# Aviation Human Factors Industry News

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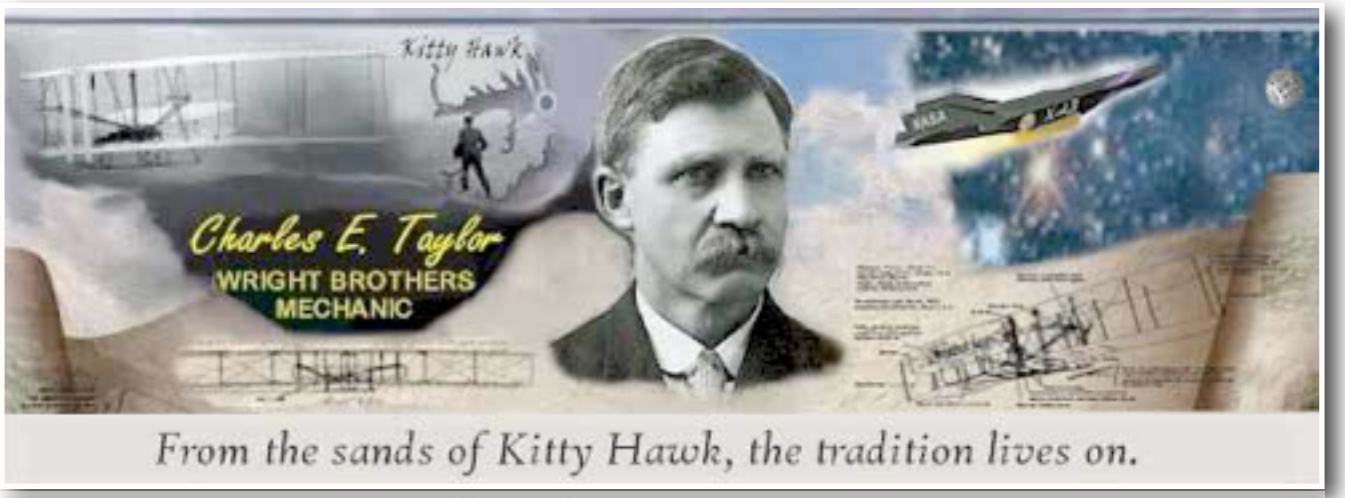


**Hello all,**

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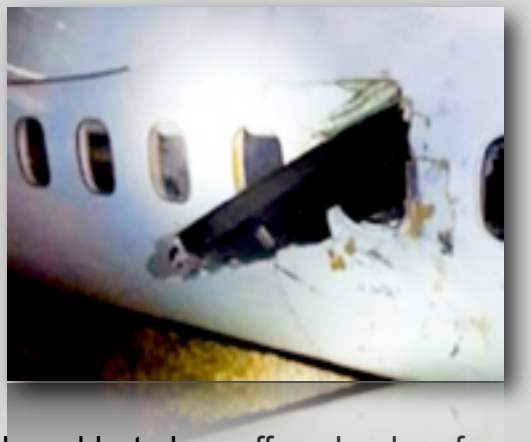
**In this weeks edition of *Aviation Human Factors Industry News* you will read the following stories:**

## Only Minor Injuries After Prop Blade Pierces Cabin



Four people, including one who was hit by a propeller blade, were taken to hospital with what were reported as minor injuries after an apparent gear collapse on an Air Canada Express Q400 at Edmonton International Airport last Thursday. Christina Kurylo was hit on the head by a propeller blade that pierced the cabin and window."All of a sudden, something came crashing through my window and I got hit in the head," Kurylo told CTV Edmonton on Saturday. Kurylo said the blade knocked her glasses off and left her dazed but she suffered only a few bumps on her head and some bruises. Neither Air Canada nor aircraft maker Bombardier have commented on those details of the mishap. The Transportation Safety Board will likely have a lot to say about it later.

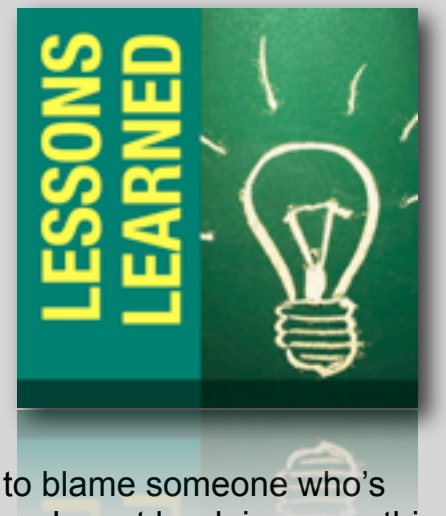
Air Canada confirmed the aircraft took off from Calgary bound for the northern Alberta community of Grande Prairie and a tire blew on takeoff. There were strong winds blowing in Calgary so rather than return the crew diverted to Edmonton. Reports suggest the landing itself was uneventful but photos show the airplane to the right of the runway with the right gear collapsed. Air Canada hasn't confirmed those details. A spokesman for Edmonton International Airport did confirm that one of the airport's runways was closed but that aircraft were using another runway and operations quickly returned to normal.

## Bombardier Safety Standdown 2014

Attention and distraction issues took center stage at this year's Bombardier Safety Standdown, the OEM's annual cornucopia of aviation safety seminars.

"What happens when attention management fails?" asked Dr. Tony Kern, CEO of Convergent Performance. In his discussion of last year's Asiana crash at San Francisco, he lamented, "I find it difficult to comprehend that these pilots said they really didn't understand what the autothrottles do."

He continued, shaking his head,"It was the culture, or it was the OEM, or it was the automation…it was anything but me. For me it's about personal accountability." Kern coined the term "pilot attention deficit disorder" to explain the Asiana event. "I don't care if the training information wasn't clear. I don't care if they were distracted. There are a few basics. You take off on the right runway. You make sure you're stabilized on an approach. Those are the simple things. Don't tell me you can't have all those things in place."Nonetheless, he acknowledged, "It's pretty easy [in the aftermath of any major accident] to blame someone who's dead [not the case in Asiana 214] and say I'm alive so I must be doing something better. We know that's not true. I've buried 13 friends. I put myself in their place and ask why would a person do that? I also wonder what would have happened if it had been me flying."




## Another Perspective on Asiana Crash

NTSB member Robert Sumwalt brought a different perspective to the Asiana discussion, pointing out that oversimplifying the root causes of an accident can block the path to a deeper understanding of the industry's failings.

"I learned that this lack of understanding about the 777's autothrottle system is fairly widespread. I got e-mails from people that proved other airlines were having trouble with the same system. One U.S. airline reported seven occurrences." The investigation found that even the Asiana ground instructor who taught the pilot at the controls of Asiana 214 didn't fully understand the system.

The pilot flying the Asiana 777 previously flew Airbus products, on which the throttles never move. During initial 777 training he was astonished when he discovered the speed protection the Boeing's autothrottles provide, but the training failed to explain the autothrottle hold function. An FAA test pilot on a Boeing 787 certification flight in 2010 (the 787 and 777 share the same automation) made a big deal about the confusing autothrottle issue. The EASA also said it didn't like this feature and suggested Boeing eliminate these few exceptions to the speed-protection mode. The FAA took no action. "And what did Boeing do about this [autothrottle confusion] when it [became aware of] people's concerns?" Sumwalt asked. "It added a paragraph of explanation into the 787 manual but nothing to the 777 book."

Sumwalt agreed that a 1,200-fpm descent violated any kind of stabilized approach criteria. He also added that Asiana 214 arrived in the San Francisco terminal area during the crew's period of circadian low, meaning fatigue played a role. "So how did an experienced airline crew crash a perfectly good airplane on a clear day?" he asked. "Allowing the aircraft to slow 34 knots below Vref means someone is not monitoring. I think it had to do with expectancy that the autothrottles were going to increase engine power. It's not an excuse. It's just a possible answer. It's easy to sit and criticize, but I want to understand the accident, not just say they should have known better."

The NTSB concluded that factors in the accident included an over reliance on technology, as well as the complexities of the automation and the inadequacies of 777 training. Quite possibly some negative training transfers were mixed into this accident as well. To adjust the approach path, Airbus pilots normally just add back pressure on the stick with autothrottles engaged because that brings up the power to maintain airspeed for the adjusted path. The data recorder on Asiana 214 showed the left-seat pilot increasing back pressure on the control column as the aircraft slowed. During the investigation into the Asiana crash, Sumwalt said, a Boeing engineer explained that the 777/787 systems were all created "assuming pilots would closely monitor everything, although research shows us that pilots are not good at monitoring at all."

## Staving Off Complacency

"We often get trapped in the crushing grip of mediocrity," Kern noted, "where we are just as good as the next guy but we're not living up to our own potential. Aren't there times where you've realized that performing well enough would not be enough to keep you alive? Someone needs to tell you that someday the world may demand a level of performance that you're not trained for and you'd better get it right."

The solution? "Imagine if you gave yourself a point total every time you noticed something you missed. Ten points for noticing an automation input error, 20 more if you preselected the wrong altitude. How long would it take to gather 100 points? Who cares? The point is that you're looking."

Kern believes we can grow out of our own mediocrity, but we need to practice our profession intent on being better at everything. "You have to fight the notion that you're good enough. You need to be your own creative genius and be better than FAA test standards. You need to know what excellence might look like. Right on speed, right on the centerline perhaps?" Kern defined four steps that take a pilot above a self-imposed level of mediocrity: "check for competence, train for excellence, practice precision by picturing perfection."

# SpaceShipTwo Mid-Air Break Up: Unprecedented Trove Of Data To Assist Investigators

by John Goglia


Investigation of the in-flight break up and crash of SpaceShipTwo is a first for the National Transportation Safety Board. While the NTSB assisted in the investigations of the NASA-launched Columbia and Challenger accidents, this is the first manned, commercial space accident that the NTSB will be leading. Under an agreement with the Federal Aviation Administration, which is charged with regulating commercial space transportation, the NTSB will be heading up the investigation with the FAA as a party. When Congress made the FAA responsible for commercial space transportation, it failed to make the NTSB responsible for investigations of any accidents resulting from that transportation which is why the investigation is being done through an inter-agency agreement.As an NTSB Member at the time of the Columbia accident, I participated in various stages of the investigation, including observing the reconstruction of the space shuttle. At the time of the Columbia investigation, NASA collected tremendous amounts of data, certainly as compared to the data typically collected by commercial aircraft. Over a thousand data points were collected as the space shuttle returned to earth. This included data typically recorded on aircraft flight data recorders such as speed, altitude and direction but also hundreds of other data points of significance to engineers down to the position of a multitude of valves and switches. Of particular significance in the investigation of the Columbia accident was the ability to trace the trajectory of the space shuttle as it began its break up over Hawaii and ultimately came to rest in Louisiana and Texas. With the trajectory established, investigators were able to locate debris that assisted in the determination of what caused the Columbia to break apart on re-entry. The probable cause was determined to be a failure of the thermal tiles which left portions of the space shuttle unprotected from the high heat of re-entry, causing structural failure and ultimately the break-up of the space craft.

The NTSB investigation of the SpaceShipTwo accident will be aided by unprecedented amounts of data, in particular the multiple video feeds of the space craft at the time of break up. In addition to ground cameras, there were multiple cameras on the space craft, as well as in a chase airplane flying behind the SpaceShipTwo. The video will help investigators understand how the space craft came apart in flight. For example, the NTSB briefing by acting Chairman Chris Hart, indicated that the first pieces in the 5-mile debris field were from the tail section. This would indicate to investigators that these were the first pieces to come off the aircraft. If the video captured the in-flight break up, as I expect it will, it will show the sequence of events initiating the break up and the progression of the break up. This will provide vital information to the teams investigating the accident from a structural perspective and help the team form recommendations for materials and future designs.

## Virgin faulted for safety precautions


Safety procedures at Virgin Galactic, whose spacecraft crashed on a test flight last week, included too few safeguards to prevent a potential catastrophe, one of the world's leading space safety experts has said.

Tommaso Sgobba, a former head of flight safety for the European Space Agency, told the FT that industry best practice called for operators to build in "two-failure tolerance", or sufficient safeguards to survive two separate, unrelated failures – two human errors, two mechanical errors or one of each.Mr Sgobba, who approved all the European-supplied parts of the International Space Station, believes Virgin Galactic's SpaceShipTwo's systems fell short of that standard.

According to investigators, SpaceShipTwo disintegrated after a pilot wrongly unlocked the "feathering" mechanism – which slows the craft during its descent – too early. The mechanism then activated even though the separate lever to deploy it was not pulled.

The crash killed Michael Alsbury, the flight's co-pilot, and seriously injured Peter Siebold, the pilot.

The feathering mechanism – which is vital to slow the aircraft but potentially deadly when it is accelerating – was typical of the safety systems that needed to withstand human errors and mechanical failures in space vehicles, analysts said.

The company, part of Sir Richard Branson's Virgin Group, has insisted it will press on with its test program once a second aircraft currently under construction is ready.

Mr Sgobba said that SpaceShipTwo's systems, which in theory required two levers to be moved before the wings went in to a "feathered" configuration, appeared to be designed to be "one-failure tolerant" – to stay safe in the event of a single pilot error or mechanical failure.

But the system had not worked that way. "What we see in the incident is what we call 'zero-failure tolerance'," Mr Sgobba said. "So you make the mistake – you have a catastrophe."

The design would not be acceptable in other safety-critical industries, such as aircraft manufacture, Mr Sgobba added.

Loren Thompson, an analyst at the Virginia-based Lexington Institute who consults for many large US aerospace companies, confirmed that safety-critical US businesses – including suppliers to Nasa, the space agency – required at least the "two-fault tolerance" that Mr Sgobba described.

He said it was a "significant concern" that some private space operators applied less stringent standards.

Virgin said the locking mechanism for the feathers represented two separate safeguards. There was a "procedural" safeguard, since the lock was meant to stay in place until after the most dangerous, early part of the flight, and a "mechanical" safeguard, in the form of the lock itself.

Mr Sgobba said procedural rules could be seen as a safeguard in some circumstances. But he added: "They are considered the least desirable. If they had designed the system according to well-established practice, they would not have had the need to rely on the least suitable control, which is a procedural control".

Virgin added that safety was its "North Star".

"It is the thing that can and must guide us as we strive to meet our goal of opening the space frontier," it said.

The National Transportation Safety Board, which is investigating Friday's crash, declined to comment immediately on the nature of the company's safety precautions.

But it said: "Clearly, what safety measures they had in place is something the investigation is going to be looking at."

The Federal Aviation Administration, which licenses most forms of aviation in the US, said its responsibility over commercial space operations was limited to setting rules to protect people and property on the ground.

"These regulations do not prescribe how operators should design their vehicles in order to achieve public safety," the FAA said.

## U.S. Sues Southwest to Recover Civil Penalty Tied to Aircraft Maintenance

Typically Airlines, FAA Negotiate to Reduce Penalties, But Sides Couldn't Agree in This Case

The Justice Department sued Southwest Airlines Co. in an effort to recover a $12 million civil penalty proposed by aviation regulators in July related to allegations of improper maintenance on some of the airline's jets.The Federal Aviation Administration said that a Southwest contractor performed improper repairs on 44 of its Boeing Co. 737 jetliners, and that the airline flew the planes in violation of safety regulations on more than 30,000 flights. The proposed penalty is the second-largest in the FAA's history.

The lawsuit, filed on Monday in U.S. District Court in Seattle, gives Southwest 21 days to answer the complaint. The Justice Department is acting on the FAA's behalf in the dispute.

Southwest, the nation's No. 4 airline by traffic, said it disputes the FAA's allegations. "We look forward to the opportunity to vigorously defend Southwest's record in a court of law," the Dallas-based discount carrier said in a statement.

Such proposed civil penalties from the FAA are rare, but most airlines over the years have received at least a few for various maintenance shortcomings, record-keeping problems and troubles with drug and alcohol testing of employees. The largest penalty, $24.2 million, was proposed by the FAA in 2010 for alleged improper aircraft repairs by American Airlines. A $10.2 million penalty against Southwest in 2008 ranks as the third-largest.

Typically, airlines negotiate with the FAA to reduce the penalties. Southwest in August 2010 settled the 2008 allegations by agreeing to pay the government $7.5 million.

But after the FAA notified Southwest of the alleged regulatory violations in the latest episode this past July, "the partners were not able to reach a compromise on the proposed civil penalties," the Justice Department said in its complaint.

The main allegations in the latest case involve work going back to 2006 by maintenance contractor Aviation Technical Services Inc. to prevent fuselage cracking on 44 Southwest planes. After the work was done, the FAA in 2009 put Southwest on notice that the planes weren't in compliance with approved airworthiness directives or other FAA-approved methods of complying.

Last summer, Southwest said the FAA letter included repair issues that "were addressed several years ago. None of the items affect aircraft currently being operated by Southwest." Southwest operates a fleet of more than 600 737s, most of them newer versions than the 737-300s that were the subject of the repairs in the past decade.

Aviation Technical Services, in a statement last summer, said it "settled with the FAA over the matter last year with no fault found." The Everett, Wash., company said it was "fully cooperating with the FAA and continuing to partner with Southwest." The FAA approved later repairs.

In the lawsuit, the Justice Department said that while Aviation Technical Services performed the maintenance, "Southwest is ultimately responsible for ensuring that the maintenance was performed properly and that the aircraft were airworthy upon return to service." Instead, even after the FAA alerted Southwest to its concerns about maintenance violations in April 2009, the carrier continued to operate the noncompliant aircraft until October 2009, the government said in its complaint.

## NTSB Cites 'Punitive Culture' In 2013 Alaska Crash

The NTSB said Wednesday a "punitive culture and inadequate safety management" along with poor weather caused the crash of an Alaska Department of Public Safety helicopter on March 30, 2013. The single-engine Eurocopter crashed in wooded and snow-covered terrain east of Talkeetna, killing the pilot, another state trooper and the snowmobiler they had just rescued. The board said in a statement that the Alaska DPS "lacked policies and procedures to ensure that risk was managed, such as formal weather minimums, formal training in night vision goggle operations and having a second person familiar with helicopter rescue operations involved in the go/no-go decision."Contributing to the crash was the pilot's "exceptionally high motivation to complete search and rescue missions," the NTSB said. The DPS's investigation of a previous accident involving the pilot was "too narrowly focused on the pilot and not enough on underlying risks that could have been better managed by the organization," the NTSB said, adding that there was a "punitive culture that impeded the free flow of safety-related information and impaired the organization's ability to address underlying safety deficiencies relevant to this accident." The board's recommendations include the use of flight risk evaluation programs.

## MIT Study Reveals Pilots Satisfied with ADS-B

Results from an MIT survey administered last spring in Flying's Enews reveal that general aviation pilots value ADS-B In traffic and weather information as a tool to increase situational awareness, decision-making capability and safety.

Of the 1,407 pilots who responded to the survey, 56 percent indicated that they had used ADS-B traffic and weather services. A higher percentage of pilots reported using portable ADS-B In systems (82 percent) versus installed panel-mounted systems (28 percent).

The majority of survey comments focused on the value of ADS-B traffic as a supplement to see-and-avoid and ATC advisories. Among pilots who reported using ADS-B In traffic services regularly, 64 percent said that the technology frequently helps them visually acquire traffic. Among this same group, 42 percent reported that ADS-B had provided information that may have helped prevent a midair collision. In terms of inflight decision-making, pilots reported using ADS-B In weather information to make better decisions about rerouting, changing altitude or diverting to alternate airports.

A sizable increase was noted in pilot satisfaction with ADS-B In traffic information for pilots who also flew with ADS-B Out gear. Among those pilots, 60 percent reported being "extremely" or "very" satisfied with traffic service coverage. For pilots using ADS-B In systems without ADS-B Out capability, the satisfaction rate was only 26 percent. Respondents in both groups voiced concerns about incomplete traffic information due to selective broadcast of TIS-B and ADS-R traffic information to ADS-B Out equipped aircraft only.

Among pilots who have not yet flown with ADS-B In equipment, about half indicated that they have plans to equip in the future. The most common reason given for not equipping with ADS-B was cost, although 27 percent of pilots also indicated that their existing cockpit equipment provided similar information.

A complete copy of the report can be found here.

## Man vs. Machine: CAA Looks to Mitigate Human Error and Over-Reliance on Automation

The U.K. Civil Aviation Authority (CAA) has launched an initiative to improve potential situations where human error may cause air transportation accidents. The training initiative, named Crew Resource Management (CRM), began with the release of open-access training videos aimed at tackling human factor issues in the cockpit.

According to a CAA statement, the three case-study videos have been developed to highlight some of the main human error concerns currently facing the aviation industry, such as automation complacency and ineffective monitoring — both of which result from an over-reliance on technology leading to the detriment of hand flying skills.The momentum behind the production of the videos, and the need for a new approach to CRM training in the commercial air transport sector in general, was prompted by research carried out by a panel of senior CAA and airline flight instructors and examiners. Analysis of 250 accidents involving large air transport aircraft, for example, shows that 28 percent of fatal accidents worldwide include flight handling issues and 24 percent include inappropriate action by crew.


## New SAIB Issued on Heading Information Errors

According to a new Special Airworthiness Information Bulletin (SAIB) issued this week by the FAA, there continues to be a growing number of reported heading errors and anomalies in heading reference systems due to standard maintenance practices and the use of standard tools while maintaining these systems. The problem stems from the sensitive nature of these heading sensors which can be substantially affected by ferrous materials, including the improper use of magnetic tools (like magnetic screwdrivers) in close proximity. The FAA recommends that you follow all manufacturer installation/maintenance instructions, warnings, and troubleshooting procedures per their instructions for continued airworthiness or maintenance manuals. A simple test for possible magnetic interference is to use a magnetic compass and slowly move around the area of the sensor looking for any deflections of the compass needle. Excessive needle movement can be evidence of ferrous material or sources of magnetic interference like flap motors or flight control system components.

For more information on how to identify sources of magnetic interference that might affect heading sensor operations, see the SAIB at: http://go.usa.gov/7hEH.

## A Guide in Addressing the Human Factors in your PPE Program

Getting workers to wear PPE is a huge issue.

You know it, We know it and the 98% of safety folks who've seen PPE noncompliance at work know it.

You've probably tried a number of different solutions—new rules, better equipment, more toolbox talks.But if you haven't seen this free guide on filling the gaps in your PPE program then you could be overlooking something.

Check out the guide and see if there's an opportunity for you to improve PPE compliance. It takes 5 minutes to read and provides insight on why workers don't always wear PPE—and what you can do about it.


**View/Download the PPE Guide PDF to learn more.**

## Controllers Condemn Call for Prosecutions in Russian Crash

Russian prosecutors last week initiated criminal prosecution of the air traffic controllers involved in the October 20 crash of a Falcon 50EX at Moscow Vnukovo Airport. The aircraft struck a snowplow, killing three crewmembers and the single passenger on board. The Air Traffic Controllers European Union's Coordination group (ATCEUC) condemned the decision to prosecute controllers, as did the International Federation of Air Traffic Controllers' Associations (Ifatca) "This decision does not respect the International Civil Aviation Organization for accident investigation to establish factual causes, with the aim to prevent future occurrences," said Ifatca. In a statement issued by the Russian Interstate Aviation Committee (MAK) on October 24, the sequence of events described does not indicate any form of criminal negligence by the ATC staff on duty, according to Ifatca. The ATCEUC added that "Prosecutors are putting in danger the establishment of equilibrium between two equally relevant goals, aviation safety and the administration of justice. The future improvement of aviation safety in Russia is also at stake."

## Long-term Shift Work Linked to Impaired Brain Power


Shift work, like chronic jet lag, is known to disrupt the body's circadian rhythms, and it has been linked to a range of health problems, such as ulcers, cardiovascular disease, metabolic syndrome, and some cancers.

But little is known about its potential impact on brain function, such as memory and processing speed.

So researchers recently tracked the cognitive abilities of more than 3,000 people who either were working in a wide range of sectors, or had retired, at three time points: 1996, 2001, and 2006. Just under half (1,484) of the sample, which was drawn from the patient lists of three occupational health doctors in three different regions in southern France, had worked shifts for at least 50 days of the year.

Participants were aged exactly 32, 42, 52, and 62 at the time of the first set of tests, which aimed to assess long- and short-term memory, processing speed, and overall (global) cognitive abilities. In all, 1,197 people were assessed at all three time points.Around one in five of those still working (18.5%) and a similar proportion of those who had retired (17.9%) had worked a shift pattern that rotated between mornings, afternoons, and nights.

The first set of analyses looked at whether any abnormal working hours were associated with a decline in cognitive abilities.

The data showed that those who currently, or who had previously, worked shifts had lower scores on memory, processing speed, and overall brain power than those who had only worked normal office hours.

The second set of analyses looked at the impact of working a rotating shift pattern and found that compared with those who had never worked this type of shift, those who had, and had done so for 10 or more years, had lower global cognitive and memory scores—equivalent to 6.5 years of age-related cognitive decline.

Finally, the researchers looked at whether stopping shift work was linked to a recovery in cognitive abilities. The results indicated that it was possible to regain cognitive abilities after stopping shift work, but that this took at least 5 years, processing speeds excepted.

This is an observational study so no definitive conclusions can be drawn about cause and effect, but the disruption of the body clock as a result of shift work could generate physiological stressors, which may in turn affect the functioning of the brain, suggest the researchers.

Other research has also linked vitamin D deficiency caused by reduced exposure to daylight, to poorer cognition, they point out.

“The cognitive impairment observed in the present study may have important safety consequences not only for the individuals concerned, but also for society as a whole, given the increasing number of jobs in high hazard situations that are performed at night,” the researchers say in a release.

At the very least, the findings suggest that monitoring the health of people who have worked shift patterns for 10 years would be worthwhile, they say.

The research is published in BMJ-British Medical Journal.

## "Chill Out" with the New FAA Safety Briefing

The November/December 2014 issue of FAA Safety Briefing focuses on winter operations. Articles cover some of the exciting opportunities that the winter flying season offers as well as provide a review of several important cold weather safety strategies. Among those strategies are some reminders on how you can recognize and keep the adverse consequences of cold stress at bay. In her article "Chilled to the Bone," author Sabrina Woods looks at how cold can affect both body and mind which can negatively affect your decision-making ability.

You can read the article here: http://1.usa.gov/FAA_ASB.

## Five Ways You Can Encourage a Positive Safety Culture

What is a safety culture? Safety culture, according to the National Institute for Occupational Safety and Health (NIOSH), is "the characteristics of the work environment, such as the norms, rules, and common understandings that influence facility personnel's perceptions of the importance that the organization places on safety." When employers create a positive safety culture, workplace safety and health improve, as do employee morale and workplace productivity.


How do your workers perceive the importance you place on safety? It matters: Their perceptions will affect their safety behavior. If they believe you think it's important, they're more likely to behave as if it is. Here are five things you can do to show workers how much you value safety.

*1. Take the long view.* Rather than looking at safety as a compliance requirement, present it as a continuous process of improvement. How is your workplace safer today than it was a year ago—or 5 years ago? What plans are you making that will make your workplace even safer 1 year or 5 years from now?

*2. Look for root causes.* Look at near-misses or accidents as indicators of a series of connected events that led to the incident, not as onetime or isolated events—or, worse, as an opportunity to lay blame on individual workers. Blaming workers fosters antagonistic labor-management relationships; careful investigations and root cause analysis invite workers to analyze, participate in, and contribute to their own safety.

*3. Integrate safety.* Safety activities should be part of your overall operation. Don't just announce safety as a new priority that appears to workers as yet another add-on, flavor-of-the-month initiative. Perceiving and treating safety as an integral part of the systems and processes of your workplace will encourage all of your workers to do the same.

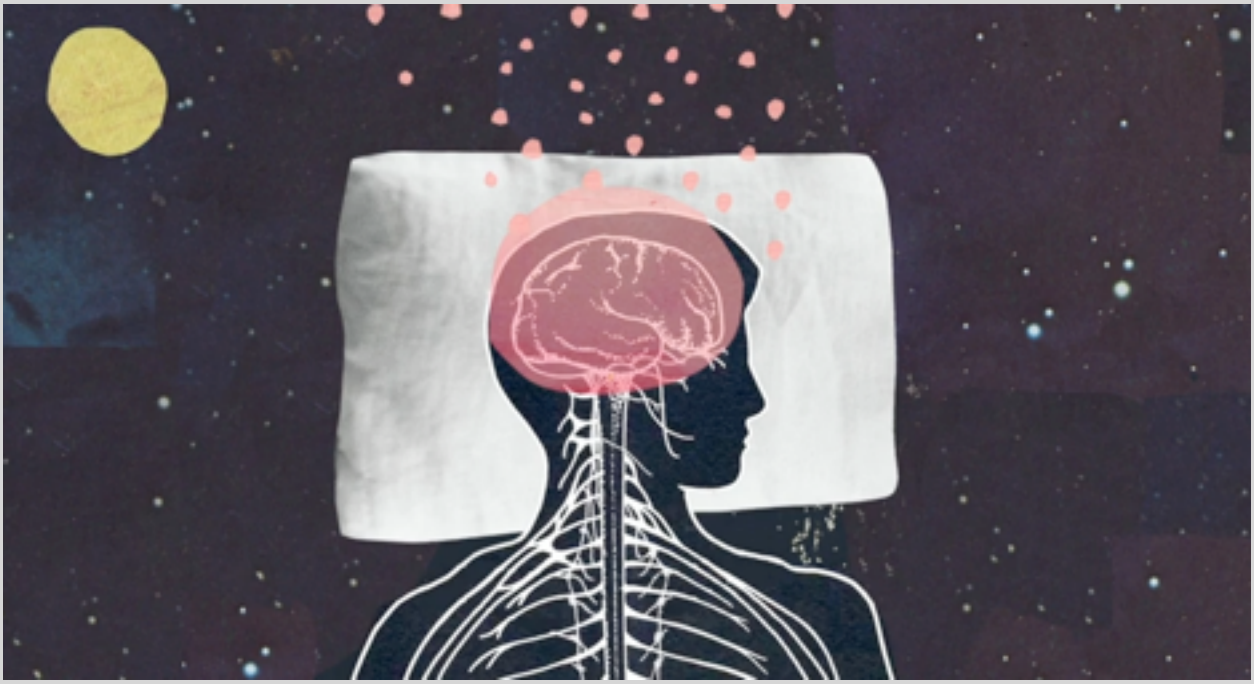
*4. Accentuate the positive.* Make the effort to encourage workers to improve safety performance. Watch for improvements and recognize them. Can you catch workers following safe work practices, wearing their PPE, or encouraging coworkers to be safe? Recognition doesn't have to be expensive or flashy; a positive word at the right moment can lift a worker's spirits and encourage him or her to continue doing the right thing.

*5. Build from the bottom up.* Get employees involved in the safety decision-making process instead of simply dictating new policies and priorities from the top down. Create communications structures that encourage workers to make suggestions, participate on safety committees, mentor new employees, or otherwise make positive contributions and take ownership of their own safety.

## TED - IDEAS WORTH SHARING

### Jeff Iliff: One more reason to get a good night's sleep

The brain uses a quarter of the body's entire energy supply, yet only accounts for about two percent of the body's mass. So how does this unique organ receive and, perhaps more importantly, rid itself of vital nutrients? New research suggests it has to do with sleep.



http://www.ted.com/talks/jeff_iliff_one_more_reason_to_get_a_good_night_s_sleep

## Sound (asleep) Advice