



## Aviation Human Factors Industry News

August 9, 2007

Vol. III. Issue 28

### Airline Worker Killed at N.C. Airport

MORRISVILLE, N.C. (AP) - Texas-based airline American Eagle on Wednesday released the identity of **an employee killed in an accident** at Raleigh-Durham International Airport.

**Fleet service clerk Lufuluabo Kalonji died in the accident** Tuesday night, said company spokesman John Hotard. Kalonji is survived by his wife and a young daughter.



Fleet service clerks work on the ramp, load bags and perform other similar tasks. Hotard said the **fatal accident involved a plane and a baggage tug**, but no other details were released.

No flight operations were affected because the airplane was scheduled to be at the airport overnight, said airport spokeswoman Colleen Fischvogt. No passengers were on the plane at the time.

American Eagle established a fund at the American Airlines (nyse: AMR - news - people) Credit Union for those wishing to contribute to the family. American Eagle, a regional partner of AMR Corp.'s American Airlines, is based in Fort Worth, Texas.

### Plane flew with rag on generator

A QANTAS plane flew from Darwin to Brisbane **with a rag on top of a power generator** even after it set off a fire alarm and the device was inspected.



The Australian Transport Safety Bureau (ATSB) report concluded that the flight on October 11, 2006 ahead despite an alarm going off in an auxiliary power unit while the plane was on the ground.

Aviation firefighters who checked the outside of the Boeing 767-336's auxiliary power unit (APU) found no signs of fire but did not examine inside it, the report found.

They advised the crew there was no sign of fire and the aircraft was returned to the departure gate ready to travel to Brisbane.

"The aircraft was returned to service under the provision of the B767 minimum equipment list item applicable for the operation of the aircraft with an inoperative APU," the ATSB report found.

Further investigations in Sydney found a burnt rag left on top of the APU had set off the fire alarm.

The rag had been left there during a maintenance inspection at Darwin airport.

Qantas had or proposed a number of changes as a result of the incident, including making it mandatory for an aircraft engineer or aviation firefighter to inspect the relevant aircraft compartment or area where a fire had occurred.

David Cox of Qantas Engineering said the airline welcomed the findings of the ATSB report.

"Qantas has co-operated fully with the authorities and undertaken a full internal investigation into this incident," he said.

"The report shows the crew followed correct procedure at the time, which included the aircraft returning immediately to the airport and the crew using a fire extinguisher."

## Throttle error cited in crash

BRASILIA, BRAZIL — An engine throttle in the wrong position probably was a major cause of Brazil's worst air accident, a congressional committee reported Wednesday, citing data from the flight recorder.



Marco Maia, a senior member of the panel investigating the July 17 crash that killed 199 people, said the throttle "was not in the correct position." But he said that did not necessarily mean human error.

Maia said aircraft equipment failure had not been ruled out, and that it was possible the pilots had shifted the throttle lever correctly but that the plane's computer had failed to respond.



Moments before TAM Airlines Flight 3054 skidded off a runway, hit buildings and exploded, co-pilot Kleyber Lima screamed, "Slow down!" flight recorder transcripts showed.

Pilot Henrique Stephanini Di Sacco replied: "I can't. I can't. Oh my God! Oh my God!"

Lima's last words were: "Go! Go! Turn! Turn! Turn!"

The recording ends with screams and an explosion.

The report casts doubt on speculation that a slippery runway was the major cause. Authorities were criticized for opening a repaved runway without grooves to speed drainage.

## [Brazilian Panel Says Spoilers Not Deployed In TAM Accident](#)

[Pilots Were Told Runway Conditions 'Wet And Slippery'](#)



A member of a congressional panel in Brazil investigating the fatal July 17 landing accident of a TAM Airlines A320 says [transcripts of cockpit voice recordings show the pilots were told the runway was "wet and slippery" -- and that braking equipment on the aircraft wasn't activated on touchdown.](#)

Deputy Efraim Filho told Bloomberg the Airbus narrowbody's [spoilers weren't deployed on touchdown](#) to slow the aircraft. The pilots were aware of that, Filho adds, saying one called ["no spoilers"](#) seconds before the aircraft ran off the runway and impacted a hangar, killing 187 people onboard the plane and 12 on the ground.

The transcripts show the pilots tried to slow the aircraft throughout the landing, and no attempt was apparently made to abort the landing and effect a go-around, Filho said.

As ANN reported, [investigators previously discovered the twinjet's right thrust reverser was inoperative](#) at the time of the accident, but airline officials maintain [the aircraft was still safe to fly.](#)

Committee members released the transcripts to the public Wednesday, after information from the CVRs was leaked to Folha de S. Paulo newspaper, according to Bloomberg.

A spokeswoman for TAM declined to comment on the latest findings, only saying the investigation is ongoing.

Officials with Brazil's Air Force say the investigation could take as long as 10 months.

## In-Flight Depressurization

**Cargo Door Seal was installed incorrectly  
A330-300. No damage. No injuries.**

Soon after departing Dublin, Ireland, on Aug. 18, 2005, for a flight to Shannon International Airport, the flight crew observed an “**Eng 1 Bleed Low Temp**” warning on the ECAM page. “The ECAM actions were carried out, but the indications remained,” said the report by the Irish Air Accident Investigation Unit (AAIU).



As the aircraft climbed through 10,000 ft, the captain noticed that altitude was an unusually high 4,900 ft. He decided to continue the flight at 10,000ft rather than climb to 16,000 ft, as planned. The aircraft was landed without further incident.

A post-flight report (PFR) generated by the aircraft maintenance computer indicated a No. 1 engine bleed problem and a cross-bleed problem, “there was no reference on the PFR to a pressurization problem,” the AAIU report said. **A test of the bleed management computer for the No. 1 engine revealed a fault that subsequently had been cleared.** Nevertheless, the bleed management computer was replaced. After the engine bleed, cross-bleed and pressurization systems were **checked by engineers**, the aircraft was released for service. “The engine bleed and pressurization systems were again check by the flight crew, and all indications were normal, with the aircraft pressurizing normally,” the report said.

The aircraft then departed from Shannon, at an unspecified time, with 237 occupants for a scheduled flight to New York. While climbing to cruise altitude, the crew observed **cabin altitude increasing through 7,500 ft.** and reduced the rate of climb. As the aircraft was being leveled at Flight Level 35, 000 ft over the Atlantic Ocean, **cabin altitude increased through 8,500 ft.** The crew changed the pressurization mode from automatic to manual but was unable to control cabin altitude. At about 1515, they requested and received clearance from air traffic control to descend and return to Shannon.

**Cabin pressure then increased to nearly 10,000 ft.** “on completion of the checklists, the flight crew conducted a full analysis of the situation and, having considered all options, including burning off fuel, etc., decided to prepare for an overweight landing at Shannon and to land as soon as possible,” the report said.

**Engineers** visually inspected the cabin pressure outflow valves and found no abnormalities. **Then they inspected the aft cargo door seal, which had been replace two days before the incident flight by the airline’s maintenance contractor in Dublin.**

The report said they found that the door seal had been installed “inside out and upside down,” preventing inflation of the seal by pressurized air in the cargo hold. Pressurized air normally enters through 2-mm (0.1-in) holes in one side of the seal; because of the incorrect installation of the seal the incident aircraft, the holes faced the outside of the aircraft. This resulted in a pressurization leak through the unsealed cargo door.

## NTSB: Confirmation bias, cockpit chatter unravels Comair pilots at Lexington

The pilots of the Comair Bombardier CRJ100 that crashed on take-off at Lexington, Kentucky's Blue Grass airport on 27 August last year were apparently lured by "confirmation bias" into believing they were lined up on the correct runway in the pre-dawn darkness that morning.



They had "ample time" and a variety of runway environment cues and air traffic control resources they could have used to verify their actual position, the US National Transportation Safety Board has revealed in its final analysis of the crash.

Contributing to error were 40s of "non-pertinent conversations" during a critical phase of the 150s taxi of Comair Flight 5191 from ramp to incorrect runway, say investigators.

Soon after that conversation - which was prohibited by federal "sterile cockpit" regulations and Comair guidelines - the pilots attempted to take off on an unlit general aviation runway.

The aircraft struck trees and burned roughly 610m (2,000ft) past the end of the 1,100m runway, half the length of the correct runway. Forty-nine passengers and crew perished in the accident, with only the co-pilot surviving.

Investigators say differences between the pilots' airport diagram and the actual airport environment due to construction were probably not factors in choosing the wrong runway, nor was similar information missing from the automated airport information service listened to by the pilots before taxiing.

Rather, "multiple external cues" and aids were available to help the pilots establish that their position before take-off was incorrect, including cockpit instrumentation, the airport diagram and help from air traffic controllers, investigators have concluded.



The NTSB **downplays the impact of the control tower being staffed by one controller rather than two** for that particular shift, per verbal US Federal Aviation Administration guidance for the facility, commenting that workload that morning was light.

Administrative tasks the controller turned to after clearing the improperly positioned CRJ to take off, although not prohibited, could have waited until a more opportune time however. **Some NTSB members chided the controller** for not continuing to monitoring the flight through the tower windows, perhaps noting the pilots' error.

NTSB members have **issued five new recommendations**, adding to earlier calls for requiring proper runway checks and calling on controllers to address possible **fatigue issues** - **the controller had obtained only 2h of sleep in the 24h preceding the crash.**

As well as requiring airline and air taxi aircraft to have moving map displays or runway advisory alerting systems in the cockpit, the NTSB wants the FAA to require airports to **install enhanced taxiway markings** and asked that controllers do not issue take-off clearances until all runways en route to the take-off runway are crossed.

## **OSHA Fines American over O'Hare Procedures**

American Airlines has been slapped with \$231,000 in fines **for 22 significant safety violations** at O'Hare International Airport, one of the largest workplace safety penalties in Illinois in recent years.

The citations issued earlier this week by the Occupational Safety and Health Administration included **six repeat violations and a rare "willful" infraction**. With a willful citation, OSHA is claiming **an employer knew a safety problem existed that could kill or seriously injure a worker but didn't correct it.**

In a statement, American said it **"takes issue with some of OSHA's findings, particularly the classification of one citation as willful**. We anticipate having discussions with OSHA concerning these and other related issues."

The company has 15 days to contest the citations. In its statement, American said **it takes safety "very seriously" and has already rectified most of the deficiencies noted by OSHA, "and is working to address the rest."**



The passel of violations and the big fine -- apparently the biggest ever against American -- **came from a regularly scheduled OSHA inspection**, also a bit of a rarity. Normally, large OSHA fines and multiple safety violations are associated with fatal accidents.

**The alleged willful violation, which involves workers being exposed to fall hazards**, alone carries a fine of \$70,000. OSHA claims that employees in an American hangar were required to inspect heaters from unprotected catwalks 80 feet above the ground.

**Also, workers were required to make inspections atop jet bridges and de-icing trucks without proper fall protection.** The bridges, which allow passengers to board a plane, are 16 feet high; the de-icing trucks, 9 feet high.

Willful citations are handed out sparingly: Of the 83,913 safety violations cited nationally by OSHA in its last fiscal year, only 479 -- less than 1 percent -- were deemed willful, the agency's data show. Repeat violations are also not common, comprising only 3 percent of all citations in OSHA's last fiscal year.

The six repeat violations with which OSHA tagged American were based on citations originally levied in 2005 at airports other than O'Hare. The repeat violations involve **fall protection, electrical and fire hazards, machine guard issues, hygiene issues and "lockout/tagout" procedures.**

**Lockout/tagout procedures protect workers from an unexpected start-up of machinery. The hygiene issue in question at O'Hare involved catwalks covered with pigeon excrement.** Together, the repeat violations led to fines of \$100,000.

The rest of the \$61,000 in proposed fines against American involves 15 "serious" safety violations. **OSHA defines a serious violation as one which an employer should have known about, as opposed to the did-know-about-it standard of a willful violation.**

OSHA has inspected American at O'Hare 10 times since 2000, leveling citations in five cases. But in the past, the initial citations never rose above \$25,000. Often, initial fines are negotiated downward by OSHA. American paid \$6,250 for that \$25,000 citation, levied in 2003 for a repeat safety offense.

## **Louisville Int. Airport ground radar "fixed"**

WASHINGTON - Nearly three months after the **ground radar system** at Louisville International Airport **failed to see a plane crossing an active runway in a downpour**, the equipment is running well, according to air traffic controllers.



**"We got all the problems fixed we wanted fixed,"** said Jeff Gilde, president of the Louisville local of the National Air Traffic Controllers Association.

The ground radar, used to track planes and vehicles on the surface of the airport, finished its testing phase last week and is now operational, according to the Federal Aviation Administration.

The radar, known as Airport Surface Detection Equipment Model X, to be deployed at 35 major airports nationwide by 2011.

**But the system has been plagued with technical problems and cost increases.** In May, the Department of Transportation's inspector general told Congress that "the program is at risk of not meeting its current cost and schedule plans."

**On May 4, a Northwest Airlines plane mistakenly crossed an active runway. The radar, which was supposed to track the plane, had just malfunctioned, according to the controllers.**

## Iran's aviation achievements notable

Despite US sanctions imposed on Iran, its leading airline **'IranAir' has obtained international certificates in maintenance and overhaul.**

With the help of domestic engineers, Iran's 40-year old airline **IranAir has reached internationally-accepted standards in aviation, quality control, avionics and aircraft overhaul,** Fars news agency reported on Thursday.



Applying state-of-the-art technology, aviation engineers at the Iran's leading airline, are working round the clock in an area of 28000 square meters to develop the country's avionics technology.

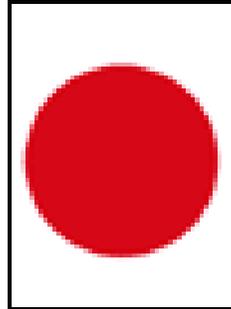
According to officials, IranAir's avionic department generates a monthly income up to 10 million USD, with which it supports local and regional aviation companies.

**Iranian engineers** contribute greatly to the savings of IranAir by bringing down the costs of maintenance and overhaul for Boeing aircrafts to US\$ 4 million, which could lay a heavy burden of US\$10-12 , should repairs be undertaken in a foreign country.

## Nuke plant leak laid to procedural lapse

Tepco staff didn't go by the book after quake

Failure to follow safety procedures was to blame for the latest leak at a nuclear power station damaged in last months earthquake in Niigata Prefecture, a top government official said Friday.



Tokyo Electric Power Co. said radioactive material was leaking from an exhaust vent as late as two days after the plant suffered a near-direct hit by last months quake, which killed 10 people and injured more than 1,000.

Tepco announced Friday that a check the previous night at the plant confirmed the vent leak had stopped.

The embattled operator of the Kashiwazaki-Kariwa plant — the world's largest in terms of capacity — had already announced a barrage of leaks and malfunctions, and said the latest might have been caused by workers failing to follow rules and turn off a fan inside the building.

Chief Cabinet Secretary Yasuhisa Shiozaki said the trade and industry minister was to issue a further "stern warning" to Tepco.

"This is an error of not implementing the manual," Shiozaki said when questioned about the latest exhaust vent leak.

Tepco and nuclear regulators have stressed the amounts of radioactivity leaked were extremely low and posed no threat to the environment or local residents. The announcement of the leak came a day after officials issued similar assurances about other damage at the plant — including a fire, burst pipes and waste spillage.

The seven reactors at the Kashiwazaki-Kariwa plant shut down automatically when the quake hit, and the plant has been ordered closed indefinitely while inspections and repairs are carried out to assure it can be restarted safely.

Meanwhile, **it has been revealed that the Kashiwazaki plant had no fire trucks equipped with chemical fire extinguishers to deal with burning petroleum products.**

As a result, Tepco **employees had no choice** but to "watch" a fire burn the insulation oil in the electric power transformer outside the No. 3 reactor for two hours. In the meantime, aerial video footage showing black smoke spewing from the structure was broadcast worldwide, amplifying fears of a major nuclear disaster.

Although Tepco had warned that closing the key nuclear reactor could trigger a power shortage, it assured the government Friday it can meet peak summer demand in the Kanto region.

Economy, Trade and Industry Minister Akira Amari said the Kanto region's power supply will not be affected.

Amari told a meeting at the ministry that Tepco had told him it was working on getting on electricity from other regional utilities, and its power supply will not be affected.

Amari also ordered the presidents of Tepco and 10 other utilities to submit upgraded nuclear safety plans by July 26. He also asked them to report on the earthquake resistance of their atomic plants in a month.

The government has urged the operators of Japan's 55 nuclear reactors — which supply one-third of the nation's energy — **to speed up safety checks for earthquake resistance**, a top concern in the temblor-prone nation.

**Officials at the Kashiwazaki plant acknowledged they had not foreseen such a powerful quake hitting the facility. They also repeatedly underreported its impact.** After initially saying the quake had caused 50 separate types of minor damage or leaks, Tepco upped that estimate to 63.

## A hangar full of boys' toys

Chocks away for an exhibition charting the history of air travel.

The new AirSpace exhibition at the Imperial War Museum's airfield at Duxford opens at an interesting period in aviation history. For this, of course, is a time when an increasingly vocal group of people seem to believe that mass aviation should indeed be made history and consigned to a museum.

Duxford is spending £25 million on kitting out a three-acre hangar James Bond-style, with an interactive "skywalk". Up here, at about the height of a jumbo jet cockpit, you can survey a collection of aircraft which even the most ardent climate campaigner might admit is a **pretty staggering tribute to British engineering genius.**



The exhibition includes a Harrier jump jet, a Lancaster bomber, a Tornado Mk 1 and a Concorde James Bond-style, with an interactive "skywalk". Up here, at about the height of a jumbo jet cockpit, you can survey a collection of aircraft which even the most ardent climate campaigner might admit is a **pretty staggering tribute to British engineering genius.**

Among other machines, there's a Harrier jump jet, a Lancaster bomber, a Tornado Mk 1 and a Concorde. But look the other way and you see what Duxford hopes will be the future of aviation: the children visiting the exhibition who might one day want to become pilots, designers or **engineers.**

The skywalk element of AirSpace is a timeline of aviation history with films, photographs and documentaries marking the landmarks along the way. There are models you can touch, pummel and fiddle with and which explain the basics, illustrating the lift, thrust and physics which keep planes in the air.

It's impressive and entertaining, but there is a serious mission behind the wind tunnels and toy joysticks. The two main private backers of the project, BAE Systems and Marshall Aviation Services, are engaged in a very different battle to the ones Douglas Bader and his like fought from this very airfield. They are fighting for the hearts, minds and skills of a generation.

When Michael Marshall, chairman of the Cambridge-based Marshall group, addressed the hundreds of small donors who helped AirSpace get off the ground, he **bemoaned the shortage of young people joining the industry.**

I tested the scope of the exhibition on a potential recruit, four-year-old Tom Barnes. Tom dashed around AirSpace merrily speaking into voice tubes and flying model planes through wind tunnels. His parents, Robin and Alice, have consumer-tested a few attractions in their time and they reckon AirSpace is up there with the Science Museum for the intelligence and usability of the exhibits.

In the hangar, Tom headed straight for his favorite, the Harrier. This was a generation-leaping moment. **The Harrier first flew in the 1960s** - when I was four, in fact - and it was my favorite too. The thrill of those days came flooding back and I surprised myself by being able to name the huge, whale-like form of the Sunderland flying boat, the supersonic Lightning - surely one of the most purely aggressive machines ever built - and the stern architecture of the Lancaster.

All brought back a childhood spent knee-deep in comics such as The Victor and Valiant. Those were the days when **planes had proper names.** It's hard to get as emotionally engaged with something called an F1 or a B52.

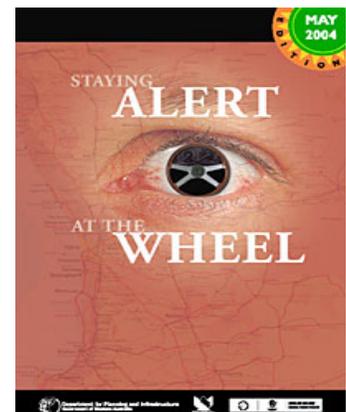
The two **most poignant** exhibits are the **Spitfire and the Comet.** The Spitfire is breathtaking: a perfectly restored bright blue and silver Mk 4 Submarine, the last and fastest of the line. At the opposite corner of the hangar is a De Havilland Comet 4, the plane that marked the end of a different kind of British air superiority.

**With BOAC, the Comet launched the era of international jet travel.** But a series of crashes caused by **metal fatigue** led to its grounding. Boeing stepped into the breach and our aviation industry took a different, more modest course.

With one giant, graceful exception: **Concorde.** Tom and I stepped aboard the BAC/Aérospatiale Concorde 101 into a cabin that even now has an air of speed, privilege and power. We walked under the vast canopy of the wing and Tom announced he'd transferred his allegiance to Concorde. Oh dear. Another **engineer** bites the dust. When Tom grows up, he wants to be a rich holidaymaker.

## **Maggie's Law Underscores Importance of Corporate Fatigue Management**

**Maggie's Law**, the recently signed New Jersey statute which turns **drowsy driving into a criminal offense**, could reportedly significantly **increase the legal risks employers face from extended hour's operations.**



Under the new law, a sleep deprived driver who causes an accident, after being awake for more than 24 hours, can be convicted of vehicular homicide. The law raises the specter of corporate liability in cases of drowsy employees who work long hours, high amounts of overtime, double-shifts, or even 24-hour on-call periods at their employer's request.

Maggie's Law is intended to address the dangers of drowsy driving. Several scientific studies have reportedly demonstrated that people who have been awake for 24 hours are impaired to the same level as someone with a blood-alcohol level of .10 percent, which is recognized as legally drunk in all states.

The 24 million Americans who work in extended hour's jobs outside the hours of 7 a.m. to 7 p.m. will reportedly be particularly affected by Maggie's Law.

Many extended hours employees routinely stay awake for 24 hours on their first nightshift of the work week. Similarly, medical professionals and other emergency services personnel are often required to remain on-duty for 24-hour shifts. In emergency situations, utility linemen and technical support personnel work up to 48 hours without rest. These employees are confronted daily with the challenge of drowsy driving.

"For extended hours employers in New Jersey and surrounding states, Maggie's Law increases the risk of corporate liability should an employee cause a fatal drowsy driving accident," said Dr. Martin Moore-Ede, chairman and CEO of Circadian Technologies, Inc. (Circadian). "We are seeing a steep increase in driver fatigue accident litigation. In fact, the US Department of Transportation identifies fatigue as the number one safety problem in transportation operations, with a cost in excess of \$12 billion a year."

According to Dr. Moore-Ede, "Employers must consider options for mitigating this risk, such as educating employees on the danger of drowsy driving and controlling long work hours, and developing policies that minimize this potential new legal liability."

## Handy Hand Tools

All tools are manufactured with safety in mind but, tragically, a serious accident often occurs before steps are taken to search out and avoid or eliminate tool-related hazards.

Hand tools can include anything from axes to wrenches. Whether on the job or in your home workshop, the greatest hazards posed by hand tools result from misuse and improper maintenance.



Even with experienced hands, unsafe tools cause accidents.

**If it's worn, cracked or mushrooming, discard it!**

**Broken, worn out, bent or damaged tools are not only frustrating to work with but, if used repeatedly, can lead to an accident or injury.**

Establish a procedure for the control of your tools and check them for defects on a regular basis. **Discard all tools** that show dents, cracks, extreme mushrooming or excessive wear. This includes all tools with spread, nicked or battered jaws, damaged gripping surfaces, or broken and bent handles.

**Mushrooming heads on striking tools can often be re-dressed** but if a striking tool easily mushrooms it is probably unsuitable for its use and should be replaced with one that is more appropriate for the job.

**Hammers or screwdrivers with broken or split handles, wrenches with worn jaws and saws with dull teeth are examples of tools that should be fully repaired or discarded.** Tool handles should be solid, firmly attached and slip resistant. Handles that fit poorly make control of the tool difficult and hazardous. If the wooden handle on a tool such as a hammer or an ax is loose, splintered, or cracked, the head of the tool may fly off and strike the user or another person.

**Cutting tools should be kept sharp for greater safety and efficiency.** Chisels, wedges, drift pins and other impact tools should be checked to make sure they have not mushroomed to a dangerous degree. The heads might shatter on impact, sending sharp fragments flying.

**Be sure to use the right tool for the job.** Using a screwdriver as a chisel may cause the tip to break and fly, hitting the user or another person.

**Around flammable substances,** sparks produced by iron or steel hand tools can be a dangerous ignition source. Where this hazard exists, spark-resistant tools made from brass, plastic, aluminum or wood will provide for safety. Take all other precautions necessary when dealing with flammable substances.

**Keep floors as clean and dry** as possible to prevent accidental slips with or around hand tools.

When working with hand tools **safety gloves as well as safety eyewear** may be required, depending on the job.

**Safety requires hand tools be used and maintained properly.** Learn to recognize the hazards associated with the different types of tools and the safety precautions necessary to prevent those hazards.

## Midnight Shift Nugget

How do I know when fatigue is affecting my performance?

Awareness of fatigue is an important first step toward taking corrective action  
Some warning signs include:

- a strong desire to sleep
- difficulty keeping one's eyes open
- feeling of sluggishness
- difficulty concentrating
- irritability
- an inability to remember the last five minutes



When you experience these symptoms, it's time to take a break. You might take a quick walk, climb some stairs, have a cold drink or eat a small snack. If you make a habit of checking your alertness level throughout your shift, you can prevent fatigue before it becomes a problem.

## Exercise

Whether you're 9 or 90, **abundant evidence shows exercise can enhance your health and well-being.** But for many people, sedentary pastimes, such as watching TV, surfing the Internet, or playing computer and video games, have replaced more active pursuits.

### What exercise can do for you

Millions of Americans **simply aren't moving enough** to meet the minimum threshold for good health — that is, **burning at least 700 to 1,000 calories a week through physical pursuits.** The benefits of exercise may sound too good to be true, but decades of solid science confirm that **exercise improves health and can extend your life.** Adding as little as **half an hour** of moderately intense physical activity to your day can help you avoid a host of serious ailments, including heart disease, diabetes, depression, and several types of cancer, in particular breast and colon cancers.



Regular exercise can help you sleep better, reduce stress, control your weight, brighten your mood, sharpen your mental functioning, and improve your sex life.

A well-rounded exercise program has four components: aerobic activity, strength training, flexibility, and balance exercises. Each benefits your body in a different way.

#### [Fighting disease with aerobic activity](#)

**Aerobic exercise** is the centerpiece of any fitness program. Nearly all of the research regarding the disease-fighting benefits of exercise revolves around cardiovascular activity, which includes walking, jogging, swimming, and cycling. Experts recommend working out at moderate intensity when you perform aerobic exercise. This level of activity is safe for almost everyone and provides the desired health benefits. Additional health benefits may flow from increased intensity.

#### [Protecting bone with strength training](#)

**Strength or resistance training**, such as elastic-band workouts and the use of weight machines or free weights, are important for building muscle and protecting bone.

Bones lose calcium and weaken with age, but strength training can help slow or sometimes even reverse this trend. Not only can strength training make you look and feel better, but it can also result in better performance of everyday activities, such as climbing stairs and carrying bundles. **Stronger muscles also mean better mobility and balance, and thus a lower risk of falling and injuring yourself.** In addition, more lean body mass aids in weight control because each pound of muscle burns more calories than its equivalent in fat.

#### [Ease back pain with flexibility exercises](#)

**Stretching or flexibility** training is the third prong of a balanced exercise program. Muscles tend to shorten and weaken with age. Shorter, stiffer muscle fibers make you vulnerable to injuries, back pain, and stress.

#### Exercise at a glance

##### In a nutshell, exercise can:

- reduce your chances of getting heart disease. For those who already have heart disease, exercise reduces the chances of dying from it.
- lower your risk of developing hypertension and diabetes.
- reduce your risk for colon cancer and some other forms of cancer.
- improve your mood and mental functioning.
- keep your bones strong and joints healthy.
- help you maintain a healthy weight.
- help you maintain your independence well into your later years.

But regularly performing exercises that isolate and stretch the elastic fibers surrounding your muscles and tendons can counteract this process. And **stretching improves your posture and balance.**

### [Preventing falls with balance exercises](#)

**Balance tends to erode over time** and regularly performing balance exercises is one of the best ways to protect against falls that lead to temporary or permanent disability. Balance exercises take only a few minutes and often fit easily into the warm-up portion of a workout. Many strength-training exercises also serve as balance exercises. Or balance-enhancing movements may simply be woven into other forms of exercise, such as tai chi, yoga, and Pilates.

## [EMERGENCY PREPAREDNESS](#)

### [7 Steps of a Family Escape Plan](#)

**Step 1:** Sketch out your home's floor plan

**Step 2:** Mark two escape routes from each room

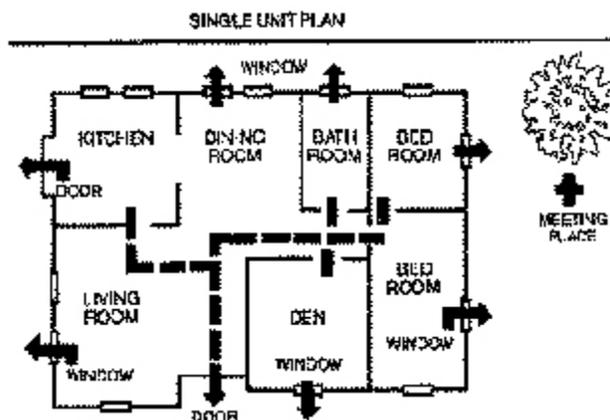
**Step 3:** Designate a meeting place safely away from the house where family members will assemble after escape

**Step 4:** Review the escape plan with each family member and make sure they understand it

**Step 5:** Post your plan on the fridge

**Step 6:** Post the fire department's phone number on every phone in the house

**Step 7:** Conduct family fire drills twice a year and vary them so that alternative escape routes are used



Picture This!

New bump caps



END