the unprecedented closing was triggered after an inspection found **no staff member was in charge of safety**, training documentation was almost nonexistent, and there were no records of what procedures were in place to protect workers exposed to toxic chemicals.



Retraining of staff and correction of hazardous environmental conditions began this week in hopes of reopening the facility that restores historic Naval aircraft for display in museums across the country.

"We just decided the time had come [to hit the restart button](#) and start laying the foundation to get back in compliance with current requirements," said Elizabeth Freese, Navy Museum System program manager at the Naval History and Heritage Command. "We don't believe there was any harm to humans or the environment. There was just a need for improvements to a lot of things."

Freese ordered the facility shut down Oct. 19 after museum officials failed to correct worker training and safety violations discovered more than a year ago.

A Pensacola Naval Hospital safety inspection in June 2010 found that restoration workers were being exposed to excessive levels of toxic lead and hexavalent chromium due to improper sandblasting and paint removal procedures.

"What happened was they were performing work the way they had always performed work," Freese said. "There was [not an appropriate awareness](#) of contaminants like lead, cadmium and chromium on things they were doing abrasive removal on."

The museum has 21 full-time staff members and about 30 part-time volunteers, said retired Vice Adm. Gerald Hoewing, president of the Naval Aviation Museum Foundation.

"We're going to go step by step," Freese said.

National Naval Aviation Museum officials would not comment directly on worker safety and management issues at the restoration facility, but Hoewing said the staff was excited about the retraining process.

"It gives us the opportunity to review procedures and processes and get our people back to work as quickly as possible," Hoewing said.

Aviation Safety is a Team Sport

Prior to January 15, 2009, one of the things of which I was most professionally proud was my involvement in making aviation safer. In the late 1980s and early 1990s, I – along with several dozen other pilots, many of whom were also safety committee volunteers – helped develop, implement and teach a leadership and team building course at US Airways called [Crew Resource Management \(CRM\)](#).



After decades of technological, procedural and training improvements, CRM was a way for us to address the human performance element of the safety equation. CRM helped us take a collection of individual pilots and flight attendants (who might not have known each other at the beginning of a week-long flying trip) and quickly form them into an **effective team**. CRM teaches the cognitive and interpersonal skills needed to create and lead a team effectively. By creating this immediate sense of bonding among crew members, the hope was that if they faced a sudden emergency on the first flight of their trip they would be as prepared to deal with it as they would be after working together over many days. More importantly, CRM teaches captains to be better leaders and to have better working relationships with crewmembers. It shows captains how to set a proper and positive tone that creates an atmosphere of mutual respect and **opens channels of communication** by soliciting feedback from every member of the team. It aligns goals, reduces hierarchy and makes clear our roles and responsibilities, not only to our passengers but to each other.

I was given an opportunity to put these lessons into action on a cold, winter day at the Minneapolis/St. Paul Airport (MSP). It had snowed before our arrival, and all of the ramp workers and ground crew were bundled up in their parkas and gloves, most trying to get their jobs done as quickly as possible so they could get out of the frigid weather. About 5-10 minutes after we arrived at the gate, once we had begun to de-plane our passengers and the ramp workers had started their work, one of the baggage employees sought me out to alert me to a problem he had noticed – there was oil dripping from the right engine. He was concerned this could pose a safety risk on our next flight. I listened attentively to his concerns and asked my first officer to take a look at the problem during his pre-flight rounds. He did, also noticed the same problem, and we decided to call US Airways maintenance to inspect the aircraft. After conferring with each other and the maintenance team, we ultimately decided that the engine had simply been over-serviced and there was no threat to safety.

But I didn't just leave it at that. I wanted to close the loop. Using my best CRM skills – because really, how often do we have an opportunity to practice what we preach? – I decided that rather than call the employee back into the cockpit, I would go to him. I put on my coat and went out into the cold to seek out this individual. I talked to him about the process and informed him of our finding, but I also thanked him for noticing the issue and bringing it to my attention. **I encouraged him** to do the same if a similar situation ever presented itself in the future.

What's important about this story is that this individual did not have an assigned role on the safety team. His core responsibility was loading and unloading baggage, but he took the time to observe his surroundings. **He had the awareness to notice something, the knowledge to know that this might lead to a bad outcome, and the initiative to share his observations.**

He didn't only focus on his own tasks; he felt a greater responsibility for the safety of our passengers, even though it wasn't his core function. He went out of his way to do something not in his job description – in miserable weather, no less. It wasn't convenient for him, and he wouldn't be rewarded. In fact, his supervisor probably never even knew that he had taken this action. But I did. And he did.

With this decision, he made our passengers safer. And with my response, I made it more likely that another captain on another flight on another day would have the benefit of the knowledge that this worker might possess that the captain might not. Each step in the process is critical to ensuring safety, and we must [promote a culture](#) where every person on the team – no matter what their level of responsibility – is empowered to speak up when needed.

CRM helped us create this kind of culture at our airline. We fostered a shared sense of responsibility for the outcome among everyone in the organization. We taught captains that CRM was not a threat to their authority, but an opportunity to use all their resources – flight attendants, dispatchers, air traffic controllers, mechanics, even the ground crew– as part of their team. This made possible better information, better decisions, better trapping of errors, and better management of risk. [I encourage you to do the same](#) within your own organization, no matter what domain or industry you work in.

To Prevent Accidents, We Must Change Attitudes

I recently heard a comment that I just can't get out of my head. I was with a group of colleagues who were discussing a workplace that had experienced several accidents all in one day. One person said that this should make folks more vigilant about prevention. Another said: ["They happened in a manufacturing plant."](#) It was a simple comment. But it was said with the conviction that accidents a manufacturing plant are bound to happen. [It came across as an acceptance](#), almost condoning that this was all right. I was taken aback. Accidents in a manufacturing plant are not okay.



It wasn't the few words that bothered me, **it was the attitude**. Attitudes Can Jeopardize the Efforts of a Learning Organization.

Many organizations today strive to create a learning organization, which can be defined as one that is continually learning new **KSAs** (knowledge, skills, abilities and attitudes). Workers improve their skills and then take that learning to the workplace where they apply their newly acquired knowledge and teach others, thereby raising the skills of the entire organization.

For health and safety, much effort is afforded and applied to increasing knowledge, skills and abilities. The results can often be measured and ranked with a clear picture of "where are we now." The elusive KSA, the one not easily seen or measured is often the one that enables or impairs the learning organization. **This is attitude**.

How Safety Professionals Can Affect Attitude

Injury prevention and a target of zero accidents is a bold undertaking, and health and safety programs with these objectives may be asking the workforce to undergo extraordinary change. Behaviors are expected to be drastically different from past history. While increasing knowledge, skills and abilities will help effect these changes, **it's the workers' attitudes that matters most**. Why are workers' attitudes so important? Because they're the route to safe behavior.

Sometimes safety supervisors find they can't always directly influence workers' behavior. Rules may not work; training may not work. **But attitudes usually drive behavior**. People learn by watching others. They pay attention to what others do and what they say are teaching tools. Workers' attitudes reflect their evaluation of what they've learned.

As a safety or educational professional, you can help change other's attitudes by your own beliefs and the attitude you exhibit towards those beliefs. Let's use prevention as an example. If you believe that accidents in your workplace can be prevented, your attitude (and your behavior) will reflect that belief. And your attitude in turn will affect what your workers believe and, ultimately, how they behave. If you can change just one attitude that injury prevention is possible and worth achieving, it can go a long way to changing lives. (By the way, if you secretly don't believe that accidents in your workplace can be prevented, don't fool yourself: That belief will come through in your attitude.)

Conclusion

It's difficult to measure the culture and values of an organization; however making a contribution to changing attitudes is something everyone can take pride in being part of. **Remember: What I do, what I say and how I say it can change lives and prevent accidents!** Organizations that can effect this change in attitude are true learning organizations.

November/December 2011 issue of FAA Safety Briefing

Airports come in all shapes and sizes and can provide pilots with opportunities for both education and enjoyment at any level. This is the focus of the November/December 2011 issue of FAA Safety Briefing, which takes an in-depth look at the nation's wide array of public-use airports. Articles highlight the benefits of exploring new places to land as well as [help raise awareness of runway safety and wildlife hazards](#).

In this issue you can also read about what goes in to building an instrument approach, learn more about deciphering airport sign language, and appreciate the lessons learned from a runway incursion. In addition, the issue's [Nuts, Bolts, and Electrons](#) department takes a look at some changes on what it means to be actively engaged. Be sure to check out all this issue has to offer!

FAA Safety Briefing is the safety policy voice for the non-commercial general aviation community. The magazine's objective is to improve safety by:

- making the community aware of FAA resources
- helping readers understand safety and regulatory issues, and
- encouraging continued training

The link to the online edition is: http://www.faa.gov/news/safety_briefing/.

