

Aviation Human Factors Industry News

Volume XI. Issue 18, September 06, 2015



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

Hello all,

To subscribe send an email to: rhughes@humanfactorsedu.com

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The evolution of aviation safety

In its newly updated annual analysis of commercial-aviation accidents involving Western-built jets with 40 seats or more, this year's version being Commercial Aviation Accidents 1958-2014, Airbus argues that **little of real value can be learned** from looking at any individual year's accidents in isolation.

This is because commercial-aviation accidents are “**very rare events**”, according to Airbus. They are so rare, nowadays, that trying to compare one year's aviation safety performance to that of another creates statistics which “are governed by ‘the law of small numbers’” and “most of the time ... prove to be rather counter-intuitive”. Airbus notes that “variations [in fatality and hull-loss rates] from one year to the next can be huge”, arguing that “the definition of safety is more subtle than a count of real accidents over a year”.

ICAO officially defines aviation safety as “the state in which the possibility of harm to persons or of property damage is reduced to, and maintained at or below, an acceptable level through a continuing process of hazard identification and safety risk management”. In other words, states Airbus, the official definition of air safety refers “to likelihood more than to real events”.

However, looking at accident data and causation over “a meaningful number of flights, reasonably at least a million flights per year” is useful, because it creates a large-enough statistical sample that useful inferences may be drawn from the data.

Because accident rates can vary widely from year to year – for instance, there were four accidents involving Western-built jets in 2004 but nine in 2005 – Airbus uses a 10-year moving average to describe the accident rate for any given year within that decade.

The company uses a 20-year timeframe in analyzing the safety performance of each succeeding generation of commercial jets. Manufacturers are now **producing the fourth generation**, fly-by-wire aircraft with flight envelope protection. Airbus employs the 20-year window because “today's operational conditions bear little resemblance to those at the beginning of the jet age”.



By aggregating data in these ways, Airbus says multi-year trends become evident. These trends “are less sensitive to yearly random variations” and so “they contribute to providing insights on the evolution of ... air transport system safety”.

Parsed in these ways, the data show there continues “a steady decrease over time” in the accident rate; and “a virtually stable absolute number of accidents despite a massive increase in exposure” – i.e., the number of flights performed annually grows substantially from each year to the next.

Meanwhile, there have been “significant changes in both the number and the nature of aircraft”: aircraft are becoming technologically more sophisticated. At the same time the governance of airlines and aviation regulatory authorities continues to improve qualitatively.

“Advances in technology bring a decrease in accident rates,” Airbus finds: each succeeding generation of aircraft is safer than its predecessors. There is a large and growing improvement in safety from the second generation to the third, as remaining second-generation aircraft reach ages where they need frequent maintenance activity – which isn’t always performed.

On the basis of a 10-year moving-average, the latest generation of jets has half the accident rate of the previous generation.

Over the past 20 years, the rate of fatal accidents per million flights has fallen by a factor of five and the rate of hull-loss accidents has declined by a factor of three. Within those rates, “Nearly 90 per cent of all accidents happened during the descent/approach/landing or take-off/climb phases,” reports Airbus.

Loss of control in-flight (LOCI), controlled flight into terrain (CFIT) and runway excursions were responsible for more than 60 per cent of all fatal accidents over the past 20 years. Runway excursions and aircraft system/component failure or malfunction were responsible for some 44 per cent of hull losses.

But while CFIT accidents have fallen by a factor of seven over the past 20 years as new avionics have given pilots better situational awareness, and the rate of LOCI accidents has halved thanks to the advent of flight envelope protection, the rate of runway excursions has declined little. “The effect of recent technological breakthrough is not measurable ... yet,” concludes Airbus.

Awake at the Helm

By [LCDR Katie Jacobson](#)

Let's face it – we've all had to make hard decisions under the pressures of fatigue and stress. But, is that what Navy sailors do on a daily basis just to survive, even in times of peace?

Research has shown time and time again that [sleep deprivation](#) can have the effects akin to being intoxicated. While there have been numerous studies that alert naval leaders to the dangers of sleep deprivation, I would be hard pressed to name one sea command that has actually done something to address this issue. Until now.



Having just completed my department head tours on a Pacific-based destroyer whose Captain [took crew sleep seriously](#), I can say that sufficient sleep is possible – even on deployment – and that the results are astounding! The “sleep initiative” takes on the [human factors side of Operational Risk Management \(ORM\)](#) to create a more holistic approach to minimizing chances of a mishap. While deployed on a seven month journey to the western Pacific, the basic schedule went like this: 0700: Reveille
0700-1900: (12 hour work day)
1900: Quiet Hours (no 1MC usage)

The majority of my crew already enjoyed four section static watches (3 hours on, 9 hours off) to allow for a normal circadian rhythm and predictable watch routine. The work day hours were adjusted accordingly within the 0700-1900 window to afford everyone the opportunity to rest for eight hours. Some of those eight hours might have been spent watching TV, reading a book, or relaxing... but the idea was to give sailors a chance to unwind and take care of their personal needs. The decrease in apparent work hours did not translate to less work being accomplished. In fact, not only did [we increase efficiency](#), but we increased morale and decreased operational risk.

Our underway schedule didn't always afford sailors the perfect eight hours, but it was the best attempt I've seen to date. Our sailors LOVED the later reveille time and a full 12 hours of no 1MC announcements. Sailors were happier, more resilient, alert, and well-balanced. Ultimately, the ship was safer and more combat ready being led by sailors whose minds were sharp.

No one would give their car keys to a friend who wasn't sober. So why is it acceptable practice to routinely allow our shipmates the license to operate a billion-plus dollar warship while fatigued? I make the following recommendations to all at-sea commanders:

- Implement a ship-specific **human factors** initiative to address the physical, emotional, and mental well-being of your sailors as it relates to ORM.
- Limit meetings, evolutions, and 1MC announcements to fit within a 12 hour work day.
- Change the **cultural mindset** that sleep deprivation is a "SWO reality." It's simply not true.

Stay awake at the helm – our survival as a surface community depends on it.

EASA issues recommendations to prevent loss of fan cowl doors on A320 **Lost cowlings on a BA A319 in** **May 2013 (AAIB)**

The European Aviation Safety Agency (EASA) issued a Safety Information Bulletin, recommending operators of A320 aircraft to take measures to avoid non- or improper closing of fan cowl doors.

There have been numerous incidents involving the loss of fan cowl doors during the take-off phase, especially on Airbus A320 aircraft. In all reported incidents, analysis shows that the latches of the fan cowl doors were either unlocked or not properly hooked and secured.



This condition remained undetected during the exterior walk-around preceding departure, leading to air scooping and subsequent cowl separation. Airbus is currently working [on a new design solution](#) for the A320 family fleet, improving the identification of any fan cowl door not properly closed and latched. That modification is expected to be the subject of an Airworthiness Directive (AD).

In the mean time EASA recommends owners and operators to [amend their pre-take-off procedures](#) to ensure that all maintenance actions involving the opening/closing, removal and re-installation, or replacement of an fan cowl door is brought to the attention of the flight crew of the affected airplane before the next flight of that airplane.

In addition, EASA recommends design approval holders to consider amending the existing fan cowl door opening and closing procedures in the applicable aircraft maintenance manual (AMM) to make a record in the aircraft logbook each time these procedures have been applied and to communicate to operators to emphasize that applying these procedures is essential to avoid further events

Routine Manual Deviations Can Have Major Safety Consequences

The just-released accident report on the Airbus A319 that lost both doors on one engine's fan cowl on takeoff from London Heathrow Airport in May 2013 is a [must-read](#) for anyone involved in aviation safety, whether at a major airline or manufacturer, at an air taxi or just flying or maintaining GA aircraft. The issues raised by the events leading to the accident, and as the events were unfolding in the airplane, affect many areas of aviation—from aircraft design to maintenance to pre-flight inspections to [communications](#) between cabin and flight crew during an in-flight emergency. But the most significant aspect of the report relates to [and maintenance human factors](#).



After all, it was maintenance errors that began the chain of events that ultimately led to the in-flight emergency.

In this accident, the precipitating factor was that the engine fan cowl doors detached on takeoff because they had not been properly closed and latched after routine overnight maintenance. The A319 was substantially damaged and the crew had to make an emergency landing. The accident report details not only the [obvious failures to comply with maintenance manual procedures](#) but also less obvious contributing factors that left the cowling doors unlatched, including the mechanics' schedules and likely effects of [fatigue](#). The report also highlights impediments to discovering the open doors during the pre-flight inspections by the crew and ground personnel. In addition, it makes recommendations for, among other things, changing the design of fan cowl door latches to prevent a recurrence.

For this long-time accident investigator and former airline mechanic, a well written and carefully analyzed accident report involving maintenance errors is more interesting than any summer thriller. This report is particularly captivating because no one was killed or even injured, although the accident could have had catastrophic consequences for the passengers and people on the ground around Heathrow. Despite the absence of fatalities, the accident report is as thorough and detailed as any I have read. Of course, the survival of the flight and cabin crews allowed them to participate in witness interviews.

[Human Factors](#)

Without the enormity of a tragic loss of life, perhaps the maintenance technicians whose failure to latch the doors precipitated the accident were more candid with investigators. I was [impressed with the apparent openness](#) of the technicians in describing how and why the doors came to be left unlatched, even when that exposed them to criticism for not following procedures in the manual. It's likely that the mechanics' willingness to participate so candidly stems at least in part from the UK Civil Aviation Authority's longstanding commitment to a [just culture](#), where employees are not penalized for unintentional mistakes even when the consequences are as critical as they were here.

One of the real highlights of the report is the [Human Factors Specialist's Report](#), which focuses on the "human factors issues that influenced the performance of the maintenance technicians" the night the aircraft was left unsafe for flight the next morning and its [log improperly signed off](#) for work that had not been completed. This is one of the most comprehensive efforts I have seen to focus on the human factors that lead to [critical maintenance errors](#).

The human factors report raises a number of issues that have long concerned many of us in maintenance. I hope that seeing these flaws analyzed in the context of such a potentially catastrophic accident will force the FAA, the airlines and others involved in maintenance to spend time and resources working through them. Studying the whole report will provide [valuable insights into compliance with detailed manual procedures](#), the use of written memory aids and the impact of mechanics' [schedules on fatigue and human errors](#).

One of the most significant issues for me is how seemingly minor deviations from the maintenance manual can—in all the wrong circumstances—lead to an accident. In this case, the mechanics intentionally did not close and latch the fan cowl doors or leave them in a clearly open position, even though the maintenance manual required them to. The reasons for not doing so are common: [the procedures are cumbersome to follow](#) and the mechanics were going to return to complete the work they had begun but needed to get the appropriate tool. In addition, they substituted their own judgment about the best way to leave the doors unlatched instead of following the manual's directions. Among the “small” items skipped that could have prevented this near tragedy was the placement of a [required warning notice](#) in the cockpit to alert the crew or other mechanics that the cowling doors were open. The human factors report calls these “routine” violations because they “are a common occurrence amongst many operators.”

The mechanics did in fact return to complete the work, [but markings on the ramp and placement of the logbook](#) caused them to return to the wrong aircraft. While technicians knew of other instances of work being done on the wrong aircraft, management seemed unaware of the problem.

This mishap clearly demonstrates why [maintenance culture](#) has to change so that deviations from manual requirements—no matter how small—are not tolerated. At the same time, problems identified by mechanics in maintenance-manual procedures or in routine maintenance operations (such as work being performed on the wrong aircraft) have to be flagged and addressed immediately, backed by a commitment from the executive suite all the way to the shop floor.

While I am not familiar with the maintenance culture at this particular base, all too often I have seen managers and executives “[winking](#)” at procedural deviations in the interests of moving work more “efficiently.” Management needs to have a presence on the shop floor and routinely audit work to ensure that detailed work steps are followed every time. Complying with detailed maintenance manual requirements takes time. So while I believe mechanics need to take responsibility for complying with each detailed step every time maintenance is performed, they need [management that supports them](#) by allowing them time to attend to all the details required to do a job correctly.

<https://www.gov.uk/aaib-reports/aircraft-accident-report-1-2015-airbus-a319-131-g-euoe-24-may-2013>

FAA Reminds Pilots To Medicate With Care

As part of its Fly Safe campaign aimed at general aviation pilots, the FAA on Tuesday posted information and links about the [effect of drugs on flying skills](#) — including prescription and over-the-counter medications, as well as illegal drugs. A 2011 study by the FAA found that 42 percent of toxicology reports from pilots who died in crashes showed the presence of some kind of drug or medication. Most of those drugs



were not illegal, and the most common ones were [antihistamines](#). While the NTSB seldom cites these drugs as a causal factor in fatal crashes, the FAA says pilots should be aware that even common medicines — and the interaction of multiple drugs — can impair performance. The FAA said pilots should assume that any drug that warns against operating machinery or motor vehicles, or performing tasks that require alertness, [will impair](#) their ability to fly, even in simple aircraft like a glider or a hot-air balloon. Also, prescription drugs may impair pilot capabilities, and doctors may not emphasize this to a patient, especially if the doctor is unaware you are a pilot. Medications taken in combination can cause side effects that may not be expected. Pilots should consult their [Aviation Medical Examiner or a Regional Flight Surgeon](#) if they have any questions about the safety of their medications, the FAA said. They also should read labels and be sure to let their doctors know they fly.

More information, advice, and links are posted at the [FAA website](#).

Safety concerns raised after Pearson runway worker hospitalized

The Swissport employee was reportedly completing a [16-hour baggage handling shift](#) early last Thursday when his cart crashed into a refueling truck — throwing him from the vehicle and trapping him under its wheels.

An 18-year-old ramp worker at Pearson airport is in hospital in critical condition, Torstar News Service has learned, after a runway accident last week that has unions sounding the alarm over airport safety.



Peel Regional Police confirmed the collision to Torstar, and said a man was transported to hospital in critical but stable condition with head and arm injuries. He was later taken to a trauma center where he remains in care. “Your heart just breaks, because it’s someone who’s just starting their life,” said Sean Smith of the Toronto Airport Workers’ Council.

But union reps say the tragedy points to broader issues surrounding airport worker safety, including low wages, high staff turnover and lack of standardizing training and safety procedures.

“Every day there is less and less experience amongst the workers there, no matter what company you’re working for,” said Corrado, whose union represents refueling workers at Pearson.

“They can’t keep an employee for what they’re paying them. [These young kids are just working unlimited overtime.](#)”

Corrado said the industry standard for full-time baggage handlers is an eight-hour shift.

Swissport baggage handlers are represented by Teamsters Local 419, whose vice-president Harjinder Badial said he couldn’t comment on the circumstances surrounding the accident until a full investigation was complete.

“It was raining, it was still dark outside — there are a lot of different factors that could have contributed to this accident,” he said.

Peel police said federal aviation safety officials are investigating the accident. Employment and Social Development Canada is also conducting an investigation.

Corrado, whose own members will lose their jobs this October when Pearson’s refueling contract changes hands, told the Star he was worried high employee turnover and lower wages could prompt future safety incidents [in high-risk](#) refueling work at the airport.

Badial added that poor wages were a concern across the airport and resulted in many Pearson employees taking on [unsustainable workloads](#).

“In this industry you have a lot of companies that bid and undercut each other, and really, they drive the wages down low because of it.”

Smith, of the Toronto Airport Workers’ Council, said last week’s tragedy highlighted the urgent need to improve the airport’s safety co-ordination. His organization will next month formally request that the Greater Toronto Airport Authority establish an [airport-wide safety council](#) that includes workers, which Smith says the authority has so far failed to implement.

“They’re the airport authority, and they need to exercise that authority and work with all groups under their jurisdiction,” he said.

Currently, individual service providers at the airport maintain their own safety procedures with little co-ordination, according to Smith.

Responding to questions from the Star, a GTAA spokesperson Shabeen Hanifa said safety is a priority at Pearson.

“Any accident that occurs at the airport — such as the Swissport accident last week — is felt across the entire airport community,” Hanifa said.

“The approximately 40,000 employees who work at the airport are responsible for the safety of each person who works, uses or visits Toronto Pearson. To support this principle several joint safety committees exist that include the GTAA’s external partners from across the airport community.”

In an emailed statement to Torstar, the CEO of Swissport Canada Ground Handling Olivier Matthey said his company is working closely with Employment and Social Development Canada to find out how the accident occurred, and said Swissport would immediately implement any new safety measures recommended by the investigation.

“At this time, our focus is on participating fully in the investigation and ensuring our colleague and the rest of our staff are supported during this difficult period,” he said.

Failure to remove rudder gust lock kills two

The pilot/owner purchased the Aeronca 7AC about a month before the accident and was flying near Taunton, Mass., with a pilot-rated passenger who owned a similar model airplane. A witness reported that the airplane accelerated and climbed normally to an altitude of about 50 to 100 feet above the ground. It then entered a slow right turn and began to descend until it hit the ground and immediately became engulfed in fire. Both the pilot and passenger were killed. The post-accident examination revealed that a rudder gust lock was installed over the rudder and vertical stabilizer, which prevented movement of the rudder. The control lock was similar to a rudder gust lock that was observed installed on the passenger’s airplane.



While it could not be determined who was at the controls of the airplane during the accident flight, **both pilots should have noted the installation** of the rudder gust lock either during a preflight inspection or during a pre-takeoff check of the flight controls.

The NTSB determined the probable cause as the inadequate preflight inspection and inadequate pre-takeoff check of the flight controls, which resulted in a takeoff with the rudder gust lock installed.

NTSB Identification: [ERA13FA372](#)

This August 2013 accident report is provided by the [National Transportation Safety Board](#). Published as an educational tool, it is intended to help pilots learn from the misfortunes of others.

See Pilot Error, The Acclaimed Air Safety Film Inspired by Air France 447



Image of Vimeo Trailer Link <https://vimeo.com/110034584> with clickable link

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Upcoming Screenings with training pilot talkbacks:

Whitehall Michigan: Howmet Playhouse, August 26, 27
Minneapolis-St. Paul Area: Elk River Cinema September 14 and 16
London, England: City University London, September 16
Spring Green, Wisconsin: Gard Theater, September 22, 23
Ann Arbor, Michigan : Quality 16 September 23, 24
Lakeland, Florida: Polk Theater, October 22



Biocompatible Shift Scheduling

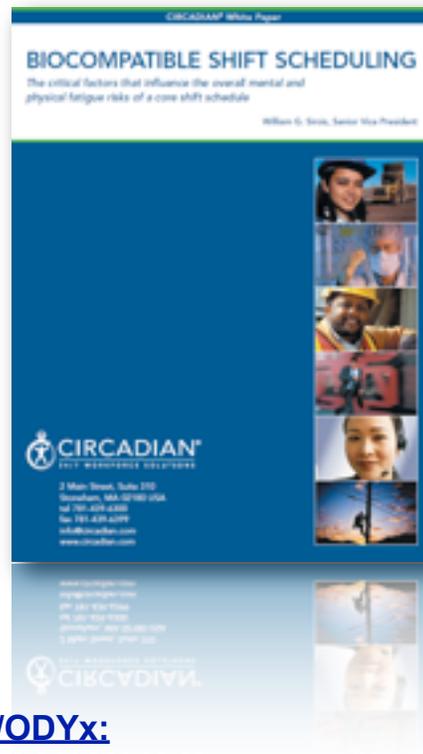
Critical factors influencing fatigue risk

Humans aren't designed to work outside of our biological limitations. Yet, the demands of our 24/7 society require many individuals to do so.

CIRCADIAN® is the global leader in providing 24/7 workforce performance and safety solutions for businesses that operate around the clock.

[Download this white paper](#) and discover the key components of biocompatible shift schedules, such as:

- Number of consecutive work days
- Duration of shifts
- Start/end of shift times
- Fixed vs rotating schedules
- Speed of rotation



<http://circadian.send24web.com/track/click/ODYx:29841:5876AD0A-329E-421D-8575-829ECDF64409/14040>

Should You Ever Take a Red-Eye?

Why you might think twice about pulling a high-altitude all-nighter.

You're making travel plans to fly from LAX to JFK for an early-morning Tuesday meeting. The options: clear your crowded Outlook calendar and take-off Monday afternoon, or power through and book the red-eye. Which do you choose?

If sleep experts have anything to say about it, you'll get your shut-eye on the ground. Even for the most resilient work-day warrior, [a red-eye flight disrupts your sleep cycle](#), wreaking havoc on your

health and, according to a recent study, your looks. Whether you're flying West to East or vice versa, your body naturally deals with the time difference by resetting its internal clock. But it's the adaptation period — what we call jet lag — that throws you out of whack. Adrenalin may keep you going during shorter trips, says Matthew Mingrone, a San Francisco-based sleep specialist, but you're still building up "[sleep debt](#)," which will take its toll once you're back in your natural time zone.

When traveling for business, taking a red-eye can defeat the trip's purpose. Research increasingly shows that sleep deprivation negatively affects problem solving skills, innovative thinking and alertness — and may even make you less ethical. (In a recent study, sleep-deprived subjects exhibited rudeness, inappropriate responses and, oddly, attempts to take more money than they earned).

Still not convinced? Researchers in Sweden found that subjects who didn't get a full night's sleep were consistently perceived as less attractive than when they'd slept soundly through the night. And while one bleary-eyed trip won't have long-term effects, studies increasingly connect [chronic sleep deprivation with weight gain](#), as well as medical problems such as diabetes and heart disease.

When a red-eye is your only option, try to ease your pain. [Hydrate. Hydrate. Hydrate.](#) If you're arriving in the evening, don't sleep at all on the flight.



But if you're landing in the morning, do your best to maximize your sleep. Noise-canceling headphones, sleep masks and natural sleep-aids like melatonin (or prescription meds) can help — and, as seductive as a sleep-inducing cocktail always sounds, it's best to stay away from alcohol before, during and after the flight.

Upon landing, Mingrone says the best way to speed up the acclimation process is to [get as much natural light as possible](#) at strategic times of day. If you're flying West, trick your body into thinking it's not bedtime yet by going outside later in the afternoon. For East-bound flights, set your biological clock forward by soaking up sunlight in the morning, which makes your body think you're running out of daylight.

[What alcohol really does to your body on an airplane](#)

While on a flight, if you've only had a couple drinks and already you're trying to convince your neighbor there's a monster on the wing, you might not be entirely crazy — it might just be that the booze has gone to your head a little more than usual. At cruising level, the altitude inside the plane cabin is different than it is on the ground, even though the cabin is pressurized. According to the World Health Organization, Air pressure inside the cabin is actually equivalent to the pressure of 6,000 to 8,000 feet above sea level — roughly the same as Bogotá or Yosemite National Park. The higher up you go, the thinner the air gets, and when you rise in altitude fast the body doesn't get as much oxygen as it needs, which can cause symptoms of altitude sickness. There's plenty of oxygen onboard, but the atmospheric pressure is lower so the body absorbs less oxygen into the bloodstream. Depending on the person, that could be a 5% to 20% decrease in oxygen, according to USA TODAY. People with heart and lung conditions might also be susceptible to hypoxia.



While scientific studies have shown that drinking alcohol at a higher altitude does not actually increase your blood alcohol level, [it might make you feel more drunk than usual](#). Suddenly going up to 8,000 feet increases dizziness,

lightheadedness, and drowsiness, which are the symptoms of altitude sickness. These are also sensations associated with being drunk (in case you can't recall). [So, altitude + alcohol = dizzy times two.](#)

Furthermore, you stand more of a chance of getting dehydrated while on a plane because the air humidity sits at around 20 percent, which is much dryer than your average environment. Dehydration makes you feel even more dizzy.

Tips for Selling Safety to Top Management

You've got an ambitious agenda for moving your safety process forward. You've done the research, and you know your ideas are sound. Now how do you communicate the value of your agenda to decision makers who hold the purse strings? [Keep reading for the strategies you need to succeed.](#)

You became a safety professional because you're passionate about worker protection and you're committed to eliminating risk. Like it or not, your job also requires you to convince those in power [that safety has value and will save, not cost, the company money.](#)

According to the nonprofit Florida Partnership for Safety and Health, "Selling health and safety relies on steady commitment, not slick slogans and artificial cheerleading." It's your job to convince management—as well as employees—that your program can deliver the knowledge and behavior required to lower the rate of accidents and injuries.

The consequences of not having top leaders on board are high, says the NAEM, the National Association for Environmental Management. Those consequences include insufficient budgets, lack of assistance from other functional areas, conflicting priorities, and unnecessary obstacles. NAEM recommends developing an [internal marketing strategy](#) to help sell your program.

Other tips for getting top leaders on board for safety:

- [Understand your company.](#) It's not enough to be knowledgeable about safety and health; you've got to know how your business operates and makes money.



- **Lead with your strong suit.** Identify the benefits and value of your safety process and make these the centerpiece of your communication.
- **Brand your efforts.** Successful programs have a common language, look, and feel. Develop the key messages and keep them simple and consistent.
- **Crunch the numbers.** Know the impact of safety incidents and the precise costs the company is facing. Present these in a clear, convincing manner.
- **Share stories.** Bring the discussion to the individual level and communicate how incidents affect workers, families, and coworkers.
- **Get permission to provide a short safety update** for leaders to use to kick off all meetings. This gets the executive team used to talking about safety.
- **Understand the competition.** Other programs will compete for attention and dollars. Make sure you have a plan to address the challenges and convince detractors that they can also gain from your program.
- **Establish ongoing communication** with your top leaders, including a regular meeting to update them on safety. The more they know, the more likely they are to support your efforts.

Too Much Sitting Is Bad - But So Is Too Much Standing

It's been all over the news in recent years: Americans sit too much, and it's killing us. We sit in our cars, we sit at the office, and we sit in front of our computers, television screens, video games, tablets, and phones—and while we're sitting, our metabolisms are changing. Our waists are getting bigger, our blood pressure is increasing, and our glucose metabolism is deteriorating, even if we are getting plenty of exercise. The person who bikes to and from work but spends 8 hours on the job sitting in front of a screen suffers these ill effects just like the coworker who commutes by car. The obvious solution would be to have workers stand up, right? Standing desks, treadmill desks, and similar solutions have become in the wake of the bad news about sitting. Unfortunately, it may not be quite that simple—prolonged standing is also hazardous to workers' health. Keep reading to find out what too much of either will do to your body.



Health Effects of Prolonged Sitting

In a 2013 review of literature published in *Harefuah*, the journal of the Israel Medical Association, the authors found a consistently demonstrated relationship between [sedentary behavior and health risks](#). The problem is compounded by the fact that sitting doesn't just take place at work; workers sit in their cars on the way to and from the workplace, they sit at work, and they sit for recreational activities like watching television, movies, and sporting events.

Researchers found that prolonged sitting—for a total of 8 or 9 hours per day, including working, television time, and time in a car—is [strongly correlated with](#):

- Premature death from all causes;
- Chronic diseases, including cardiovascular disease, diabetes, and cancer;
- Metabolic syndrome (a precursor to diabetes);
- Back, neck, and shoulder pain; *and*
- Obesity.
-

Health Effects of Prolonged Standing

Workers who stand all day aren't doing much better, though. In December 2014, the National Institute for Occupational Safety and Health's science blog published an article on the [ergonomic harm](#) done to workers who spend all day on their feet, unable to sit down. Nurses and retail workers demonstrate in their sore feet, back pain, swollen legs, and increased cardiovascular symptoms that standing all day is not the antidote to sitting all day.

Prolonged standing—for more than 4 hours without a break, especially in a single spot—is associated with:

- Back pain;
- Circulation problems in the legs, including swelling, pooling of blood, and varicose veins;
- Leg cramps;
- Preterm birth and spontaneous abortion in pregnant women; *and*
- Cardiovascular disease.

The Last Pilot: A Novel

"Harrison sat very still. On the screen was the surface of the moon."

Jim Harrison is a [test pilot in the United States Air Force](#), one of the exalted few. He spends his days cheating death in the skies above the Mojave Desert and his nights at his friend Pancho's bar, often with his wife, Grace. She and Harrison are secretly desperate for a child- and when, against all odds, Grace learns that she is pregnant, the two are overcome with joy. While America becomes swept up in the fervor of the Space Race, Harrison turns his attention home, passing up the chance to become an astronaut to welcome his daughter, Florence, into the world. Together, he and Grace confront the thrills and challenges of raising a child head-on. Fatherhood is different than flying planes-less controlled, more anxious-however the pleasures of watching Florence grow are incomparable. But when his family is faced with a sudden and inexplicable tragedy, Harrison's [instincts as a father and a pilot are put to test](#). As a pilot, he feels compelled to lead them through it-and as a father, he fears that he has fallen short.



TED: Ideas Worth Spreading

The Astounding Athletic Power of Quadcopters | Raffaello D'Andrea | TED Talks

In a robot lab at TEDGlobal, Raffaello D'Andrea demos his flying quadcopters: robots that think like athletes, [solving physical problems with algorithms](#) that help them learn. In a series of nifty demos, D'Andrea show drones that play catch, balance and make decisions together -- and watch out for an I-want-this-now demo of Kinect-controlled quads.

TEDTalks is a daily video podcast of the best talks and performances from the TED Conference, where the world's leading thinkers and doers give the talk of their lives in 18 minutes (or less). Look for talks on Technology, Entertainment and Design -- plus science, business, global issues, the arts and much more.



<https://www.youtube.com/watch?v=w2itwFJCgFQ>