

# Aviation Human Factors Industry News

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

Hello all,

To subscribe send an email to: [rhughes@humanfactorsedu.com](mailto:rhughes@humanfactorsedu.com)

In this weeks edition of *Aviation Human Factors Industry News* you will read the following stories:

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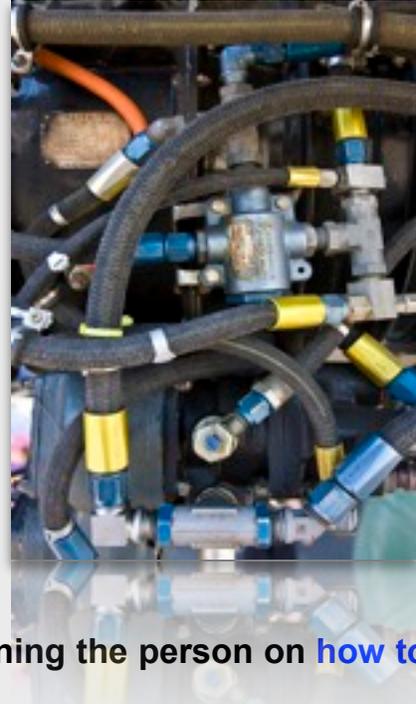
★Best Practices!

## Human Factors training is just common sense... Or is it?

Gordon Dupont - System Safety Services

Many times over the years, I have had class participants tell me that they don't need human factors training because it is **just common sense**. Nothing could be farther from the truth.

For example, look at the picture of the plumbing fittings on the right. It is just common sense that even your grandmother would know to tighten every single one of those fittings. Yet in my seven years of accident investigation I have met all too many **very qualified, conscientious and loaded** with common sense maintenance personnel who have left a line loose on an aircraft.



Human Factors training is nothing more than training the person on **how to avoid the error they never intended to make**.

It calls for providing the person with information on what can set him/her up to make an error and more importantly, what **"safety nets"** the person can put in place in order to prevent an error from occurring or to prevent any error from becoming an accident.

What is a "Safety Net"? A safety net is a regulation, a policy, a procedure or a practice which if in place, might break a link or prevent a link from forming. An example is: developing the habit to always go back three steps in your work after being distracted. In Human Factors training you are taught that your mind can work faster than your hands and thus you may think and believe you have completed a task when in fact you have not. Now take a look at our plumbing lines, a safety net of always using **TorqueSeal** to mark lines as you tighten each fitting would let you and others know that each fitting is correctly tightened. A **dual inspection** by a second person would also help ensure no lines were left loose.

### To error is human

Ever since Eve made the error of eating the forbidden apple, we humans have been making human errors. To lessen errors being made we have

tried to “Murphy-proof” everything we have come into contact with. For example; you can’t start your car unless it is in neutral or park or you can’t retract the landing gear on the ground.

We also have come up with rules, laws and regulations to reduce human errors. I.e., You must stop at a red light even though common sense tells you there is no one around and it would be safe to not do so. If you do make an error we have put up warnings to prevent it from causing an accident or at least lessen its consequences. I.e., A **warning horn** to let you know that you forgot to lower the landing gear before you land or a seat belt to keep you Safer if you choose to ignore the horn.

Today we have “**human-proofed**” the aircraft to the extent that we have a whole new set of problems. The pilots and crew on many occasions don’t even know what the aircraft is doing.

We also have so many rules nowadays that there are rules for the rules and because there are so many, few of us can remember them all. But the fact still remains that human error is still our biggest problem and in order to lower human error we must provide the correct training to all humans in the organization because EVERY human can make a mistake even with years and years of experience.

### **But what is the correct training?**

We believe that by providing training that each participant believes in, can understand and easily apply to his work, to be the correct training. There are some terrible training courses out there. Courses that pilots call “Charm School” and maintenance call “Hug a Tree 101”. These courses are simply a waste of time and money.

Human factors training for everyone (maintenance and pilots included) center around the “**Dirty Dozen.**” The Dirty Dozen consist of 12 contributing factors that can set you up to make an error.

While human factors (HF) training will help lower human error we must also provide a work environment that is resistant to human error. This is the role of a **Safety Management System (SMS)** of which HF training is a part of. HF training will help ensure the success of any SMS and is an integral part of any SMS seeking to lower human error to as low as reasonably practical. (ALARP).

[http://www.system-safety.com/ourservices/maintenance\\_posters.htm](http://www.system-safety.com/ourservices/maintenance_posters.htm)

## Cockpit distractions go beyond laptops

The **laptops** that triggered two Northwest Airlines pilots to fly 91 minutes without talking to the ground may be relatively new technology, but **distractions in the cockpit** have led to accidents and incidents since the dawn of aviation.

# Cockpit Interruptions and Distractions

As lawmakers and federal regulators called this week for banning laptops and certain other electronic devices in airline cockpits, experts who study why pilots **make mistakes** said the problem may be much more fundamental: **People don't multitask very well.**

Distractions ranging from a disgruntled passenger to a **burned-out light bulb** have been behind scores of crashes, according to federal accident reports and researchers.

"This has been recognized for decades now," said John Lauber, a former NASA researcher in **human behavior** who also served as a member of the National Transportation Safety Board (NTSB).

The pilots on Northwest Flight 188, which initially flew past its destination of Minneapolis on Oct. 21, told the NTSB that they were working on a **new airline-issued computer program** and didn't realize they had flown so far without talking to air-traffic controllers.

Distractions have been involved in numerous other airline accidents. The distractions range from frivolous conversations to pilots becoming overwhelmed by regular duties. Examples:

- On Dec. 28, 1978, 10 people died when a United Airlines jet **ran out of fuel** and crashed in Portland. The pilots were so focused on diagnosing a problem with the landing gear that they forgot to monitor their fuel, the NTSB found.
- On Aug. 27, 2006, pilots on a Comair regional jet tried to take off from a dark, closed runway in Lexington, Ky. The runway was too short, and the jet hit trees and burst into flames, killing 49 of the 50 people aboard. The NTSB concluded that the pilots' **conversation about seeking other jobs** contributed to the error.

Though he could not comment on the Northwest pilots, Key Dismukes, a NASA aviation researcher in human behavior, said that **increasingly automated aircraft make distractions a potentially greater problem**. Modern jets can fly for hours without any input from pilots, making distractions seem less critical.

"It's not astonishing to me at all that people get **absorbed** in a task and lose track of time and where they are," Dismukes said.

## **Air Force personnel disciplined over faulty fighter maintenance**

All air force personnel involved in **improperly maintaining** a Mirage 2000-5 jet fighter last month have been disciplined, the Air Force Command Headquarters said Monday in a statement. The Apple Daily reported earlier Monday that a Mirage fighter at the Hsinchu air base in northern Taiwan suffered an engine breakdown during a high-speed trail run on a runway Sept. 21 **because of faulty maintenance**.



A follow-up examination found that a **fuel check valve was mistakenly installed in the reverse direction** in the fighter's fuel system, preventing fuel from flowing to the aircraft's engine and eventually leading to the plane's breakdown.

The Air Force statement neither confirmed nor denied the newspaper report, but it acknowledged that the fighter's engine breakdown during "a regular maintenance test run" was caused by the **negligence** of both mechanics and flight staff.

"Because of their negligence, the fuel delivery system could not operate normally and ensure a sufficient flow of fuel to the fighter's engine," the statement said.

The Air Force blamed the incident on the failure of mechanics **to precisely**

**follow standard operating procedures in installing parts and components,** and it said all officers involved had been disciplined, with punishments ranging from a reprimand to two demerits.

The statement also said the Air Force has **revised its standard operating procedures** to beef up inspections, mutual checks and supervision to prevent the recurrence of similar errors.

Taiwan purchased 60 Mirage fighters from France in the 1990s that form the backbone of the country's air force arsenal along with U.S.-built F-16s and locally developed Ching-kuo Indigenous Defense Fighters.

## **Rotor Blade Strikes Ramp Worker**

**Kaman K-1200. Substantial Damage. One Fatality.**

The pilot has started the engine in preparation for a positioning flight from Clarita, California, U.S., to Los Angeles the morning of December 17, 2008. The engine was at flight idle when a ground crewmember, a **company maintenance technician** disconnected the external power unit cable from the helicopter.

The pilot said as the ground crewmember was walking away from the helicopter, which was facing towards the north - northwest, the Kaman was hit by a gust of about 15 kt from the east - southeast. He felt the right side of the helicopter lifting off the ground. "The pilot applied full right cyclic to counter the uplifting condition, however the wind gust continued lifting the helicopter to the left and nose-down until the aircraft came to rest inverted," the NTSB report said.

As the helicopter rolled over, the main rotor blades struck a fueling truck and separated. **One of the blade struck and killed the ground crewman.** The pilot was not injured.



Noting that the K-1200 flight manual says that the maximum velocity for a right quartering tail wind is 17 to 25 kt for takeoff and landing the report said. “The winds at the accident site **most likely exceeded the maximum wind allowed.**”

## **Control and Actuator Locks/Pins - FAASTeam** **Maintenance Safety Tip**

### **AMT Safety Tip**

**Notice Number: NOTC1960FAASTeam**  
**Maintenance Safety Tip**

### **Control and Actuator Locks/Pins**

The more complex the aircraft is, the more dangerous the maintenance environment. Aircraft manufacturers know this and engineer a variety of special safety equipment. **Safety pins and locking devices** are available to apply or affix to aircraft system components to prevent accidental movement when maintenance is being performed around or on them. Their use is typically directed in the maintenance procedures. If you have them, use them. If you don't have them, acquire them.



Ponder this. Even though you may have jack stands, how often have you worked under your vehicle supported only by a hydraulic jack? No matter how long or short you plan to spend under the car, this decision is dead wrong. You are placing a great deal of confidence that the small o-ring seal will not fail. If you are wrong.....you are injured....or dead. It is the same when working on aircraft. Use the safety devices and you will be able to return home after work to relax and be with your family. They will appreciate this.

Unfortunately, there is a collateral hazard associated with using locks and pins. It is the **failure to remove them before flight**. Be sure they have streamers attached to them to catch attention and make sure their use or installation is documented in the maintenance records. Why? Because these devices that protect you can end up jeopardizing the safety of others.

## Wanted: A Qualified Maintenance Human Factors Manager

Dr. Bill Johnson, FAA Chief Scientist and Technical Advisor for Human indicates there is no intentionally recognized certificate to indicate that one is qualified to manage an **aviation**



**maintenance human factors program.** The career path of the HF manager's job varies. The HF manager must be something of a super hero, with a unique skill set that includes **great communication abilities, a positive attitude and knowledge of human factors and aviation maintenance.** If the job position is a good one, then it will demand highly qualified candidates who bring "The Right Stuff" to the job.

The person in the HF manager's position can have high organizational impact on worker performance, overall safety and company cost control. The position can permit the manager to derive significant job satisfaction. The HF manager's position should be appropriately elevated to have the **respect of senior executives, the labor organization and the work force.** This is not a fantasy. Five years ago, FAA chose to create a senior executive position for maintenance human factors. That is my job and it is a great one.

Specific qualifications must be matched to organizational requirements. Larger company or small, established HF program or not, the HF manager must have certain knowledge, certain skills and certain attitude. The HF manager must have a **demonstrated understanding of human factors in maintenance and engineering organizations.** The HF manager from a small company may require more HF expertise than a larger company HF manager, who likely has a larger support staff. The large company HF manager will require the experience and ability to manager people.

In the trade-off between HF knowledge and maintenance knowledge, **maintenance is more important.** It is easier to train an experienced maintenance professional about human factors than to train a human factors expert about MRO.

I have witnessed situations where a highly qualified maintenance HF manager with a Ph. D failed—simply because the manager **did not understand** the maintenance environment.

The HF manager must be a skilled communicator with a **combination of speaking and writing talent**. The manager must be able to work with the CEO and top executives as well as the crews on the **maintenance night shift and ramp personnel**. They must be able to talk technical about **human error** and shift easily into a discussion about return on investment. They must understand not only human fatigue but also metal fatigue.

With the right knowledge and skills, a successful HF Super Hero must also have a **super attitude**. Some have called it **passion** for addressing human factors challenges. And finally, a successful HF manager must be able to elicit respect from other senior managers, from middle management and supervisors, and from the workforce. That respect is a function not only of a senior job title but also of his or her demonstrated knowledge and ability to communicate and lead others. Above all, the HF manager must be able to convince the organization that there is a **high payoff** in attention to human factors in the MRO workplace.

## **Best Practices!**

