



## Aviation Human Factors Industry News December 12, 2007

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### Twin Otter Inspection Ordered

The French Bureau d'Enquetes et d'Analysis (BEA), citing the fatal August 2007 crash of a de Havilland DHC-6 Twin Otter in French Polynesia, is recommending **inspection** of stainless steel stabilizer **control cables**.

The BEA recommended that Transport Canada and European Aviation Safety Agency “require operators to perform an inspection **as soon as possible** on stainless steel stabilizer control cables installed on DHC-6 Twin Otter airplanes, with particular attention being paid to chafing areas in contact with cable guides.”

A second recommendation said that two agencies should “consider extending these inspections to carbon steel cables that may also be installed on the stabilizer control system of this airplane.”

**Twenty people died** and the airplane was destroyed in the crash, just after takeoff from Moorea. A preliminary investigation found that sections of the two stainless steel stabilizer **control cables were heavily worn** because of **chafing** at positions where they passed through cable guides.



## US: NTSB Adds Worker Fatigue Issues to "Most Wanted List"

The National Transportation Safety Board recently made important additions to its "NTSB Most Wanted List" of transportation safety improvements. Edward Wytkind, President of the Transportation Trades Department, AFL-CIO, offers the following statement:

"We are pleased to see the National Transportation Safety Board add air traffic controller and rail operating employee **fatigue** to its "Most Wanted List" of transportation safety improvements. **Continued neglect of these issues will have severe consequences.** Having the NTSB out front calling for action will serve to advance transportation labor's agenda to deal with **chronic fatigue issues in the workplace.**



"**Understaffing and poor scheduling practices** have produced a dangerously fatigued air traffic control workforce. We cannot allow FAA mismanagement to set controllers up for failure, because failure on the runway and in the skies is not an option.

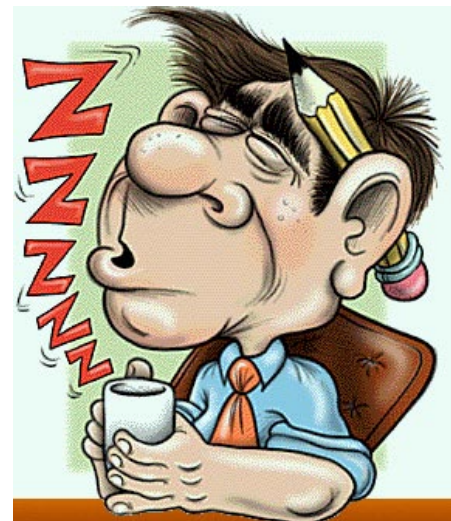
"**Railroad accidents are on the rise, and fatigue** has been cited as a major contributing factor by many recent NTSB reports. Unwieldy hours of service rules, reckless scheduling policies, and the abusive practice known as "limbo time," all contribute to a tired rail workforce with dangerous consequences.

"The Bush Administration should heed the warnings of its own appointees to the NTSB and work with Congress in pending FAA and rail safety legislation to **eradicate longstanding worker fatigue problems in our transportation system.**

"We commend the NTSB for taking aggressive steps yesterday to challenge our government's inaction."

### Waking up on flight fatigue

For years, the National Transportation Safety Board has been recommending shorter work hours for pilots to help reduce the chance that **fatigue** will lead to a disaster. But the Federal Aviation Administration, under pressure from the airline industry, has been woefully slow to respond.





The safety board re-emphasized the need for tougher work hour rules on Thursday as it performed its yearly list of "most wanted" safety improvements. Fortunately for the flying public, **this time the prospect is better that recommendation will turn into action.**

That's because the recent outing of data from NASA's now-infamous "secret" survey of pilots from across the nation has more than buttressed the safety board's own analyses that show **fatigue causes too many serious and fatal aviation accidents as well as numerous near-crashes.**

The current fatigue rules are simply too lax to be effective. Airline pilots now are limited to eight hours a day of flight time. But they can spend a total of 16 hours or even more working, including waiting at the airport and other time on the ground. Even when flight crews are given, say, eight hours off, they often have to spend much of that time eating, getting between the airport and a hotel and on other personal chores. **The time left for sleep ends up being far less than is healthy.** Pilots and flight crews aren't the only ones whose energy levels affect passenger safety. **The fatigue rules for mechanics** and air traffic controllers also aren't robust enough to provide the public with the best possible safety.

The NASA data paint a chilling portrait of the problem. Hundreds of pilots and **other aviation workers** complained that fatigue had led to **mistakes** on the job. The reports include six cases of pilots falling asleep in midflight, a USA Today analyses of the data showed, including the case of both a pilot and co-pilot dozing off as their jetliner approached Denver's airport.

The NTSB, for its part, says pilot fatigue has contributed to at least **10 accidents** in the last two decades that killed more than **250 people.**

Stronger mandatory rules concerning **fatigue** are needed even though the airlines have developed procedures allowing pilots to refuse to fly if they feel too tired. But these aren't enough. Given the economic and time pressures of the modern aviation industry, workers will always hesitate to call out "tired," never mind that company policy claims there is no penalty for reporting fatigue.

The airlines, of course, are worried about cost. And cutting work hours will raise fares. But **tougher federal rules will affect all carriers equally**, so no one company will be at a disadvantage. The public will go along. Few passengers would object to paying a few dollars more if they know the money is **boosting safety.**

The NTSB has made a powerful case for toughening **aviation fatigue** rules. If the Federal Aviation Administration doesn't finally step in to produce regulations that will do the job, Congress should order it by law.

## Atlasjet MD-83 crashes near Isparta, killing all 57 onboard

An Atlasjet Airlines MD-83 outbound from Istanbul crashed early morning, Nov. 30, 2007 during its approach to Isparta Airport in southern Turkey, **killing all 57 passengers and crew onboard.**

The crash site was located in mountainous terrain approximately 7 mi. from Isparta. The aircraft, which was wet-leased from World Focus Airlines, departed IST at 12:50 a.m., 90 min. late owing to its late arrival inbound from Pristina, according to Atlasjet. The crash occurred about 45 min. after takeoff. Published reports described weather as clear and moonlit.



Turkish Prime Minister Recep Tayyip Erdogan said in widely reported televised remarks that while the crash's cause is "not yet certain," officials **"suspect the plane's tail hit a hilltop and that the aircraft fell on its fuselage with the force of the impact."** According to Flight Safety Foundation's Aviation Safety Network, "Local officials said the plane had broken into two pieces, with its fuselage and rear landing in different locations. . .the plane's wings and engine were at the top of a hill while the fuselage was 500 ft. lower."

Video (You Tube): <http://youtube.com/watch?v=8XqsHAzYG8s>

Audio (MP3): <http://www.airsafe.com/podcasts/show27.mp3>

## Lion Air MD-90 loses three-metre-long part on takeoff

An MD-90 operated by Indonesia's Lion Air has been grounded after the airline admitted that a **three-metre-long part** found on a runway belonged to it.



The airplane lost the part on takeoff from Jakarta-Sukarno Hatta airport, December 4. Lion Air's operational director told the Detikcom online news service the part was **from the exhaust system** and not vital for flight. He reportedly said **it fell off the plane because of 'a mistake of the workshop'.**



## GAO Report: Runways Not Safe Enough

Despite FAA efforts to improve safety, [the rate of runway incursions has not decreased in the last five years](#), according to a [report](#) released Wednesday by the Government Accountability Office. The report also notes that air [traffic controller fatigue](#) continues to be a matter of concern. As of May 2007, at least 20 percent of the controllers at 25 facilities, including towers at some of the country's busiest airports, [were regularly working six-day weeks](#). The FAA's [Office of Runway Safety](#) has not carried out its leadership role in recent years, the report says, and technology upgrades that could enhance safety are behind schedule. The GAO concludes that the FAA needs a new national runway safety plan, better data about runway overruns and [ramp accidents](#), and a plan to address controller [overtime and fatigue issues](#). The National Air Traffic Controllers Association was quick to respond. "The facts are crystal clear: Both the NTSB and the GAO are now on record saying controller [fatigue](#) affects runway safety," said NATCA President Patrick Forrey in a [statement](#) on Wednesday. "There is nowhere else the FAA can run and hide from this staffing crisis and deny its existence."



Another promise or strategic plan is not needed, Forrey said. "[The time to act is now](#), not after a catastrophe. The agency needs to sit down and settle the labor problems with its unions, stop the bleeding of experienced controllers, and find ways to entice the best and brightest [to stay on the job](#) and fix these safety problems with a fully staffed and rested workforce."

## FAA: Airline safety management systems not quite ready for prime time

An international call for airlines to have [safety management systems](#) in place by January 2009 will probably not be met in the USA as the [Federal Aviation Administration](#) and other stakeholders attempt to perfect how the tools are used in practice.

The agency this week is holding a safety conference largely to gather lessons learned and best practices from the international aviation community to further its effort to define standards for proactive safety programmes that help airlines identify hazards, mitigate risks and monitor how well intervention strategies are working.



The [International Civil Aviation Organisation](#) in 2004 and 2006 published standards and recommendations for implementing [safety management systems](#) at airports and air traffic control organisations, respectively, and plans to do the same for member nation airlines in January 2009, says Tony Ferrante, director of the FAA's air traffic safety oversight service.

Ferrante says the FAA's internal safety management system for its air traffic organisation, the most mature [safety management system](#) programme within the agency, started in 2005 and will be "fully implemented" in 2010.

Jay Pardee, head of the FAA's Aviation Safety Analytical Unit, says officials have tested the [safety management system](#) concept as part of six projects, including construction of tall towers, the design of a required navigation performance approach into Washington Reagan National airport and a departure procedure for Las Vegas airport.

The FAA recently launched pilot [safety management system](#) programmes at six US airlines in an attempt to advance information published as part of an advisory circular on the topic in June 2006.

Pardee says the tests, designed to provide information on how safety management systems can be applied to both "large complex" carriers and small operators, will possibly last for one year, after which the agency could update the advisory circular or propose a rule.

"We're fine tuning," he says, "though it's in a pretty mature state right now." Lessons learned from the international community aired at this week's conference, he adds, will be used to "figure out how to deploy [safety management systems](#)."

More immediate pressure for action on [safety management systems](#) is coming from the [National Transportation Safety Board](#), which called for the FAA to mandate them at all Part 121 airlines in the aftermath of the 2004 [Pinnacle Airlines Bombardier CRJ accident](#) in Jefferson City, Missouri.

The crash killed both pilots on the repositioning flight, but no-one on the ground. Although the NTSB blamed the pilots' unprofessional behaviour, failure to follow standard operating procedures and other factors for the crash, officials highlighted the broader problem of airlines not having insight into an eroding safety culture within the ranks.

## [South African Airline Grounded](#)

Nationwide Airlines, which hit the headlines three weeks ago when an [engine on one of its aging Boeing 737-200s sheared from the wing](#) on takeoff, has been grounded by South Africa's Civil Aviation Authority on the [suspicion that it's using unapproved parts](#).



The CAA says it **found some bolts that don't have the correct paper trail** and it was investigating the pirate parts possibility when the 737 lost the engine Nov. 7. The flying pilot, Trevor Arnold, is up for an award from the South Africa Airline Pilots Association, for his actions during the emergency.

The grounding of the budget airline stranded 6,000 passengers, and their problems may not be over. The International Air Transport Authority has suspended Nationwide from its interchangeable ticket arrangement, which means that other airlines won't accept their tickets for replacement flights. Nationwide's managers are reportedly in closed-door meetings with CAA officials trying to sort out all the issues.

## **TSB issues final report on A310 loss of rudder incident**

The Transportation Safety Board of Canada (TSB) released its final report into the Air Transat loss of rudder incident that occurred on 06 March 2005.

The TSB investigation found that the A310 aircraft took off from Varadero, Cuba, **most probably with pre-existing damage** to the rudder. The separation of the rudder from the aircraft together with the findings of the investigation determined that **inspection programs for this model of composite rudder are not adequate for the timely detection of defects.**



The consequences of a rudder separation include reduced directional control and possible separation of the vertical tail plane. (TSB)

**Small gaps** in the carbon-fibre composite of this plane's rudder **were not spotted by routine checks** and later exploded. Accident investigators say **better maintenance tests** are needed before composites are used for entire planes

After the accident only 5% of the 8.2-metre (27-foot) rudder remained – fortunately the plane landed without serious problems

**A standard test** used to assess the safety of carbon-fibre composite airliners can be dangerously ineffective, according to air-safety investigators in Canada.

In a report published on 22 November, the Canadian Transportation Safety Board (TSB) says an aircraft can pass the **"tap test"**, even though its composites actually have **small flaws.**

**Tap tests** are part of routine servicing. A **ground engineer** listens for a change of pitch as they tap a composite surface like a tailplane or rudder. This is supposed to reveal gaps where layers of composite have come apart, but the TSB says small gaps can go undetected and later grow.

These gaps can suddenly **grow in size** and potentially endanger an aircraft, the board says. It is working with the aviation industry's global International Maintenance Review Board to review the current maintenance procedures.

### Exploding rudder

The TSB report follows a two-year investigation into a March 2005 incident in which an Air Transat Airbus A310 airliner lost nearly all of its 8.2-metre (27-foot) carbon composite rudder (see pictures) on a flight from Varadero, Cuba, to Quebec City, Canada.

Despite being pitched into a "Dutch roll", rolling its wings and wagging its tail, the aircraft landed safely, causing only a minor back injury to one person.

TSB tests in flight simulators showed that the Dutch roll could only happen if the rudder was "fluttering" uncontrollably side to side, as a result of sudden, serious damage.

Weather conditions had been normal. The investigators started to **suspect gaps in the tail's composite had been missed during recent services.**

They took already damaged composite specimens – some from other A310 rudders – and placed them in a vacuum chamber. The samples experienced pressure changes simulating changing altitude during many simulated flights.

"The areas of the damage **almost doubled instantly,**" the report says. "The rapid propagation event was explosively loud and violent." The explosion even damaged their test chamber. The TSB say **this explains the loud bang heard by the crew.**

### Laser tests

The investigators concluded that a gap in an inner composite panel somehow **passed tap tests.** After many cycles of changing pressure the gap grew and finally exploded. The rudder lost strength and stiffness, fluttered and broke up.

"The manufacturer's recommended inspection program for the aircraft was not adequate to detect all rudder defects," says the report, saying there is no way to tell how old the damage was.

The news that **composite maintenance needs fresh attention** comes as the aviation industry is preparing to launch passenger aircraft with fuselages made entirely from composites.



US firm Boeing plans to launch its composite 787 Dreamliner in 2008, followed by Airbus's A350 in 2012.

Both companies use **tap tests** in their **maintenance programs**. The TSB hopes its findings will inspire an urgent search for more reliable procedures, like "twanging" composites with lasers to produce high resolution ultrasound echoes.

TSB Report Number A05F0047:

<http://www.tsb.gc.ca/en/reports/air/2005/a05f0047/a05f0047.asp>

## Video of the Week: Airbus A380 Tail Scrape

Here is an A380 doing some interesting testing. In this clip, the pilots bring the Airbus across the runway at minimum allowable airspeed and weather a pretty significant-looking **tailstrike**.

<http://flyboytv.com/index.php?m=video&v=78>



## Dubai to have world's largest aircraft maintenance facility

The world's largest **aircraft maintenance, repair and overhaul (MRO) centre** will be established in Dubai, it was announced at the 10th Dubai Airshow which started on Sunday.

The centre will be part of the five-billion dirham (\$1.36 billion) **Dubai World Central Aviation City**, being developed as part of Dubai World Central (DWC), the 140 sq km urban aviation multi-phased development at Jebel Ali, according to a DWC press release.



Chairman of Dubai City of Aviation Corporation Sheikh Ahmed bin Saeed Al Maktoum unveiled the final masterplan of the project, which has been designed as a **one-stop centre for all aviation-related operations**.

Maktoum said that the Aviation City's strategic location near the new Al Maktoum International Airport -- which is under construction and which is stated **to become the world's largest airport** when completed -- would give potential investors an advantage to reach regional and international clients alike.

"The MRO centre will be the world's biggest in land area earmarked for development, and will be able to handle all types of aircraft from light jets to superjumbos such as the A-380", Maktoum stated.

DWC executive chairman Khalifa Al Zaffin said that the facility would host all **aviation manufacturing, MRO, aviation support services, design and consultancy, research and development, aviation training, product and parts, light manufacturing units and high-technology industries**.

"When complete, DWC Aviation City will lead the region in aviation services, excellent quality infrastructure and hi-tech research. The project is set to create an innovative and unique business concept in the region by inviting all aviation related businesses to be based within one location," he stated.

Apart from the MRO centre, the Aviation City will also feature a heliport zone, an **educational and academic zone**, an industrial zone and a hub for aircraft component and parts supply.

"These multiple zones will allow several operations to be simultaneously functional at any given time", said Abdullah Al Qurashi, CEO, DWC Aviation City.

"**The academic zone will host several aviation colleges and training centers** which will offer aerospace and academic studies while the industrial zone will offer an integrated infrastructure and localized environmental control in one location available on ground," he said.

Qurashi added that individual developers would be given an opportunity to build their own hangars and facilities within a free zone area on long-term lease.

## **Pilots On Anti-Depressants "Safer"**

The first study on the safety records of **pilots taking anti-depressants** suggests they're **no more likely to crash an aircraft than those who don't need the drugs**. The study was done in Australia, the only place it could be done since it's the only country that **allows pilots** to take anti-depressants and keep their medicals. "There was virtually no difference in the number of incidents or accidents," Professor Kathy Griffiths, a mental health researcher from Australian National University, told a mental-health conference in Australia.



"But importantly, there was a tendency for more accidents in the period prior to pilots going on to anti-depressants, but not once they were on them."

Use of anti-depressants is medically disqualifying in all other jurisdictions, but Australia has allowed them since 1993 and up until 2004 the medicated and unmediated pilots groups each had five major accidents. The unmediated had 15 incidents compared to 18 for those on the drugs but that wasn't considered a significant difference. "This really confirms for the first time that the longstanding liberal policy of supervised anti-depressant use introduced by CASA to allow medicated pilots is a good one," said Professor James Ross, a co-investigator and former aviation medical specialist with Australia's Civil Aviation Safety Authority (CASA). "But it does raise a lot of questions about what is happening in all these other countries, where **presumably people secretly take medication unsupervised, or they just fly depressed, increasing their chance of incident.**"

## "Hear" Problems Before They Become Breakdowns

Westbury, New York-Spectronics Corporation has introduced the Spectroline® Marksman(TM) **ultrasonic diagnostic tool**, a highly accurate

instrument that converts and amplifies inaudible ultrasonic sound into audible "natural" sound. Now, service **technicians** can easily hear sounds that signify problems such as **compressed air leaks, electrical discharge, as well as vacuum, natural gas, propane, refrigerant, seal and gasket leaks**. This allows technicians to repair them long before they become major headaches.



The Marksman uses a two-tiered process to ensure accurate diagnosis. First, the receiver unit converts inaudible sound into audible sound using a process known as heterodyning. Then, the receiver's Sound Signal Technology(TM) fine-tunes the audible sound into the natural sound emitted by the defect itself. A 10-bar LED display indicates the intensity of incoming signals.

Designed for optimal performance, the **MDE-1000 Marksman Master Kit** comes with a receiver, full-sized headphones, two probes, and an ultrasonic emitter that allows technicians to test for faulty seals, gaskets and weather stripping in doors, windows, ductwork and other unpressurized enclosures. When attached to the receiver, the 12-inch hollow probe accentuates air sounds, while the solid contact probe accentuates sounds of wear or grinding inside gears. Standard 9-volt alkaline batteries are included for both the receiver and the emitter.

All components are packed in a sturdy storage case with foam insert.

For more information about the Spectroline Marksman, call toll-free 1-800-274-8888 or fax 1-800-491-6868. Outside the United States and Canada, call 516-333-4840 or fax 516-333-4859. Website at [www.spectroline.com](http://www.spectroline.com).

## Fatigued Driving Under-Recognized, Under-Reported

**Drowsy driving** causes at least 100,000 police-reported crashes and **kills more than 1,550 Americans each year**, according to the National Highway Traffic Safety Administration (NHTSA). Unfortunately, motor vehicle crashes continue to be under-recognized and police officers lack sufficient training to deal with this issue, says the National Sleep Foundation (NSF).

**The situation is equally alarming in Canada**, where one in five Canadian drivers surveyed admitted to nodding off while behind the wheel sometime during the previous 12 months.

The NSF has issued a call to action to all states to do more to prevent drowsy driving and falling asleep at the wheel. The foundation has completed a report on the issue and intends to use that information “toward establishing standard language that states may use to code sleep-related crashes on police crash report forms and to address the impact of sleep loss in police training programs.”



The report found that only one state, **New Jersey**, explicitly defines drowsy driving as recklessness under a vehicular homicide statute. However, at least eight states are looking into passing legislation to address this huge safety concern.

The NSF says it is also working in partnership with high schools, universities and youth organizations to educate young drivers about the consequences of **sleepiness** behind the wheel. **Experts believe that people who are driving while sleep-deprived are as dangerous as drivers who are impaired by alcohol or drugs.**

## Midnight Shift Nugget

### No-Doze Keeps Drivers Awake

If you have **drivers who travel long distances**, you know that **drowsiness** is often a hazard that can't be ignored. That's why "No-Doze" was invented.



This electronic safety gadget fits behind a driver's ear and **monitors tiredness**. When the driver begins to doze off and his or her head slumps forward, the device emits a loud tone. It works like a "**splash of cold water**" in the middle of the night.



The No-Doze has an **ergonomic design** that makes it comfortable to wear. It operates on a 1.5-volt battery, and is ideal for long haul truck drivers or those working shifwork. Just turn it on, adjust the wake-up angle switch and place it behind your ear. When **drowsiness** comes calling and your head starts to droop, the piercing tone will jolt you awake.

For more information on No-Doze, visit [www.alibaba.com](http://www.alibaba.com)

## The Connection Between Sleep and Job Strain/Burnout

Analyzing 316 healthy workers, researchers sought to study the relationship between **sleep, burnout and job strain**. The study found that **sleep quality** and various dimensions of job strain are significant predictors of several aspects of burnout. Additionally the study found that sleep quality had a more significant impact on emotional exhaustion than work demands did. The study suggests that **interventions to optimize sleep** could prevent or alleviate burnout.



Source: Psicothema 2007;19(3):388-94

Given the connection between sleep and burnout, it should be highlighted that the most common complaint among **shiftworkers**, especially new ones, is trouble sleeping. The most common causes of **shiftworker** sleep problems are:



- [Disruption of circadian rhythms](#) – often caused by schedules that aren't biocompatible (e.g. rotate too quickly, wrong direction)
- [Environmental factors](#) – increased light, noise, etc during the daytime
- [Social factors](#) – often, workers sacrifice sleep to spend time with their families and fulfill domestic responsibilities, or to pursue social activities

In many cases, sleep problems can be **alleviated** through scheduling and education on managing a **shiftwork** lifestyle.

### [Sleep Hygiene Tips](#)

The promotion of regular sleep is known as *sleep hygiene*. The following is a list of sleep hygiene tips which can be used to improve sleep. Also included is a list of special relevance to adolescents, who may experience sleep difficulties due to *circadian rhythm* changes occurring during the teenage years and into young adulthood.



#### [Adults:](#)

1. Go to bed at the same time each night and rise at the same time each morning.
2. Make sure your bedroom is a quiet, dark, and relaxing environment, which is neither too hot or too cold.
3. Make sure your bed is comfortable and use it only for sleeping and not for other activities, such as reading, watching TV, or listening to music. Remove all TVs, computers, and other “gadgets” from the bedroom.
4. Physical activity may help promote sleep, but not within a few hours of bedtime.
5. Avoid large meals before bedtime.

#### [Adolescents/Young Adults:](#)

1. Avoid caffeinated drinks after lunch.
2. Avoid bright light in the evening.
3. Avoid arousing activities around bedtime (e.g., heavy study, text messaging, getting into prolonged conversations).
4. Expose yourself to bright light upon awakening in the morning.

5. While sleeping in on weekends is permissible, it should not be more than 2–3 hours past your usual wake time, to avoid disrupting your *circadian rhythm* governing sleepiness and wakefulness.
6. Avoid pulling an “all-nighter” to study.

Adapted From: Taheri S. The link between short sleep duration and obesity: We should recommend more sleep to present obesity. *Arch Dis Child* 2006;91:881–884.

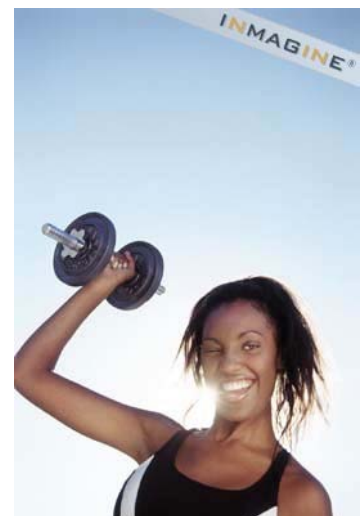
### How Much Sleep Do I Need?

While there is variability between each of us in how much sleep we need, the National Sleep Foundation has noted that the need for sleep changes as we age. The National Sleep Foundation has recommended the following sleep guidelines for selected age groups (\*including naps):

INFANTS	
(0–2 months)	10.5–18 hours*
(2–12 months)	14–15 hours*
TODDLERS/CHILDREN	
(12–18 months)	13–15 hours*
(18 months–3 years)	12–14 hours*
(3–5 years)	11–13 hours*
(5–12 years)	9–11 hours
ADOLESCENTS	
	8.5–9.5 hours
ADULTS	
	7–9 hours

### Retrain Your Brain to Love Exercise!

The best diet for weight loss may still be under debate, but there's no doubt that the dynamic duo of diet and exercise continues to be the gold standard for weight loss and, more importantly, maintaining a weight loss. In spite of the much-publicized benefits of exercise, too many people fail to stick with an exercise program.





Here are three ways to think about exercise and its benefits that will help you love it — especially if your goal is to lose weight.

**[Tip #1 — Without the appropriate fuel, exercise can feel more like punishment than pleasure.](#)**

For those seeking a quick fix, a very low-carbohydrate diet can seem like the magic bullet. But a balanced diet with adequate carbohydrates is necessary to optimize energy for exercise.

Any diet, especially a weight-loss diet, that is too low in carbohydrates — 125 grams or fewer a day — is a recipe for disaster when it comes to exercise. The primary fuel for muscles is glucose (from carbohydrates) and its storage form, glycogen. Without them, you're likely to feel tired or have sore muscles early in your workout.

Planning an exercise routine includes timing meals and snacks to prevent exercising on empty. If you feel sluggish while walking at 5 p.m. because you haven't eaten since lunchtime, try having a pre-workout snack. The same walk just an hour or so after dinner will probably be adequately fueled from that meal.

To boost your stamina, eat a 150- to 200-calorie snack that contains one to two servings of carbohydrates about 30 minutes to 1 hour before exercise. Here are some examples:

- An apple with 1 tablespoon of peanut butter or mixed nuts
- One ounce of string cheese and 6 crackers
- A granola or protein bar with about 150 calories and five to seven grams of protein

**[Tip #2 — Think of exercise as a savings account.](#)**

With a savings account, you make deposits, watch your money grow with interest, and then reap the rewards. You don't deposit money so you can immediately withdraw it. Exercise is similar. It also gathers interest:

As you get more fit, your body rewards your hard work by using more calories during and after your workouts.

Here are some other ways that exercise contributes to long-term weight loss and weight maintenance.

- Muscle burns calories while fat does not, even though it weighs more than fat.

- Exercise builds muscle, which increases your body's resting metabolic rate, so you expend more calories even when you're not exercising. Exercise also helps maintain muscle. Because muscle burns calories, exercise can also help you maintain the weight you lose, which is often harder than losing weight.
- Some studies show that vigorous exercise can help reduce appetite; therefore exercisers take in fewer calories during the day without even thinking about it.
- Researchers estimate that your body continues to burn calories at a higher rate for between 2 and 24 hours after you finish exercising.

If you have not exercised in a while or plan to do more than walking, check with your physician prior to starting to exercise.

***Tip #3 — The benefits of exercise aren't measured just by a scale, but by a better working body.***

Instead of focusing on the minutes that tick by, the calories racked up on the treadmill, or the number on the scale, focus on how exercise changes your body from the inside out.

- It reduces depression and can be especially effective for women who have postpartum depression.
- It can increase insulin sensitivity if you have diabetes; if you're at risk for diabetes, exercise can help prevent it.
- It can help reverse sarcopenia, a condition associated with inactivity and aging in which fat replaces muscle. According to one study, postmenopausal women were able to reverse muscle-mass loss after two months of small increases in physical activity and strength training. This was linked to better overall health, better balance, and fewer falls.

Many people are discouraged by the slow weight loss associated with moderate calorie restriction (250-500 fewer calories per day) plus exercise (mobilizing another 250 calories a day) especially in light of the old adage that muscle weighs more than fat. It can be disheartening not to see your hard work reflected in a lower number on the scale. Some changes can't be measured on the scale. Rather they create a better functioning body.

Success isn't about any one workout, but if you challenge yourself for the long-haul and continue to exercise even if your weight isn't changing, you can affect more lasting improvements in your body.

## GO FIGURE

What does this number represent? **45.3 million**

**Answer:** It's the approximate number of American adults who are current cigarette smokers.

November 15, 2007 marks the 31st annual Great American Smokeout, organized by the American Cancer Society to encourage cigarette smokers to butt out for at least one day.



**Why quit?** Here are some motivating statistics:

- **20 minutes** after quitting, a smoker's heart rate and blood pressure drops
- **12 hours** after quitting, the carbon monoxide level in a smoker's blood drops to normal
- **2 weeks to 3 months** after quitting, a smoker's circulation improves and lung function increases
- **1 to 9 months** after quitting, coughing and shortness of breath decrease.
- **1 year** after quitting, an ex-smoker's risk of coronary heart disease is half that of a smoker's

For more good reasons to quit smoking, visit the [Great American Smokeout](#).

(Source: American Cancer Society)

## Hand Injuries Interfere With Your Life

If you have ever had a **hand injury** such as a fracture or a serious cut, you have some idea how inconvenient it can be. Your injury probably healed and your life returned to normal.

**But stop and think** what your life would be like with a permanent hand injury. You'd have difficulty performing thousands of everyday tasks you now take for granted. It would be tough to button your own shirt, let alone do your job.





Every year industrial workers suffer an estimated **100,000** hand injuries. Many of these are permanently disabling - amputation, burns and crushing injuries.

- Follow safe work practices at all times. Review the **manufacturer's instructions** before operating tools and equipment.
- Use **lockouts** so equipment cannot move when you are doing maintenance and adjustments.
- Use **push sticks, tongs and other tools** to handle materials so your hands do not come into contact with moving machinery or harmful chemicals.
- Make sure **machine guards** are in place before operating equipment.
- Watch for **pinchpoints** - places where your hands can be crushed between two moving objects or a moving object and a stationary one,

Wear the **correct gloves** to guard against the specific hazards you encounter. Here are a few of the many choices:

- **Gloves must fit properly.** Loose fitting gloves often contribute to hand injuries.
- The common leather work glove protects against rough surfaces. **Be aware** that, over time, leather gloves may become sloppy and loose-fitting.
- **Insulated gloves** protect from the heat and cold.
- **Rubber gloves** lined with insulation are used to protect against electric shock.
- **Metal mesh gloves** are worn when handling sharp objects or using knives.
- **Grip gloves** have raised points on the surface for better grip of slippery materials.

Gloves are also the **last line of defense** against contact with harmful chemicals. They must be made of material which has been proven effective against the specific hazardous substance. This includes natural rubber, neoprene, nitrile or butyl synthetic rubber, or various plastics such as polyvinyl chloride (PVC) or polyethylene. Gloves made of the wrong material may be subject to deterioration and leakage when exposed to a chemical.

Hand accidents can be minor such as a thumb hit by a hammer. Or they can be terrible - **a hand caught and crushed** in pair of rollers or cut off by a spinning blade. **Be on guard for hand hazards**

## AUDIO SAFETY TALKS!

### HAND PROTECTION IS A GOOD DEAL

Gloves are cheap. If you doubt it, try buying a new set of fingers after they've been crushed, torn or amputated. But **awareness** of the hazards is the first step in safety. To let your workers know what some of those hazards are, present this safety talk. For multilingual workplaces we include the same talk in Spanish.

- [To listen to the English talk, click this link](#)
- [Click here for Spanish](#)

## PICTURE THIS!

Speaking of machines and hands: A pilot came out one cold morning and found his battery dead. So he decided to turn on the ignition of his aircraft, and then get out and starts it by hand, swinging the propeller to start the machine. Unfortunately, it worked. **Unfortunately, the brakes were off.** And even more **unfortunately the aircraft wasn't chocked.** Six planes were destroyed, and \$2 million in damage done, before the plane stopped.

