

Aviation Human Factors Industry News

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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:

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New Products on the FAA Maintenance Fatigue Website

Take advantage of the following fatigue mitigation tools from the FAA's Maintenance Fatigue website. Just use the form to order the *Fatigue Countermeasure Training CD*, view and order the *Fatigue Awareness DVD* entitled *Grounded* and the *Sleep log* to help you accurately track your sleep and assess your sleep habits, use this interactive sleep log to total your sleep each day and calculate your average sleep period, number of awakenings, and sleep ratings per week.

The screenshot shows the FAA's Maintenance Fatigue website interface. On the left side, there are three promotional tiles: a 'NEW!!' callout above a 'FATIGUE COUNTERMEASURES TRAINING' CD cover, a 'GROUNDED' video cover, and a 'Newsletter' tile. The main content area features a blue header 'Welcome to FAA's Maintenance Fatigue Section' followed by introductory text. Below the text is a navigation bar with page numbers 1, 2, 3, 4 and three control buttons (back, stop, forward). The bottom section contains a grid of eight circular icons representing different resources: 'Frequently Requested Tools', 'Fatigue Management Toolbox', 'News & Events', 'Educational Materials', 'Regulations', 'Publications/Articles', 'Questions?/Help', and 'Links'.

<https://hfskyway.faa.gov/hfskyway/fatiguehome.aspx>

Baker's Dozen

The maintenance world is familiar with the “**Dirty Dozen**”-the 12 most common causes of human factors-related maintenance errors. There is one more root cause that doesn't appear on the list but should:

Attitude. When individuals and organizations develop the right attitude **toward error**, it typically follows that errors decrease.

The progression makes sense: If a technician cares enough to speak up when he/she sees something wrong, he/she could prevent a serious problem. If he/she cares about doing the right thing, he/she will take the long walk to the hangar to turn in and out-of-date torque wrench rather than use it one last time because the shift is about to end.

Attitude is **often at the root** of other Dirty Dozen-related problems, says Sue Yost, owner of Human Performance in Aviation (HPA) Consultants, a Canadian company that has conducted human factors training for about 10 years. “Attitude dictates whether the other factor exist,” says Yost. “Do you care if you're working when you're **fatigued**, or do you just want the paycheck? Do you care enough to point out a problem, or do you rationalize that it won't matter this one time?” **Those who care can make a difference.**

So how do you measure attitude? You can't-but you can get a sense of whether it needs some work by watching how your technicians respond when something goes wrong. For every problem, there's **a spectrum** of possible reactions; a technician's attitude will be revealed by where he/she falls on the continuum. For instance, take the example of cross-threading a nut. Yost says technicians usually respond in one of five ways:

- > **Anger or blaming**: “Stupid nut!” or “That wasn't my fault!”
- > **Hiding the mistake**: “I'll just keep tightening it, and no one will notice.”
- > **“Good enough” minimalism**: “I'll just take it off and put another one on.”
- > **Fixing the problem**: “I'll take it apart and sue a new bolt and nut to redo it properly.”



> **Evaluating root cause:** “I wonder what made me do that?” or “How can I prevent that from happening again?”

The fundamental difference among these responses is attitude.

Obviously, a combination of the final two types of responses is most desirable, which begs the question: How do you move people from the first response to the last? There’s good and bad news here. The **bad news** is that you can’t train for attitude on an individual level, says Yost. If you’ve got a great team and a safety -focused culture overall with one or two bad apples, nothing will change them and it’s best to move them out. However, **managers can impact the culture**, which in turn will affect attitudes as a whole.

When you create a culture that shows how your company **genuinely cares** about its employees, your employees will genuinely care about performance and safety. For instance, in Canada there are not duty-time limits for technicians, but at an MRO, managers and directors consistently walk the shop floor and talk to technicians about their work and ask how long they’ve been there that day. If the answer is more than 10 to 12 hours, the manager urges the technician to go home, get some sleep and come back when they are rested. As a result, says Yost, technicians are acutely **aware of fatigue and its consequences**; they generally put rest ahead of squeezing in another few hours of work.

In another case, Yost says she recently worked with an MRO that sent its people home during an unprecedented heat wave. This action was no blip; Yost says the company always puts its people first and, as a result, its technicians give 110% to their jobs.

Contrast these examples with a workshop Yost gave recently where technicians were reticent to contribute. Later, a participant confided to Yost that if anyone said anything negative, their director of maintenance would come down on them later. That kind of closed, uncommunicative and **punitive** environment creates poor attitudes and, ultimately, errors.

“Attitude could easily be the **13th factor** making the Dirty Dozen a baker’s dozen,” Yost concludes. “What helps foster great communication? **ATTITUDE**. What helps build a great team? **ATTITUDE**” Add it to your Dirty Dozen list, and tackle it as you would any of the other items.

FAA Team Maintenance Safety Tip

DO YOU KNOW YOUR LIMITATIONS?

Individuals often fail to visualize that maintenance processes “**safety**” are made of complex tasks that are implemented and maintained by people. These people have different aptitudes, abilities, and training and will operate under various conditions, organizational structures, procedures, and work scenarios. The total composite of these elements, including the **human component**, will determine the performance, safety, and efficiency of an operation.



Safety chains are such that they ensure **human capabilities** are not stretched beyond limits. All aviation professionals should realize the important part they play in the “**safety chain.**”

The Pilot/Mechanic Disconnect

A B737 Captain pleaded with Maintenance Technicians to follow established procedures.



Upon doing external preflight inspection, I noticed several Mechanics working on the aircraft. They were changing a tire. I asked them if they had posted the sign **alerting pilots** that maintenance was being performed and not to touch controls. I told them that my First Officer was in the flight deck (we were doing a scheduled aircraft change) and I had not noticed the sign and he was probably about to perform preflight duties.

They said they had **not** posted the sign, but that he can do anything he wants except turn on hydraulics or mess with the parking brake. I tried to convey to them **the risk they had just incurred** by not following procedures, but they seemed to shrug it off. We (the pilots) had no warning at all that they were down there, and very well could have turned on a hydraulic pump for any of many reasons, including to keep the wheel [yoke] steady in windy conditions.

Please, please, please advise all Mechanics of the importance of following the procedure of displaying the card in the flight deck while they are working on the airplane. **Indifference and complacency can maim and kill.**

The Limits of Indifference

Some air carrier reports to ASRS call it **pencil-whipping**, and others **pilot-pushing**, but by whatever name, **non-standard Maintenance practices**



crews to follow up when they are uncomfortable. A First Officer describes one such situation in which a Maintenance Supervisor **exerted pressure** on both the flight crew and Maintenance Technicians to ignore a potential flight hazard.

Upon arrival for flight, the Captain and I started our pre-flight of the aircraft. Captain found his (forward) windshield delaminated. He asked me to give Maintenance a call to come and check out the windshield. Two Maintenance personnel arrived and found that the delaminated window was **one inch out of limits**. The Maintenance crew then radioed in to their Supervisor to advise him that the windshield was out of limits. The Captain and I heard the Supervisor call back and say, **Sign it off**. The Maintenance crew member said, It is out of limits and I am not going to sign it off. The Supervisor then said, Are you scared? The Maintenance crew member then said, I am not scared, it is out of limits and **I'm not signing it off!** If you want it signed off, you have to sign it off.

About three minutes later, we see a Supervisor come to the stairs of the jetway and walk straight to the logbook and sign it off without even looking at the delamination on the window. Then the Supervisor walks into the

aircraft and looks at the window, pushes on it, turns around and says, **Your window is just fine.** I made a comment to the Captain I can't believe what he just did, he signed it off without even looking at it and not even measuring the delamination of the window.

Inflight, Captain saw that there was a scratch in front of the delamination on the window. Once we got back, we wrote up the scratch and also requested the delamination be re-inspected. Maintenance met us at the aircraft and inspected the aircraft and found that it was **out of limits and grounded the aircraft.**

CAL flight incident caused by pilots' error in reading radar

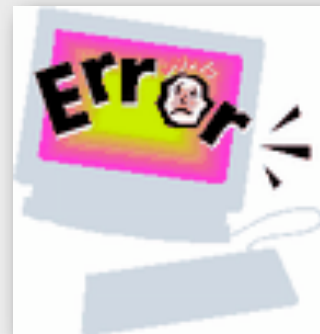
Pilots' **failure to accurately use radar** was to blame for an incident involving a China Airlines (CAL) flight bound for the Indonesian island of Bali two ago that injured 24 passengers and cabin crew, according to an investigative report issued Friday by the Cabinet-level Aviation Safety Council (ASC).

The report showed that the two pilots of flight CI-687 that departed for Bali from the Taiwan Taoyuan International airport at 9:34 a.m. on Sept. 20, 2008, were found responsible for flying the Boeing 747-400 plane into powerful turbulence over the South China Sea at 11:27 a.m. after **misreading** the plane's meteorological radar.

Although the plane landed at Bali's Ngurah Rai International Airport at 2:30 p.m., the cabin chief and one passenger sustained serious injuries in the incident, and three other cabin crew and 19 passengers were slightly injured.

The injuries, the ASC report indicated, were due mainly to cabin crew and **passengers failing to fasten their seat belts in time** after the plane encountered powerful turbulence and the **lack of clearly-defined standard procedures** for cabin crew to follow in handling turbulence.

The ASC proposed in the report that to improve flight safety, all pilots should acquaint themselves with the meteorological radar operation guidebook, and **clearly-defined standard procedures** should be worked out for pilots and cabin crew to follow in dealing with turbulence.



The ASC also suggested that the Civil Aeronautics Administration reinforce its checks of cabin operations for all local airlines, including reinforcing calls for passengers to fasten seat belts.

The ASC is an independent government agency established to investigate and prevent the re-occurrence of civilian air incidents and accidents.

Human Factors in Aviation Communication

1.

Effective communication

can help prevent tragic aircraft accidents.

Aircraft accidents are many times caused by communication. Krifka, et al. (2003) states that

"Factors related to interpersonal communication have been implicated in up to 80 percent of all aviation accidents in the past 20 years."

Despite these statistics, pilots and air traffic controllers (ATC) have safety training, and effective communication between them has saved lives. However, incidents can be reduced through consistent, effective communication between pilots and copilots; and between pilots and ATC personnel.



Improperly Encoding or Decoding Messages

2. Communication between pilots to pilots, and pilots to ATC, should involve **clear understanding of the message**. But, there are many possible barriers in the transfer of the message that leads to improperly encoding or decoding it. **These include** static or noise, multiple communications, fatigue, stress and distractions. Also, the message can be incomplete or worded ambiguously. There can be a lack of credibility in decoding the message or lack of rapport between the sender and receiver. There can be confusion about what a communicated word represents, especially if jargon is used.

Communications Between Pilots

3. Pilot error many times reflects failures in **team communication** and coordination. There could be a communication barrier because of subordination problems. The Pilot in Command is the final authority for the operation of the aircraft. The First Officer should be an **assertive individual** and subordinate to the pilot as a team. But it can be difficult for the First Officer to speak up to his superior if he thinks the pilot is in error. This could have tragic results. Also, there can be cultural differences between pilots. This could lead to communications that are interpreted differently, especially in heavy workload situations during flight.

Communications Between Pilot and Air Traffic Control

4. There can be deficiencies between pilots and air traffic controllers. Many times controllers in foreign countries are **deficient in the English language**, and talk with accents, dialects and semantic misinterpretations. ATC personnel can also have a difficult time understanding the pilot because of his accent. "Readbacks" or "hearbacks" represent another communication barrier. The pilot needs to confirm that instructions given by the controller have been understood and will be followed. But, the controller may not properly understand a readback. For example, the pilot could read back that she has clearance for 16,000 feet when she actually has clearance for 14,000 feet, and the controller may not hear back the discrepancy.

Positive Communication Factors

5. Pilots and ATC personnel are highly trained to react in times of emergency, and communication between pilots and ATC have **avoided accidents and saved lives**. An example is a split-second communication between an Air India pilot and controller that aborted the plane's take-off and halted a bad collision.

Technical Report:

U.S. Airline Transport Pilot International Flight Language Experiences, Report 4: Non-Native English-Speaking Controllers Communication with Native English-Speaking Pilots.

In 1998, the International Civil Aviation Organization (ICAO) took a heightened interest in

the **role of language in airline accidents**. Member states agreed to take steps to ensure air traffic control (ATC) personnel and flight crews involved in flight operations in airspace where the use of the English language is required were **proficient in conducting and comprehending** radiotelephony communications in English. This report is a compilation of responses and comments by a group of U.S. pilots from American, Continental, Delta, and United Airlines of **their difficulties** in international operations. In this report, their responses to questions 39-45 are presented as a compiled narrative. We derived six major thrusts: (1) The English language proficiency of non-native English-speaking controllers may be **inadequate** for high workload conditions; (2) Pilots develop and use different strategies to improve ATC communications once they determine the controller's language proficiency; (3) Pilots describe ATC communications between users of the same and different languages; (4) Language switching distracts pilots and limits understanding, adversely affects situational awareness, leaves them with feelings of uncertainty, and increases their workload; (5) Language barriers most affect situational awareness just prior to top-of-descent and during taxi; and (6) How pilots compensate for reductions in situational awareness. We offer **16 recommendations to improve communication** practices ranging from developing standardized and secure English language testing for use by all ICAO member states, to realistic emergency and non-routine scenarios and simulations demonstrating use of conversational English to enhance datalink for surveillance and communications.



For a copy of this report, please visit: <http://www.faa.gov/library/reports/medical/oamtechreports/2010s/media/201012.pdf>

Fake Parts 'Endanger' Flight Safety

A large number of counterfeit spare parts for the aviation industry enter Russia from former Soviet republics, **jeopardizing flight safety** on both military and commercial aircraft, Deputy Prime Minister [Sergei Ivanov](#) said.

Ivanov cited Transportation Ministry statistics from an inspection of more than 60,000 aircraft parts that exposed about **14,500 counterfeits**.

"In plain Russian, they're all fakes," Ivanov said, Interfax reported.

In 2009 and 2010 alone, the Federal Customs Service filed 19 criminal cases and over 300 misdemeanor cases in connection with aircraft parts imports, he said.

Most of the counterfeit parts are imported to Russia illegally from bordering countries, he said. Ivanov mentioned Ukraine, Lithuania and Latvia as transit points for counterfeit parts made in third countries and said much of the counterfeit production comes from CIS countries.

Ivanov also said the government was drafting a development program for the aircraft industry that the Cabinet would consider in the second quarter of next year.

The program will call for the modernization of existing production capacity and the building of new high-tech production lines, Ivanov added.



Air controller 'fatigue threat'

An air traffic controller directed passenger jets across northern Australia after being **awake for more than 17 hours**.

It happened because he was asked to do a **second shift** by his employer, Air Services.

The air traffic controller's union, Civil Air, said the safety of passengers could have been compromised by Air Services' actions on Monday night, which the union claims was in breach of safety standards.

"You had someone who had been awake for 17 1/2 hours supervising planes and we believe that this raises serious questions about safety when someone is **so fatigued**," Civil Air executive secretary Peter McGuane said yesterday.

Mr McGuane said yesterday that "no reasonable person would consider that having no rest for that period of time would allow you sensibly to be separating planes".

It is believed that an Air Services manager completed a **risk assessment** of the situation before deciding that the risk to the controller and to the passenger jets using the airspace was acceptable.

A spokesman for Air Services -- the government-owned air traffic control manager -- said yesterday: "We have a thorough fatigue management program at Air Services and the request to undertake additional duty was consistent with these procedures."

The Brisbane-based controller was one of about 40 controllers responsible for airspace across northern Australia stretching from Cape York to Broome.

Mr McGuane said Air Services **had a shortage** of air traffic controllers and so it was asking controllers to work extra shifts rather than close the airspace.



EHEST found that helicopter operator safety culture and management are largely to improve

Cologne, Germany - European helicopter safety team unveils secrets of rotary wing's problems

The European Helicopter Safety Implementation Team (EHEST) has a short guide to preventing and overcoming four of the most pernicious operational risks affecting rotary-wing flight. This is one of the European Aviation Safety Agency's contributions to the global effort to improve helicopter safety launched by the International Helicopter Safety Team in 2005. Just-published analysis of data from six years of European helicopter accidents has led the European team to identify **four specific killer risks**, and has decided to provide pilots and operators with a training strategy - and techniques - to avoid or deal with them.



The four hazards identified include unexpected encounters with a degraded visual environment; getting into a "Vortex ring state"; loss of tail rotor effectiveness (LTE); and static and dynamic rollover. To counter these hazards, the European team has produced the first in a forthcoming series of training leaflets intended to provide "Methods to improve helicopter pilots' capabilities", with an emphasis on helping their technical understanding of the phenomena, how to avoid them, and how to recover.

Inadequate mission planning was high on the list of accident contributory factors in all types of helicopter operation and the new training leaflet provides pilots first with the information about how to plan and manage a mission to avoid exposure to the four hazardous conditions examined, to be able to recognize the developing risks early enough to avoid them, and finally how to carry out the recovery action to escape an accident once the condition is established.

EHEST found that operator **safety culture and management** is largely to blame for poor mission planning.

It found evidence of a reluctance to "Establish and apply effective standard operating procedures for all activities that they undertake", and recommends that the implementation of an effective **safety management system** would rectify the inherent conditions that lead to the kind of accidents that are happening today.

Young woman becomes first Aircraft Maintenance Engineer

A young woman from Rotuma has created history by becoming Fiji's **first female** Aircraft Maintenance Engineer for Air Pacific.

Maria Munivai Wilson recently acquired her Aircraft Maintenance Engineers License from the Civil Aviation Authority of the Fiji Islands(CAAFI) after joining Air Pacific Engineering and Maintenance department's avionics workshop as a trades woman three years ago.



Air Pacific managing Director and CEO Dave Pflieger said the airline is extremely proud as the development of their people is one of Air Pacific's key strategies as a business.

Wilson is now part of the Air Pacific team that maintains the air-worthiness of Air Pacific's fleet of two Boeing 747s, one B767 aircraft, its three narrow bodies 737s and Pacific Sun's two ATR42-500 turboprops.

ERAU Graduate Survey:

My name is Gary Chag, and I am currently a graduate student at Embry-Riddle Aeronautical University.

As part of my graduate project I've created a brief (5 questions) survey regarding the topic of Crew Resource Management (CRM).



I would appreciate the assistance of anyone who has been exposed to CRM. The results will be used only in the completion of my project, and I can be reached for comments or questions at gary.chag@gmail.com.

Thank You.

Survey Here: www.surveymonkey.com/s/5R75X6J

Aerobic Exercise Relieves Insomnia

Regular aerobic exercise improves the **quality of sleep, mood, and vitality**, according to a small but significant new study from Northwestern Medicine. The study included 23 sedentary adults, primarily women, 55 and older who had difficulty falling sleep and/or staying asleep and impaired daytime functioning. After a conditioning period, the aerobic physical activity group exercised for two 20-minute sessions four times per week or one

30- to 40-minute session four times per week, both for 16 weeks.

Participants worked at 75% of their maximum heart rate on at least two activities including walking or using a stationary bicycle or treadmill.

Participants in the non-physical activity group participated in recreational or educational activities, such as a cooking class or a museum lecture, which met for about 45 minutes three to five times per week for 16 weeks.

Both groups received education about **good sleep hygiene**, which includes sleeping in a cool, dark, and quiet room, going to bed the same time every night, and not staying in bed too long, if you can't fall asleep.

Exercise improved the participants' self-reported sleep quality, elevating them from a diagnosis of poor sleeper to good sleeper. They also reported **fewer depressive symptoms**, more vitality, and less daytime sleepiness.

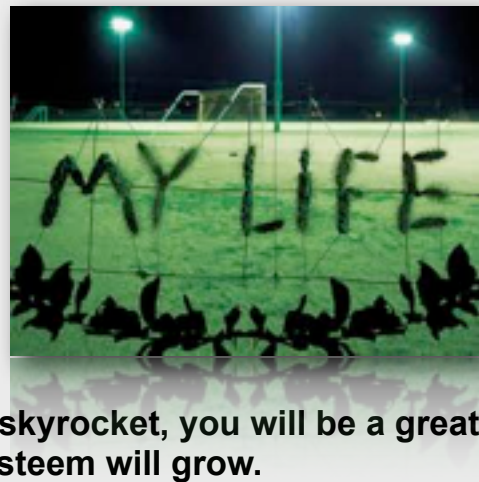


The participants' scores on the Pittsburgh Sleep Quality Index dropped an average of 4.8 points. (A higher score indicates worse sleep.) In a prior study using t'ai chi as a sleep intervention, for example, participants' average scores dropped 1.8 points.

<http://bit.ly/cNNojn>

Personal Accountability—A Requirement for Life Advancement

Accountability is normally viewed as being responsible—giving an explanation of your actions—to somebody for something. However, today's lesson is not about someone holding you accountable. It's about **you holding yourself accountable**. When you take 100 percent responsibility for holding yourself accountable, your performance will improve, your relationships will flourish, your market value will soar, people's respect for you will skyrocket, you will be a great example for others to follow, and your self-esteem will grow.



How is it that in all these areas of your life you can see such dramatic improvement? Because when you hold yourself accountable to doing the things you know you should do, you will **distinguish** yourself from the crowd.

I am convinced if you want to advance your life personally or professionally, you must hold yourself accountable for your actions, responsibilities, and goals. Think about it. Why should it be someone else's job to make sure **you are doing the things** that you know you should be doing?

The mindset I adopted more than 25 years ago is this: it is up to me and no one else to make sure I am doing what I know I should be doing. When someone has to hold me accountable, because I failed to do what I should have done, I have a serious conversation with myself. My belief is that no one should have to hold me accountable for my actions, responsibilities and goals. While I appreciate others helping me get better, I am the one that must hold myself to a high standard.

Three Types of Accountability

There are three areas in which you must hold yourself accountable:

1. **Your actions and choices**—This would include such things as:
 - The way in which you communicate with others
 - How you spend your time
 - Your behavior and manners
 - The consideration and respect you show others
 - Your eating habits and exercising routine
 - Your attitude and thoughts
 - The way you respond to challenges
 -
2. **Your responsibilities**—This would include these types of things:
 - Returning calls, emails, and texts in a timely manner
 - Being on time for business and personal appointments
 - Keeping your home, car, and workplace clean
 - Spending less than you earn
 - Doing the things you agreed to do when you agreed to do them
 - Executing your job description to the best of your ability
 - Writing things down on a “To Do” list so you don’t forget
 -
3. **Your goals**—This would include your:
 - Fitness and health targets
 - Financial goals
 - Family objectives
 - Career ambitions
 - Personal goals
 - Marital enhancement
 - Any other goals you have set for yourself

Make no mistake about it. You cannot achieve any worthwhile personal or professional goal, if you don’t hold yourself accountable. The reason is simple. It’s your life! If you have to be held accountable at work, don’t expect to be promoted or to experience any type of significant career advancement. If you have to be held accountable at home by your parents, roommate or spouse, it will grow old fast and your relationships will deteriorate.

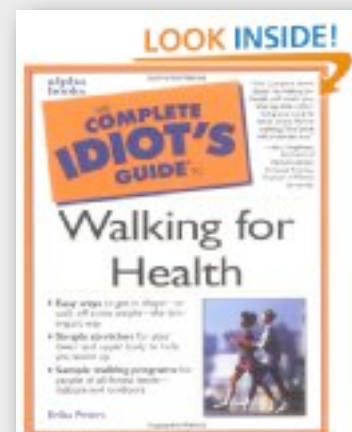
Holding yourself accountable is nothing more than **following through with YOUR commitments and responsibilities**. It's doing what YOU know YOU should do, when YOU should do it.

Whether you are 15 years old or 60 years old, let today be the day that you make the commitment to yourself that you will NEVER again require anyone else to hold you accountable. Let me also encourage you to start keeping a **prioritized "To Do" list** and focus on holding yourself accountable to working through your tasks in a prioritized sequence.

This is your life! Take control. Be responsible for it.

The Complete Idiot's Guide to Walking for Health

Walking is one of the simplest and most convenient ways to get **much-needed** daily physical activity. It doesn't require fancy equipment or a gym membership, and just about everybody can find ways to fit more walking into their daily schedule. The Complete Idiot's Guide to Walking for Health (Erika Peters, Alpha Books, \$16.95) is a comprehensive guide to walking your way fit. More than 275 pages of tips, photos, and illustrations cover everything you need to know, whether it's creating a weight loss program, combining walking with strength training, or avoiding injury.



For more information, visit

www.idiotsguides.com

Medical Error Prompts Doctor to Push for Safety Measures

In 2009, Dr. Jose Gonzalez, the medical director for the Texas Medicaid/State Children's Health Insurance Program, discovered the devastating results of a **medical error** in a very personal way. When his niece Kaelyn Sosa, then 18 months old, was brought into a Miami hospital after receiving a bump on her head from a fall, she was sedated and given an MRI. During the test, her breathing tube became dislodged, resulting in a severe brain injury.



Cases like Kaelyn's are all too common in the U.S. - and some patients don't even leave the hospital alive. Nearly **100,000 people die every year** in hospitals and doctors' offices due to **medical mistakes**. It's a huge number: put in perspective that's the equivalent of one **fully loaded 747 crashing every single day for a whole year**.

In Texas, unlike many other states, reporting medical errors isn't mandatory - yet. So the scope of the problem in the Lone Star state isn't clear. Recent research in North Carolina suggests physicians make one to **two serious mistakes every month** and cause harm to a patient once a year. With 613 hospitals and thousands of physicians in Texas, a similar error rate would mean thousands of hurt patients here.

The frequency of medical errors hasn't motivated enough hospitals and other health care facilities to take action, and that's a message being spread by Dr. Gonzalez and his niece's parents, Ozzie and Sandy Sosa. So when Dr. Gonzalez saw Stephen Harden, CEO of LifeWings, speak on the issue of **patient safety** and systems for change, he knew he needed to invite the expert to Texas.

Harden will present "Meeting the Unspoken Expectation of Safety: What Every Clinician Can Learn from the Miracle on the Hudson and the Ditching of Flight 1549" at the upcoming Texas Pediatric Society Annual Meeting in San Antonio. His presentation, which will take place on Saturday,

November 6, will explain the type of safety systems that can **stem the tide** of mistakes.

Harden's organization, LifeWings, has adapted the **best practices** of high-reliability organizations - such as **commercial aviation**, U.S. Navy aircraft carriers, and nuclear power - to help more than 100 healthcare organizations provide the highest safety for their patients. Seven of those healthcare organizations are located in Texas. At the San Antonio conference, he'll explain just how the healthcare industry can adapt the safety systems used by commercial aviation.

"Had the **back-up systems and cross-check** we use in commercial aviation been in place when Kaelyn was being treated, the dislodged tube would very likely have been discovered and her brain damage prevented," says Harden. "The one thing we know from aviation is that people will make mistakes. A good safety system recognizes **people aren't perfect** and will catch their mistakes before they harm the patient. The great thing about the Texas Pediatric Society is that they recognize more work is needed to protect their patients and they are willing to look outside of healthcare to find the best way to do that."