

THE AIRLINE PILOTS' GUIDE TO



FIGHTING FATIGUE



A supplement to *Air Line Pilot*.
Pull gently to remove.

CONTENTS

Warning! Fatigue Is Hazardous	iv
Physiology's Role in Fatigue	v
Fatigue Mitigation Do's and Don'ts	vii
Physiological Impediments to Sleep	xi
Credits	xi

FATIGUE BLUE RIBBON PANEL

ALPA's Fatigue Blue Ribbon Panel, formed by ALPA President Capt. John Prater in late 2007, was tasked with reviewing the science and economics surrounding pilot fatigue as well as the flight/duty regulations in the U.S. and Canada. Key deliverables from the Panel include recommendations to address this serious safety and quality-of-life concern in the legislative and regulatory arenas and pilot education materials.

The Panel is pleased to provide this booklet with the goal of providing some straightforward information, in an easy-to-read format, that will help you get the most from your sleep opportunities, both at home and away. We trust that you will find it beneficial.

Capt. Don Wykoff (DAL)—Chairman, Fatigue Blue Ribbon Panel; ALPA Executive Administrator; and Chairman, Flight and Duty Time Committee

Capt. Rory Kay (UAL)—Executive Air Safety Chairman

Capt. Jeff Kilmer (FDX)—Chairman, Pilot Assistance Committee

Capt. Andy Nordgren (EGL)—Collective Bargaining Committee

Capt. Martin Gauthier (TSC)—Canada Board



THE AIRLINE PILOTS' GUIDE TO FIGHTING FATIGUE

One constant within the piloting profession since its origin has been the toll that fatigue-inducing schedules take on pilot health and the margins of airline safety. ALPA has a long history of lobbying and advocating for legislation, regulations, and collective bargaining agreements that protect pilots from onerous flight and duty time rules.

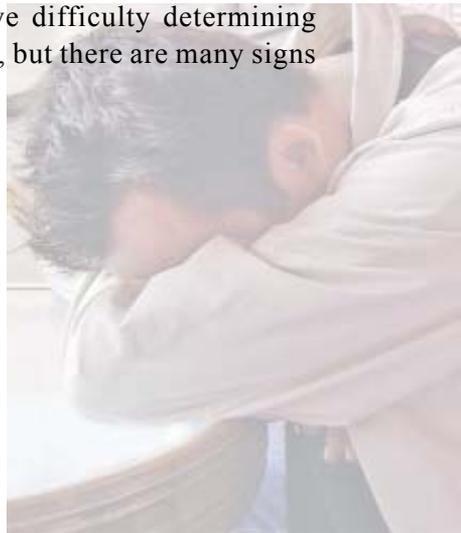
The flight and duty rules and regulations in the United States and Canada are archaic, were written decades ago, and were based on aircraft types and operations that were in existence then. The regulations, when written, did not anticipate the evolution of aircraft design and operations that have occurred since. Erosion of contractual protections in recent years has further exacerbated the problem by causing pilots to work longer duty days and more flight hours each month than in the past. Progress to improve on today's rules has been difficult to achieve despite the Association's best efforts to promote new regulations aimed at reducing fatigue. That work continues under the aegis of the ALPA Fatigue Blue Ribbon Panel (BRP) and will undoubtedly always be a critical element of the Association's endeavors to "Schedule with Safety."

Regardless of what the regulatory authorities or individual airlines may or may not do with flight and duty rules or scheduling practices in the future, it is possible for individual pilots to apply a few simple techniques to improve their rest.

WARNING! FATIGUE IS HAZARDOUS

Fatigue is different from being merely tired or drowsy. Fatigue symptoms include drowsiness, but also include a feeling of *apathy* about one's surroundings and situation, which is anathema to good piloting skills and decision making. Warning: A fatigued crewmember may be unable to recognize his/her level of impairment. Just as we operate an aircraft as a crew, we may need each other to identify the insidious signs of fatigue. Scientific studies have shown that humans have difficulty determining when they are first affected by fatigue, but there are many signs of its onset, including:

- *Forgetfulness*
- *Poor decisions/mistakes*
- *Slowed reaction time*
- *Reduced vigilance*
- *Poor communication*
- *Fixation*
- *Lethargy/complacency*
- *Bad mood*
- *Nodding off*



When you observe one or more of these symptoms, you are likely experiencing the onset of fatigue even if you do not feel overly tired.

It may surprise you to learn that long periods of wakefulness are equivalent to alcohol-caused impairment of mental alertness and cognizance:

- Wakefulness for 17 hours ~ blood-alcohol level of .05% (illegal to fly)
- Wakefulness for 24 hours ~ blood-alcohol level of .10% (legally drunk)

You would never fly under the influence of alcohol, but you have probably found yourself flying when your mental alertness and cognizance have been similarly impaired by long periods of wakefulness.

PHYSIOLOGY'S ROLE IN FATIGUE

Two major physiological factors affect fatigue:

- Amount and quality of sleep
- Circadian rhythms

SLEEP

Most adults require seven to nine hours of actual sleep each night for optimal performance, safety, and health. Sleep loss is cumulative; losing one hour of sleep each night for a week is equivalent to losing one night of sleep in that same period.

Sleep has two distinct phases: non-rapid eye movement (NREM) and rapid eye movement (REM) sleep.

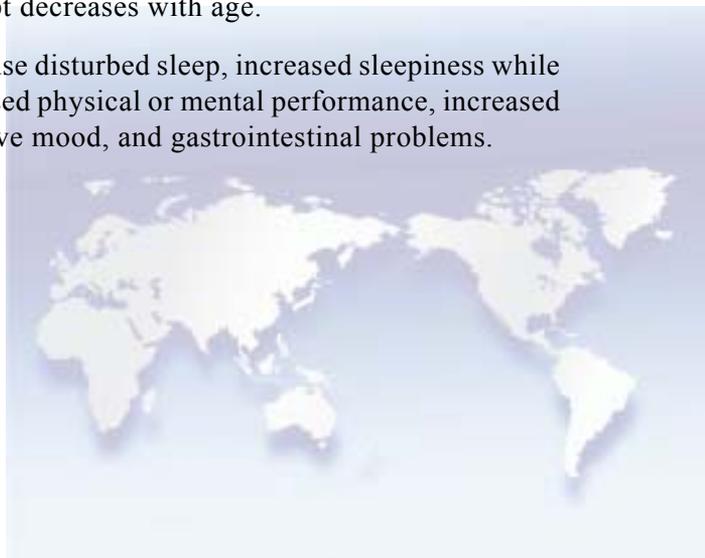
- Sleep occurs in cycles of NREM and REM phases with approximately 60 minutes of NREM followed by 30 minutes of REM. The cycle repeats during a typical sleep event.
 - ♦ NREM—Physiological and mental activities slow. Four stages occur, with deepest sleep coming in stages 3 and 4. If awakened during deep sleep, sleep “inertia” with symptoms of grogginess, sleepiness, and disorientation may be felt for as long as 30 minutes.
 - ♦ REM—Dream sleep associated with bursts of rapid eye movements. Most REM sleep occurs in the final four hours of sleep cycle and is necessary for mental refreshment.
- The amount and structure of sleep changes over one’s life span. With increasing age, sleep may become shallower and more disrupted, and the total amount of sleep decreases.
- Long-haul flight crewmembers aged 50 to 60 have demonstrated a daily percentage sleep loss 3.5 times greater during trip schedules than those aged 20 to 30 years.

CIRCADIAN RHYTHMS

Humans have an internal, circadian (i.e., “around a day”) clock for sleep/wakefulness, performance, temperature, digestion, hormones, etc. Specific environmental time cues, which include bright sunlight and work/rest schedules, synchronize the body to a 24-hour day. The circadian clock cannot adapt immediately to a new environmental time or to a duty/rest schedule change; it may take days or weeks for all rhythms to synchronize to a new time zone after one trans-meridian flight. As a result, long-haul flight crews seldom become fully synchronized to local time during layovers, and their rest may be affected.

More facts about trans-meridian travel:

- The more time zones crossed, the longer it takes to adapt.
- Adaptation occurs more quickly after a westward flight or with progressively later duty times.
- Different people adapt at different rates.
- “Evening types” adapt faster than “morning types.”
- Ability to adapt decreases with age.
- Jet lag may cause disturbed sleep, increased sleepiness while awake, decreased physical or mental performance, increased fatigue, negative mood, and gastrointestinal problems.



FATIGUE MITIGATION DO'S AND DON'TS

Following are some recommendations for getting better rest, both at home and away. Sleep patterns may change with age and/or as one's personal health or other circumstances change. What may help one pilot sleep better may not help another at all. Accordingly, you may wish to experiment with some or all of the tips in this booklet to see by trial and error what works for you and what doesn't.

GENERAL TIPS FOR IMPROVED SLEEP

- If unable to sleep after 15 to 20 minutes in bed, get up and engage in a relaxing activity (e.g., listening to music, reading). Return to bed when you feel sleepy; avoid watching the clock.
- Use an eye mask and earplugs or “white noise” to reduce visual and audible disruptions.
- Take a hot bath or shower just before bedtime; the body exerts energy to cool itself, which increases fatigue.
- Use relaxing imagery or thoughts to induce sleep.
- Food:
 - ◆ Do not eat a large meal or consume lots of liquids before bedtime; eat a small snack if hungry.
 - ◆ Sleepiness may be induced through foods such as dairy products, bananas, turkey, and granola.
 - ◆ Proteins increase energy levels and may inhibit sleep.
- Caffeine:
 - ◆ Caffeine is a stimulant and can be used tactically to increase alertness.
 - ◆ Avoid using products containing caffeine when already alert.
 - ◆ Caffeine takes effect within 15–30 minutes of consumption, and its effects may last four hours or longer.

- ◆ More than 500–600 mg. of caffeine per day can cause restlessness, anxiety, headaches, and other problems.
- ◆ Caffeine quantities in certain products¹:

▪ Plain brewed coffee (8 oz.)	95 mg.
▪ Starbucks Caffè Grande (16 oz.)	330 mg.
▪ Nestea (12 oz.)	17 mg.
▪ Brewed black tea (8 oz.)	47 mg.
▪ Coke (12 oz.)	35 mg.
▪ Mountain Dew (12 oz.)	54 mg.
▪ Full Throttle energy drink (16 oz.)	144 mg.
▪ Excedrin (2 tablets)	130 mg.
▪ NoDoz maximum strength (1 tablet)	200 mg.



- Alcohol:

- ◆ May hasten beginning of sleep but increases sleep disruption and hinders restorative sleep.
- ◆ Avoid alcohol three hours or less before bedtime.

- Nicotine:

- ◆ Is a stimulant and may inhibit sleep.
- ◆ Nicotine withdrawal may cause sleep interruptions.

- Exercise:

- ◆ Exercising several hours before bedtime can help obtain deeper sleep.
- ◆ Don't exercise strenuously within three hours of bedtime; increased adrenaline and body temperature make sleep more difficult.



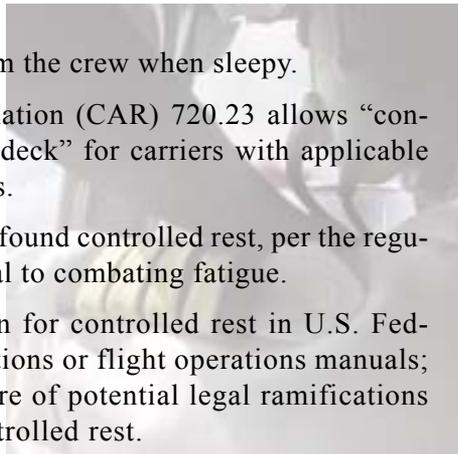
¹ Source: mayoclinic.com

- 
- Medications:
 - ◆ Many prescribed and over-the-counter medications can adversely affect sleep onset, duration, and quality.
 - ◆ Some prescription sleeping pills may facilitate falling asleep and staying asleep; side effects include altering sleep structure, creating drug dependence, and decreasing alertness and performance.
 - ◆ Evidence of sleeping pills in the bloodstream can create certification issues in the event of an accident/incident.
 - ◆ Consult a physician or your aeromedical examiner with any questions about medications.

AT HOME

- Maximize sleep and naps one to two days before trip.
- Shift circadian cycle as necessary.
 - ◆ Not more than 1–1.5 hours each day.
 - ◆ Avoid sleep during average circadian highs (1000–1200 and 2000–2200).
- Keep a regular sleep/wake schedule as able.

ON DUTY

- 
- Don't nap secretly; inform the crew when sleepy.
 - Canadian Aviation Regulation (CAR) 720.23 allows “controlled rest on the flight deck” for carriers with applicable Operations Specifications.
 - ◆ Canadian pilots have found controlled rest, per the regulation, to be beneficial to combating fatigue.
 - ◆ There is no provision for controlled rest in U.S. Federal Aviation Regulations or flight operations manuals; crews should be aware of potential legal ramifications of unauthorized, controlled rest.
 - Try to maintain a balanced diet and regular nutrition throughout the day.

- Carry snacks; increasing blood sugar level minimizes mental fatigue.
 - ◆ Reactive hypoglycemia can cause fatigue one to three hours after eating.
 - ◆ Snacking, and limiting or avoiding high-sugar foods, can reduce potential for reactive hypoglycemia.
- Drink water; dehydration causes fatigue.
- Use caffeine as appropriate.
- Engage in physical activity; take a regular stretch break and move around, even when seated.
- Participate in conversations with others.
- Keep the cockpit temperature low and turn up the lights at night, with due consideration given to maintaining night vision.

ON THE ROAD

- If possible, nap during circadian lows (0300–0500 and 1500–1800).
 - ◆ 40-minute nap increases alertness 100%.
 - ◆ 20-minute nap increases alertness 50%.
- Make sleep a priority over sightseeing and recreational activities.

AT THE HOTEL

- Request a room away from noise sources (e.g., elevators, interstate).
- Use the “Do Not Disturb” sign.
- Keep the room cool (65°–70° F).
- Close curtains, darken the room, use an eye mask.
- Use white noise and/or earplugs to reduce audible disruptions.
- Cell phone—off.
- Alarm clock—set.
- Request wake-up call.

PHYSIOLOGICAL IMPEDIMENTS TO SLEEP

Consult with a physician if you suffer, or believe that you may suffer, from any of the following impediments to sleep.

- *Snoring* is a primary cause of sleep disruption; it often afflicts overweight individuals and worsens with age.
- Loud snoring can be a symptom of *obstructive sleep apnea* (OSA), which causes repetitive breathing stoppages and wakefulness.
- *Insomnia* affects 44% of older persons at least a few nights per week or more.
- *Restless Legs Syndrome* is a neurological disorder that is characterized by an overwhelming urge to move the legs when they are at rest.
- *Narcolepsy* is a neurological disorder caused by the brain's inability to regulate sleep-wake cycles normally, and may result in excessive daytime sleepiness, sudden sleep attacks, insomnia, dream-like hallucinations, and other irregularities.

CREDITS

- National Sleep Foundation website (www.sleepfoundation.org)
- Mayo Clinic website (www.mayoclinic.com)
- NASA/TM-2001-211385, Crew Factors in Flight Operations X: Alertness Management in Flight Operations Education Module

AIR LINE PILOTS ASSOCIATION, INT'L
1625 MASSACHUSETTS AVENUE, N.W.
WASHINGTON, DC 20036

OCTOBER 2008

