

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:

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Ethiopian Airlines 787 Nose Gear Collapses at the Gate

As passengers sat patiently waiting to depart for Rome, suddenly the Dreamliner slammed onto the tarmac as the nose gear gave way.

How did it happen?

The nose gear collapsed on an Ethiopian Airlines Boeing 787-800, significantly damaging the Dreamliner.

An Ethiopian Airlines Boeing 787-800 scheduled to fly from Addis Ababa, Ethiopia, to Rome, had just completed boarding and was about to depart when the nose gear collapsed at the gate. Passengers were shaken in the incident, and one [flight attendant was injured](#). The Dreamliner, not surprisingly, received significant damage.

The question of how in the world the gear could collapse as the airplane sat idle won't be conclusively known until the investigation into the March 3 incident is completed. [But early signs are pointing to human error.](#)

A senior official with the Ethiopian Civil Aviation Authority has told Aviation International News that it appears technicians working on the 787 [inadvertently caused the gear collapse](#) due to a "technical error." A senior airline official, meanwhile, told AIN the failure was caused by "technical error."



Two airport workers hospitalized after Iron Maiden's plane Ed Force One crashes into tow truck in Chile

Two ground workers have been hospitalized after Iron Maiden's plane crashed into a tow truck at an airport in Chile.

In addition to the injuries suffered by the tug operators, two engines on the the Boeing 747-400 were extensively damaged. The accident happened when a pin connecting the plane to the truck dislodged and the two vehicles crashed into each other on the tarmac at Santiago Airport.

Iron Maiden front man Bruce Dickinson often pilots the airliner, named Ed Force One.

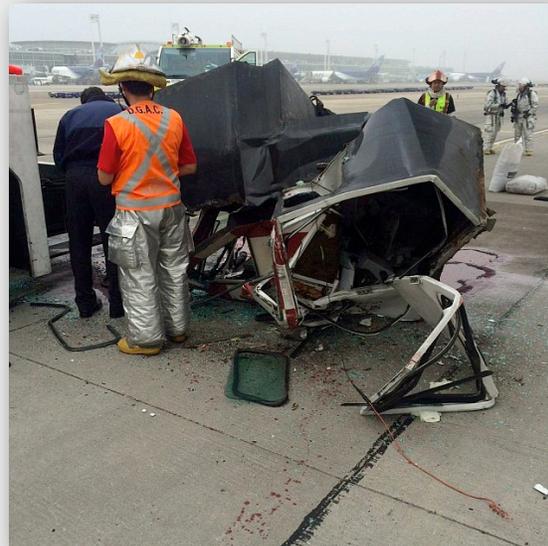
A statement on the band's website reads: 'Ed Force One was this morning tethered to a tow truck to be taken for refueling prior to flying over the Andes to Cordoba for the next show.

On moving the steering pin that is part of the mechanism that connects the ground tug to the aircraft seemingly fell out.

'On making a turn the aircraft had no steering and collided with the ground tug badly damaging the undercarriage, two of the aircrafts engines and injuring two ground tug operators, both of whom have been taken to hospital.'

The aircraft will now undergo emergency maintenance, where it is believed two engines may need replacing. Lead singer Bruce, 57, trained on a simulator at Cardiff Aviation, his aircraft maintenance facility in Wales, for a license to fly the massive Boeing 747-400, nicknamed Queen of the Skies.

On board are the London-based heavy metal band plus their roadies, technicians and all their equipment.



VEHICLE STRIKES PLANE AT PHILADELPHIA INTERNATIONAL AIRPORT

Authorities say a pickup ran into a parked jet at Philadelphia International Airport, [sending the truck's driver to the hospital](#).

Airport spokeswoman Mary Flannery said the Air Wisconsin regional jet flown by American Eagle was struck just before 1 p.m. Monday at a gate at Terminal F.

No passengers or crew were aboard the aircraft. Flannery said the truck was driven by an airport vendor and was authorized to be on the tarmac. Both the aircraft and the truck were damaged. The jet was taken out of service and a replacement plane was assigned for a flight to Cincinnati. The truck driver was taken to a hospital. There was no immediate word about his condition.



FAA Proposes New Safety Rules For Certifying Small Airplanes

[John Goglia](#)

The FAA issued a proposal to change the way small airplanes are certified to “reflect the needs of the small airplane industry, accommodate future trends, [address emerging technologies](#), and enable” the creation of new manufacturers and new airplane types.



The proposed rule would affect the airworthiness certification of airplanes carrying 19 passengers or less and which have a maximum take off weight of 19,000 pounds or less.

These aircraft are referred to as general aviation aircraft and are mostly used for recreation, training or personal travel. This would include weekend recreational fliers, as well as executive jet travelers. The proposed rule would change the current prescriptive requirements contained in the federal aviation regulations and [replace them with risk and performance based standards](#). This change in certification procedure was required by Congress in the Small Airplane Revitalization Act of 2013 which “directed the FAA to streamline the approval of safety enhancements for general aviation airplanes.” The rule also proposes new certification standards for loss of control and icing.

Existing requirements for airplane certification are highly prescriptive today. This means that the rules set out very detailed and strict standards that have to be met in order to receive FAA approval to manufacture aircraft or to produce FAA-approved components. According to the FAA, these design standards date from the 1950s and 60s and [make it cumbersome](#) for manufacturers to “incorporate new or innovative technologies.” In order to deviate from the prescriptive requirements, manufacturers today have to request and receive additional approvals from the FAA, which are costly and time-consuming for both the industry and the FAA. The performance-based standards proposed in the new rules focus on the desired outcomes rather than prescribing specific methods for compliance.

In a written statement, FAA Administrator Michael Huerta said, “This proposal would streamline how we approve new technologies for small piston-powered airplanes all the way to complex high-performance executive jets.” According to Mr. Huerta this approach would accommodate [“today’s rapidly changing aviation industry and technological changes now and in the future.”](#)

I strongly support these proposed changes because they would allow safety enhancements to airplanes to be made without the burdensome process currently in place.

http://www.faa.gov/regulations_policies/rulemaking/recently_published/media/Revision_Airworthiness_Standards_Normal_Utility_Acrobatc_Commuter_Airplanes_NPRM.pdf

Flight safety must keep up with technology

Aviation experts gather at the Global Aerospace Summit discussing the [rapid rise of technology](#) in the aviation sector and its impact with commercial planes becoming increasingly sophisticated thanks to technology, [the risk](#) of pilots getting left behind is a challenge that airliners must address, ensuring that pilots do not lose key skills due to over reliance on technology, said aviation experts at the Global Aerospace Summit held in Abu Dhabi on Monday.



The two-day summit has brought together some of the leading figures and companies from the aviation industry to discuss several issues relevant to the aerospace and aviation sector.

Key among those topics was the [potential clash between technology and passenger safety](#). The aviation industry has, in the past, witnessed air crashes due to [pilot error](#) often caused by the pilot relying too heavily on the plane's systems, rather than actually flying the plane. "One of the things I find concerning is the fact we are getting so high-tech. I think it's wonderful for the efficient operation of the airplane, but I wonder if we are leaving the pilot behind with this advanced technology," said Patrick Gordon, Chief Executive of Royal Jet.

"I see a generation of pilots coming in that are [more systems operators and systems monitors than they are pilots](#), I think we're losing, or have lost perhaps a new generation of pilots [with] the ability to hand-fly the airplane especially when it enters straight into an emergency or an unusual situation," he added.

Captain Majed Al Marzouqi, Vice President Corporate Safety and Quality, Etihad Airways, said the solution was down to [good pilot training](#) by the airlines. "One thing that is fundamental here is the investment on training, going back to the basic of flying," he said. "Loss of control [of the aircraft] could happen, what's important is for the pilot to recognize it and get out of that loss of control, and that happens when we go back to basic flying."

Positive

For Captain Billy Nolan, Senior Vice President, Safety, Security and Operations, Airlines for America, technology is a good thing that has contributed to the increased safety of flying, and should be seen as a positive rather than a potential negative.

“It’s not a zero-sum game, we can have both [safety and efficiency], I think if we look at the emergence of technology today, if we look at the roll out of next generation aircraft ... All this [technology] allows these airlines to take advantage to fly the aircraft **more efficiently, and to fly them safer,**” he said.

Echoing those sentiments, Hassan Dabbas, Regional Vice President, Africa and Middle East, International Air Transport Association (IATA), said that flying was safer than it has ever been.

“If we look at the past year the aviation industry carried **over three and a half billion passengers,** and maybe this is a bit too much, but only 136 fatalities [were caused] **due to mechanical or management reasons,**” he said.

Critical role

Dabbas also stressed that while aircraft technology was on the increase, the role of the pilot was still critical and the most important component in having the plane fly.

“The cockpit has become such a vast machine that pilots are now managing the flight more than just flying it, there is now talk about maybe not having the crew or the pilot [on the plane] and just letting someone else fly [the aircraft] from the ground, which we at IATA don’t see happening,” he said.

“We always believe that there should be someone working on this machine, making sure it works efficiently ... So even though the cockpit and the planes have become very sophisticated, the pilot and the training of the pilot is a **very important factor** in making sure that the safety and security of the operations continues,” he added.

Germanwings crash: New rules needed for pilot health issues

Arnaud Desjardin, deputy head of the investigations department of BEA, the French Air Accident Investigation Agency.

Seeking to ensure that suicidal pilots can't crash their jets, French authorities investigating last year's Germanwings crash are urging new reporting requirements for doctors treating pilots, and [new measures](#) to keep pilots from hiding mental health issues.



The recommendations are delicate. The investigators from France's BEA air accident agency acknowledged Sunday that it's [not easy to balance patients' right to medical privacy and public safety](#), and said they don't want to stigmatize people suffering depression.

But they argue that aviation authorities around the world need clearer rules, after Germanwings co-pilot Andreas Lubitz locked his captain out of the cockpit and slammed Flight 9525 into an Alpine mountainside March 24, 2015. All 150 people aboard were killed.

Lubitz had suffered from depression in the past, but authorities and his airline later deemed him fit to fly. [What they didn't know is that his mental health troubles had returned.](#)

The final crash report released by the BEA Sunday lays out in chilling detail how bad things had become.

Lubitz consulted dozens of doctors about perceived vision troubles and sleeplessness in the months leading up to the crash.

One doctor prescribed antidepressants, including one whose side effects can include suicidal tendencies. Another doctor referred Lubitz to a psychiatric clinic two weeks before the crash, suspecting a potential "psychotic episode," said Arnaud Desjardin, leader of the BEA's Germanwings investigation.

Lubitz reported none of this to Germanwings or its parent Lufthansa. [Neither did the doctors, citing Germany's strict medical confidentiality laws.](#)

The BEA says those rules need to change.

Among a list of 10 safety recommendations to international, European and German aviation authorities, the BEA said they should draw up new rules requiring medical workers to warn authorities when a pilot's mental health could threaten public safety.

It suggested more rules like those in the U.S. and some other countries, which allow use of some antidepressants under medical supervision, to encourage pilots to seek treatment and come forward about depression.

Germany's confidentiality laws prevent sensitive personal information from being widely shared, [though doctors are allowed to suspend patient privacy if they believe there is a concrete danger to the person's safety or that of others.](#)

Desjardin said German doctors [fear](#) losing their jobs or potential prison terms if they unnecessarily report a problem to authorities. The doctors who treated Lubitz for depression and mental illness also refused to speak with the BEA investigators, citing medical privacy — and complicating the investigation.

Johann Reuss of Germany's air accident investigation agency told The Associated Press "there is no need to change the law." Reuss said "it might not be easy" to loosen the privacy rules and suggested that authorities instead focus on giving doctors checklists to prevent similar scenarios with pilots.

The BEA safety recommendations also include special insurance options and peer support groups for aviation workers, to ease concerns about losing a job that pilots with mental health issues face.

Even though Germany's medical privacy laws are stricter than those in the U.S., it's hard to imagine a U.S. doctor reporting mental health concerns about a pilot to an airline or the FAA without his patient's permission, said John Gadzinski, an veteran U.S. airline pilot and safety consultant.

[The underlying problem is](#) that society hasn't figured out how to deal with mental health in a way that protects both the patient and society, Gadzinski told the AP from his home in Virginia Beach, Virginia.

"I think the Germanwings accident is more of a symptom than the major issue," he said. "The major issue is how do we deal with mental health."

Jim McAuslan, general secretary of the British Airline Pilots Association, said in a statement, "Pilots welcome recommendations to introduce peer support programs for pilots across the aviation industry. ... By encouraging those with mental health problems to seek help, offering them treatment and ensuring they do not suffer financially if they do come forward, we prevent these issues being driven underground."

The BEA also recommended more frequent, deeper monitoring of pilots who had mental health issues in the past — for example every three months instead of every year. Lubitz' relapse appeared to begin around four months before the crash.

The agency said airplane cockpit security rules shouldn't be changed, saying hijacking remains a greater threat than pilot suicide. Current cockpits are equipped with a code system to prevent the kind of hijackings that occurred on Sept. 11, 2001, in the United States, where planes full of passengers were turned into weapons.

After the Germanwings crash, some airlines required that at least two people be in the cockpit at any given time.

Lufthansa pledged to back the new safety recommendations. Since the crash, the [airline has replaced its Germanwings brand with the name Eurowings](#).

On the day of the flight, Lubitz rehearsed a similar crash a few hours earlier. Then half an hour after Flight 9525 took off from Barcelona, Capt. Patrick Sondenheimer handed the controls to Lubitz and went to the restroom. Lubitz quickly locked the cockpit and set the plane into an accelerated dive for a mountainside near the French village of Le Vernet, where a stone memorial to victims marks their memory.

Traces of anti-depressive medications Citalopram and Mirtazapine were found in Lubitz's remains, as well as the sleeping medication Zopiclone, the BEA report says. The U.S. National Library of Medicine notes on its entry for Citalopram that children and young adults who take the drug can become suicidal.

Lubitz was 27 when he crashed the plane.

The BEA investigation is separate from a manslaughter investigation by French prosecutors seeking to determine eventual criminal responsibility.

The French safety board therefore believes that international regulations are necessary in cases where the health of a patient could cause a risk for public safety. In the case of pilots, this would mean that medical confidentiality will have to be breached.

The Dutch pilots think that this is a bad idea. They fear that it will only result in pilots keeping their depression or addiction a secret, for fear of losing their jobs. When asked about psychological complaints, [pilots will simply give socially desirable responses to keep their jobs.](#)

The VNV states that since the 70's they've had good experiences in helping members suffering from alcoholism and drug addiction through self help groups operated by their peers. In most cases they overcame their addiction. This same format can be used to help pilots struggling with psychological problems. "It is important for a pilot [that he dares to seek help](#) and may return to his job after a successful treatment", a spokesperson for the association said to the news wire.

The VNV expects to soon reach an agreement on this with the airlines and the Ministry of Infrastructure and Environments. The VNV represents some 5 thousand Dutch pilots.

Single-Pilot Ops, Ground Handling Top NBAA Safety List

In adding the single-pilot accident rate to the list, NBAA cited concerns that single-piloted turboprop aircraft have a [1.5 times greater chance of being involved in an accident than dual-piloted aircraft.](#) Further, [60 percent](#) of accidents involving turboprops certified for single-pilot operations occurred while being flown by a single pilot, the association said.



As for ground-handling incidents, NBAA noted that 48 percent of respondents to its survey reported having one to three incidents within the past three years and 8 percent reported having four to nine incidents or close calls.

In addition to the single-pilot accident rate and ground-handling incidents, the committee [retained loss of control in flight \(LOC-I\) and runway excursions on this year's list](#). The committee also outlined a series of notable safety hazards: [intentional non-compliance, distractions from duty, fatigue, task saturation](#), bird and wildlife issues, intentional laser strikes, [airspace complexities and pilot deviations](#).

“The NBAA Safety Committee’s data-driven approach to identifying the most significant risks yields clear results,” said NBAA Safety Committee chairman Steve Charbonneau. “Loss of control in flight and runway excursions remain significant risks, and our research shows that single-pilot operations and ground-handling incidents [are equally worthy of significant safety-improvement efforts](#). NBAA, in collaboration with industry partners, will dedicate substantial resources to develop tools and programs designed to help operators mitigate these risks.”

[UPS Pilots Applaud Senator Klobuchar for Introducing Amendment to End Cargo Exclusion from Part 117](#)

The Independent Pilots Association applauds Senator Amy Klobuchar (D-MN) for introducing an amendment [to end the exclusion](#) of cargo-only airlines from Part 117 flightcrew duty and rest requirements during a mark-up of the Federal Aviation Administration Reauthorization bill in the Senate Committee on Commerce, Science, and Transportation. Senator Klobuchar's amendment would establish one level of aviation safety by applying the same fatigue rules currently followed by passenger airline pilots. Captain Robert Travis, President of the Independent Pilots Association, commends Senator Klobuchar for her leadership on the issue of [pilot fatigue and air safety](#).



"Senator Klobuchar's stand to fix this deeply flawed, two-tiered safety standard will end the cargo carve-out that leaves our pilots subject to rules that do not reflect the [best available science about pilot fatigue](#)."

As pilots who fly nightly across multiple time zones, we are grateful for Senator Klobuchar's leadership and efforts on this issue, along with those of Senator Barbara Boxer (D-CA) who initially introduced the Safe Skies legislation in the United States Senate."

Senator Klobuchar is an original cosponsor of S. 1612, Senator Barbara Boxer's Safe Skies Act.

To view the Final IPA Opening Brief and other materials related to the case go to: ipapilot.org/ipavfaa.asp.

To view the original version on PR Newswire, visit: <http://www.prnewswire.com/news-releases/ups-pilots-make-oral-argument-before-the-dc-circuit-challenging-cargo-exclusion-from-rest-rule-300231135.html>

Hartzell teaches A&Ps how to evaluate and repair minor damage to composite propellers

Hartzell Propeller has created [a series of how-to videos](#) and a new field repair manual describing how to evaluate and repair Hartzell's structural composite propeller blades when they suffer minor damage.

A true composite propeller is made from carbon fiber or Kevlar. "Unlike aluminum or wooden blades, Hartzell's composite propeller blades can be restored to their original dimensions over and over again. These materials [are incredibly durable](#), but they are not entirely immune to damage," says Hartzell Technical Representative **Kevin Ryan**. "Don't be concerned if you experience minor damage from debris, such as a stone nick, paint damage, or a lead edge impact," he says.



"As with aluminum blades, composite blade damage can be evaluated and often repaired on-wing by a certified Airframe and Powerplant (A&P) mechanic using information provided by Hartzell."

Information on evaluation and repair of damage on Hartzell composite blades is provided to aircraft mechanics in Hartzell Composite Propeller Blade Field Maintenance and Minor Repair Manual 170 [and the companion videos, both available free on the Hartzell website.](#)

In the companion videos, Ryan, who teaches repair classes around the world, walks viewers carefully through the evaluation and repair processes.

Hartzell Composite Propeller Blade Field Maintenance and Minor Repair Manual 170 can be reached on the Hartzell Propeller website:

<http://hartzellprop.com/hartzell-field-maintenance-manuals-3/>

The companion how-to videos can be reached on the Hartzell Propeller website using the following links:

[Carbon Gouge Repair](#)

[Carbon Tip Repair](#)

[Carbon Trailing Edge Foam Repair](#)

[Kevlar Gouge Repair](#)

[Kevlar Tip Repair](#)

[Kevlar Trailing Edge Foam Repair](#)

A FINE VIDEO of a plane we almost lost:

IKE'S PLANE—the first Air Force One!

Eisenhower was aboard Columbine II over New York City in December 1953 when [air traffic controllers briefly confused the plane,](#) known to them as "Air Force 8610," with Eastern Airlines flight 8610, according to the White House Museum.



The aircraft nearly collided, and afterward, the president's airplane became known as "Air Force One."

https://www.youtube.com/watch_popup?v=ehwvZXVKmPU

APA Releases Flight Data Mobile App for Pilots

The Allied Pilots Association (APA) has built and released a mobile application to provide pilots with [easier access to information during flights](#), alongside IT company Sogeti USA. The app aims to provide pilots with flight data, passenger and crew lists, weather updates and manuals, among others, on their smartphones or tablets while in flight.

"The new APA mobile app has been enthusiastically received, with a significant percentage of our pilots already using it," said Keith Wilson, APA president.

Sogeti and APA began working on the app last year and first released it to a small group of users to test functionality and incorporate additional features based on their feedback. The iOS and Android app is now available for all APA pilots to download on the App Store and Google Play.



Hey, Where's That Logbook?

Where are your customer's aircraft's maintenance logbooks? – [Do you keep them in a safe place](#) or piled on the side of a desk? What condition were they in when you received them? Are you sure you returned all of them when the plane left the shop?

And the big question, will your insurance policy cover maintenance logbooks if they are damaged, or worse yet lost? How much would the aircraft go down in value if the maintenance logbooks were lost, damaged, or destroyed?

These can be scary questions that many aircraft repair shops and service providers may not have thought about. **Don't assume** the aircraft's maintenance logbooks are considered part of the aircraft and covered by the aircraft insurance policy. It is common for aircraft insurance policies to include “tools and repair equipment” and “parts temporarily removed and not replaced” in the definition of aircraft, **but no mention of aircraft maintenance logbooks**. The Federal Aviation Regulations only stipulate that aircraft maintenance logs be transferred with the ownership of the aircraft. They do not include logbooks in the definition of an aircraft. As such, it is left to the insurance policies and the courts to decide what should and should not be included in the definition of aircraft on a disputed claim.



You might say to yourself “I’m paying thousands for insurance every year to cover by maintenance shop, my insurance policy must cover logbooks, right?”. **Not necessarily**. Most repair shops buy liability insurance which means the shop must be found negligent for the damage or loss. If the loss was unintentional (Acts of God, theft, or simply misplaced) a liability policy may not pay. And if they do, they may only replace the logbooks (with new, blank ones), not “reconstruct” the logbooks to their original content. As you know, the older the airplane the more entries were in those logs. Complete reconstruction of older logbooks may be a monumental task.

So, what can you do? Practice some practical and straight-forward Best Practices when it comes to handling maintenance logbooks for your customers.

- **When the logbooks arrives in your shop take digital photos of each page and upload them to off-site storage.** Technology and storage are cheap these days, and taking a few extra minutes on the front end can save a lot of headache if the books are lost.
- **Store the logbooks in a safe, dry, secure place during the maintenance.** A lockable firebox or fireproof cabinet work well for this.

• **Have an acceptance/delivery document listing the logbooks and requiring signatures by the customer and the shop.** Sign when you receive the logbooks, and sign when you return the logbooks. In this manner both parties acknowledge receipt of the logbooks, and no one has to rely on memory.

[Taking these simple steps](#) will give your customers renewed confidence in your shop, and may save a lot of time, hassle, and money should the logbooks become destroyed or misplaced.

[Learn how to survive a plane crash with the 'Prepare for Impact' app](#)

In a world where most flight passengers are desensitized to the pre-takeoff safety lectures, a free iPhone and Android game is [designed to fill that gap and more effectively teach people aviation safety](#), aka how to survive a plane crash. The app is called Prepare for Impact, and it simulates the in-flight scenarios of your nightmares, ranging from crashing into water to in-flight decompression (when those oxygen masks drop from the ceiling) and runway overrun — all decorated with additional threats like fire, unusable exits and water. Users make first-person decisions and see the consequences their actions have, hopefully making it to safety.



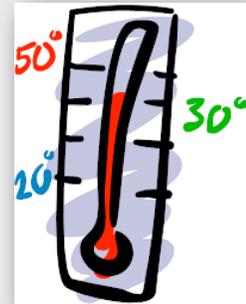
The app was created by the Human-Computer Interaction Lab at the University of Udine, Italy, according to a press release for the game. Game developers and researchers are continuing to look into how humor and interactive cartoons will help further people's comprehension of flight safety.

<https://youtu.be/2QnQB3SQSDQ>

This One Tip Has Helped Hundreds Get a Better Night's Sleep

For some time now, researchers have known that setting your room's temperature to a certain degree can help you fall asleep faster, reports Business Insider.

In a study done in 2015, they debated how important of a role temperature plays in the quality of your sleep.



[Watch the video at www.businessinsider.com](http://www.businessinsider.com)

The Dirty Dozen - What Are Your Safety Nets? Distracted-walking injuries

People who wander through the streets transfixed by their smartphones, utterly unaware of their surroundings, aren't merely irritation. Research indicates that walking while preoccupied can lead to serious injuries-and even death. An Ohio State University study found that injuries due to **distracted walking** doubled 2004 and 2010, resulting in more than 1,500 emergency room visits for broken pelvises, legs and wrists, and injuries to the head and neck, *The New York Times* reports.

Preoccupied pedestrians are walking off train platforms, falling down stairs, walking into poles or moving cars in crosswalks, or in the recent case of a tourist in San Diego, even stumbling off cliffs. Experts warn that this 21st-century menace may only get worse as handheld gadgets become equipped with even more enticing features. The best safeguard is simple common sense. **"You can't really pay attention to more than one thing at a time,"** says New York City orthopedic surgeon Claudette M. Lajam, who has treated many phone-related injuries. "Look in front of you, not down at your phone."



The Dirty Dozen - Aviation Errors

- **Lack of Communication** - A lack of clear direct statements and good, active listening skills
- **Complacency** - Self-satisfaction accompanied by a loss of awareness of the potential dangers
- **Lack of Knowledge** - Lack of experience or training in the task at hand
- **Distraction** - Drawing one's attention away from a task
- **Lack of Teamwork** - Lack of working together to achieve a common goal
- **Fatigue** - Weariness from labor or exertion, nervous exhaustion or the temporary loss of power to respond
- **Lack of Resources** - Failure to use or acquire the appropriate tools, equipment, information and procedures for the task at hand
- **Pressure** - Pushing for something in spite of opposing odds, creating a sense of urgency or haste
- **Lack of Assertiveness** - A lack of positive communication of one's ideas, wants and needs
- **Stress** - Mental, emotional or physical tension, strain, or distress
- **Lack of Awareness** - Failure to be alert or vigilant in observing
- **Norms** - Commonly accepted practices where assumptions are made that the course of action or procedure is correct based on history without re-validating or verifying the current procedure