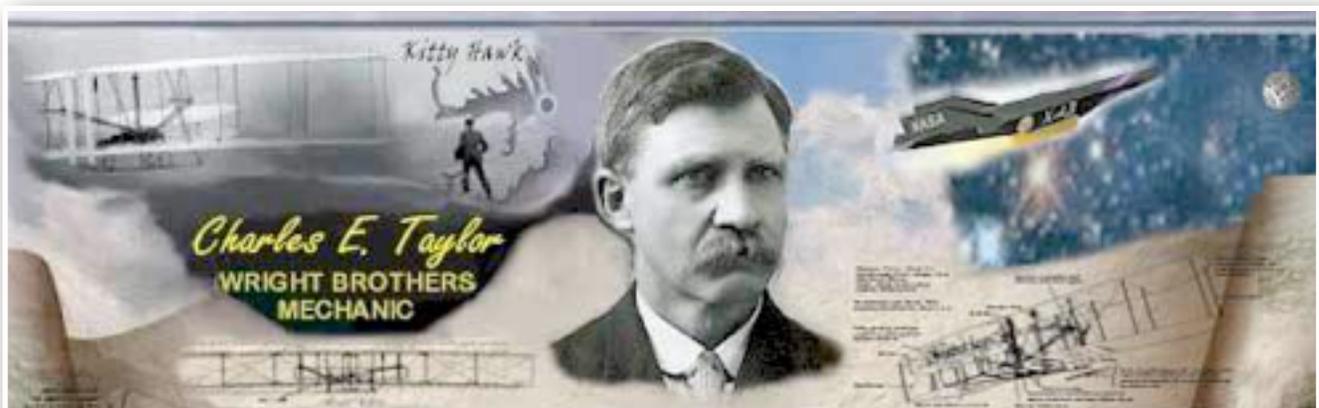


Aviation Human Factors Industry News

Volume XV. Issue 12, June 9, 2019



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

Hello all,

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

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

★**Presidential Message on Aviation Maintenance Technician Day**

★**Safety Initiative Launched To Improve Compliance With Procedures**

★**Detached rudder cable brings down Piper**

★**Are Your Safety Messages Getting Through to Your Employees**

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Presidential Message on Aviation Maintenance Technician Day

Each day, millions of Americans rely on our Nation's strong aviation infrastructure to travel and do business. [On Aviation Maintenance Technician Day](#), we acknowledge the thousands of hardworking men and women who help ensure the safety, security, and reliability of the aviation industry.



Our country's storied history of flight is a testament to the [innovative spirit and industriousness](#) of the American people. Today, we honor a talented man who exemplified these traits—[Charles Edward Taylor](#). Often referred to as the “Father of Aviation Maintenance,” Charles served as a mechanic for Orville and Wilbur Wright and was a pioneer in the aviation industry, making fundamental contributions to the building of the engine used to help man achieve powered flight.

My Administration is committed to helping expand opportunities for our country's hardworking men and women to develop the skills to succeed in technical careers. Last December, the [National Science and Technology Council's Committee on STEM Education](#) released the Federal five-year [STEM](#) education strategic plan for incorporating the most advanced resources and research into educating and training our future workforce. I also signed into law a reauthorization of the [Carl D. Perkins Career and Technical Education Act](#) to provide career-focused training and education to nearly 12 million students and workers. Additionally, I established the National Council for the American Worker to expand apprenticeships and encourage investment in worker education.

Today, we express our gratitude to the men and women who carry on our Nation's legacy of aviation and work diligently to ensure our aircraft continue operating at the standard of excellence synonymous with American industry. Looking forward, my Administration will continue to prioritize offering the next generation of technicians, mechanics, and engineers [every opportunity to succeed and preserve our country's status](#) as the world's leader in aviation technology and industry.

Safety Initiative Launched To Improve Compliance With Procedures

A new FAA online training resource tackles corporate culture and accountability around failure to follow procedures-related incidents.

Last September, a Jetstar Airways Airbus A320 utilized normal braking when thrust reversers were found inoperable during landing roll. A post-flight inspection [revealed lockout pins still installed in the hydraulic control units](#). Investigation of the incident concluded that maintenance personnel failed to remove the pins after a three-day maintenance check. Contrary to operator task cards prescribing sequential functional checks, engineers signed off on required tests based on checks completed earlier in the day.



To save the time required to check out a lockout pin from the tool crib, [a substitute pin—designed for in-service use and without an attached warning flag—was used](#). The report describes a series of contributing factors leading to the failure to follow procedures (FFP). [Unanticipated maintenance needs](#) and an [expedited departure schedule](#) put added pressure on maintenance personnel, who worked extra hours and through breaks to return the aircraft to service on time. And [generic cockpit notices](#) were used in lieu of specific warning labels for thrust reverser de-activation, reportedly a common practice.

The incident is one a new FAA initiative aims to prevent. William Johnson, FAA chief scientific and technical advisor for human factors in aircraft maintenance systems, says the story is all too familiar. “Despite the common understanding of the importance to use written technical procedures, [failure to follow instructions continues to be among the largest safety issues in aviation maintenance](#),” says Johnson. “FFP is not a technical issue; it is about [attitude and commitment](#).”

Johnson is leading a new project focused on increasing attention on procedural compliance and educating and empowering MRO leadership and personnel. “There’s often lots of blame that goes around for failure to follow procedures. Mechanics are the obvious scapegoat, [but blame could also lie with](#) inspectors who overlook procedures, or managers that rush a task to meet a production schedule or flight departure time,” he says.

[A new FAA online training resource](#) focuses on corporate culture and individual accountability. Trainees who complete the course pledge to become champions of the procedural compliance culture and not to blame others for their own failure to follow procedures.

FAA officials say around [4,000 individuals](#) have taken the online course since it was released in October. Anyone can access it for free at

www.humanfactorsinfo.com

<https://www.faasafety.gov/>

Detached rudder cable brings down Piper

The private pilot reported that, shortly after takeoff for the personal flight, the Piper PA-18A began to yaw left.

He applied right rudder input in an attempt to regain yaw control, however the airplane did not respond. He initiated a forced landing near Coeur D'Alene, Idaho. The airplane hit the ground in a nose-down attitude, and then came to rest oriented about 90° perpendicular to the runway.



Post accident examination revealed that the forward right rudder cable, between the front and rear seats, **had detached** at the rear seat foot pedal connection. The cable had pulled through its swage sleeve, indicating that **the swage had not been adequately compressed**. The **cable appeared** to have been recently replaced, however, during a review of maintenance records, **no logbook entry was found documenting the replacement**.

Probable cause: The loss of yaw control due to an inadequately compressed rudder swage, which resulted from inadequate maintenance and led to the separation of the forward right rudder cable.

NTSB Identification: [WPR17LA102](#)

This May 2017 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.

Are Your Safety Messages Getting Through to Your Employees?

by [John Goglia](#)

Those of you familiar with safety management systems know that one of the four so-called pillars of SMS is [safety promotion](#). (For those not familiar with SMS, the other three pillars are safety policy, safety risk management, and safety assurance.)



As one of the critical components of any SMS program, safety promotion includes [communicating to relevant employees](#) information necessary for them to do their jobs safely. While the FAA’s SMS rule currently applies only to Part 121 air carriers at this time, many aviation companies—especially Part 135 air carriers that fly to Europe—have adopted SMS programs because of the safety benefits and because such programs frequently result in [cost-savings by reducing or eliminating the costs of incidents and accidents, including injuries to employees and damage to property](#). The FAA’s rule—Federal Aviation Regulation Part 5 <https://ecfr.io/Title-14/pt14.1.5>—includes “safety communication” as a component of its safety promotion requirement. The rule includes the following requirement, among others: “The [air carrier] must develop and maintain means for communicating safety information that, at a minimum...[conveys hazard information relevant to the employee’s responsibilities](#).” The rule does not define the word “conveys,” so we can assume its ordinary dictionary definition, one synonym being “communicate.”

But is it really enough to just “communicate?” Or should we be including a requirement to ensure that your message is read, understood—and most importantly—[acted upon appropriately](#)?

I have been a long-time proponent of safety management systems and have co-authored [three textbooks](#) on the subject. But even being immersed in the subject, I sometimes struggle with how to accomplish some of the most basic tenets of an SMS program—in this case, safety communication. Sure, it's easy to *give* employees information, but harder to ensure that they receive and act appropriately on it. Especially in the age of email, texts and other electronic means of sending messages, you can reach a worldwide group of employees in seconds. [But have you successfully communicated?](#) One of my pet peeves when I was a Member of the National Transportation Safety Board was asking an employee if something was successfully accomplished and hearing the response, “Yes, I sent him an email.”

I'm pondering all this because of an [interesting podcast](#) I've been listening to called Breach <https://www.carbonite.com/podcasts/breach/>, which looks at some of the world's biggest data breaches. Cybersecurity is not only a critical privacy and national security issue, but I also see it as having implications for the safety of our transportation system. The podcast examines how several major data breaches occurred and includes interviews with cybersecurity experts at the U.S. General Accountability Office or GAO—Congress's investigative agency—regarding the major breach two years ago at the credit reporting company, Equifax. I was particularly struck by the analysis of what led to the Equifax breach, because it has such implications for aviation's communication of critical safety information. I decided to dig deeper and review the GAO's report.

A short recap of the Equifax breach <https://www.gao.gov/products/GAO-18-559> : “In March 2017, unidentified individuals discovered the presence of [a known vulnerability](#) in software running on Equifax's online dispute portal that could be used to obtain access to the system. In May of that year, attackers exploited the vulnerability and began to extract data containing PII [personally identifiable information] from Equifax's information systems.” The breach “resulted in the compromise of records containing the PII of at least 145.5 million consumers in the U.S. and nearly 1 million consumers outside of the U.S.”

I highlight the words “known vulnerability” because Equifax had been informed by a little-known agency within the Department of Homeland Security—U.S. Computer Emergency Readiness Team (US-CERT) —that a vulnerability in certain software had been discovered.

The mission of US-CERT is to catalog vulnerabilities and disseminate them to government agencies and the public so they can be addressed. Of course, disseminating them to the public means hackers also become aware of the vulnerabilities so companies have to act fast when they're notified of a problem.

According to the GAO, Equifax did act quickly on the information it received and sent out an email to some 430 employees with information on the software vulnerability and the patch to be applied. "According to Equifax officials, the [software] vulnerability was not properly identified as being present on the online dispute portal when patches for the vulnerability were being installed throughout the company. After receiving a notice of the vulnerability from the United States Computer Emergency Readiness Team in March 2017, Equifax officials stated that they circulated the notice among their systems administrators. **However, the recipient list for the notice was out-of-date and, as a result, the notice was not received by the individuals who would have been responsible for installing the necessary patch.**"

So, basically, 145.5 million people had their identities put at risk of being stolen because an Equifax email list of system administrators had not been updated! In addition, it appears that Equifax did not have a system for ensuring that mandatory patches were actually applied—in other words, ensuring that an email sent to hundreds of people responsible for protecting the private information of hundreds of millions of people **had been properly acted upon.**

So, the moral of the story here is, if it can happen to Equifax it can happen to any one of us who sends important safety messages out into the ether and expects them to be read, understood and acted upon. This is true whether the message goes to one person or to hundreds or even thousands.

Of course, I'm not suggesting that we stop using electronic means of communication. And I'm certainly not suggesting resorting to word of mouth – the game of telephone comes to mind. But I am suggesting that for every critical safety email or other electronic message sent, **there be a system for verifying that it was received by the correct people and properly acted upon.**

<https://ecfr.io/Title-14/pt14.1.5>

<https://www.carbonite.com/podcasts/breach/>

<https://www.gao.gov/products/GAO-18-559>

The fifth pillar: PHI, Inc.

By any measure, 2008 was a tragic year for the U.S. helicopter emergency medical services (HEMS) industry. From December 2007 through October 2008, [35 people lost their lives in 13 helicopter air ambulance accidents](#) — the most ever in an 11-month period.

According to calculations by Dr. Ira Blumen of the University of Chicago, the fatality rate for HEMS crewmembers in 2008 was 164 per 100,000 employees, ranking it as [the most dangerous job](#) in America that year.



Since then, a concerted industry-wide effort has attempted to improve safety in the sector, with Congress, the Government Accountability Office (GAO), Federal Aviation Administration (FAA), National Transportation Safety Board (NTSB), industry experts, and the media all playing a role in addressing [HEMS safety issues](#). The NTSB held a public hearing on the subject in 2009, which led to them issuing recommendations.

Among other things, the NTSB wanted to see HEMS operators [adopt safety management systems](#), night vision imaging systems, autopilots, scenario-based training, and flight data recording devices. Some of the NTSB's recommendations were incorporated into a final rule issued by the FAA in 2014, while operators have voluntarily adopted others.

Around this time, one company, the offshore and air medical operator [PHI, Inc.](#), decided that simply reducing the accident rate wasn't enough; that its goal should be [no accidents at all](#). So, in late 2010, PHI launched a safety initiative called "[Destination Zero](#)" that extended to its HEMS operations under PHI Air Medical, LLC.

"[Destination Zero](#) was born of a desire [to change and strengthen our culture](#), to have a sense of direction and a platform to direct our energy and aspirations for a more focused, more deliberate approach to safe operations," explained PHI president and chief operating officer Lance Bospflug. "When we launched [Destination Zero](#), our goal was to create a work environment that is accident- and incident-free — a work environment with zero personal injuries, zero flight accidents, and zero preventable occurrences."

Beyond a commitment to continued investment in technology, systems, and processes, the organization set out to make [Destination Zero](#) a belief system that changed the culture of the company by fundamentally empowering individual employees.

"With education, ongoing engagement, and unwavering commitment by leadership at every level of PHI, [Destination Zero](#) became a movement across the company — with people embracing their responsibility to 'Stand Up, Speak Out and Take Action' as important as any function for which they were responsible," Bospflug said. "Because our workforce and stakeholders are constantly changing, it is a message which needs to be told and retold so that new employees, new partners, and customers understand the passion, the history, the fears, and the expectations that were behind its original intent."

Understanding that a culture of safety needs to be [supported by a solid and proven framework](#), PHI set out to develop a robust safety management system (SMS). Guided by International Civil Aviation Organization (ICAO) and FAA standards, PHI initially developed its SMS using the [four standard pillars](#) of safety policy, safety risk management, safety assurance, and safety promotion.

However, as the company evolved its approach to the [human element](#) of safety, it came to believe that the traditional SMS required new and additional connection points to ensure the safety and well-being of employees and customers.

“[We] recognized that it is the [human factors that most determine](#) the ability to achieve and sustain Zero,” Bospflug said. “The more we introduced new initiatives around the human element, the more we recognized that they were obscured in a traditional SMS. We believed to ensure their full effectiveness and longevity, we needed to officially place them where they belong — at the heart of our SMS — in a codified manner.”

Consequently, PHI added a fifth pillar to its SMS, [the human dimension](#) of safety, which addresses the mental, social, and psychological well-being of individuals as it relates to one’s performance. This pillar now sits at the center of PHI’s SMS and influences and connects each of the other four pillars, reflecting how human beings influence each component of a safety management system.

“Within the fifth pillar, we will expand our work on, and support of, [Destination Zero](#), life-saving thinking, life-saving behaviors, and brain-centric hazards and individual and team reliability. Within this new pillar, we will work on important initiatives such as unhealthy fear mitigation, fatigue risk management, the role of positivity on performance and more,” Bospflug said.

“And, the more we explore human boundaries, the more we recognize the need to better understand, manage, and support the mental, social, and physiological aspects of the [human dimension](#),” he continued. “That is at the core of this pillar, one that is not only in compliance with the FAA and other global regulatory bodies, but demonstrates an unwavering commitment by PHI to do what is right and best for each employee.”

PHI announced the addition of this fifth pillar to its SMS in December last year. Bospflug said that initial feedback to the concept has been positive, “yet we are clear that [we must continue to demonstrate](#) a program’s merit before our informed, intelligent workforce will truly buy in and own it.” He said the company intends to take a sustained, methodical approach to introducing, educating, and reinforcing the elements of the human dimension of safety.

However, Bospflug is optimistic about its long-term potential. “We believe the human element, and [the science around it](#), will be transformational in how we empower our employees to be and work safe,” he said. “We have only begun to scratch the surface of the human element, and as we continue to invest in the understandings and drivers of the human psyche, we will uncover new and more profound ways to educate, inform, and engage our employees to embrace the safest behaviors and practices.”

What PHI is doing isn’t just noteworthy for the aviation and air medical transport communities; it could potentially benefit all companies that rely on humans to perform tasks.

“Regardless of the industry, we all share one thing — people,” Bospflug said. [“People are at the heart of our success](#) and our ability to be and work safe. This is true for healthcare, petrochemical, energy, aviation, and many other industries. When it comes to human factors, it doesn’t matter what industry it is; people are what define success.”

Despite its current financial difficulties (PHI, Inc. filed for Chapter 11 bankruptcy protection in March 2019 in order to address the upcoming maturity of its unsecured senior notes and strengthen its balance sheet), PHI’s commitment to safety and more specifically [human factors science](#) will serve them well as they enter the second decade of their journey to Destination Zero.

“Through the human dimension of safety, we are making a bold statement that even in a changing and even challenging economic environment, we will continue to build upon what we have invested the most in over the past decades — the most important element of safety — each of our people,” said Bospflug.

As an industry, we should appreciate PHI for its transparent commitment to zero being not only obtainable, but also the only acceptable number of accidents.



June 1, 2019

Safety Initiative Update

Online Course for Wings Credit

As promised, I am working to put up some content that is valid for FAA Wings credit. For starters, I updated a course that I had previously created called "Call the Ball." The course focuses on how to make better and safer approaches and landings and it is valid for one Knowledge-3 Wings Credit. Click [here](#) to visit the course promo page which has a button to begin the course.

More Accidents Analyzed

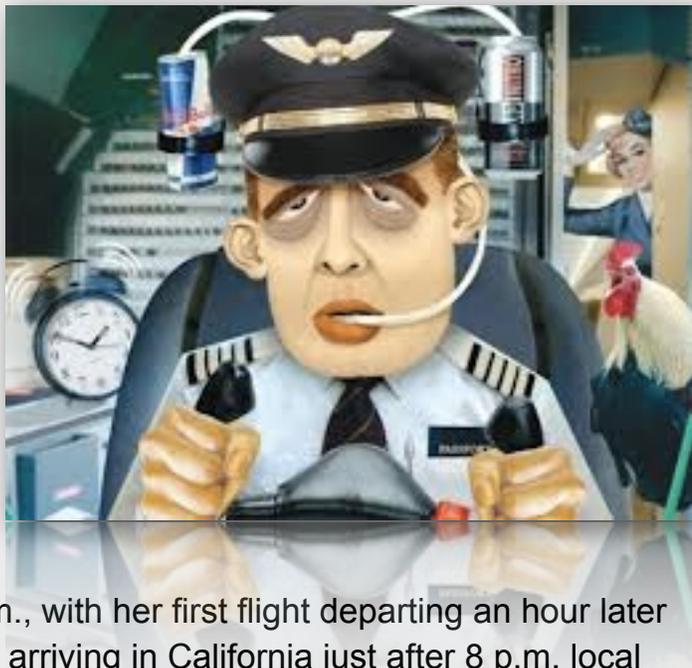
I posted several additional accidents to the "[Accident Analysis](#)" section of my website. One of them involving, a Piper PA46 350P, the turboprop version of the Piper Malibu, illustrates a common trap that lures pilots into attempting to land from an unstabilized approach. Read about the trap and how to avoid it.

http://2k32o.r.a.d.sendibm1.com/mk/mr/RegzCr4AbxorO-F6iIgWYmtf-BTJhcME5_mJ_51qsgxPqXbGhRA2Qt8Q5IqN92dSzmIqkeDC8V12zi4Wy50SU8PEYy-j5PYa1e3ACI2R1oIL

Why allowing pilots to sleep in the cockpit might improve airline safety

Airline pilots are often exhausted. An extreme example happened in 2008, when a pilot and a co-pilot both fell asleep at the controls, missing their landing in Hawaii -- earning pilot's license suspensions as well as getting fired.

More recently, overtired pilots came very close to landing on top of another airplane at San Francisco International Airport in 2017.



It's not uncommon for a pilot for a major commercial airline to, for instance, start work in Florida at 5 p.m., with her first flight departing an hour later for a five-hour trip across the country, arriving in California just after 8 p.m. local time. Then she might get a short break and fly a 90-minute short-hop flight to to another California city.

When she lands from this second flight, she has spent six and a half hours of the last nine in the cockpit. She is also [three time zones](#) from where she started work, and her body thinks it's [2 a.m.](#) There's no doubt she's tired -- and she's lucky not to have encountered any schedule adjustments for aircraft maintenance or weather delays.

The airline industry and the government agency that regulates it, the Federal Aviation Administration, have taken steps to reduce pilot fatigue, but many pilots and others remain worried that two pilots are required to remain awake and alert for the entire flight, though one or both may be dealing with [symptoms of fatigue](#). One possible suggestion is letting pilots take brief naps in the cockpit.

As researchers of consumer opinions about the airline industry, we've found that the American public is wary of this idea, but may feel better about it once they've heard an explanation of how it [actually makes their flights safer](#).

Limiting pilots' work time

Pilot fatigue can be difficult to predict or diagnose -- especially since tired pilots usually manage to take off, fly and land safely. Even when something goes wrong, accident investigators may have little evidence of fatigue, except perhaps the sound of someone yawning on cockpit audio recordings.

In 2014, the FAA imposed the first new pilot-rest rules in 60 years, limiting overall on-duty time and flight hours per day depending on when a pilot's shift starts. The rules also established a process by which pilots can report fatigue without being disciplined by their airlines or the government.

Resting in the cockpit

It's widely known that a short nap can improve a pilot's alertness. Some planes, such as those commonly used on long international flights, have beds their pilots and other crew can use, but smaller planes don't have the space.

Only flights that are longer than eight hours require an additional pilot to be on board so one pilot at a time can rotate out for rest. On shorter flights, US regulations expect both pilots to remain alert for the entire length of the flight, without any chance for rest during the flight.

Some countries, including Canada and Australia, allow for pilots to nap in the cockpit. In an example from China, a pilot was caught napping and faced disciplinary action for napping in the cockpit.

The official procedure to allow for pilots to nap in the cockpit is called "controlled rest in position." CRIP has established policies and procedures to allow pilots to rest.

The rules are strict. The Air Canada Flight Operations Manual, for instance, says a pilot who wants to rest must notify the co-pilot and a flight attendant.

The pilot can sleep for no more than 40 minutes, and must wake up at least half an hour before the descent for landing.

They get the first 15 minutes after the nap to fully awaken, during which they can't resume actually flying the plane, unless they need to help deal with an emergency.

Consumers' opinions

As consumer opinion experts, we have conducted a series of studies to see what members of the public think about letting pilots use this CRIP procedure to nap in the cockpit. In general, people are less willing to fly when they know a pilot might be allowed to sleep at the controls, and women are less willing than men.

In our research, we find that this is mostly attributed to fear, because they don't understand the benefits of pilot naps. Some of our earlier work has shown that when consumers understand the value of a new procedure, they'll feel better about it. It seems likely that explaining to people how better-rested pilots makes a flight safer could help more people feel comfortable flying in a plane where the CRIP procedure is allowed.

What do pilots think?

In a follow-up study, we asked pilots what they thought about being allowed to rest in the cockpit during flight -- and they were much more enthusiastic than nonpilots. Seventy percent of pilots favored allowing CRIP. On average, all participants who completed the survey felt that naps of 45 minutes should be approved, which was closely related to the 40 minutes suggested by scientific evidence.

They also recognized the need for the pilot to be awake at least 30 minutes before beginning the descent to landing. Overall, the participants thought there were very few potential problems with CRIP and said it would be useful.

However, some pilots did express worry about unintended consequences of CRIP implementation. The airlines, knowing that pilots could take naps during the flight, might be tempted to impose more rigorous flight schedules that would eliminate any benefits derived from CRIP.

Lastly, participants commented on how this procedure is already being used by international carriers such as Air Canada and Qantas with success. So far, those companies' crews have not registered widespread complaints about abuse of scheduling practices, and none of the survey respondents who fly for those airlines complained about this potential problem.

<https://www.seattletimes.com/life/travel/faa-suspends-pilots-who-fell-asleep-on-hawaii-flight-overshooting-airport/>

<https://www.bloomberg.com/news/articles/2018-09-24/after-near-disaster-ntsb-eyes-tech-to-keep-planes-on-runways>

<https://www.skybrary.aero/index.php/Fatigue>

<https://flightsafety.org/wp-content/uploads/2018/11/Controlled-Rest.pdf>

https://www.ecfr.gov/cgi-bin/text-idx?SID=7fc4e6fe69deee75c9d2ffd80b47d30f&mc=true&tpl=/ecfrbrowse/Title14/14cfr117_main_02.tpl

<https://www.sciencedirect.com/science/article/abs/pii/S0001457513004077?via%3Dihub>

<https://flightsafety.org/wp-content/uploads/2018/11/Controlled-Rest.pdf>

<http://ojs.library.okstate.edu/osu/index.php/CARI/article/view/7456/6857>

<https://www.sciencedirect.com/science/article/abs/pii/S0967070X17305450?via%3Dihub>

<https://commons.erau.edu/cgi/viewcontent.cgi?article=1181&context=ijaaa>

<https://ntrs.nasa.gov/search.jsp?R=19950006379>

<http://ojs.library.okstate.edu/osu/index.php/CARI/article/view/7733/7158>

Kentucky Launches Fast-Track Program in Aviation Mechanics for Military Veterans

The aviation mechanics program at Somerset Community College.

Kentucky has launched a program that gives military veterans a [fast track](#) to earn certification in aviation mechanics.

Veterans who have experience working on military aircraft can now [get credit for their skills](#) that can be used toward certification from the Federal Aviation

Administration. The new program called VALLO, which stands for Veterans Accelerated Learning for Licensed Occupations, is available at Somerset Community College and Jefferson Community and Technical College.



Rick Johnson is vice president of the Kentucky Science and Technology Corporation in Lexington, which does innovation-based economic development for the state and federal government, as well as industry. He said the fast-track certification now available in Kentucky is geared to help military veterans transition to [high-paying jobs](#) in the state's growing aerospace industry.

"For example in the Army, if you kept C-130s or Blackhawks flying you can get FAA certification in one semester at Somerset Community College," said Johnson.

The program has been initiated due to the availability of training through the Kentucky Community and Technical College System.

"The team we have at KCTCS discovered that two of their campuses have FAA certified maintenance technician programs and their instructors there will give credit for education and experience in the military and now that's been formalized," said Johnson.

The other partners in the program are the University of Louisville and the Kentucky Commission on Military Affairs.

Kentucky ranks second in the U.S. [in the export of aviation and aerospace products](#) and the nation is facing a critical shortage of trained workers in that sector, according to Stewart Ditto, executive director of the Kentucky Aerospace Industry Commission.

Wiring failure leads to forced landing

The private pilot, who was the builder of the Bede BD-5B, said the purpose of the test flight was to obtain rate of climb data on the airplane, which had recently been completed.

Following the sixth climb of the flight, the engine began to run rough. The pilot turned back toward the airport and entered the traffic pattern, and the engine [experienced a total loss of power](#). The pilot determined that the airplane would not reach the runway and performed an off-airport landing in a field near Portland, Indiana. The field was soft and contained high vegetation, which resulted in a ground loop during landing.



The pilot noted that, during the flight, the No. 1 cylinder exhaust gas temperature and cylinder head temperature had dropped, indicating that the No. 1 cylinder was not firing properly. It was after the No. 1 cylinder quit firing that the No. 2 cylinder also quit firing.

A post accident examination of the engine revealed that the wire in the No. 1 cylinder connector between the engine control unit and the fuel injector **was not properly crimped at the connector**, which allowed the wire to be pulled back.

In addition, a wire to the No. 2 connector **was found broken where the wire had been spliced**. This wire most likely separated at the spliced area due to engine vibrations after the No. 1 cylinder ceased operating.

Probable cause: A failure of the wiring between the engine control unit and the fuel injector, which resulted in a total loss of engine power.

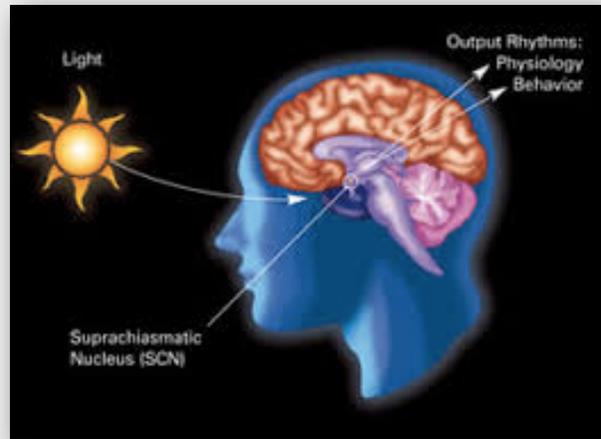
NTSB Identification: [CEN17LA205](#)

This May 2017 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.

Light and The Circadian Rhythm: The Key to a Good Night's Sleep?

While scientists have long understood the importance of getting enough sleep, the key part played **by light exposure can sometimes be overlooked**, reports BBC News.

Without any access to light, the human body clock appears to drift, adding about half an hour on to its 24 hour cycle for each day of darkness. Jetlag is the most obvious example of the effect light can have. Exposure to light in the new time zone helps reset our body clock to local time, telling us the right time to sleep. In 1800, most people across the world worked outside and were exposed to the change from day to night. Today, many of us miss out on these environmental cues as we work inside. Agriculture and fishing, for example, now make up just 1% of jobs in the UK.



[We have become a light deprived species](#), and this has far reaching consequences for the quality of our sleep, and consequently our wellbeing. The optimum amount varies from person to person, but we do know that our bodies need exposure to very bright light that the majority of indoor lighting does not provide.

[Get the full story at www.bbc.com](http://www.bbc.com)

Words that Weaken Your Writing

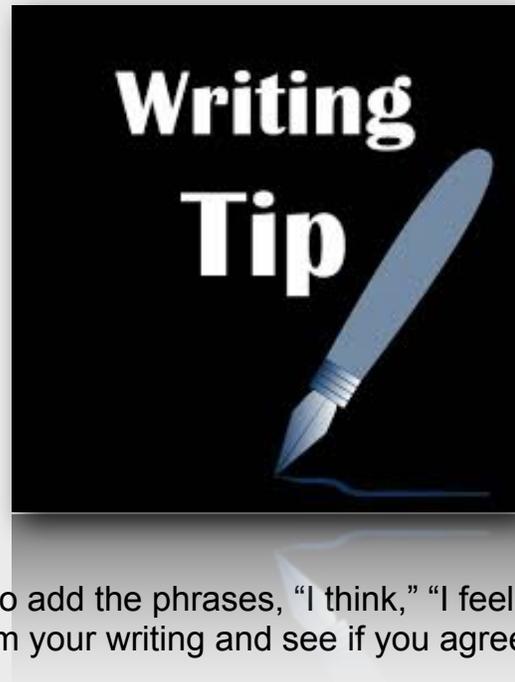
Deanna Harms, executive vice president at Greteman Group, a marketing communications agency based in Wichita, the Air Capital.

I'm against banishing books, but all for exiling certain words and phrases. Whether drafting a press release, a speech for your CEO, or a new-product blog, your outcome will benefit from a few suggestions.

Omit lazy words. Flabby writing lacks discipline. Filler, fluff words add little. These include:

- Really
- Very
- A lot
- Just

Do the work. Replace vague words with concrete examples. Don't just say your new AOG service gets aircraft back in the air fast. Say, on average, it restores aircraft to service within 24 hours. Or don't say you're about to launch a revolutionary product. Say that, "Achieving 130 patents to date underscores our technological innovation." **Whip your prose into shape** by editing and reading copy aloud. Have others provide constructive criticism. They see things the author may be blind to.



If you're writing an opinion piece, everything you say reflects your thinking. You don't need to add the phrases, "I think," "I feel" or "I believe" before statements. Strip them from your writing and see if you agree - **it's stronger without them.**

State your case. Rid copy of add-nothing, overused phrases. These include:

- The fact of the matter
- In order to
- At the end of the day
- Going forward

Develop Fresh Approaches

I would never suggest issuing a press release with a quote saying,

"I am excited to announce"

Not that this phrase was bad the first time it was used, but a zillion repetitions later, it's time for something original. Think about what you're trying to convey. Yes, you are excited/happy/thrilled/elated/proud about the good thing that is happening, but what other way might you express its significance?

Here's a fabricated example: "While competitive aircraft are sure to follow, being first to market gives our clean-sheet flying car a buy-now advantage. Those of us who are Jetsons at heart will rejoice to learn that certification is on track for this fall and first deliveries for early 2020."

Stick to Short, Simple Words

Aviation has many long, technical terms. You can't avoid them. That makes it even more important to not needlessly complicate your text. Why say "utilize" when "use" works perfectly well? Switching a one-syllable word for three doesn't make your writing sound smarter or more professional. Consider your audience and the context, then say what you need **concisely and clearly**. For anything other than an academic paper, strive for a **conversational voice**.

Axe what doesn't work. Be ruthless. Your audience will thank you by reading more than just the cutlines.