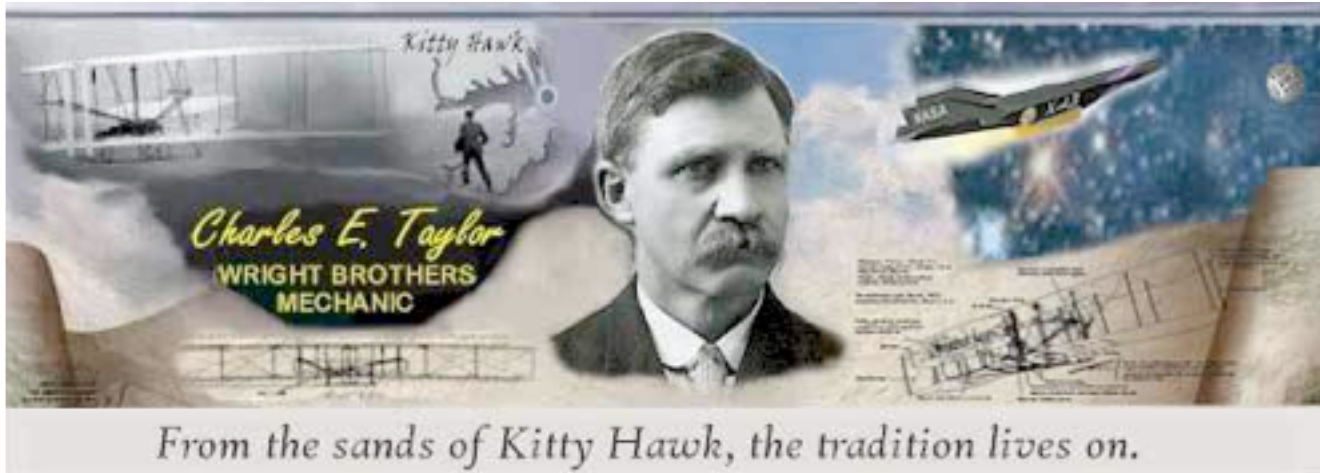


# Aviation Human Factors Industry News

*Volume V. Issue 27, September 18, 2009*



Hello all,

To subscribe send an email to: [rhughes@humanfactorsedu.com](mailto:rhughes@humanfactorsedu.com)

In this weeks edition of *Aviation Human Factors Industry News* you will read the following stories:

★Post Article Examines 'Crash Pads'

★Post-maintenance Flights Are Critical - A GA pilots view

★Human Factors: Beyond the "Dirty Dozen" - Part I

★True leadership different from culture of command

★FAASTeam Youth

★The Nine Switches of Human Alertness

★One-Third of Americans Take Naps

★Barrier to Communicate

★Picture This!

## Post Article Examines 'Crash Pads'

A recent article in the Washington Post looked at **crash pads**, makeshift used as an inexpensive housing option for regional airline flight crews. Crash pad owners told the Post that these dorm-like housing arrangements — accommodating **10 to 30** people at one time — are concentrated in cities with major airline operations fed by regional carriers. The article states that most crash pad tenants claim to have **sleep**

**issues** and **abnormal body clocks**, attributed to sharing a room with co-workers and their constantly changing flight schedules. Sleep research has shown that sleeping too little can not only inhibit your productivity and ability to remember and consolidate information, but **lack of sleep** can also lead to serious health consequences and **jeopardize your safety** and the safety of individuals around you. Historic tragedies have been linked to fatigue-related human error, among them the Exxon Valdez oil spill and the NASA Challenger shuttle explosion. According to the Department of Transportation, the last six fatal commercial aviation accidents in the U.S. involved regional air carriers, **citing excessive pilot fatigue as a contributing factor**.



\* Read the Post article

<http://www.washingtonpost.com/wp-dyn/content/story/2009/08/03/ST2009080303154.html?sid=ST2009080303154>

## Post-maintenance Flights Are Critical - A GA pilots view

This is the time for a **slow, focused** preflight examination. I worked as the placement officer at an A&P school many years ago. The students would perform the annual inspections on my little Grumman Yankee; under the supervision of their properly licensed instructors, of course. Like now, general aviation was in a down cycle, and I remember nervously addressing the graduating class, explaining how I would be using my airplane to fly around, scouring every airport within range for companies that might be hiring. After an awkward pause, one of the guys muttered, "Geez. If you'd told us you were going to use it to find us jobs, **we'd've fixed it better.**"



Even under less demanding conditions, the **first flight after maintenance** needs to be approached with **particular caution**. Even assuming all the work was performed flawlessly, you need to remember that the airplane has just been turned inside out. And when reassembled, some stuff might not have gone back together just the way you left it. One pilot I know couldn't get his radio to work after an annual—not a peep. After increasingly aggravated calls for a radio check, he taxied back to the shop, convinced they had severed a wire or shorted a connection. The technician on duty politely pointed out the volume control was turned all the way down. ( ... all right, it was me.)

But **more serious problems** do surface. This is the time for an extended preflight inspection, and your **mental attitude** is what it's all about. If you usually check the oil through the small access door, take the time and patience to open the cowl for a detailed look inside the engine compartment. Scan carefully for anything that doesn't seem just right—loose or chafed wires, bolts without safety wire, or other unsecured bits. Same with the airframe. As you walk and crawl around it, check for anything that might look even a little bit askance or uneven. And you're **not**

**insulting** the technician when you ask about something that catches your eye.

In the cockpit, your **printed checklist** is your best friend on the first flight after maintenance. But this time, as you enumerate each item, try to imagine a particularly ingenious gremlin doing its best to dismantle or readjust anything and everything that used to be set up just the way you liked it. Include the seat adjustment, throttle and/or prop control friction locks, trim, instrument settings—and everything else in your usual cockpit sweep. There have been documented cases of ailerons **rigged backwards** during maintenance—so your "free-and-correct" control check should be performed with particular concentration after maintenance. That's a small sample. There's plenty more, if you think about it.

If you rent airplanes, you face many of the same issues as an aircraft owner if you draw the short straw and book an airplane just out of the shop. Your attention needs to be **that much more focused**, because you are that much less familiar with the airplane's particular idiosyncrasies.

And don't forget to check the volume control on the radio.

## Human Factors: Beyond the "Dirty Dozen" - Part I

About 80 percent of **maintenance mistakes** involve **human factors** (HF), to the Federal Aviation Administration. The

maintenance world has unique HF issues that are more severe and longer lasting than elsewhere in aviation. Operators are looking at various techniques to combat HF challenges.

**"Dirty Dozen"**

Human factors (HF) are **constant watchwords** in maintenance operations. Although HF maintenance training is not strictly required in the U.S., many U.S. maintenance organizations have adopted it because they see regulation on the horizon, want to comply with regulations elsewhere or simply accept the business case.

Why are human conditions, such as fatigue, complacency and distraction, so important? As one expert put it, if you scratch the surface of a maintenance incident, **you're likely to find HF issues**. About 80 percent of maintenance **mistakes involve human factors**, according to Bill Johnson,

the FAA's chief scientific and technical advisor for human factors in aircraft maintenance systems. If they are not detected, maintenance errors can cause accidents. The agency's HF "Operator's Manual" states that maintenance was the primary cause of **8.3 percent** of U.S. accidents in the 1990s. It has been a **contributing factor** in about 18 percent of aircraft accidents, Johnson said. A "maintenance event" started the accident chain in 26 percent of the worldwide accidents in 2003 for Western- and Eastern-built jets and turboprops, the manual states.

The cost of flight cancellations and delays is also steep. The cancellation of a Boeing 747-400 jumbo jet flight can cost an airline \$140,000, according to researcher Alan Hobbs, in an Australian Transport Safety Bureau report. A delay at the gate can shave an average of \$17,000 per hour off a company's revenues, the report states. Ramp incidents wreaked \$5-billion-worth of damage worldwide in 2004, according to the FAA manual.

Another reason to train relentlessly is the **constant challenge** of the **maintenance environment**. This world has unique HF issues that are more severe and longer lasting than elsewhere in aviation, as Hobbs points out. Mechanics work in a hazardous environment that demands physical strength, coordination and meticulous attention to detail in reading and recording data. They may work high up on the aircraft structure or deep in some confined inner space in extremes of hot and cold and at night. **Communications** between team members are crucially important but difficult in high-noise environments. Mechanics may need to diagnose and solve problems in the face of urgent time pressures, especially on the flight line. Pilots and air traffic controllers encounter great job stress, as well, but can put it behind them at the end of the day. Like doctors, however, **mechanics** know that their mistakes may affect the health of their charges months or years down the road.

Some maintenance shops have gone to the length of creating a "sterile environment," said Richard Komarniski, president of Grey Owl Aviation Consultants. One civilian helicopter maintenance shop which his company does training for decided to **improve focus** by controlling phone calls, the presence of sales reps, visitors and other distractions in the work area. It made a difference, he said.

HF awareness needs to remain sharp, if for no other reason than to keep **complacency** at bay. Aviation Maintenance interviewed experts at Lufthansa Technik, Delta TechOps and Aveos to survey the latest HF programs in Europe, the U.S. and Canada.



## True leadership different from culture of command

**Culture** is one of those words that everyone uses but can't define. There is pop culture or the culture of another country. There are cultures within. For the anthropologist, culture is the sum total of all things that make up a way a people live that is transmitted to the next generation.

John Nance, a former Air Force lieutenant colonel and airline pilot, goes around the country speaking about the transformed culture of flying airplanes safely and the current clinical culture of crashing. He landed at our new hospital to talk about the difference between the **culture of leadership and the culture of command**.

The occasion was the very first meeting of the medical staff of a brand-spanking-new hospital. It was like the **flight crew** coming together for that pre-flight briefing one sees in the movies. The dashing pilots in their flight gear gather, first slowly, then the top gun steps to the podium and begins, "Gentlemen, our mission today is ...."

On this occasion, Nance gave the assignment to be something different than we had been trained, schooled, and cultivated to be. We were told to **abandon our traditional culture of commanding** the medical or surgical ship **by control and intimidation**.

The airline industry and culture since the 1970s have completely changed, **especially in the cockpit**. Before, the captain was king. Contradict and you die, was the motto. The pilot was earthly deity airborne. Intimidation was the rule of the day. What the boss said went. The problem was that sometimes the whole plane, including passengers and crew, went into the ground or a mountain because **someone else** didn't speak up.

The results were disastrous. There were **problems in communications**, perceptions and assumptions. There was a National Guard transport in which the pilot said, **"Take off power,"** meaning he needed more thrust to clear the obstacle, and the result was that the engineer took off the power,



crashing the plane. There were the **errors of perception** of trained professionals not seeing the flaps in the wrong position. There were **assumptions in the cockpit** that the runway was clear, when in reality, a big 747 was literally dead ahead. Death followed.

In medicine, be it the crew in the OR or the team in the clinic, there are the **same sorts of mistakes**. Calling them malpractice doesn't help because the current liability system is structured to either get money for the victim and his attorneys, or it is to punish and seek revenge. It does not prevent harm. Instead, what we have is a **very complex human system** designed to produce exactly the results it gets. Presently, that system is designed to produce by some estimates **40,000 to 90,000 excess deaths a year**. That doesn't count the wounded. If the airlines did that, the whole fleet would be grounded and the entire citizenry would be in an uproar and everyone would walk. In health care, there is barely a peep. It is said that the pilot is the first one on the scene of a crash. Maybe that is the problem. Surgeons don't operate on themselves.

Somehow health care has to **rethink** how we are flying the hospitals and practices that carry patients, not passengers. For the docs, we have to undergo a **pride-ectomy**. **Control by command and rule by intimidation** have to be abolished. It was fascinating that the subject chosen by the new medical-staff president at the same first meeting of the doctors was to declare the new facility a "No Jerk Zone." The message was clear. For the building to be a safe place for patients to heal without accident, the **doctors have to change**. Maybe we all need to expect something different from those trained to care for us; now is the time to expect them to care about us.

To fly right, we physicians need to be cultured in better perceptions, different assumptions and improved communications. **Otherwise**, we are all going to crash.

## FAASTeam Youth

Spread the news about the newest aviation experience **dedicated to youth**. next generation of aviation enthusiast, craftsman, pilot, **mechanics** and engineer.

Information on everything from the Boy Scout aviation merit badge to NASA training.

See additional information and informative videos at:



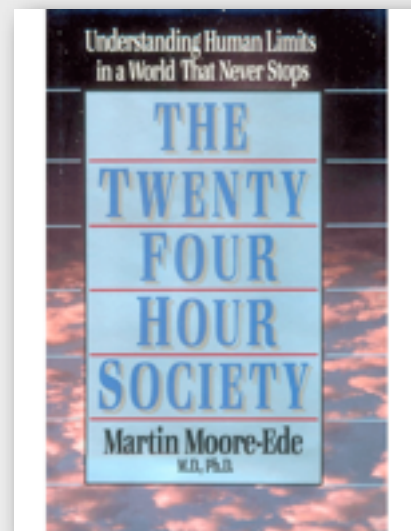
<http://www.faasteamyouth.org/>

## The Nine Switches of Human Alertness

Right now, take a moment and estimate how alert you are on a scale of 1 to 10. Now, go a step further and try to pinpoint **what factors** are influencing alertness levels.

In his book, **The Twenty-Four Hour Society**, Dr. Martin Moore-Ede how a person's alertness is triggered by **nine key internal and external factors** that can be considered the switches on the control panel of the mind.

Understanding these 9 key switches and how to manipulate them is the secret of gaining power over one of the most important attributes of the human brain: **alertness**.





**Here are 9 switches – recognizing them can help you stay alert on the job.**

**1 – Sense of danger**, interest or opportunity. Nothing pulls us faster from a drowsy state than the imminent threat of danger, or just surviving a near miss. The emergency fight-or-flight response is activated by the sympathetic nervous system, and the brain is placed on full alert. However, it is important to note that the presence of danger is not enough; the danger must be perceived and feared.

Although less extreme than the response to danger, a stimulating task or opportunity triggers a similar response. The flip-side is that alertness fades if what you're doing is monotonous. An endless stretch of freeway or a quiet night in a plant where everything is running smoothly can prompt drowsiness.

**2 – Muscular Activity**. Physical activities such as walking or stretching also trigger the sympathetic nervous system and help keep you alert. However, many jobs require us to be sedentary. Extended periods without much movement, such as sitting in a chair or car, can make it difficult to stay fully alert or even awake.

**3 – Time of day on the circadian clock**. Circadian rhythms – daily ups and downs in body temperature, blood pressure, hormone levels and other physiological traits – have a major effect on alertness. We generally experience peak levels of alertness in the morning and early evening and lowest levels of alertness in the early afternoon and during the overnight hours.

**4 – Sleep bank balance**. How long you've been awake and how much sleep you've had in recent days affects your alertness level. If you only sleep four or five hours a day for several days, you build up a "sleep debt" that leads to reduced alertness. A long spell of sleep acts as a "deposit" that offsets your sleep debt.

**5 – Ingested nutrients and chemicals**. Caffeine and amphetamines temporarily increase alertness. Others, such as sleeping pills, antihistamines, melatonin and certain foods, may induce sleep. Of course, some of these substances have serious drawbacks because of their negative effect on overall health and potential for abuse or addiction.

**6 – Environmental light**. Bright light tends to increase alertness, particularly during the over-night hours. Whether you're at home or on the job, dim light or darkness set the stage for falling asleep.

7 – **Temperature and humidity.** Cool, dry air, especially on your face, makes it easier to stay alert, while heat and humidity make you drowsy. Similarly, a cold shower is invigorating, while a warm bath prepares you for sleep.

8 – **Sound.** As you know, sound can be both a tool for promoting sleep and increasing alertness. Be conscious of the sound around you and adjust it to fit what you need. For example, the soft hum of computers in the middle of the night might lull you into sleep.

9 – **Aroma.** Some researchers believe that aromas like peppermint, pine and citrus can make people more alert. Lavender, meanwhile, seems to have a sedative effect.

**In Review...** It is tempting to say that the Nine Switches of Alertness may seem obvious and straightforward. However, we have not learned them as a society, not have we used them when we know them well.

One challenge is that the **human desire** for comfort intervenes. Making oneself comfortable is not compatible with optimal alertness, especially during the wee hours of the morning. In fact, the desire for comfort may be so dominant, and lack of awareness of the compromise one is making with alertness so large, that alertness takes a back seat.

Take for example, high-tech industrial control rooms that are being built around the world. Many of them are more **focused on human comfort than on alertness** because of the belief that comfort equals improved performance. However, the truth is that sometime to be fully alert one must be a **little uncomfortable**.

Source: Martin Moore-Ede, *The Twenty-Four Hour Society: Understanding Human Limits in a World That Never Stops*, Addison-Wesley 1993

## One-Third of Americans Take Naps

Do you find yourself taking a quick power snooze every once in a while? **not alone.** One-third of adults in the United States take naps, to a recent poll by the Pew Research Center. The poll not only found that 34 percent of a nationally representative sample of 1,488 adults admitted to taking naps, but that more men reported catching



a couple of quick Zzzs compared with women (38 percent versus 31 percent). In older adults, the difference was more pronounced, with more than 41 percent of men age 50 and older saying they napped in the past day compared with 28 percent of women in the same age range. The poll's findings were based on responses to a question in a survey about aging that had asked respondents to identify activities that they had engaged in over the last 24 hours, including taking a nap. The Pew Research Center notes, however, that the word "nap" was not defined in the question, so for some people it could mean falling asleep on the subway and for others it could mean crashing on your couch in the afternoon.

## **Barrier to Communicate**

**How many words are there? The number of words in English vs. other major languages:**

**English = 999,985**

**Chinese = 500.000 ( various dialects)**

**Japanese = 232,000**

**Spanish = 225, 000+**

**Russian = 195,000**



## Picture This!

