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

In this week's edition of 'Aviation Human Factors Industry News' you will read the following stories:

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Human Factors in Aviation Maintenance

Dr. Bill Johnson, a frequent contributor to this newsletter, is the FAA Chief Scientific and Technical Advisor for Human Factors in Aircraft Maintenance Systems. His comments are based on nearly 50 years of combined experience as a pilot, mechanic, airline engineering and MRO consultant, professor, and FAA scientific executive.

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“Circumstance does not make the man; it reveals him to himself.” So wrote James Allen in his classic, 1904 book, “As A Man Thinketh.” Allen’s work is a powerful study of how an individual’s thoughts shape his or her life.

Allen’s belief that our external world is a foundation on our inner world of thought is not unique to him. Other great thinkers throughout history have shared the same belief. What contribute to the value of Allen’s work is its simplicity, common sense and brevity. Those three factors all stem from the common characteristic that truth can always be stated simply.

I hope your will purchase or be gifted a copy of this powerful little book. It is a book I had read many years ago. But, reading it again, now, was a much more powerful experience for me. It is often so easy to get caught up on the everyday challenges of life that we forget many of the simple common sense truths necessary for our happiness. We allow ourselves to get so caught up in the things of everyday life that we don’t allow ourselves to circle our mental wagons to protect and re-capture our minds. Allen’s little book is a tool to help us do this re-capturing.

Allen’s powerful metaphor of comparing a person’s mind to a garden vividly captures the power of our thoughts. When we realize that our thoughts an be compared to seeds planted in a garden, we better understand that whatever seeds (thoughts) we choose to plant will produce a harvest.

Each of us is the farmer of our mental garden. Each of us has the responsibility of keeping our mental gardens free from the weeds that can destroy and limit the beauty and happiness of our lives. Each of us is challenged to weed out those thoughts that are disruptive to our continual growth and development. In Allen’s words, “…. man is the causer (through nearly always unconsciously) of his circumstances, and that, wiliest aiming at a good end, he is continually frustrating its accomplishment by encouraging thoughts and desires which cannot possibly harmonize with that end.”
As we look around our world today, we find much confusion. Allen, writing in 1904, believed that people who have no central purpose in their lives, easily fall victim to petty worries, fears, troubles and self-pity. These mental seeds produce a harvest of failure, unhappiness and loss. To Allen, doubt and fear are the great enemies of knowledge. The person who feeds these enemies and who does not continually work to destroy them, undermines personal happiness and fulfillment.

In our society today, more and more people are becoming aware of how their eating habits affect their physical bodies. We are eating better foods, smoking less and drinking less alcohol. But, we have yet to act on strengthening our mental diets. We need to develop a better understanding of how what we feed our minds has greater power than what we feed our bodies.

**Beware Aviation’s Accident Record**

by John Goglia

Like many of you, I, too, celebrate—albeit cautiously—aviation’s accident record; or rather the lack-of-accidents record. This past year saw zero fatalities worldwide in commercial passenger jet travel, causing many to laud it as “the safest year in aviation ever.” It’s important to note that this statistic includes only “passenger,” “commercial,” and “jet” flights. There were 10 other airliner accidents (including cargo and turboprop aircraft) that resulted in 79 fatalities, involving crewmembers, passengers, and people on the ground. In the U.S., the last fatal crash involving a scheduled, FAA-certified airline was the 2009 Colgan accident outside Buffalo, New York. All 49 people on the aircraft were killed, as was one person on the ground. Again, it’s important to read all the modifiers in that sentence; we're talking about FAA-certified, >
scheduled airlines, which doesn’t include most Part 135 flights and foreign airlines like the Asiana Airlines flight that crashed in San Francisco in 2013, killing three people.

Notwithstanding all the qualifiers to the accident records, there’s no question great strides have been made in managing risk and creating a safer system. I applaud all those who have made the accident rates as low as they are. Safety is truly a team effort and everyone deserves credit: the frontline workers (pilots, mechanics, air traffic controllers, ramp workers, and so many others)—, those who toil in back offices doing the unheralded jobs that also contribute to the incredibly low accident rate (data gatherers and analysts, to name just two), and their supervisors, managers, and executives in industry and government whose leadership deserves recognition.

But lately, I worry, too, that there’s been too much patting on the back about this “safety” record from some in the government, as well as industry. Whenever people equate accident statistics with safety, I am reminded of the famous words of Jerome Lederer: the absence of accidents doesn’t mean your operation is safe. (Jerome Lederer is an aviation safety pioneer, widely credited with being the father of the system safety approach to aviation safety.) So, all this bragging about the accident rate or how safe the system is has me concerned that complacency will rear its ugly head and that people will—consciously or unconsciously—dismiss airline safety concerns because “there hasn’t been a fatal passenger airline accident in the U.S. since 2009.”

**BEWARE COMPLACENCY**

And that complacency is inimical to aviation safety. As those of you in maintenance surely learned, complacency is one of the human factors’ “dirty dozen,” the preconditions for the most common human errors that lead to accidents or incidents. The list was developed in Canada but is now taught to maintenance professionals worldwide. The Flight Safety Foundation defines complacency, ranked as number five on the list, as “a feeling of self-satisfaction accompanied by a loss of awareness.” This can happen on an individual level, as well as an organizational level. My fear is that it can happen on a national level, if we’re not vigilant to its dangers.
I’ve been concerned about complacency setting in but was particularly concerned by a quote in a news report attributed to the acting FAA Administrator in response to a DOT Inspector General report highly critical of the FAA’s actions regarding suspected unapproved parts.

The report found the “FAA’s oversight of industry actions to remove unapproved parts is ineffective.” According to the NBC news report, “FAA Acting Administrator Daniel K. Elwell told the investigative unit his agency is reviewing the inspector general’s recommendations while also touting his agency’s safety track record. ‘There has not been a commercial passenger fatality in the U.S. in nine years. It’s an amazing safety record that is borne from a collaborative approach to safety,’ Elwell said.”

Statements like this make my head spin. Like many of you who recall (or have studied) the tragedy of ValuJet Flight 592, the McDonnell-Douglas DC-9 that went down in the Everglades in 1996 killing all 110 people on board, you will also remember that then FAA Administrator David Hinson and Secretary of Transportation Federico Pena rushed to the scene of this deadly crash to reassure the public that the airline was safe and if it wasn’t, the FAA would have grounded it. Well, just a month later, ValuJet was indeed grounded for serious deficiencies the FAA noted both before and after the crash.

So now, some 20 plus years later, we have an Acting FAA administrator assuring us basically not to worry about an IG report on unapproved parts getting onto airlines because the system is so safe. And sure enough, a week later, the FAA issues a press release revoking the repair station certificate of an Arlington, Texas company for, among other things, allegedly overhauling turbine engine bearings for General Electric, Pratt & Whitney, and CFM International engines without using approved data. The company planned to appeal the FAA’s emergency order. So much for not worrying about unapproved parts. I hope the FAA is doing more than just revoking a Part 145 certificate and actually doing something about any of these engine bearings that may be flying around the system.

[Link to report]

https://www.oig.dot.gov/sites/default/files/FAA%20Oversight%20of%20SUPs%20Final%20Report%5E5E5-30-17.pdf
NSC Survey Finds 90 Percent of Employers Negatively Impacted by Employee Fatigue

According to the council, 13 percent of workplace injuries can be attributed to fatigue. In the survey report, NSC identifies night shift and overtime scheduling, a lack of time off between shifts, and inadequate rest areas for employees within the workplace as some of the factors contributing to worker fatigue.

A survey by the National Safety Council found 90 percent of U.S. employers have been negatively impacted by tired employees, with half reporting that they’ve had an employee fall asleep on the job. The survey report, Fatigue in the Workplace: Risky Employer Practices, was released June 13. According to the survey, 57 percent of employers have experienced absenteeism. Another 32 percent reported injuries and near-misses because of employee fatigue.

Fatigue is dangerous for employees' health and safety. According to NSC, 13 percent of workplace injuries can be attributed to fatigue. In the survey report, NSC identifies night shift and overtime scheduling, a lack of time off between shifts, and inadequate rest areas for employees within the workplace as some of the factors contributing to worker fatigue.

"This survey shows that employers are waking up to a hidden workplace hazard – too many employees are running on empty," NSC President and CEO Deborah A.P. Hersman said. "Employees are an organization’s greatest asset, and addressing fatigue in workplaces will help eliminate preventable deaths and injuries." Ninety percent of employers surveyed said they will meet with a fatigued employee to try to understand the root causes for the fatigue, but only 55 percent said they would adjust an employee's work schedule or responsibilities as a result.
In addition to injury and health risks for employees, fatigue can affect an employer's bottom line. According to NSC's Fatigue Cost Calculator, an employer with 1,000 employees can expect to lose more than $1 million yearly in missed workdays, lower productivity, and increased health care as a result of employee fatigue.


Learn more about fatigue

In support of human factors expert Ben Cook's feature article in the June issue of Australian Aviation, we have made available the following supporting documents:

Fatigue investigation checklist: a simple checklist, as collectively developed by several civil and military organizations to provide enhanced guidance to determine whether fatigue contributed to the incident or accident.

Fatigue risk management chart: a list of some of the many factors that should be considered in determining whether fatigue risk is unacceptable. The chart is particularly good for personnel to better understand the main factors that influence fatigue.

A guide to a good night’s sleep: some extracts from a definitive book, A complete guide to a good night’s sleep, written by Dr Carmel Harrington, one of our local leaders in sleep science. The extracts provide practical insights from over 20 years of applied sleep science.
The FAA Updated Their Guidance On Flight Reviews. Will It Make Aviation Safer?

How seriously did you take your last flight review?

Unfortunately in many cases, flight reviews amount to "box checking" to complete the requirement every 24 calendar months.

The FAA just released AC 61-98D to help beef up what pilots and instructors cover in their flight reviews.

While it doesn't change the regulation and minimum training requirement of FAR 61.56, it does recommend where pilots should spend their time in the review, in an effort to lower accident rates.

Loss Of Control Is The Major Concern

According to the FAA, Loss Of Control (LOC) was the number one cause for GA fatalities from 2001 through 2010.

So what exactly is LOC? It happens when aircraft accidents result from situations when a pilot should have maintained (or should have regained) aircraft control, but failed to do so. And unfortunately when LOC happens, it usually doesn't end well.
Pilot Proficiency Seen As A Common Problem

FAA studies show that LOC is most likely to happen to pilots who lack proficiency. Rusty pilots are more likely to have an accident - not necessarily on a clear, calm day - but when things don't go as planned.

So where are the major areas the FAA thinks pilots can improve on during flight reviews? Here are three of the biggest problem areas.

1) Traffic Pattern Operations

Any time you're maneuvering, your risk of LOC increases. When you're maneuvering close to the ground, like you do in the traffic pattern, the risk level goes up.

The FAA identifies three primary areas for pilots and flight instructors to focus on during the flight review when it comes to traffic patterns: departure stalls, attempting a return to the field after an engine failure, and base-to-final turn.

Here's what they have to say about all three in the Advisory Circular:

Flight instructors should emphasize training that ensures that pilots of small single-engine airplanes depart in coordinated flight at the best-rate-of-climb speed (VY) for normal takeoffs, and maintain this speed to the altitude necessary for a safe return to the airport in the event of an emergency.

Flight instructors should train pilots of single-engine airplanes not to return to the field after an engine failure unless altitude and best glide requirements permit. Accordingly, flight instructors should provide training that emphasizes the correct speeds at which light twin-piston aircraft depart the runway. Flight instructors should emphasize that a departure at the best-angle-of-climb speed (VX) is used for obstacle clearance and short-field takeoff procedures.

Flight instructors should also emphasize the risks and potential consequences of climbing out at speeds less or greater than what is required for a particular type of takeoff. Flight instructors should train pilots of single-engine airplanes not to return to the field after an engine failure unless altitude and best glide requirements permit a safe return.
Therefore, flight instructors should not routinely train pilots to make a 180-degree turn from a simulated engine failure while climbing. However, this training should occur at a safe altitude. A critical part of conducting this training is for the flight instructor to be fully aware of the need for diligence, the need to perform this maneuver properly, and to avoid any potential for an accelerated stall in the turn. It is essential for a pilot to know the altitude that will be lost in a 180-degree turn, in the specific make and model (M/M) flown, if and when a pilot considers turning back to the departure airport at best glide. During the before-takeoff check, the expected loss of altitude in the turn, plus a sufficient safety factor, should be related to the absolute altitude at which a turnback may be attempted. In addition, the effect of existing winds on the preferred direction of a turnback should be briefed.

Flight instructors should also teach pilots to reject an approach and initiate a go-around when the pilot cannot maintain a stabilized approach.

2) Stabilized Approaches

Stabilized approaches are another problem area that lead to a large number of LOC accidents. Whether you're in VMC or IMC, it's hard to "chase the needles" down low, and stay safe at the same time.

Here are the areas the FAA recommends for a stabilized approach in a GA aircraft, with minor deviations on final approach. (It's something you can practice on your next flight or flight review!):

• **Glidepath.** The airplane is on the correct flightpath. Typically, the glidepath is 3 degrees to the runway touchdown zone (TDZ) (obstructions permitting).

• **Heading.** The airplane is tracking the extended centerline to the runway with only minor heading/pitch changes necessary to correct for wind or turbulence to maintain alignment. Bank angle should not exceed 15 degrees on final approach.

• **Airspeed.** The pilot maintains a constant target airspeed within +10/-5 knots indicated airspeed (KIAS), which is usually at, but no lower than, the recommended landing speed specified in the pilot's operating handbook (POH)/Airplane Flight Manual (AFM), approved placards/markings, or 1.3 times the stall speed or minimum steady flight speed at which the airplane is controllable in the landing configuration (VSO), if not specified.

• **Configuration.** The airplane is in the correct landing configuration with flaps as required, landing gear extended, and the airplane in trim.
• **Rate of Descent.** Descent rate is a constant and generally no greater than 500 feet per minute (fpm). If a descent greater than 500 fpm is required due to approach considerations, it should be reduced prior to 300 feet above ground level (AGL) and well before the landing flare and touchdown phase.

• **Power Setting.** Power setting is appropriate for the airplane configuration and is not below the minimum power for approach as defined by the POH/AFM.

• **Checklists/Briefings.** All briefings and checklists (except the landing checklist) are completed prior to initiating the approach.

### 3) Instrument Meteorological Conditions (IMC)

Flying in the clouds is difficult and confusing. When you add in a lack of recent experience, the stakes are even higher.

Here's what the FAA says about loss of control in IMC:

Another area where pilots have experienced LOC is while maneuvering in IMC. Vertigo or spatial disorientation has been a significant factor in many aircraft accidents. The common result when a non-instrument-rated pilot inadvertently continues flight into IMC is spatial disorientation of the pilot and LOC. Pilots who are instrument rated, but not instrument proficient, are also susceptible. Recovery from LOC in IMC can be nearly impossible without skills and competency. Additionally, instrument-rated pilots maneuvering in IMC who fail to prioritize pilot workload properly and use Crew Resource Management (CRM) or Single Pilot Resource Management (SRM) may become inattentive or distracted and lose situational awareness (SA), which too often can lead to LOC.

The GAJSC determined that pilots and flight instructors need to emphasize effective preflight planning and pilot proficiency to reduce the risk of LOC in IMC.

**LOC is not limited to the examples provided above.** Other examples of areas where pilots have experienced LOC include environmentally induced aircraft upsets, system malfunction/failure-induced upsets, and exceeding personal skills.


[https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&r=PART&n=14y2.0.1.1.2](https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&r=PART&n=14y2.0.1.1.2)
Safety Advocates Highlight Need for Transition Training

The FAA and industry safety advocates are continuing their efforts to tackle the general aviation fatal accident rate, focusing on the importance of transition training for all types of aircraft. “Many accidents occur when pilots fly aircraft they’re unfamiliar with,” the FAA Safety Team (FAAST) says in its latest briefing. “In fact, the first 50 to 100 hours in a new aircraft type are particularly dangerous, especially when a formal transition training program isn’t followed.” Since transition or familiarity training programs are required only on larger turbine-powered general aviation aircraft types, pilots of the majority of GA aircraft are on their own to seek out transition training.

To that end, the FAAST, in concert with the industry/government General Aviation Joint Steering Committee, is spotlighting transition training in the latest safety briefing. The briefing explains the need for transition training and the steps to be taken to ensure proper familiarity with a different model or type, whether moving up to a more complex aircraft or down to a simpler one.
The briefing recommends pilots take these three steps: “hit the books; train with a qualified instructor; and practice, practice, practice with an instructor.” Knowledge of the transitioning aircraft’s systems, avionics, normal and emergency procedures, cockpit switch locations, and performance numbers is essential, the article emphasizes. The briefing also advises how to find the proper instructor and what maneuvers to practice.

http://ea.ecn5.com/Clicks/bVpzSU85Z3VIM3RMkdxcVQ5MGViOWITeVJoanNJesTqTEDHUXo0SWVMcWhwcEYWcVFJb1dUdm9IRzg5ZmQ1bURRMFBEQzg5bDFJNERIL3Ic0xr2c9PQ%3d%3d

**Plane ‘three seconds from crash’**

The WestJet plane came too low. The green is the optimal flight path, the purple was its actual trajectory.

It’s one of the world’s most famous airports, attracting thousands of thrill-seekers eager to snap once-in-a-lifetime images of planes coming in for extremely close landings by the beach.

But for passengers on board this flight, the approach to Princess Juliana International Airport at St Maarten became far more hair-raising than usual.

WestJet flight 2652 from Toronto, which had 164 people on board, was hit with a sudden and extreme change in weather conditions and descended too low, ending up just 12 meters from the water before aborting the landing.
That's according to a new investigation report by the Transportation Safety Board of Canada, probing the incident, which occurred on March 7 last year.

It cited some incredible videos and photos taken at the time, showing the dramatic moment the Boeing 737-800 came extremely close to disaster and shocked onlookers.

"(The) Canadian probe … shows the plane was less than three seconds away from hitting the water," aviation writer Christine Negroni said.

According to the report: "The aircraft deviated from the normal descent path … (the) aircraft was 0.30 nautical miles from the runway threshold and had descended to an altitude of 40 feet (12m) above the water. The crew then initiated a missed approach."

Air safety investigators found that as the plane made its approach the visibility at the airport deteriorated significantly, with heavy rain.

However, air traffic control did not inform the crew of the visibility issue.

"Significant changes in visibility were not communicated to the crew, which allowed them to continue the approach when the visibility was below the minimum required to do so," the report found.

Additionally, the runway lights were set at a low-intensity, making it difficult to spot and resulting in the pilots confusing a hotel with the airport while conducting a visual approach.

"Among the visual references that remained available, the features of a hotel located to the left of the runway, such as its color, shape, and location, made it more conspicuous than the runway environment and led the crew to misidentify it as the runway," the report stated.

"(The pilot flying) advised that he had the runway in sight. He began to roll the aircraft to the left to align it with what he thought was the runway but what was actually the hotel.

"The reduced visibility and conspicuity of the runway environment diminished the crew's ability to detect that they had misidentified the runway."

As a result, they fell below the "three-degree descent angle of the standard approach path".
When the plane came as close as 19m to the water, an alert message sounded saying "too low, terrain", and the pilots responded by increasing the pitch upwards by 4 degrees. However the plane continued to descend and the alert sounded again.

The crew ended up aborting the approach, performing a go-around one third of a mile away from the runway, and landing 45 minutes later.

The island of St Maarten was severely damaged by Hurricane Irma on September 15 and communication with the Saint Maarten Civil Aviation Authority was lost. As a result, some local air traffic control information was not available to the investigation.

WestJet was quick to brush off the concerns at the time, denying it was a "potential disaster" in a statement.

No injuries or damage to the plane was reported.

http://www.bst-tsb.gc.ca/eng/rapports-reports/aviation/2017/a17f0052/a17f0052.asp

**Transportation Department watchdog to examine airplane cabin evacuation standards**

The Department of Transportation’s inspector general will conduct an audit of airplane cabin evacuations following a request from two House Democrats.

The Office of the Inspector General wrote in a Monday memo that starting this month it will examine the Federal Aviation Administration’s (FAA) oversight of airplane evacuation standards, with a focus on "how changes in passenger behavior, passenger >
demographics, and seating capacity, affect the standards” and “whether aircraft as currently configured meet evacuation standards.”

The announcement comes in response to a March request from House Transportation and Infrastructure Committee ranking member Peter DeFazio (D-Ore.) and Rep. Rick Larsen (D-Wash.), the top Democrat on the Aviation subcommittee.

The two lawmakers had asked Inspector General Calvin L. Scovel III to conduct a study evaluating whether simulations mirror the drills previously used by manufacturers to comply with FAA regulations. They also asked if the agency has looked into whether industry changes have affected “passengers’ ability to safely evacuate airliners in 90 seconds with half the exits blocked.”

“Stakeholders have noted other behavioral shifts as well, such as the propensity to film evacuations on smartphones rather than focusing on actually evacuating,” DeFazio and Larsen wrote in their letter to Scovel. “For these reasons, we have concerns about the continuing validity of Federal Aviation Administration (FAA) assumptions within computer simulations of cabin evacuations.”

The probe comes amid a renewed focus on aviation safety after a woman died as a result of injuries sustained on a Southwest Airlines flight, and after a "60 Minutes" report by CBS News in April highlighted low-budget carrier Allegiant Air's mechanical issues.

The inspector general said in May that it would alter an ongoing audit to begin examining the FAA’s oversight of airline maintenance on American Airlines and Allegiant Air.

That followed a request from Senate Commerce, Science and Transportation Committee ranking member Bill Nelson (D-Fla.), who asked the inspector general to begin an audit or probe of FAA’s oversight of Allegiant.

A new series of videos from HeliOffshore show how implementing key safety programs can enhance the safety of offshore helicopter operations. The three key safety programs highlighted in the videos are approach path management guidelines, line operations safety audits (LOSAs), and flight crew operating manuals (FCOMs).

In HeliOffshore’s Approach Path Management video, senior pilots and safety experts from member operators explain how the right training and preparation can help offshore helicopter pilots safely manage the approach path phase of flights. Its second outlines the benefits that LOSAs provide offshore helicopter operators, namely a “valuable and fully authentic picture of how the reality of frontline operations might differ from what is called for in standard operating procedures.”

Meanwhile, its third new video explains that FCOMs provide the most complete picture of how aircraft designers intended the aircraft to be flown, as well as how crew can make the best possible use of all aircraft systems and the available automation.

The videos were shot on location with HeliOffshore member operators around the world, including Babcock Aviation Offshore, Bristow Group, CHC Helicopter, Cougar Helicopters, and Weststar Aviation.
TED TALK: Ideas worth Spreading

Adam Grant: Are you a giver or a taker?

In every workplace, there are three basic kinds of people: givers, takers and matchers. Organizational psychologist Adam Grant breaks down these personalities and offers simple strategies to promote a culture of generosity and keep self-serving employees from taking more than their share.

https://www.ted.com/talks/adam_grant_are_you_a_giver_or_a_taker