

FATIGUE

THE SILENT, STEALTHY **KILLER**

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SHOULD WE FLY UNDER THE INFLUENCE?

**“HOW
DO YOU
FEEL?”**

Your crewmembers or passengers may often ask you this. What they really mean is, “Have you had any drinks within the last day? Have you had eight hours of sleep? Can I trust you with my *life*?”

I never thought the day would come when I would hear a story about a person breaking the sacred eight-hours-from-bottle-to-throttle aviation commandment, but after ten years of flying with countless students and crewmembers, the day finally came. It's a short story, really. Two pilots were in the bar having a beer for lunch when a cell phone rang. A pilot flying in the private sector received a call from a client who wanted to go on a short trip. Within minutes he had paid his tab, fired up his aircraft, and flew the mission without a pause. I know what you're probably thinking: *I would never do that, and that pilot is an idiot.* But let me ask you a couple of questions. Have you ever flown tired? Have you ever had a sleepless night and proceeded to work the next day?



FATIGUE MEASUREMENT

We know that sleeping five hours per night for a week is equivalent to having about seven alcoholic drinks!

YOU are the worst judge of your own fatigue levels.

According to Dawson and Reid (1997), sleep deprivation has the same impairment effect as drinking alcohol. Do you grasp that statement? Let's make the point even clearer: *Sleeping five hours per night for seven days is equivalent to having about seven alcoholic drinks!* So, why do we only measure the quantity and timing of alcohol consumption when assessing ourselves before flight, when sleep plays an equally important role?

How can we produce a full day of physical and mental exercise, eat a few meals, close our eyes for a few hours, and then do it all again the next day? The human body is a delicate organism, and it is paramount that we take continuous action to enhance performance efficiency and decrease fatigue, both of which facilitate health and safety. If we don't get enough sleep at night, we are not fit for flight—period.

There is also an enormous amount of unspoken pressure involved in flying. When we are *under the influence*—of alcohol or *fatigue*—our judgment can be compromised. The natural tendency is to hide fatigue status and accept the flight because we do not want to show any signs of weakness. Our decisions are too often influenced by pride. Would you have the foresight and courage to postpone your flight, even if it meant risking your professional image?

Have you ever dropped something, bent over to pick it up, and immediately dropped it again? How about putting things in the wrong place? These are just a couple of the signs and symptoms of being under the influence of fatigue, and they could be a direct result of disrupted circadian rhythms.

Our body clock is typically molded to follow a 24-hour period influenced by habitual sleep times, meals, work, and leisure activities. The body clock dictates our core temperature and is adjusted to accomplish certain biological goals.

HUMAN RECOVERY BACKGROUND

Have you ever had a day when your memory just isn't on point? Maybe you broke a glass while washing dishes. External factors can have adverse affects on our biological rhythms; GET TO KNOW THEM.

Body temperature is highest around 5:00 p.m. This increased temperature is associated with high sympathetic nervous system activity, high metabolic rate, increased alertness, and better vigilance-related performance. Motor skills and cognitive working memory are best at mid-day, while short-term memory load decreases throughout the day. Around 4:00 a.m. our temperature drops in order to slow metabolic rate and this aids in acquiring the deepest levels of sleep (more on this later).

According to Wise, Hopkin, and Garland (2010), subject isolation tests show that people living in chambers without any reference to external cues, such as natural light sources, still maintain a diurnal sleep schedule. As it turns out, the subjects were still being served breakfast, lunch, and dinner at the usual times!

Throughout the night, our bodies go through several stages of sleep. Some stages allow our mental and physical bodies to recover, while other stages are utilized for categorizing our daily experiences into memories. In order for our memory and cognitive/physical reaction times to be fully functional, we must pass through all sleep stages three times each and every night.

Just because you lie in bed doesn't mean you are getting adequate rest. In fact, last night I woke up at 3:00 a.m. and began contemplating what I should write for this

very article. I never actually fell back asleep. As luck would have it, I did not have to fly today. But what if I did?

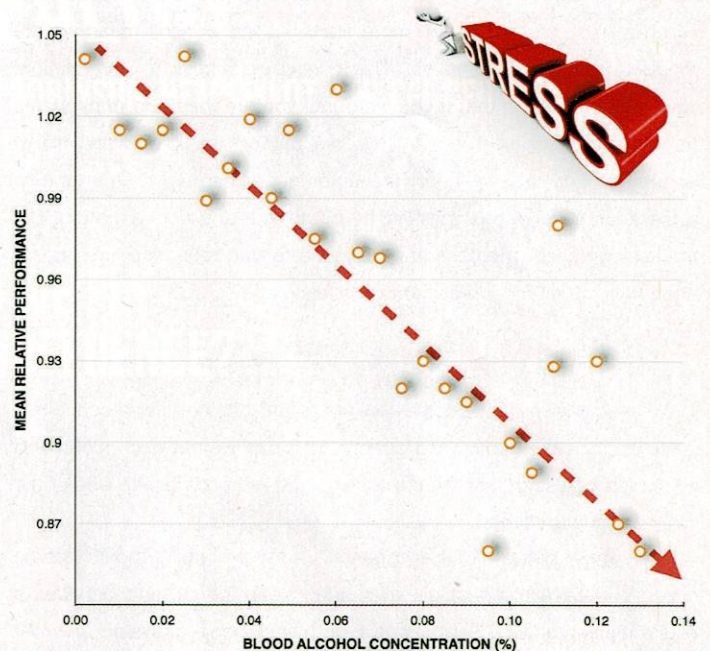
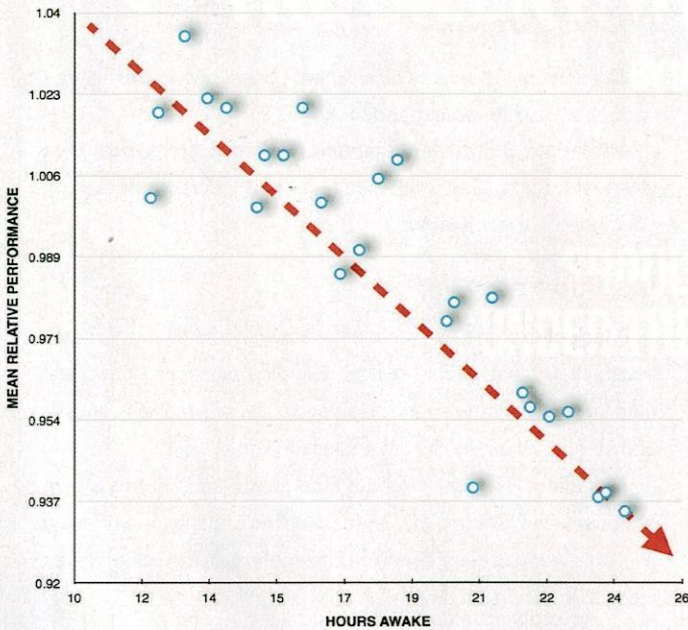
This article does not attack the ideas of organizational pressure, punishment, and reward, but it should be noted that pressure exists. One of my supervisors once mentioned that my earning potential would be in excess of \$100,000 on a 12-hour shift! How would you respond to that? At times, you may fear that your professional image is at stake if you don't respond favorably when duty calls, but what would you do if the tables were turned? Would you put your loved ones in the back of an aircraft with a pilot who had only had one or two hours of sleep?

How do you feel about your company's safety policy regarding fatigue? The FAA says we must have crew rest periods, but what we do during that time is completely up to us. We are all human, and various factors affect our lives. Some of us have newborn babies that need us in the middle of the night. Sometimes, marital discord

results in an uncomfortable, restless night on the couch. Regardless of the type of disruption, sleep deprivation can have dangerous consequences.

Does your organization have a policy in place that gives you the day off, with pay, if you lose a critical amount of sleep during your rest period? If not, will you have the courage to close down the operation? I know what you're probably thinking (because I've thought it too): *That would never happen; it would cost too much.* But how much does a collision cost in dollars – or in lives? Think about it. I believe that there is a plausible solution to mitigate this pressure, but that will have to wait for another time.

I challenge you to do the right thing, even if it costs you your job. Real productivity comes from integrity, not by pushing the pedal to the metal—or the aircraft throttle balls to the wall. Learn to mitigate the stressors that lead to sleep deprivation and distraction, and when warranted, **CALL IN TIRED!**



• SOURCE DREW AND KATHRYN REID'S "FATIGUE, ALCOHOL, AND PERFORMANCE IMPAIRMENT," NATURE VOL. 388, JULY 1997. •

Biological Rhythms



Ultradian rhythms

- Heart rate
- Respiration
- Electric brain waves

Circadian rhythms

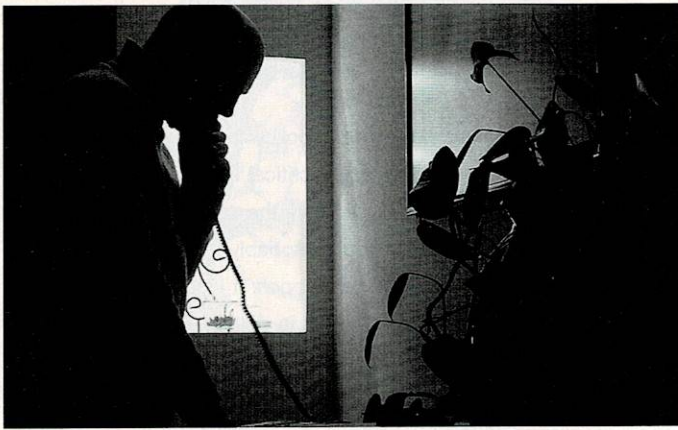
- Sleep cycle
- Wake cycle
- Body temperature

Infradian rhythms

- Weekly—immunological responses
- Monthly—menstrual cycle
- Yearly—seasonal mood/hormonal changes

CALL IN ~~SICK~~ TIRED

So, your organization is safe? Do they give you the day off PAID if you didn't get the proper sleep?



Thirsting for Sleep

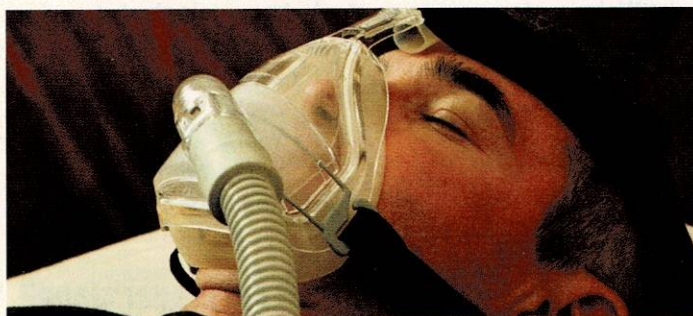
I was driving cross-country the other day and noticed something very interesting and remarkable about the human body. While in the drivers seat, my eyes felt a little dry but I had the desire to remain at the wheel. After stopping for fuel, we switched drivers and I immediately fell asleep. Why the drastic change? While the brain's concentration level is in high demand, we tend to *feel* more alert, but this doesn't mean we are operating at our full potential. This concept is similar to dehydration. Have you ever heard that if you wait until you are thirsty to drink water, then you have waited too long? Do not rely on tangible symptoms of fatigue as your sole device of measurement. When we hit the ignition in the aircraft, fatigue is masked by adrenaline and concentration, *but* processing speed, memory, and vigilance-related response time are all reduced ... oftentimes to dangerous levels.

Monitor and Measure

We need a baseline to decide if we are actually losing sleep. Technology exists to track the quality and quantity of sleep we get each night, and we should be using it. Monitor the sleep you are getting with one of the many devices available.

I personally use a \$1.99 application on my iPhone. It monitors time in bed and each sleep stage, eliminates sleep inertia, and provides a resultant sleep quality. Some apps even have a noise-activated recorder and motion detector that will let you know if you are snoring or have been disturbed during the night.

Sleeping well saves lives. Track your sleep, document it, and when you need to - call in tired! If you are not rested, treat the situation as you do with alcohol; account for your sleep debt and spend time "sobering up," regardless of your own personal assessment.



ATTENTION EMS PILOTS

Have you ever been awakened by an alarm clock or phone call and felt more groggy than usual?

"Sleep Inertia" occurs when you wake up during one of the deeper stages of sleep. You require approximately 15 minutes for your reaction times to return to normal.

There are several stages of sleep. Certain stages are used for categorizing memory, while other stages are used for physical recovery. In order to have complete, well-rounded rest, we must go through all stages of sleep three times each night. **This requires approximately eight hours.**

MITIGATE STRESSORS

THINK OUTSIDE THE BOX AND TAKE SOME ACTION TO ENSURE THE FOLLOWING STRESSORS DO NOT LEAD TO SLEEP DEPRIVATION.

Poor mattress

Capillary shutdown occurs when body weight causes hot spots that lead to tossing and turning.

Mitigation: Buy a new mattress. Go to a store, talk to a sleep specialist, and make an informed decision based on your individual sleep needs.

Insufficient exercise

A lack of exercise has more of an adverse affect on our overall health than most people realize. Exercise balances hormones, cuts fat (that contributes to sleep apnea), increases energy levels, and so on ... the benefits are endless.

Mitigation: Exercise! Find the time. If you can't get to a gym or find an enjoyable activity, then go online and buy one of many available workout programs. You can squeeze in a quickie with as little as 20 minutes a day.

Restless mind

A running mental dialogue about finances, honey-do lists, aspirations, colleagues, and business can lead to sleepless nights.

Mitigation: Many admirable and enviable business associates have given me the same advice—keep paper and pencil on your nightstand. When nagging thoughts arise, scribble them down without getting up or turning on the lights. It will ease your mind to know that you don't have to wrack your brain in the morning.

Other people

A successful flight relies on multiple people - not solely the pilot. Our families are a big part of this success, but they likely don't realize the role they play. They send us to work with an "I love you" and a "Fly safe," but a professional pilot genuinely needs

more than a thoughtful send off. The stresses of family life – while entirely worthwhile – can significantly influence our ability to rest easy.

Mitigation: We must have “the talk” with our family, friends, and others that we deal with on a daily basis. They must understand that a team effort is required to facilitate safety on every level. Now gentleman, please realize and understand—you will still have to tackle that honey-do list to maintain a harmonious partnership. If you are having difficulties with this particular chat, however, pull out this article and blame it on me! (Happy wife = Happy life, right?)

Environmental factors

Normal rates of fatigue can be accelerated by certain environmental factors. Light, noise, cockpit ergonomics, vibrations, and workloads can have devastating effects on our mental and physical status.

Mitigation: Attempt to soften your work environment with natural lighting, utilize a combination of hearing protection with substantial passive and active noise reduction, and sharpen your situational awareness with diligent preflight planning. Make sure your air-

craft is well within track-and-balance limitations and allow enough rest time in between strenuous flights.

Sleep apnea

The FAA is in the process of mandating a sleep apnea test for pilots with a body mass index (BMI) greater than 40. Sleep apnea is simply a disruption in the completion of a sleep cycle due to oxygen deprivation. Individuals with greater BMIs tend to be more prone to conditions like sleep apnea. Many people may resist this policy, but it has significant potential to save lives. Unfortunately, the bureaucracy of the FAA prevents a truly proactive and predictive safety culture (It took them 10 years to allow us to use night vision goggles in flight.) but it is at least a step in the right direction.

Irreplaceable You

It may be difficult for us as mortal beings to execute countless safety recommendations because we can't (or don't) visualize ourselves actually crashing a helicopter. Still, there have been almost no new reasons for accidents in

the past decade. This tells me that we're simply not doing our due diligence. In fact, we cannot do our due diligence because there are more pages written about safety than we have time to read in a lifetime. Nonetheless, we must take extra steps in furthering our knowledge in areas of our lives that we have control over.

I'll tell you why this topic strikes a chord with me. I have lost dear, *irreplaceable* friends in accidents directly related to fatigue. Two of those wrecks occurred right next to me while we were flying frost protection. One minute we were chatting on frequency and the next . . . radio silence. When you see firsthand the horror and wreckage of a fatal crash, especially when the victim is someone you considered a comrade, business partner, and friend, it tends to stick. For me, those experiences inspired a passion that quickly spiraled into an obsession for safety. **My sincerest hope is that this article will be the only inspiration that you need to make sleep and safety your professional priority.**



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