

# Aviation Human Factors Industry News

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

Hello all,

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

★Human Factors Are Important to Aircraft Certification

★Scientists develop quick way for pilots to detect hypoxia symptoms

★Virgin 747 gear jammed after actuator fitted upside-down

★Investigation: Faulty filter cover, pilot error caused fatal Marine helicopter crash

★PRISM Safety Management System releases iPhone app

★NTSB LOC Forum Spotlights Culture, Training Issues

★Bombardier Safety Standdown 2015

★Fueling safety on our airfields

★And Much More

## Human Factors Are Important to Aircraft Certification

A few months back, *AMT* Editor Ron Donner asked me to write about design specifications that addressed human factors. He wanted the article for the “October” issue. My initial response was the usual, “no problem.” Knowing that there are plenty of design regulations for aircraft and parts certification it would be



easy to describe human factors in certification in a few pages. After considerable discussion with FAA personnel from Aircraft Certification this is my 1,000-word attempt to answer Ron Donner’s request. This article describes the FAA Aircraft Certification Service and the general structure of its regulations. It [should serve as a review for most readers and lead you to sources of additional detailed information](#). It ends with Chapter 6 (Considering Human Factors Issues when installing equipment and conducting other maintenance) of the *Operator’s Manual for Human Factors in Maintenance*. Aircraft Certification Service FAA’s Aircraft Certification Service (AIR), as paraphrased from Order 8100.5A), works with authorities, manufacturers, and other stakeholders to ensure continuing safety. The AIR process administers safety standards governing design, production, and airworthiness of products. AIR oversees design, production, and airworthiness certification programs. They ensure that the aircraft and components are designed for safety, manufactured for safety, and modified for safety throughout the product life cycle.

The initial AIR mission appears to be straightforward. However, this mission must extend to small and large aircraft including airplanes and helicopters, powerplants, propellers, avionics, and other accessories. The AIR process must serve not only brand new aircraft and powerplant design and manufacturing but also certification of new parts for very old aircraft. AIR supports certification of the constant flow of new technologies and the demand of special repairs and alterations made in the field. That support extends to the entire world.

AIR [pays attention to human factors](#) by staffing the various Directorates and Aircraft Certification Offices with design, manufacturing, continued operational safety, and flight test human factors professionals. Those personnel are involved with most new systems and modifications, especially related to flight deck and flight control avionics and control systems. They are especially supportive in matters related to engineering assisted field approvals. Increasingly, because of FAA encouragement and commercial value, most manufacturers have a team of human factors experts on staff.

FAA Human Factors engineers have the skill set and education that helps ensure effective communication with their industry counterparts.

I have worked with a variety of the FAA Aircraft Certification Human Factors professionals, mostly with activity on the Aviation Safety Human Factors Coordinating Committee. That group brings together the FAA personnel that have industry, government, and academic perspective of aircraft and component certification process and the related human factors issues. I have observed a high degree of competency and level of industry cooperation among that team. [I encourage readers to take advantage of that expertise.](#)

### **The Certification Details**

If you want the “details” you must proceed to the Federal Aviation Regulations. Part 21 is the overarching certification rule, titled Certification Procedures for Products and Parts. From there you can proceed to aircraft, engines, avionics, and other chapters. From those sections you can obtain everything from the strength limits for flight controls to the size, color, and location of icons on avionics displays. A recent certification rule for transport category aircraft affects “Installed Systems and Equipment for Use by the Flightcrew” (See AC25.1302-1) That human factors oriented information was nearly a decade in the making and approval process and is representative in the important information likely to continue to flow from AIR.

There has been a lot of industry talk about upcoming momentous rule changes for Part 23 – Airworthiness Standards: Normal, Utility, Acrobatic, and Commuter Category Airplanes. The proposed rule has the goal to reorganize Part 23 based on airplane performance and complexity. This rule will ensure the safety of aircraft but will also streamline the time and cost to certify many small aircraft.

## Making Human Factors Decisions in the Field

This discussion above addressed the part of the certification process that tends to happen with parts or aircraft production facilities. It is more likely that you are more concerned about “field Approvals” – an FAA approval of technical data for a major alteration or repair to a single typed–certificated product. For example, your customer asks you to install a new avionics component, cameras, air conditioner, etc. to an existing aircraft. In many cases the product provider has already completed most, if not all, of the data necessary for a field approval. However, that is not always the case. The responsibility then falls on the installer to ensure the compatibility and obtain the necessary data to complete the installation.

The 2014 version of the [Operator’s Manual for Human Factors in Aviation](#) (See AMT October 2014) (full document at [www.humanfactorsinfo.com](http://www.humanfactorsinfo.com)) had a chapter to offer human factors support on field approvals. Chapter 6 was written for general aviation mechanics, repair station personnel, and mechanics with Inspection Authorizations. They must make decisions regarding such factors as: A mechanic may be the best final check to ensure not only for safe physical installation, but also for alterations made to the aircraft, ensuring selected [human-machine](#) issues are addressed. These can include: visual access/viewing angles, installation specific readability, glare, nighttime application, panel real estate, electrical loads/load shedding, pilot workload, and more. These types of factors should be considered for field approvals. Chapter 6 emphasizes that proper attention to human factors during installation not only helps ensure effective and safe equipment use, but also offers ideal customer/user satisfaction.

See the section of Chapter 6 below as an example of the practical advice.

The Operators Manual is but one of many sources to help with Field Approvals and other aircraft and parts certification. Many sections of the certification rules have matching Advisory Circulars. They can be accessed through the FAA website ([www.faa.gov](http://www.faa.gov), go to Certification). Additionally, many of the FAA’s certification personnel and resources can also be accessed by working with your local Flight Standards District Office who has a working relationship with the engineers in nearby offices.

We have all heard the famous expression that “FAA is here to help.” When it comes to human factors and certification, [I believe that to be true](#). Yes, there is a trace of Kool-Aid on my upper lip.

Dr. Bill thanks FAA Certification Engineers Barry Ballenger, Jason Brys, and Steven Thompson for the technical guidance provided herein.

Dr. Bill Johnson, as the FAAA chief scientific and technical advisor for Human Factors in Aircraft Maintenance Systems, advises on the identification of practical ways to ensure continuing effective, efficient, and safe human performance in maintenance and engineering. He works for both the Flight Standards and the Aircraft Certification Services.

<http://www.humanfactorsinfo.com/>

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

## **Scientists develop quick way for pilots to detect hypoxia symptoms**

Automatic detection for the condition would make pilots and airplane passengers more safe.

Researchers with the U.S. Air Force may have found a way to detect hypoxia in pilots in real-time during flights by measuring volatile organic compounds, or VOCs, in their breath, according to a new study.

Hypoxia is a deficiency of oxygen reaching the tissues. A sudden loss of cabin pressure, speeding up the lack of oxygen flowing through the body, could result in a pilot losing consciousness before being able to take actions in the cockpit for both passengers and to keep the plane in the air.

Researchers at Wright-Patterson Air Force Base think [an automatic system](#) may be able to detect hypoxia based on pilot's breath, allowing either the pilot or systems on the plane to take action.

"Despite the myriad of advances in aerospace technology, many modern, high-performance aircraft still rely on the pilot to recognize the symptoms of hypoxia in order to initiate appropriate procedures in the event of a malfunction," said Dr. Claude Grigsby, a technical advisor in the [Human Signatures Branch](#) in the 711th Human Performance Wing, in a press release.





"This research provides the basis for both the utility of exhaled breath monitoring to monitor for hypoxia as well as targets for future solid state sensor development."

The researchers worked with eight pilots, simulating a "fairly standard" hypoxic event while in flight. The volunteer participants were exposed to five minutes of reduced oxygen levels to simulate higher altitudes, and then were given five minutes of oxygen "recovery," a typical in-flight response to the condition.

For each of the participants, VOC levels were measured before and after the simulated hypoxia and recovery, as well as every minute during the simulations. Although the results showed VOC levels drop after a hypoxic event, researchers are unsure how this works.

"We are working to better understand hypoxic episodes mechanistically to validate our findings and to improve our non-invasive chemical sensing platforms," said Dr. Sean Harshman, a research scientist in the 711th Human Performance Wing at Wright-Patterson Air Force Base. "Our future and ongoing studies seek to confirm the data presented in this manuscript, develop a flight worthy chemical sensor, and begin further mechanistic studies of respiratory hypoxia."

The study is [published in the Journal of Breath Research](#).

## **Virgin 747 gear jammed after actuator fitted upside-down**

Maintenance personnel installed a Boeing 747-400 main landing-gear actuator upside-down before the aircraft suffered an undercarriage jam while returning to London Gatwick.

The Virgin Atlantic aircraft (G-VROM) had departed the airport for Las Vegas on 29 December 2014, but the crew was alerted to a depletion of hydraulic fluid shortly after gear retraction.

Although the situation was contained by the crew, the carrier requested that the aircraft return to Gatwick.

The wing main landing-gear was one of the systems affected by the hydraulic failure and deployment required use of the alternate gear-extension procedure.

But as the undercarriage lowered, the right wing main gear – falling quickly as a result of being undamped by the loss of hydraulic fluid – jammed against its door and did not lock in place. The crew, unaware of the reason for the jam, attempted to dislodge it with a series of maneuvers. But these were unsuccessful and the aircraft was forced to land at Gatwick on its three remaining main-gear bogies.



In its analysis of the event the Air Accidents Investigation Branch found that the aircraft had undergone replacement of the actuator on the right wing main gear [the night before the flight](#).

The maintenance team [did not use a sling](#) to hold the 85kg actuator in place as it was fitted. Two technicians [instead](#) manually supported it – holding the heavy component for over 30min, owing to delays in locating an attachment pin.

Opting not to use the sling “greatly” increased the difficulty of installation, says the inquiry.

“The task became so physically demanding that the maintenance team [became entirely focused](#) on just attaching the actuator to the aircraft, in order to relieve themselves of the [weight],” it states.

“As such, they had no remaining capacity to ensure they installed the actuator in the correct orientation.”

The inquiry says the actuator was inadvertently installed upside-down. [No full operational test was required](#) and the error remained undetected until the 747’s landing-gear was retracted after take-off for Las Vegas.

Incorrect installation resulted in forces that distorted a hydraulic port during retraction, causing the fluid leak and subsequent gear jam.

Virgin Atlantic produced its own “comprehensive” report following the incident, which included 28 recommendations mainly relating to internal process improvements, says the inquiry.

But the investigators also point out that the actuator was “[virtually uniform](#)” in shape and color, with no “obvious” indicators regarding orientation.

Labels on the hydraulic ports were “[inherently open to misinterpretation](#)”, and the design meant that hydraulic connections could be made to fit an incorrectly-installed actuator, says the inquiry, which has recommended that Boeing modify the component to reduce risks of a recurrence.

## **Investigation: Faulty filter cover, pilot error caused fatal Marine helicopter crash**

Two Marine pilots killed in a January helicopter crash in California were just a few hundred yards from their destination when the transmission of their aircraft seized, stopping its main rotor and causing it to plummet, according to a lengthy investigation into the crash.

[Improper aircraft maintenance and pilot misjudgment contributed](#) to the fatal Jan. 23 UH-1Y Venom helicopter crash near Marine Corps Air Ground Combat Center Twentynine Palms, investigators wrote in the accident report. The report was obtained by Marine Corps Times through a Freedom of Information Act request. The pilot, Maj. Elizabeth Kealey, and co-pilot, Capt. Adam Satterfield, were killed in the crash. Both were assigned to Marine Light Attack Squadron 169, and were concluding a short flight from Marine Corps Air Station Camp Pendleton, their home base, to participate in an exercise with the rest of their squadron. Kealey was a captain at the time and Satterfield a first lieutenant — the pair was posthumously promoted during a February ceremony.



At the heart of the tragedy was an [improperly installed filter cover](#), which allowed the transmission to dump all its oil during flight.



Ultimately, investigators found that the aircraft plummeted 200 feet, just 400 yards away from the Marines' intended landing point.

Investigators would find that a [confluence of missteps, oversights and miscalculations](#) led to the fatal accident, but stopped short of finding wrongdoing.

Maj. Gen. Michael Rocco, the commanding general of 3rd Marine Aircraft Wing, wrote in his endorsement of the investigation that the deaths of Kealey and Satterfield were "in the line of duty and were not due to their own misconduct."

### **Sensor troubles**

About 34 minutes into the 49-minute flight, the pilots noticed that their oil pressure gauge fluctuated and then plummeted to zero.

While the warning lights typically indicate an emergency, the pilots likely [assumed the problem was due to a faulty gauge](#), not actual fluid loss, because of recent maintenance issues. About a week prior, their aircraft had undergone maintenance because of a faulty reading, which included replacing oil pressure sensors.

With Twentynine Palms more than 15 minutes away, the pilots decided to continue flying. They passed two airports [where they could have landed](#) safely before the transmission froze, the investigators found.

"The [pilots] chose not to divert to either Palm Springs or Yucca Valley airports, both of which would have put them on the deck in about six to seven minutes after initial indications of loss of [main rotor gear box] oil pressure," the investigator wrote. "This would have provided them eight to nine minutes of time remaining until the designed failure limit ... was reached."

Instead of putting the aircraft down, they calmly called to have avionics trouble shooters standing by on the flight line.

["This is indicative of a pilot who thinks they have an instrument indication problem, not one that has a full-blown emergency on their hands,"](#) the investigating officer wrote.

According to Navy aviation publications, zero oil pressure should trigger pilots to execute "impending [main rotor gear box] failure procedures," under the assumption that the aircraft will soon become inoperable. That means landing as soon as possible.

“Loss of MRGB oil pressure will render the helicopter unflyable within 15 minutes,” the aircraft’s Naval Air Training and Operating Procedures Standardization manual states.

l]“The [Marine aircraft commander’s] decision to continue on to Twentynine Palms, which was over 15 minutes away, was directly causal to this mishap.” the investigating officer wrote. “...I believe the fact that the [Marine aircraft] had recently had the MRGB pressure sensor and packing on the pressure transducer replaced in the days prior to the [Marine flight] [greatly influenced this decision.](#)”

### **A maintenance error**

A new filter cover improperly installed three days before Kealey and Satterfield were killed leaked or came off in flight.

The root cause of the trouble with the filter was a [maintenance error made long before the accident](#). The filter housing must be uninstalled to change the filter. But at some point, an [unapproved epoxy](#) was used to seal the filter body, preventing Marines from removing it.

As a result, three waivers were issued over months to forgo a filter change. It was deemed unlikely that the filter was dirty, an assumption supported by the post-crash investigation, meaning the filter itself was not a contributing factor.

However, during one failed attempt to change the filter while it was still installed in the aircraft, [the cover was damaged](#). That required that a new one be installed on Jan. 20. Three Marines worked to accomplish the task, which was later inspected and approved by a superior.

But because the filter housing was [contained in a small space](#), they did not realize that a retaining ring that holds the cover on was not seated properly.

That ultimately led to massive fluid loss during flight.

Ultimately, investigators found “oversights in judgment in various areas that do need to be addressed through mentoring and leadership,” however they did not find any negligence.

The investigator recommended changes to the filter housing maintenance that caused the leak. [Those include:](#)

- Ensuring proper supervision of flight-line maintainers removing the 40-micron filter housing.

- Update naval air publications with detailed instructions for removal, disassembly, inspection, reassembly and installation of the filter housing.
- Ensure all members of the UH-1 helicopter community learn pertinent information from the accident and begin training with it pending publication updates.
- Prohibit the installation of the filter cover without removing the entire filter housing.

Beyond that no action was recommended.

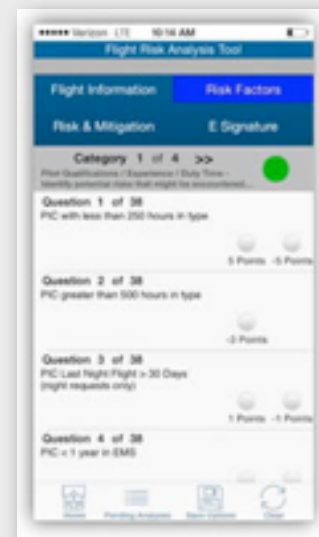
“I do not believe there should be any punitive action taken against any members of HMLA-169,” the investigating officer wrote.

## **PRISM Safety Management System releases iPhone app**

Professional Resources in System Management, LLC (PRISM) have announced the release of their Safety Management System iPhone app.

“We are continually looking for ways to enhance our users’ experiences and make it easier for our customers to effectively manage their [Safety Management Systems](#),” said **Chris Young**, VP of PRISM Helicopter Services. “We live in a mobile world and in order to remain efficient, our customers need to be able to access their SMS tools whenever they need to, wherever they are.”

**Steve Witowski**, VP of PRISM Business Aviation Services, added, “The release of the PRISM iPhone app is just one of the many resources PRISM offers to help employees [communicate hazards and promote a healthy and active safety culture](#). It’s important for aviation operators to track and analyze their risks so they can improve their safety performance.” The PRISM app allows users to easily submit flight and ground risk analysis and hazard/incident reports directly from their iPhones. The app can be used in both online and offline modes.



Other functionalities available in the new PRISM iPhone app include:

- Create new FRAT reports and access stored pending reports for final submission.
- Document all risks and mitigations.
- E-sign FRAT reports.
- Add up to 6 additional crew members.
- Record and type passengers' names for accountability.
- Pre-built drop downs that make for quick selections in certain fields (Aircraft Tail Number, Crew Names and Mission Type).
- Attach a photo to hazard reports through iPhone camera and photo gallery.
- Create email notifications to automatically send managers after a user has submitted a safety/hazard report.

*The PRISM app can be downloaded for free from the Apple iTunes store by searching, "PRISM Safety" or by [clicking here](#)*

## **NTSB LOC Forum Spotlights Culture, Training Issues**

Concerned that loss of control (LOC) accounted for more than 40 percent of fixed-wing general aviation accidents between 2001 and 2011, the NTSB kicked off a day-long forum recently to delve into [human performance, training and equipment factors](#) that play into these accidents.

"The general aviation industry has not seen the same improvements [as commercial airline operators]," NTSB member Earl Weener said, "While there were no fatalities in passenger flight accidents last year, 491 people died in general aviation accidents," he noted. [LOC was the single most frequent cause](#). The general aviation community, through the General Aviation-Joint Steering Committee, in 2011 began to take a data-driven approach to analyzing accidents, similar to that taken by the Commercial Aviation Safety Team. "But we are at the very beginning of the journey," said Wendell Griffin, director of FAA's Office of Accident Investigation & Prevention.



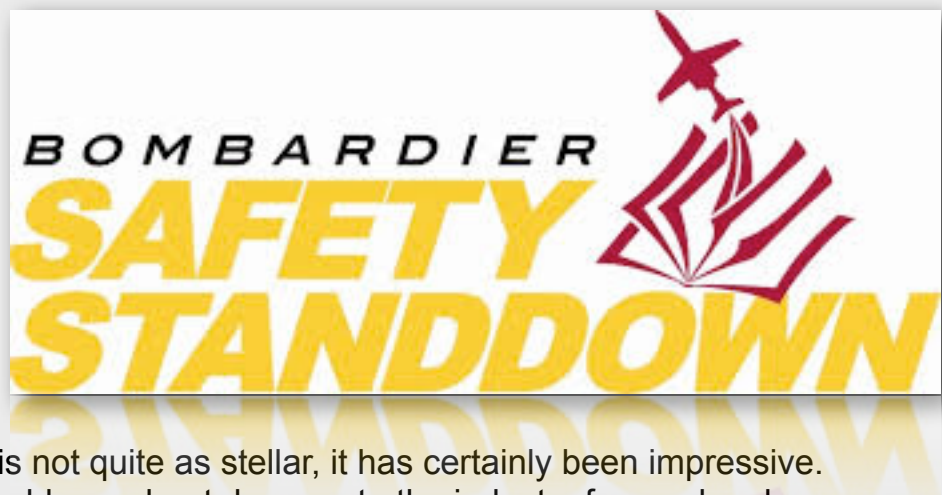
Participants agreed a key factor will be [changing the culture of pilots, including changing the way they approach flight](#). Pilots must use basic risk management, Griffin said.

George Perry, senior-VP for AOPA and head of the association's Air Safety Institute, pointed to needed updates in the training, saying it hasn't evolved. "[Pilot training is stuck in the 1970s](#)," he said, noting a lack of simulator training, attention to angle-of-attack and focus on stabilized approaches. Perry also cited the need to be able to improve technology. But whatever solutions are developed, he said, must be "simple, affordable and present a value proposition."

## **Bombardier Safety Standdown 2015**

Bombardier's 2015 Safety Standdown proved itself again this month to be an antidote to a dangerous time for aviation safety: a six-year period with no commercial aircraft accidents.

While the business aviation safety record is not quite as stellar, it has certainly been impressive. Discussions at the standdown about dangers to the industry focused on how periods of accident-free flying [can breed complacency](#). Managing distractions was the focus of this year's Bombardier Safety Standdown. [Lapses](#) can include when a crewmember is impaired by drugs or alcohol, or pilots who lose focus because their knowledge of their own glass cockpit operations barely meets standards for safe flight. The week's talks centered on how seemingly innocuous events left unchecked can and have become hazards or led to accidents. As Retired U.S. Navy Commander and pilot Al Gorthy reminded the audience, "Attention control techniques is the theme [for this year's standdown]. There are no easy answers to these kinds of complex [cognitive problems](#)...it's sometimes difficult to see through the window and into the human mind. But whatever the cause, inattention is an invitation to increased risk and error."





A recurring theme at all standdowns, however, is the importance of [personal and professional responsibility](#), a topic all presenters seem to believe is just as critical as understanding what action to take when faced with potentially hazardous situations.

Presenters acknowledged the hurdles employees everywhere face to ignore safety issues when pressured, such as fear of losing their job or reprisal by their boss. Those fears alone can make people clam up. But many of the speakers believe a bit of reluctance to speak up today can grow mightily into a personal philosophy that sounds like, [“They don’t listen to me anyway.”](#) Also spoken about is what it takes to be considered a true professional at everything, meaning someone who’s better than just mediocre. Gorthy said, “It’s time you realized that good is the enemy of great. And greatness requires risk and risk can mean failure. But failure is necessary for growth and growth leads to success. It’s time to be dissatisfied with our personal performance and raise the level of our expectations.”

The theme of personal responsibility and raising performance above the mediocre “minimum standards” label is a favorite of [Tony Kern, CEO of Convergent Performance](#). At this year’s event, he blended those ideas with his philosophy for dealing with distractions. “For us to pay attention, we have to have an intention,” Kern said, “a reason to care about what it is we do, or we’ll simply go back to the way we’ve always conducted business.” He declared the era of pilot cynicism, apathy and frustration over, although he conceded that full compliance could take a while.

Kern acknowledged the bad times of much of the past and he believes a better industry is just around the corner, but only for those people who can manage to get themselves [unstuck from dissatisfaction with the job](#). “Before you can do anything, you’ve got to care,” he said. Simply pontificating about a lousy work atmosphere absolves the individual of his own role in maintaining the status quo, no matter his rank in the organization. “You need to decide you want a positive outlook, because negative emotions close down much of a person’s concentration and focus,” he told the audience. “It doesn’t mean ignore the dark side, but consider changing the bad things and how that effort alone positively affects your outlook. [What’s going on around you doesn’t matter as much as your attitude.](#)” Kern believes professionals, people who consider safety a serious concern, “need to admit they can be better, that they can be excellent in their job. If we feel helpless, we’ll be helpless. First you have to care and second you need to take control of the things you can control.”

Imagine tying the concept of safety together with efficiency, Kern suggested. The bean counters might sit up and take notice if the flight department explained how running a safer operation makes the whole business more efficient.

“The idea that safety and efficiency of operation must be in opposition is nonsense,” he said. He swung back to talking about the need for pilots, flight attendants and maintenance technicians [to be better than the minimum standards required by the regulations](#). “Think about a marketing slogan that tells people our department is so safe that we’re proficient to minimum standards,” he said. Compliance with SOPs is important but hardly enough for Kern.

To support his philosophy of being better than simply meeting standards, Kern asked the audience to imagine a flight and how they’d perform when their life and the lives of their passengers depends upon performance that is near perfect. “Mother Nature could quite easily give you an exam that exceeds 100 percent of your potential, let alone demand performance above minimum standards. There’s quite a bit of work to be done in that huge gap [between FAA standards and perfection](#).

“The only one who can close that gap is you,” he said. “But why would you bother when you’re cynical and bummed out? You need to take this to heart: be a role model.” Kern told the audience to “stay on top of their game ... read stuff, share stuff. Have courage, be humble. Remember the love you had coming into this industry. You need passion for what you do. It’s tough to pay attention when you have a negative mindset. [Take some personal responsibility. No one is going to do it for you.](#)”

Gorthy asked the audience simply to pay attention during his talk and to give his words careful consideration. “The world is filled with knowledge but very little understanding,” he said. Gorthy told the audience the average adult attention span is 20 minutes and they hear only every fourth word. That’s a challenge. What’s important is what we allow ourselves to hear and seek to understand, because [“understanding is the number-one antidote to risk](#). Attention requires an incredible amount of focus. I’ve had many of those What am I doing? moments or What am I thinking? moments over my career.” Gorthy also believes it’s time for individuals to begin rising above the limitations imposed by other people and situations.

Clearly there is no magic pill or seminar that can improve a person’s attention to avoid distractions. As he watched many in the audience checking their smartphones every few minutes, Gorthy said, “The gratification from those devices is addictive. [But] it is your choice to allow that device to remain on and distract you. [You need to make the decision](#) not to allow those distractions into your life that interfere with your focus. That begins with willpower. Why not turn them off?”

Gorthy set the stage for the rest of the week by challenging attendees to understand themselves, their airplanes and the threats of the real world. “As leaders of the industry, it’s time to stop tip-toeing,” he said, “it’s time to realize we have a problem with [inattention and error](#) and it’s time to lead with disciplined people, thought and action.”

Safety Standdown is not about trying to achieve perfection, although everyone believed that might be a step in the right direction. “You’re not expected to be perfect,” Gorthy said, “but in this business good enough just isn’t. If you don’t have the time to do it right now, you might not get a chance to do it over again. I believe you already have exactly what you need [to manage distractions] right between your ears. But you have to have the willpower to put it into motion. If it’s important to you, you’ll find a way. If it’s not, you’ll find an excuse. [And any excuse involving safety is invalid.](#)”

As a man who has lost comrades, Gorthy’s final remarks presented a chilling challenge. “We’re engaged on a thousand battlefields with an elusive enemy, the enemy of [human error](#). It’s elusive, it’s stealthy, it’s opportunistic, it’s indiscriminate. It lies in dormancy and strikes on its own terms. It has no shelf life or expiration date. It has no schedule. We need to defeat this enemy now and stop pretending it doesn’t exist. If there was ever a time to make a difference it is now. Let’s not postpone our responsibilities any longer.”

### High-profile Accident Provides Teachable Moment

The NTSB investigation of the 2014 crash of a Gulfstream IV at Bedford confirmed that the two experienced pilots, members of a flight department preparing for IS-BAO stage 3 certification, ignored numerous pre-takeoff warnings and started the takeoff with the jet’s control lock still engaged. All seven people aboard died when the Gulfstream ran off the end of Bedford’s Runway 11. The investigation also revealed that, on many flights before the accident, the [crew had failed to conduct the standard flight control checks before takeoff](#), a simple task that would have called attention to the lock.

Tony Kern, CEO of Convergent Performance and a speaker at this year’s standdown, asked the audience which of those missed control checks they thought was most important. Most answered, “the one just before the accident.” Kern offered a thought-provoking response. “[\[I think\] it was the first one.](#) Whatever were they thinking about when they got to the end of the runway, knowing full well how important flight control checks were and they didn’t do them? If you could just find that moment in time.” Former NTSB member John Goglia discusses the crash in this month’s Torqued and news editor Chad Trautvetter examines what the accident says about IS-BAO certification.

## Fueling safety on our airfields



Poor fuel management can have costly and potentially catastrophic effects. Sam Crooks, operations and technical manager at fuel distributor Gulf Aviation, explores the risks, responsibilities and regulations surrounding fuel management at airports. The revelation that the 777's engine which caught fire in Las Vegas in September 2015 had already been deemed unsafe four years ago is a perfect example of what shouldn't happen when it comes to aviation safety. Although an isolated incident, it serves as cause for concern – especially considering that over the next 20 years, the number of global air passengers is set to reach 7.3bn annually, according to figures from the International Air Transport Association (IATA). To put this into context, an estimated 3.3bn passengers travelled by air last year. There are a myriad of challenges in the fuel operations business, but as passenger numbers grow exponentially, safety remains a top priority. Despite for fixed-base operations (FBOs) to increase efficiency, **it's important that due care and attention is never sacrificed in the name of speed**. Exceeding best practice

Various European industry groups have released a number of guidelines for aviation fuel handling, including the Civil Aviation Authority (CAA), IATA, the Joint Inspection Group (JIG), and the European Aviation Safety Agency. These guidelines should serve as a minimum standard to ensure duty of care is fulfilled when it comes to both new and existing customers. Fuel handlers should always aim to exceed these guidelines despite any time or cost constraints. Delivery and storage Fuel provided to aircraft needs to meet regulatory standards of quality to minimize the risk of incidents.

Each day, tests for water and other potential contaminants must be carried out to see whether the fuel is fit for purpose and operators should maintain all fuel equipment regularly. If tests are not conducted properly, fuel can cause wear and tear on engine parts – which could lead to fuel pipe blockages. In the most extreme cases, this could even cut power to engines during flight, endangering lives. People power All staff involved in handling fuel should be **professionally trained** and be in possession of the correct industry recognized qualifications. Supervisors need to be diligent when enforcing protocols, as they are on the front line when it comes to safeguarding all fuel operations. It's not just the safety of the aircraft and its passengers at stake either. Negligent handling of aircraft fuel can result in a number of health problems for fuel handlers – for example it is a hazardous substance which should never come into direct contact with skin. Regular audits must be carried out to guarantee that all personnel who receive, store and dispense the fuel are competent and confident when at work. Using the correct fuel Loading the wrong quantity or the wrong kind of fuel can impact an aircraft's performance in terms of endurance, balance and structural strength during flight. A recent example of this involves a fueling operator who began fueling an aircraft with the wrong kind of fuel, after noting there was no fuel grade ID marking at the plane's fill point. If a third party hadn't noticed the error and the plane had taken off without the situation being rectified, there would have been a high risk of the engine failing during flight. When off-specification product is used, it jeopardizes fuel quality and the risk of engine failure increases significantly. Staying cool In all the hubbub of activity in any aerodrome, aircraft operators must stay alert and look out for anything that could cause damage to the refueled or refueling hose. All possible precautions should be made to avoid any spillage during fueling to reduce the risk of fire. In the case of a fuel spillage, operators must carry out containment measures and rectify the situation at the first juncture. Looking ahead With passenger numbers taking off over the coming years and decades, everyone involved in fuel handling, including aviation bodies, ground staff and fuel handlers must be focused first and foremost on safety. It needs to be guaranteed that pressures for lower costs and **faster turnaround times** never affect the quality and best practice for fuel handling methods. When it comes to fueling, there is an immense pressure to get it right every single time. After all, most other critical flight systems are at least duplicated or designed to be failsafe. However if fuel fails, there is often no backup. Fueling properly, and with the correct type of fuel, is therefore paramount to operational efficiency and passenger safety. -

See more at: <http://www.mro-network.com/guest-blog/2015/10/16/fuelling-safety-our-airfields#sthash.HRW9PuOO.dpuf>



## 8 Ways Sleep Can Help (or Hinder) Your Work Performance

Americans have a sleep problem, and that means we have a work problem. We're getting less and less sleep (especially on work nights), to the point that the CDC has declared sleep deprivation a public health epidemic.

Entrepreneurs are particularly susceptible to sleep deprivation given the pressures and massive workloads that are common for business owners of all stripes. But insufficient sleep will cost you in just about every way -- physically, mentally, financially, and on the job.

In contrast, high-quality sleep can up your game and give you a competitive edge over the caffeine-addicted zombies wandering the office hallways. Here's a run-down of the many ways that sleep can help (and harm) productivity.

If anything remotely like a panacea for all problems exists, then sleep might be the closest thing to it. Here's just a sampling of the ways that getting enough sleep can improve work performance.

**1. It repairs our brains.** Sleep is critical for repairing the neural pathways in our brains, a process that's necessary for maintaining memory functions and learning new skills. In short, the only way to keep growing and improving at work is to consistently get a good night's sleep.

**2. It keeps us firing on all cylinders.** Sleeping well on a regular basis keeps us sharp by improving logical thinking, heightening our sensory perceptions, and enhancing our abilities to problem solve, pay attention, be creative, and make good decisions. In other words? Sleep is a vital component of pretty much all the characteristics that make for an exceptional leader at work.

**3. It prevents burnout.** Getting enough sleep reduces stress, [rejuvenates our bodies and brains](#), and promotes long-term job satisfaction so we remain productive for the long haul.



**4. You'll be a better coworker.** Adequate sleep [improves our mood](#) and [decreases the chances](#) that we'll be chronically irritable or impatient. Sleeping well also helps us [regulate our emotions](#) and behavior so we don't lash out at coworkers or clients.

## How Sleep Deprivation Hurts

Some experts posit that even mild sleep deprivation is so damaging to productivity that it's worse than not eating for days. Not convinced? Here are just some of the ways that not getting enough sleep can wreak havoc on our performance at work.

**1. It reduces our cognitive capacity.** When we aren't sleeping enough, our brains lose their ability to process learning that takes place during the day, and our short-term memory goes down the tubes. This means that sleep deprivation makes us less able to [consolidate information](#), process tasks, and concentrate at work, and it increases the chances of making a mistake on the job.

**2. It decreases engagement.** Sleep deprivation can cause us to [feel less invested in our work](#), thereby reducing work performance. It's also been linked to decreased quality of life at work--meaning tired people aren't just less interested in doing their jobs well; they also feel miserable while working.

**3. It costs us money.** Harvard researchers have found that the average worker [loses 11 days](#) of productivity every year because of insomnia. That amounts to \$2,280 per worker per year, or a whopping \$63.2 billion annually.

**4. It makes us sick.** Not sleeping enough (or well enough) puts us at risk for a variety of physical and mental health conditions, including depression, anxiety, heart disease, kidney disease, high blood pressure, diabetes, stroke, and immune system deficiencies. Whether mild or severe, these health problems can severely inhibit our ability to be productive workers.

Need one more reason to make sleep a priority? All the [top performers are doing it](#). Increasingly, research is finding that great performers make a point of getting enough sleep (at least eight hours a day), and companies are starting to take notice. More and more, top companies are enlisting sleep experts to weigh in on office culture and encouraging employees to get the rest they need--even if that means taking naps in the office.

Make sleep a priority in your own life by advocating for your personal sleep needs, practicing [good sleep habits](#) (e.g. not using electronics in bed and keeping the bedroom dark and cool), and enlisting the help of [sleep supplements](#) if necessary. Your body, mind, coworkers, and business will thank you.

## TED: Ideas Worth Sharing

You're not at your best when you're stressed. In fact, your brain has evolved over millennia to release cortisol in stressful situations, inhibiting rational, logical thinking but potentially helping you survive, say, being attacked by a lion. Neuroscientist Daniel Levitin thinks there's a way [to avoid making critical mistakes](#) in stressful situations, when your thinking becomes clouded — the pre-mortem. "We all are going to fail now and then," he says. "The idea is to think ahead to what those failures might be."



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