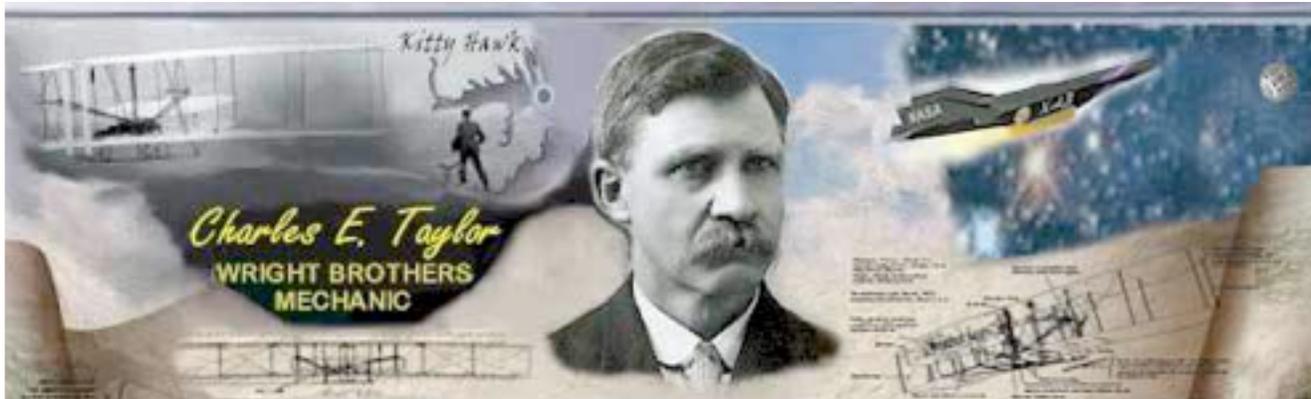


# Aviation Human Factors Industry News

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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:

★New Science on Sleep

★Machinists Union Forms Online Community To Help Workers Through Difficult Times

★Embry Riddle Initiates Aviation Ph.D.

★No Accidental Deaths on Korean Airlines in a Decade

★NTSB Amends Accident Reporting Requirements

★"Position And Hold" Change Expected Soon

★Jack of All Trades

★Copying A Good Idea

★Aircraft Accident Investigation

★\_Do You Accommodate the Three Learning Styles?

## New Science on Sleep

### Catching up on lost sleep a dangerous illusion

People who are **chronically sleep-deprived** may think they're caught up after a 10-hour night of sleep, but new research shows that although they're near-normal when they awake, **their ability to function** deteriorates as night falls.

Some studies show that **almost 30% of Americans** get less than six hours of sleep at night. The research indicates that the body's daily circadian rhythm hides the effects of chronic sleep loss and gives such people a second wind between about 3 p.m. and 7 p.m., when the circadian rhythm is pushing them to be awake.

But then they fall off a cliff in terms of attention.

Staying up for 24 hours straight is bad enough, but the study shows that if you do that on top of having gotten **less than six hours of sleep** a night for two to three weeks, your **reaction times and abilities are 10 times worse** than they would have been just pulling an all-nighter, says Daniel Cohen, a neurologist at Harvard Medical School and lead author of the study in Wednesday's Science Translational Medicine journal.

That's dangerous for public health because many critical positions are held by people who have to stay up long hours, including doctors, pilots, **airline technicians**, paramedics, police officers and truckers.

Eve Van Cauter, a sleep researcher at the University of Chicago, calls the study "almost scary, because it really reveals that a large segment of the modern population may be at **high risk of committing catastrophic errors, particularly in the middle of the night and the early morning hours.**"



To put this in context, prior research has shown that staying awake for **24 hours** in a row impairs performance on par with **legal intoxication** with alcohol (for driving), and six hours of sleep per night for two weeks causes a similar level of impairment as staying awake for 24 hours, Cohen says.

The study followed participants who each took up residence for 38 days at Brigham and Women's Hospital in Boston. They had five days to catch up on sleep, then spent 21 days on a sleep cycle of about 33 hours awake and 10 hours asleep.

The study looked at three things: the number of consecutive hours awake, the number of days or weeks of chronic sleep reduction, and what time it was in the person's day. "How those three factors combine determine how well we perform at any moment," says Cohen.

**"It's very hard to cheat the sleep system. You will pay a price sooner or later,"** says David Dinges, a professor of sleep studies at the University of Pennsylvania school of medicine. This research suggests **"it takes longer to recover from sleep debts than has been believed in the past."**

This study shows for the first time in humans that sleep regulation is actually composed of at least two separate processes acting on different time scales. The short-term process causes performance to decline with each hour awake, and this process can be rapidly overcome with one extended sleep episode.

The long-term process builds over weeks of too-little sleep. It causes a faster decline in performance for each hour a person is awake, **particularly during the biological late night, the equivalent of 3 a.m. to 7 a.m.** It is unknown how many nights of good sleep it takes to recover from this longer-term component.

This work in humans parallels work in animals showing more than one mechanism that promotes sleepiness in the context of reduced sleep hours. The sleep-inducing chemical **adenosine** appears to increase with hours spent awake. Recently a second mechanism, which is affected by long-term sleep deprivation, has been found. In this, the number of receptors in the brain for adenosine increase as long-term sleep deficit becomes bigger.

In effect, the brain **becomes sensitized** to the effects of adenosine, and the same number of hours awake has a bigger impact on performance.

**"Sleep appears to be a crucial process, and evolutionary mechanisms have evolved so that more than one mechanism kicks in to promote sleepiness,"**

## Machinists Union Forms Online Community To Help Workers Through Difficult Times

The International Association of Machinists and Aerospace Workers (IAM), today unveiled a **new community service program** designed to mobilize the unemployed and underemployed to better **cope with the stress and pressure** of being jobless in America. The new IAM program, called Ur of Unemployed, or UCubed for short, will function as an online

community, with small groups of unemployed activists in a single zip code forming "cubes" and ultimately becoming a linked network with considerable political and economic influence. "We hope that UCubed will provide a measure of relief and an end to the isolation, frustration and depression that so many unemployed workers experience," said IAM President Tom Buffenbarger. "Working together, they can build a network of mutual support and help each other to get through the next few years."

In addition to giving unemployed workers a means to connect and share experiences through a dedicated website, they will also have the opportunity to speak with a single voice on critical political issues. The UCubed website will feature links to allow activists to pressure state and federal lawmakers to respond more effectively to the jobs crisis.

The UCubed legislative component will focus on issues directly affecting the jobless, including unemployment benefit extensions, food stamps, COBRA benefits and JOBS NOW!, the IAM effort to draw attention to the need for a national industrial policy.



## Embry Riddle Initiates Aviation Ph.D.

Designed for **working professionals** and available as a mix of online courses and six-day on-campus residencies, Embry Riddle Aeronautical University's Ph.D. in Aviation, the "only one in the nation," has begun. There are eleven students pioneering the research-intensive three-year

course that began this month and aims "to tackle the major issues facing today's aviation aerospace industry." Getting into the program isn't easy. We were able to be highly selective in assembling this first cohort of students," Alan Stolzer, director for the Ph.D. program, said. The first group is roughly balanced between males and females and each individual will explore topics in management, training, economics, regulation, communications, and NextGen air transportation, with a special focus on aviation operations. The program is designed to allow them to do that while continuing with their careers. A next group will be accepted to the program beginning in July, 2010. Applications will be accepted prior to April.



After receiving their doctorates, no sooner than three years from now, the program's first graduates have so far expressed desires that include research in aeromedical issues, airspace redesign, human factors, space tourism, and unmanned aerial systems. Those who believe this kind of higher education may be their calling should visit the program's online home for more details, including application requirements.

## No Accidental Deaths on Korean Airlines in a Decade

Korean flag carriers Korean Air and Asiana Airlines have had no passenger fatalities caused by accidents over the past decade, the Ministry of Land, Transport and Maritime Affairs said Tuesday. The last accident that resulted in fatalities took place on Dec. 23, 1999, a Korean Air B747 cargo aircraft crashed and killed four right after it took off from Stanstead Airport in the U.K.

A total of four accidents involving the country's flag carriers resulted in 307 deaths in the 1990s. In the 1980s, five accidents led to 481 deaths.



"The International Civil Aviation Organization and other international agencies rate the safety of airlines based on fatalities that have taken place over the past 10 years," said Lee Kwang-hee, the director of the ministry's aviation security division. He added Korean flag carriers' record of zero fatalities over the past 10 years proves that the country's aviation **has reached a safety level** comparable with countries like Australia, whose passenger aircraft has a record of no fatalities for 28 years, Germany (17 years), the U.K. (13 years), and Japan (10 years).

Korea received the **highest score in the world** in the ICAO's general evaluation of aviation safety, including air traffic control and airport safety facilities, in May last year.

## **NTSB Amends Accident Reporting Requirements**

The NTSB has published a final rule amending its regulations and reporting requirements regarding aircraft accidents and specifying the sort of that must be reported immediately. Incidents making the list now include **EFIS system and PFD or PND failures, and specific collision avoidance system advisories** received while operating on an instrument flight plan or in class A airspace. Also included are powerplant issues including **turbine component failure** resulting in debris thrown anywhere other than out the exhaust path, and **propeller failure** resulting from anything other than a ground strike. Along with all that, air carriers will be required to report any landing or departure from a taxiway or use of the wrong runway. There is more.

The complete final rule is available online as published in the Federal Register. It includes information regarding reporting of overdue aircraft and preservation of aircraft wreckage. The provisions detailed in the rule will become **effective March 8, 2010**.



<http://www.nts.gov/>

## "Position And Hold" Change Expected Soon

The FAA could soon implement a changeover from "position and hold" to "line up and wait," to conform with international phraseology standards, said this week. If approved later this month, the new terminology could be implemented as soon as this June. It's long overdue, according to NTSB Chairman Deborah Hersman. She said the NTSB issued six



recommendations in July 2000, asking the FAA to change various ATC procedures to reduce the risks of runway operations. "In response, we were recently advised that the FAA soon plans to adopt a single change: the use of "line up and wait" instead of "position and hold" to instruct pilots to enter a runway and wait for takeoff clearance," Hersman said at a runway safety summit in Washington last month. "We needed to wait nine years for that?" Bob Lamond, of NBAA, told AVweb on Tuesday he doesn't expect too much distress over the change. "Folks are going to stumble over it at first, but we'll get used to it," he said. "It's been talked about for years, so it's really a non-issue for us."

However, implementation will require an "extensive awareness campaign" to ensure that pilots and controllers are informed, NBAA said. FAA Administrator Randy Babbitt, speaking at the safety summit last month, said the FAA has done a lot to address runway safety concerns. "The numbers prove we've made a dramatic improvement," he said, nothing that in the past year there were just 12 incursions out of more than 50 million operations, and only two of those involved commercial carriers. "We've revamped our on-line courses. We've produced public service spots. And we mailed a half-million runway safety DVDs and brochures to pilots," said Babbitt. "It's been a tremendous joint effort across all parts of the FAA and the aviation industry. It worked." He added, however, that there is still work to be done in the GA community. "We can make every protection possible, but the human in the loop is the challenge of the future," he said. Click here for the full text of Babbitt's talk.

[http://www.faa.gov/news/speeches/news\\_story.cfm?newsId=11007](http://www.faa.gov/news/speeches/news_story.cfm?newsId=11007)



## Jack of All Trades

For a Maintenance Technician, a gear-swing check on a B737-700 **went wrong when hurry-up pressures and distraction** led to an oversight.

**Narrative:** I was working on aircraft that was in the hangar **for the night** for a C-check. I was assigned by my Lead to work the right wing. The first thing that had to be done was jack the aircraft and perform a gear-swing for a functional check. I started setting up the right wing to be jacked. I removed the screw that holds the jack pad plug to the wing. After I removed the screw, I attached the jack pad to the bottom of the wing **without removing the plug**. Tightened the jack pad, seated the jack and started raising the aircraft at the same time and rate as the others. As the aircraft started coming up and there was some weight on the jack pad, the bolt that held the jack pad in place **sheared** and the jack slid forward, **puncturing a hole** in the bottom forward part of the wing.



We found that I failed to remove the jack pad plug from under the wing. I have jacked other aircraft **many times** and this particular time I got in a **hurry and had other things going through my mind....**

## Copying A Good Idea

Every now and then, one comes across an example of a safety program that could be emulated by the Federal Aviation Administration (FAA).

In the UK, there is a program known as **CHIRP, for Confidential Human Factors Incident Reporting Program**, in which pilots, flight attendants, air traffic controllers and **mechanics** can anonymously report safety problems. The **best, or most instructive**, of the reports are published quarterly by CHIRP Feedback, an electronic bulletin. There is nothing comparable to this program in the U.S., and there should be. To be sure, there is the aviation action safety program (ASAP), but those confidential reports are not regularly mined and pertinent examples regularly published for the benefit of the industry.

Although separate from the Civil Aviation Authority, CHIRP is funded by it. To be sure, many operators in the UK support their own confidential reporting schemes. But CHIRP covers all operators and its **feedback goes to the community at large** – providing a very useful insight into trends across all operators.

This is an example, with the CHIRP response:

### AN ELECTRIFYING EXPERIENCE!

Report Text: I am employed as a contract B1 certifying engineer, carrying out line maintenance and rectification. On this occasion, I was requested to carry out fault investigation into a suspect electrical fault. The previous operating crew had left the aircraft **de-powered in a safe condition**. I was able to access the electrical panel and components. After 15-20 minutes, the next operating crew arrived at the aircraft. The pilot saw that I was working in the electrical panel, but he **immediately applied** full aircraft electrical power via the Ground Power Unit.

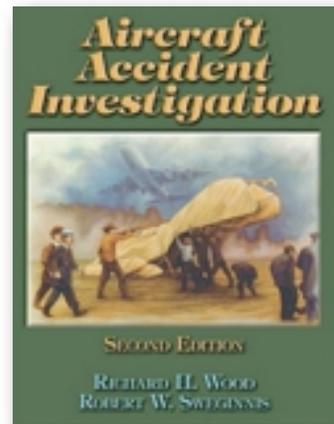
I saw and "felt" the electrical arc, but luckily at the time I had withdrawn my hands from the panel. I was very lucky no injury or damage occurred as a result. I told the pilot in polite straight-forward terms that he should never apply power to the aircraft without clearance from technicians.

Afterwards I reported the incident to my line manager; their response was that I should be more polite and considerate when addressing the crew. The fact that I was highlighting an event that could have led to serious injury was secondary to the fact that I had spoken firmly to the crew.

**CHIRP Comment:** This report is a good reminder that ensuring a safe working environment is the responsibility of all concerned and that in a Line environment **the pressures** to resolve technical problems and maintain the schedule might be greater than during routine servicing. Good working practice requires electrical power to be isolated and relevant switches/controls to be 'flagged' with a warning not to operate. In this particular case, **this does not appear to have been done** and, combined with a **breakdown in communication** with the oncoming flight crew, led to the incident.

## **Aircraft Accident Investigation**

Covers all aspects of aircraft accident investigations, including procedures required by the NTSB and ICAO. Covers basic investigation techniques, and structural knowledge useful to investigators. Also covers analysis, investigation management, and report writing. **Book / eBook \$69.95**



Call (800) 780-4115 or click here for more information.

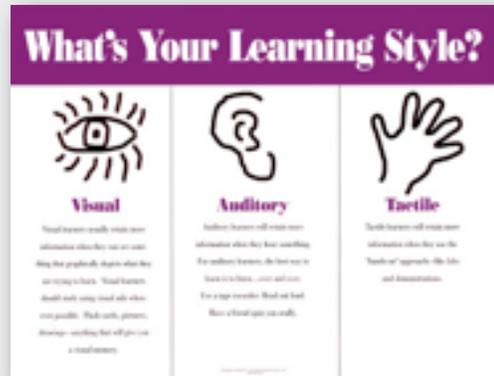
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## Do You Accommodate the Three Learning Styles?

People process information in different ways. And in your training sessions, you need to accommodate these different learning styles. We have made a science out of learning styles, but all you really need to know is that people tend to learn the most using one of the:

- \* ears (auditory learning),
- \* eyes (visual learning), or
- \* hand/body movements and touching (kinetic/tactile learning).



How can you tell which worker prefers which approach? Watch for these clues.

Auditory learners prefer a discussion to written words. Reading aloud or tape recording a presentation to hear later helps them. To decode meanings, they notice your tone of voice, speed and how high or low your voice is pitched.

Visual learners learn through slides, videos, overhead transparencies, flip-charts, handouts and diagrams. Taking notes may help them absorb information. Since your facial expressions and body language help them grasp the message, they often sit in front.

Kinesthetic learners are hands-on people, getting the message through actively exploring and touching something

**Your safety communication** is most effective when you accommodate these different learning styles through different modes of delivery, from discussion and classroom instruction to e-learning and written/visual materials.