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:

2016 IS ACTUALLY SET TO BE ONE OF THE SAFEST YEARS IN AVIATION HISTORY.

The statistics derived by Aviation Safety Network have been widely published a day after the crash of LaMia Airlines near the Colombian city of Medellín killing all 71 on board, most were members of a local football team.According to Aviation Safety Network which holds a database of all air travel incidents, 2016 had 16 fatal accidents, resulting in 272 deaths, 560 less than what was recorded in 2015, the Telegraph reports.

At the close of 2016, some 3.5 billion passengers would have taken to the skies, resulting in a very low percentage rate of accidents per number of travelers and 2016 with 30 days left in the calendar, may rank to be the safest year for air travel on record, closely followed by 2015.

However last year was marred by hijackings and sabotage causing fatal accidents for Germanwings, deliberately caused by its pilot, and a Metrojet flight which had suspected bomb resulting in the crash.

In general however, it appears that air travel has never been safer.

Safest years in aviation history | Total deaths

1. 2013 – 29 fatal crashes; 265 deaths
2. 2016* – 16 fatal crashes; 272 deaths
3. 2012 – 24 fatal crashes; 476 deaths
4. 2011 – 36 fatal crashes; 524 deaths
5. 2004 – 36 fatal crashes; 543 deaths
6. 2015 – 16 fatal crashes; 560 deaths
7. 2008 – 33 fatal crashes; 588 deaths
8. 1984 – 39 fatal crashes; 676 deaths
9. 2003 – 33 fatal crashes; 703 deaths
10. 1999 – 48 fatal crashes; 706 deaths

*January 1-November 30

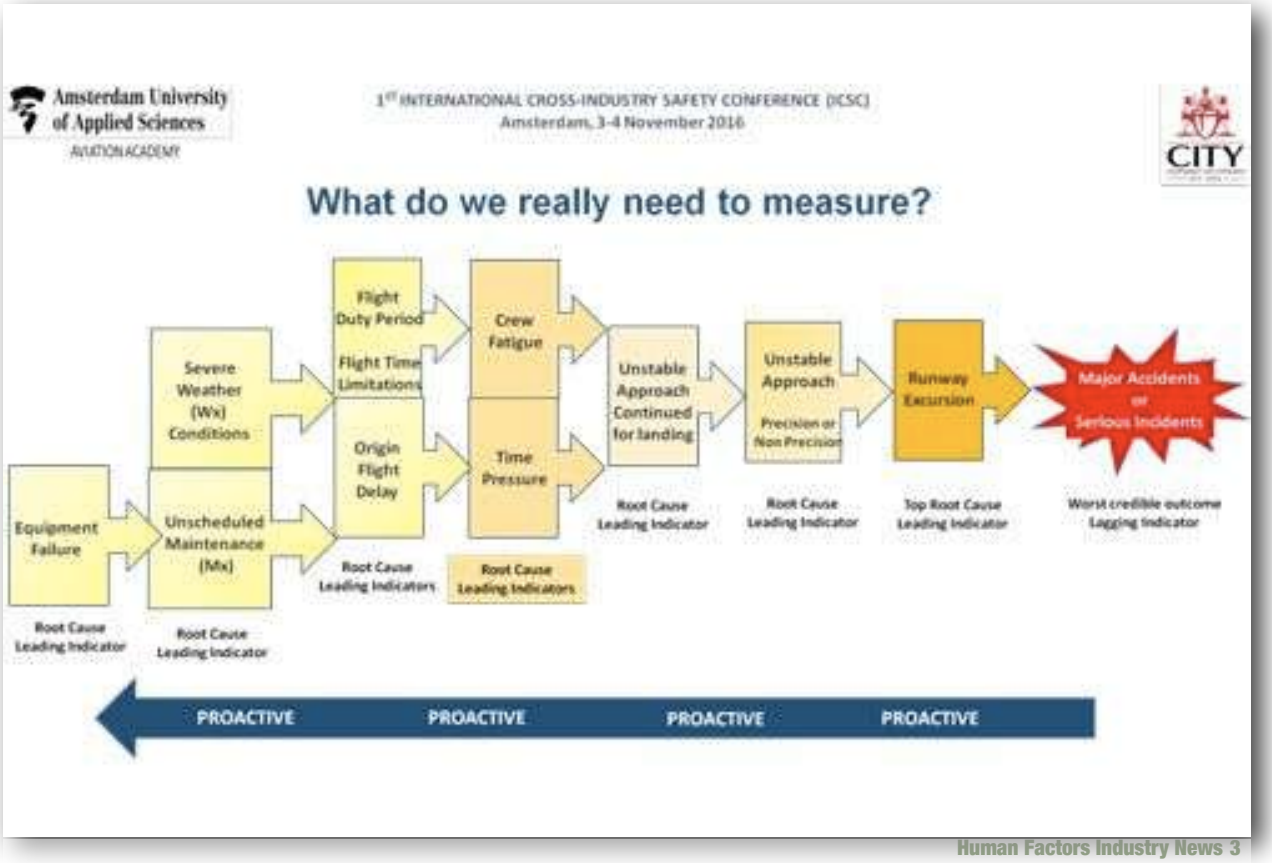
Safest years in aviation history | Deaths per total number of passengers flown

1. 2016* – one per 12,867,647
2. 2013 – one per 11,501,886
3. 2015 – one per 6,144,642
4. 2012 – one per 6,079,831
5. 2011 – one per 5,318,702
6. 2008 – one per 3,755,102
7. 2004 – one per 3,478,821
8. 2014 – one per 3,253,791
9. 2009 – one per 2,960,526
10. 2007 – one per 2,803,299

*JANUARY 1-NOVEMBER 30

All statistics from Aviation Safety Network

Measuring an aviation system's safety performance



PhD candidate and Safety Manager at NATO's Airlift Management Program, Ilias Panagopoulos, has collaborated with Professor Chris Atkin and Dr Ivan Sikora, senior academics in the Department of Mechanical Engineering & Aeronautics at City, University of London, for his doctoral research in aviation safety performance.

Ilias presented his methodology for measuring performance and research results at the 19th EURO Working Group on Transportation Meeting (EWGT2016) on 5th to 7th September 2016, Istanbul, Turkey, and at the 1st International Cross-industry Safety Conference (ICSC 2016), organized by the Amsterdam University of Applied Sciences (Aviation Academy) in the Netherlands from 3rd to 4th November 2016.

Annex 19 of the International Civil Aviation Organization (ICAO) says: 'safety is the state in which risks associated with aviation activities are reduced and controlled to an acceptable level'.

New harmonized approach

Safety is a system quality stemming from a legal and regulatory framework which stipulates strict and high- performance targets as well as a number of activities which must be performed by air operators. Annex 19 goes on to say that aviation service provider (i.e. airlines, airports, aircraft maintenance organizations, air training organizations and air traffic services) shall, as a minimum:

- Establish a Safety Management System (SMS)
- Provide continuing monitoring and regular assessment of safety performance
- Ensure remedial action to maintain agreed performance
- Aim at a continuous performance improvement

At the European level, the European Aviation Safety Agency (EASA), in parallel with management system requirements, outlined its new harmonized approach for establishing a Performance-Based Environment by introducing a clear set of indicators and targets against which the oversight performance of civil aviation authorities is assessed.

In the aviation industry there is nevertheless a level of uncertainty about the extent existing methodologies for measuring performance are suitable for those operators who have achieved excellent safety records (i.e. zero accidents or serious incidents) and in-control processes, and as such the need to look for further improvements.

Besides, the development and measurement of proper Safety Performance Indicators (SPIs) or metrics is not straightforward and the operational experience for measuring the effectiveness of SMS is very limited, since there are many questions yet to be answered on measuring safety performance.

Continuous improvement methodology

Consequently, the main challenge remaining is how to control and maintain performance within agreed safety specification limits and how to develop an objective methodology that will proactively investigate and measure system performance variability from target.

As a consequence, this study further investigated the following key research questions:

- What methodology could proactively measure system safety performance and improve the safety performance measurement process?
- Could a conceptual framework assist the continuous improvement of the safety performance measuring process?

So as to address the key research questions, the research presents a conceptual framework that will improve the safety performance measurement process and the aviation system safety performance.

In this framework, the Safety-Performance Indicator Lean Sigma (Safety-PILS) model has been embedded within Define-Measure-Analyse-Improve and Control (DMAIC) continuous improvement process. This integration results in a continuous improvement methodology that measures system safety performance and reduces the safety process variability.

In addition, the study provides an implementation guide on how organizations could use this framework to design and develop a proactive, performance-based methodology for measuring Acceptable Levels of Safety Performance (ALoSP) at sigma (σ) level, a statistical measurement unit.

In Phase I of the safety measurement process, the Safety-PILS model provides guidance on how organizations could design, implement and use a proactive, performance-based measurement tool for assessing and measuring ALoSP. Also, Safety-PILS model assists operators to comprehend and design their safety system in accordance with the agreed Safety Performance Indicators (SPIs), targets and specification limits.

Nevertheless, the Safety-PILS model provides a holistic view on how organizations could set leading performance indicators and monitor metrics on the top of identified root-causes that affect safety performance or how to set lagging indicators and feedback metrics on the top of safety outcomes (e.g. number of occurrences).

Moreover, the core advantage of the Safety-PILS model is that applies the Central Limit Theorem and since it repeatable uses a large size of data and means, the distribution of the sample means will finally approach a normal distribution. Accordingly, the next step for the operator is to follow at Phase II the DMAIC process for continuously improving the overall system's safety performance measurement process.

Through DMAIC process shown in the Figure below, the operator could apply Lean Six Sigma methodology for measuring both the performance of each established indicator and system safety performance variability at sigma level from core safety objectives.

The research study introduces an integrated, empirical-tested conceptual framework that may satisfy the requirements of aviation authorities for establishing a performance-based approach in aviation safety.

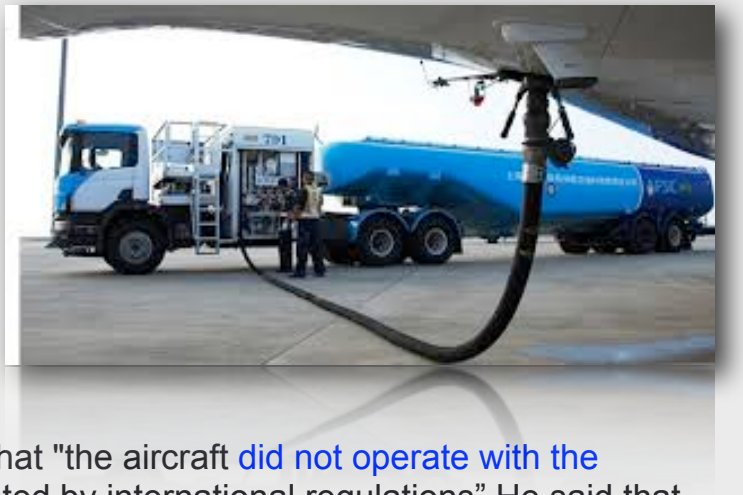
Furthermore, the study identified and filled the gap existing in the literature and proposed a practical implementation guide and tools for measuring aviation system safety performance.

Finally, the study revealed that the application of Lean Six Sigma methodology can enhance the safety measuring process.
To this end, the proposed guide is a new way of thinking for designing a safety case aims to achieve desired outcomes within agreed specifications limits.

Read more at: http://phys.org/news/2016-12-aviation-safety.html#jCp

Crashed Avro operated without mandatory fuel reserves: Aerocivil

Colombia's Civil Aviation Authority has officially confirmed that the Bolivian BAe Avro RJ85 operated by Lamia crashed near Medellin with empty fuel tanks..



During a press conference held on 30 November, Aerocivil's Secretary of Aviation Safety Freddy Bonilla assures that "the aircraft did not operate with the mandatory fuel reserves mandated by international regulations".He said that Lamia's flight plan had established as the alternative airport Bogota, which is slightly less distant from de Santa Cruz (Bolivia) than Medellin, indicating, however, that "the aircraft had not loaded sufficient fuel for an eventual diversion back to the alternative airport, nor for the internationally established 35min fuel reserve".

Bonilla also confirmed that the actual distance between Santa Cruz and Medellin on the route followed by the Lamia flight was 1,588nm.

"We will investigate why Lamia authorized a flight, which [taking into account the mandatory reserves] was beyond the range of the aircraft [1,600 NM]".

He also confirmed the authenticity of the ATC recording that had been filtered to FlightGlobal and some other media, but said that he could "not confirm if the recording was complete, resembling the exact timing of the sequence of events."

"We are working with specialists from Bolivia, Brazil, the UK and the US to reach the final conclusions as soon as possible", he concluded.

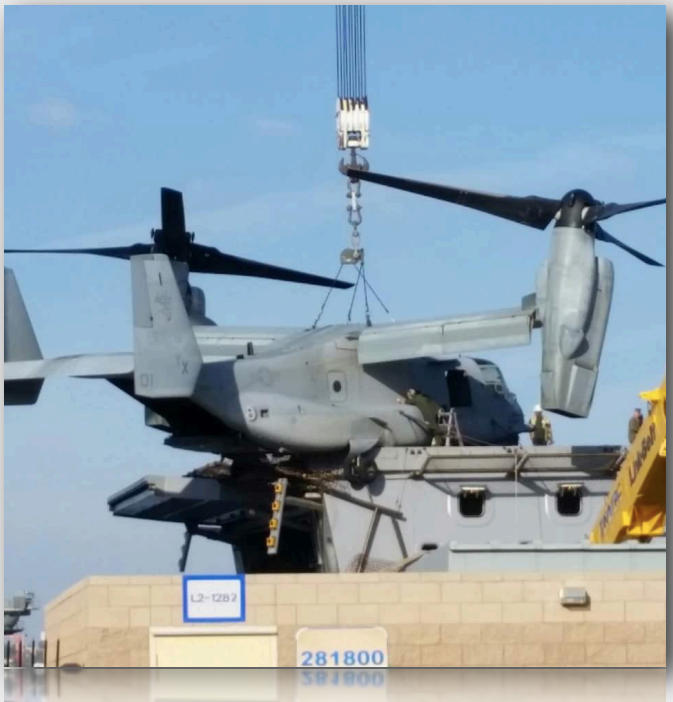
Previously, Bolivia's Civil Aviation Authority DGAC had declared almost immediately after the accident that Lamia had its AOC in order, the aircraft maintenance record correct and both pilots' licenses up-to-date.Incidentally, DGAC's director of aircraft registries, Gustavo Vargas Villegas, is the son of Lamia's owner, Gustavo Vargas Gamboa. In addition to establishing any aircraft's operational specifications as part of the registry process, one of the attributions of Vargas Villegas' role at the DGAC is the safe custody of all documents and informations related to any Bolivian registered aircraft involved in an incident or accident.

Pilot error led Osprey to crash onto ship

The pilot of an MV-22B Osprey was at fault for a December 2015 crash aboard the amphibious transport dock New Orleans, an investigation into the incident found.

"The aircraft commander, failed to ensure the safe and orderly execution of the flight to the USS New Orleans," according to the official investigation report, which Marine Corps Times obtained through a Freedom of Information Act request.

One factor in the crash was that the pilot underestimated how much weight the Osprey was carrying, the investigation says.



“He has taken responsibility for this event, and he possesses the ability to benefit the Marine Corps going forward,” the investigator wrote.
“I recommend the convening authority consider administrative or disciplinary actions as appropriate.”
The investigator also determined the co-pilot was not proficient enough to land the Osprey under such difficult conditions.

“I recommend more training in Crew Resource Dynamics and aerodynamics,” the investigating officer wrote. “With this experience, Captain [Redacted] could make an influential Aviation Safety Officer.”

Both the pilot and co-pilot were put on conditional flight status in January and their deck landing and aircraft commander qualifications were revoked, requiring retraining, the investigation says. The names of both the pilot and the copilot were not released with the report.

When 22 Marines boarded the Osprey, the manifest did not say how much each Marine weighed, the investigation found. The pilot estimated that each Marine weighed about 250 pounds, including gear, but the average weight of each passenger was actually 307 pounds.

Additionally, the pilot took on 9,000 pounds of extra fuel in case the aircraft was unable to land on the New Orleans and had to divert to Marine Corps Air Station Miramar in California, the investigation found.

The pilot and co-pilot were unable to keep the Osprey in the air as it tried to land on the New Orleans, which was at sea in the Pacific off the coast of California, the investigation found. They managed to fly the aircraft forward and make it on to the ship’s deck.

No one aboard the Osprey or the ship was seriously injured in the mishap.

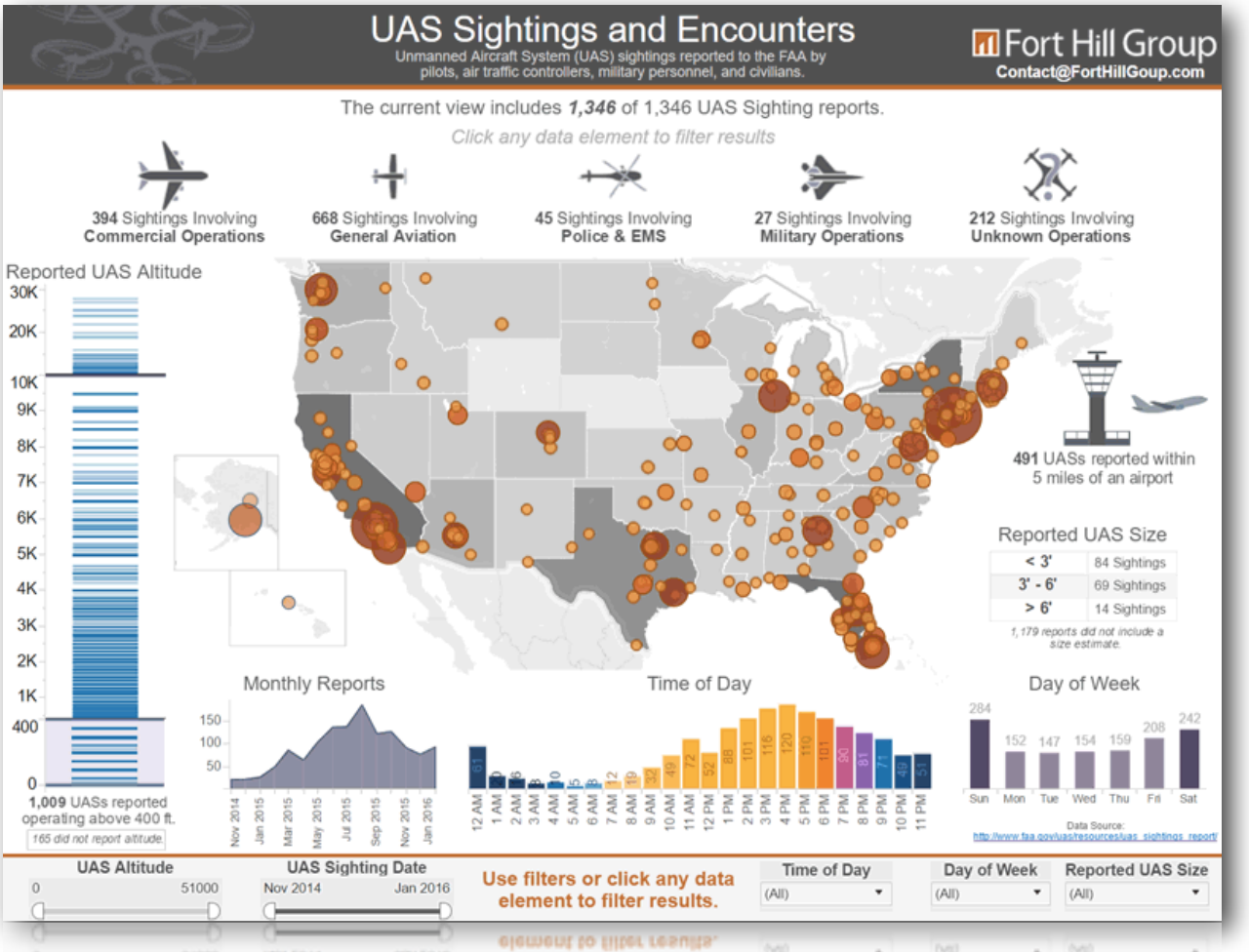
The investigating officer determined that the pilot was “complacent and derelict in his responsibilities,” but the commander of the the 13th Marine Expeditionary Unit disagreed.

“Neither the materials contained in this investigation nor the findings ... support assigning culpable neglect or inefficiency in the execution of his duties,” the commander wrote. “Additionally, complacency is too broad a description and does not accurately describe the moment born out in the statements.”

The 13th MEU commander said the crash was the result of a “series of judgment errors” and “a moment of inattentiveness with the co-pilot during final approach.”

However, the commander of I Marine Expeditionary Force agreed with the investigating officer about the pilot, writing that he was “derelict in the performance of his duties by a negligence standard.”

UAS Sightings & Encounters Visualizations



As the world continues to embrace the use of Unmanned Aircraft Systems (UASs), the challenges of integrating UASs with existing aircraft operations increase exponentially. To proactively address these issues, the FAA has begun collecting and releasing information on UAS sightings reported by pilots, air traffic controllers, military personnel, and civilians. To date, the FAA has released 1,346 UAS sighting reports occurring between November 2014 and January 2016. Fort Hill Group has developed two interactive visualizations to equip the aviation community to better understand and analyze UAS sightings reported to the FAA. The first provides an interactive view of all 1,346 UAS sighting reports released by the FAA. The second provides a detailed view of UAS sightings near airports or operating near manned aircraft. Each visualization is fully interactive. Hovering over each of the data elements will provide additional report details.

These interactive visualizations are freely available to the aviation community at: http://www.forthillgroup.com/uas-sightings

British Airways Patents In-Flight Pill – Lets Cabin Crew Know What You Need

How about this! Check out the patent application filed by British Airways yesterday. While flight attendants for certain airlines are known to constantly check on First and Business passengers, imagine the flight crew knowing exactly what you need before they even approach your seat. Another drink perhaps, blanket because you're cold, meal because you just woke up… Condé Nast Traveler explains that passengers will need to swallow the tiny transmitter:

…this digital pill of sorts will transmit information to flight attendants to "provide water when the passenger is determined to be dehydrated, to offer a blanket when the detected temperature is determined to be below a predefined and/or preferred threshold, or not to disturb or wake up for a scheduled meal based on the determined sleep phase of the passenger." All passengers would have to do is swallow the miniature transmitter and go about their usual in-flight routines, with the expectation that the cabin crew will be attuned to messages pinging from deep inside their bodies.

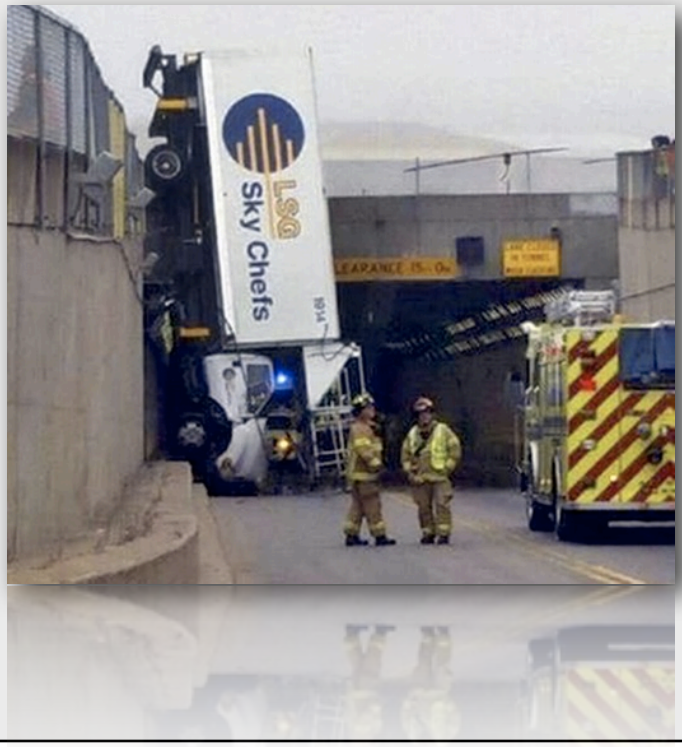
Would you be down for swallowing the pill which is "naturally excreted by the body"? Check out the full 24 page patent application for the very cool technical details.

https://www.ipo.gov.uk/p-ipsum/Document/ApplicationNumber/GB1600548.0/f84a7455-8531-428f-8bc1-294070e0a9b5/GB2538339-20161116-Publication%20document.pdf

Two Hurt When Airport Catering Truck Does Nosedive

Two people were injured last Sunday morning when an airport catering truck overran a barricade at Minneapolis-St. Paul International Airport.

The LSG Sky Chefs truck fell to a lower level, blocking a tunnel that led to the airfield and Terminal 1 about 11:30 a.m. Sunday, according to airport spokesman Patrick Hogan.No one knows why the truck took a nose-dive, Hogan said. It took more than five hours to get the truck horizontal again, and outside help had to be brought in. Air traffic was not affected, Hogan said.



The driver and passenger were able to get out of the van and were taken to the hospital with injuries that weren't life-threatening.

There have been accidents before, Hogan said, but "this is the first one we've had to my knowledge where the vehicle has actually gone over the barrier and into the tunnel roadway below."

Breaking Bad

Ever wondered what to do when you see an airman doing something they shouldn't? Whether they are skimping on the preflight, or buzzing the local wildlife, watching a fellow aviator do something wrong and potentially put their life in danger can be a distressing experience. Sabrina Woods' "Breaking Bad" gives a bit of insight into navigating that fine (and often necessary) line between buddy and *butt-in-ski*.

You can find a mobile-friendly version of the article here in the Nov/Dec issue of *FAA Safety Briefing* www.faa.gov/news/safety_briefing.

December GAJSC Safety Topic

Each month the General Aviation Joint Safety Committee (GAJSC) Loss of Control (LOC) Work Group selects a safety topic. For the month of December it is "Flight Risk Assessment Tools" (FRATs). The FAASTeam is on the committee and fully supports every safety initiative. We need your help in spreading this message:

The FAASTeam has a new electronic tool that can assist that should be out by mid-December. You may remember the request for beta testers' back some months ago.

[cid:image006.png@01D24C97.A4D1EF00]https://drive.google.com/file/d/0ByzDLwg1bGS2cGNHSlpMWkNEbnM/view

Above is a link to a 12 minute video that can show some great tips for preflight briefing and what the issues exactly are.

Tool Storage

The GrypMat consists of a 2' x 1' rubberized, flexible, non-marring, non-slip, anti-static material. Designed for safety and security, GrypMat provides mechanics the surface to store tools alleviating the worry and sources of damaged. It works where other tool trays won't – it melds to the curved surfaces found on aircraft wings and bodies. It keeps you organized and accountable to avoid lost tools or hardware.

http://www.aircraftspruce.com/catalog/topages/grypmat12-04761.php

Smartphone app to protect pilots from dazzling mid-air laser attacks

Defense scientists have developed a smartphone app that could be used to prevent dazzling mid-air laser attacks on pilots.The danger from people shining hand-held laser pointers into cockpits is so high that earlier this year a pilots' union called for the devices to be classed as offensive weapons.

Official figures show that more than 10,000 aircraft in the UK alone have been targeted by hand held lasers since 2009, in attacks that can distract or temporarily blind pilots. Attacks are punishable by up to five years in prison, but pilots and police often struggle to pinpoint where the laser beams are coming from so that the culprits can be found and charged.

Scientists at the MoD's Defense Science and Technology Laboratory (Dstl) have now developed an app that can be used on smartphones in the cockpit to log, analyze and share data about attacks.

The laboratory has signed a deal with a firm called Profound Technologies to commercially develop and market the Laser Event Recorder app (LERapp) which is likely to be available by the middle of next year.

Air crew will be able to mount a smartphone in a hands-free cradle in the cockpit and the app will use the phone's camera and GPS to log details of the attack. Information could then be passed to the police and shared with other planes to warn them of the hazard.

Craig Williamson, who developed the app, said: "The LERapp has the potential to significantly improve aviation safety. It is another example of the innovative and exciting work that Dstl is doing. Like much of our work, there are clear uses outside the military and security environments."

The Civil Aviation Authority logs around 1,500 dazzle attacks each year affecting both military and civilian aircraft. Heathrow, Birmingham and Manchester were last year the worst affected airports.

Attackers can be charged with recklessly endangering the safety of an aircraft, which can carry a sentence of up to five years in prison, or the lesser crime of shining a light on an aircraft in flight, which carries a maximum £2,000 fine.

Shift Work and Sleep

In today's competitive economy, an increasing number of U.S. businesses operate to meet customer demand for 24/7 services. These around-the-clock operations are required in order to maintain a place in the global market where transactions with clients, suppliers, and colleagues can span multiple time zones. Consequently, for many men and women, the workday no longer fits the traditional 9-to-5 model. They may clock in at midnight and out at 8 in the morning, or they may follow a rotating shiftwork schedule consisting of periodic day shifts, evening shifts, and night shifts.Since our body clocks typically are set for a routine of daytime activity and nighttime sleep, working irregular shifts or night hours can be associated with disrupted or insufficient sleep. In turn, drowsiness, fatigue, and circadian rhythm disruption from too little sleep or interrupted sleep are associated with risks for dysfunction of the immune system, diabetes, cardiovascular disease, and other chronic health problems. As nontraditional schedules become more common, it becomes increasingly important to understand who may be at risk of unintended job-related outcomes, and why. From that knowledge, employers, workers, and practitioners can better craft practical, effective interventions.

Scientists know little about the prevalence of sleep disorders broadly in the U.S. workforce because, to date, most studies have been limited to selected occupational groups, geographic areas, and types of sleep disorders. In a study published on-line earlier this month in the peer-reviewed journal *Occupational & Environmental Medicine*, we designed a larger investigation that would not be subject to those limitations.

We used data from the National Health and Nutrition Examination Survey (NHANES), conducted by the National Center for Health Statistics, one of our partner centers in the U.S. Centers for Disease Control and Prevention.

Ours was the first-ever study using a nationally representative sample of the U.S. working population to examine the role of shift work in sleep quality, sleep-related activities of daily living, and insomnia.

Our nationally representative sample included 6,338 adults, 18 years of age and older. They were asked to complete a survey questionnaire covering sleep duration, sleep disorders, sleep quality, impairment of sleep-related activities of daily living (ADL), and insomnia. To determine the shift schedule worked by each individual, they were asked which choice best described the hours they usually worked: regular daytime (any hours between 6 a.m. and 6 p.m.), regular evening shift (any hours between 4 p.m. and midnight), regular night shift (any hours between 7 p.m. and 8 a.m.), rotating shift, or another schedule. Based on a recommendation by the National Sleep Foundation that adults should sleep seven to nine hours per night, we created two categories of sleep duration for the study: either less than seven hours referred to as short sleep duration, or seven or more hours.

From our study of this large, nationally representative sample, we concluded that sleep-related problems were common among workers, especially among night-shift workers who had the highest risks for sleep problems. Moreover, these risks among night-shift workers persisted even after we adjusted for potentially confounding factors, such as long working hours, socio-demographic characteristics, and health/lifestyle/work factors. Findings included these:

- 37.6 percent of the respondents reported short sleep duration, representing 54.1 million U.S. workers. Short sleep duration was more prevalent among night-shift workers (61.8 percent of those who reported short duration) than among daytime workers (35.9%).

- Daytime workers had the lowest prevalence (31 percent) of "prolonged sleep-onset latency," which is when at bedtime 30 or more minutes are required to go from full wakefulness to sleep — compared with the night shift (46.2 percent), evening shift (43 percent) and rotating shift (42.1 percent).
- Poor sleep quality was reported by 30.7 percent of night-shift workers, and moderate sleep quality by 34.1 percent of workers on another schedule. Night- and evening-shift workers more frequently had difficulty falling asleep (21.7 percent and 21.2 percent, respectively, vs. 12.7 percent of daytime workers). Night-shift workers had a higher prevalence of feeling excessively or overly sleepy during the day (22.3 percent vs. 16.2 percent).
- Insomnia, which is defined as having both poor sleep quality and impaired sleep-related ADL, was reported by 18.5 percent of night-shift workers compared to 8.4 percent of daytime workers.
- Workers 60 years old or older had a lower prevalence of short sleep duration, impaired sleep-related activities of daily living (ADL), and insomnia than those 30 to 59 years old.
- Female workers had a lower prevalence of short sleep duration but a higher prevalence of the other three sleep outcomes (poor sleep quality, impaired sleep-related ADL, and insomnia) than male workers.
- Obese workers had a higher prevalence of short sleep duration and poor sleep quality than those who were normal weight/underweight.
- Current smokers had a higher prevalence of short sleep duration, poor sleep quality and insomnia (but not impaired sleep-related ADL) than non-smokers.
- Workers who worked 48 hours or more per week had a higher prevalence of short sleep duration, poor sleep quality and insomnia than those who worked less than 48 hours per week.
- Workers who frequently used sleeping pills had a higher prevalence of poor sleep quality, impaired sleep-related ADL and insomnia (but not short sleep duration) than those who did not.

- A higher prevalence of all four sleep outcomes (short sleep duration, poor sleep quality, insomnia, and impaired sleep-related ADL) was observed among workers who were widowed, divorced or separated; workers who reported fair or poor health; workers with symptomatic depression; and workers who had a physician-diagnosed sleep disorder – than among workers who did not have those characteristics.

Although our study was not subject to limitations of earlier investigations with smaller sample sizes, it was subject to other limitations inherent in the kind of investigation we conducted. We describe those limitations in our paper. As we note there, they are mitigated to some degree by the consistency of our methods and findings with those of other well-designed studies in the literature.

Particularly in light of the likely continuing increase in nontraditional working schedules, work-based prevention strategies and policies should be adopted to improve the quantity and quality of sleep among workers. Unfortunately, there is no single ideal strategy to successfully address the sleep risks of every demanding shiftwork situation. Instead, interventions often need to be customized to the specific employer and worker. These include designing new shift schedules with frequent rest breaks, avoiding night shifts that exceed eight hours, improving one's sleep environment, taking a long nap before a night shift begins, accelerating the modulation of circadian rhythms using bright lights, improving physical fitness, engaging in stress reduction activities, and strengthening family and social support. Sources of further information and recommendations from NIOSH can be found on the Work Schedules: Shift Work and Long Hours topic page. What challenges have you found with night shifts, and what approaches have you used?

http://oem.bmj.com/content/early/2016/09/08/oemed-2016-103638.full

http://www.cdc.gov/niosh/topics/workschedules/default.html

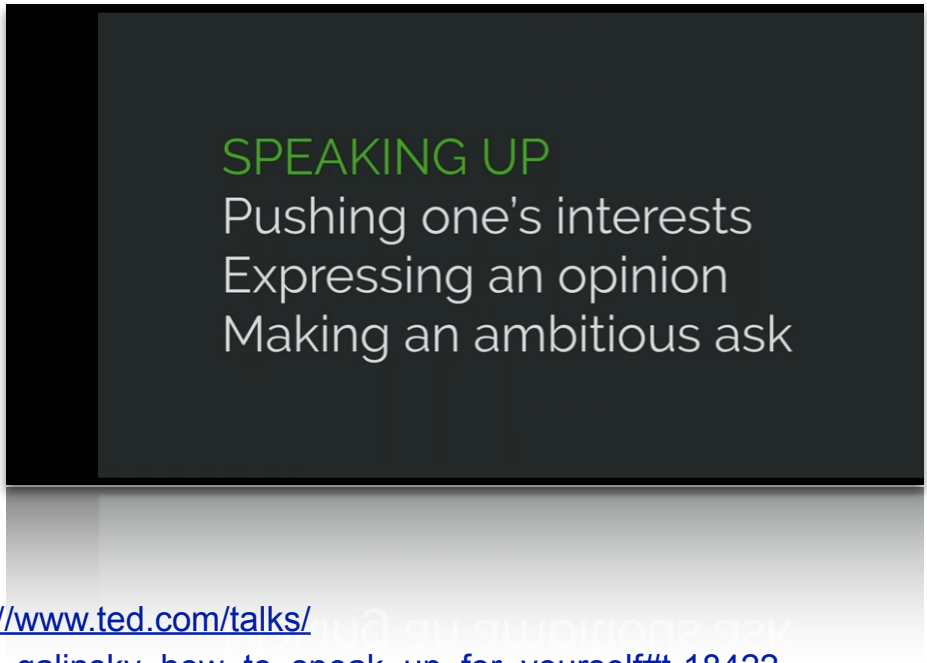
SHUT-i Informational Video

SHUT-i is an interactive, online program designed to improve the sleep of adults with insomnia. It was created by a team of international experts in insomnia and experts in online interventions.

https://www.youtube.com/watch?v=bjJ-_wipKVghttp://www.myshuti.com/

TED: Ideas Worth Spreading

Speaking up is hard to do, even when you know you should. Learn how to assert yourself, navigate tricky social situations and expand your personal power with sage guidance from social psychologist Adam Galinsky.



https://www.ted.com/talks/adam_galinsky_how_to_speak_up_for_yourself#t-18422