

Managing Driver Fatigue

1. INTRODUCTION

Driver fatigue is a contributing factor in a significant number of vehicle crashes and fatalities each year. This is a particularly important topic to address among people driving for work and commuting. Fatigue makes us less alert to what is happening on the road, and less able to react quickly and safely if a dangerous situation arises.

NETS recommends that all organizations adopt policies that state that employees and authorized drivers may not operate a vehicle in a state of fatigue or while using prescription or over-the-counter medication that may adversely impact their ability to safely operate the vehicle. Fatigue management is a shared responsibility for the organization and the employee. The organization is responsible for informing drivers of how to identify fatigue and alertness problems and the appropriate means for addressing this issue. E, and employees are responsible for following organizational policies and guidelines related to fatigue management.

Through proper journey management and education of drivers and supervisors, the risks associated with driver fatigue can be minimized. The most effective way to manage the risks of driver fatigue is to eliminate the need to drive – journeys should only be undertaken where there is a clear business necessity and where alternatives such as teleconferencing or video conferencing are not feasible.

The sections that follow present useful information to help workers plan and conduct a workday to minimize the risk of driver fatigue while behind the wheel. Organizations should incorporate this information into their policies and awareness materials. Organizations should also develop overnight stay policies that apply to drivers who recognize that they are fatigued.

2. FACTS ABOUT DRIVER FATIGUE

Sleep is regulated by two body systems: *sleep/wake homeostasis* and the *circadian biological clock*. When we have been awake for a long period of time, sleep/wake homeostasis tells us that a need for sleep is accumulating and that it is time to sleep. All adults need between seven and nine hours of uninterrupted sleep a night to feel well rested and function at their fullest.

On the other hand, our internal circadian biological clocks regulate the timing of periods of sleepiness and wakefulness throughout the day. The circadian rhythm dips and rises at different times of the day. According to the National Sleep Foundation in the United States, adults' strongest sleep drive generally occurs between 2:00 and 4:00 a.m. and in the afternoon between 1:00 and 3:00 p.m. This may vary depending on whether you are a "morning person" or "evening person." The sleepiness we experience during these "circadian lows" will be less intense if we have had sufficient sleep, and more intense when we are sleep-deprived. The times of day "circadian lows" are likely to occur are also the times of day when the risk of collisions tends to be highest.

Even if you don't fall asleep, driving while you are drowsy or fatigued means that you will be less attentive, your reaction times will be slower, and your ability to make decisions will be impaired. Research has shown that lack of sleep can impair driving performance as much as or more than alcohol. In fact, the effects of staying awake for 17 or more hours on driving performance are equivalent to that of a blood- alcohol

concentration at or above legal limits in North America and Europe. In other words, driving sleepy is like driving drunk.

Lack of sleep leads to “sleep debt,” and the only way to repay this debt is by sleeping. Until you catch up on your sleep, you are at greater risk of having a fatigue-related crash.

3. RECOGNIZING FATIGUE

The following are some of the most common signs and symptoms of fatigued driving:

- A. Trouble keeping your posture or your head up
- B. Excessive yawning
- C. Tired, heavy or burning eyes
- D. Difficulty concentrating
- E. Difficulty remembering the past few miles driven
- F. Drifting from your lane, driving off the shoulder or crossing the center line
- G. Missing your exit
- H. Hitting a “rumble strip” on the side of the road
- I. Loss of attention due to microsleep (an unintended loss of attention that can last about six seconds or longer).

If you experience one or more microsleeps, or any other signs of fatigue while driving, stop immediately at a safe location and rest before continuing your journey.

If you frequently experience the symptoms listed above, you may have a sleep disorder such as sleep apnea. Symptoms include heavy snoring broken by sudden periods of silence, restless sleep and constantly being tired during the day. To learn more about options for diagnosis and treatment, consult your health professional.

4. STRATEGIES FOR MANAGING FATIGUE

Pre-Trip Planning

A. Getting Sufficient Rest

1. Be sure to get adequate sleep prior to driving. Most adults need seven to nine hours of uninterrupted sleep each day.
2. Do not schedule extended work-related and non-work-related activities prior to a long drive.
3. Try to go to sleep and wake up around the same time each day, even on non-work days. The best rest occurs when your sleep times are consistent.
4. If you exercise after work, allow three hours between the end of your workout and the time you go to bed.
5. Alcohol and caffeine can both disturb your sleep patterns and should be avoided.

B. Scheduling to Avoid High-Risk Driving Times

Try to avoid long or monotonous driving trips at times of day when you are likely to experience “circadian lows” and may therefore be at higher risk of a fatigue-related collision or incident: early morning hours and the hours between lunch and mid-afternoon.

C. Planning the Route

1. Reduce your drive time by planning your routes effectively. When possible, plan your business stops in successive order so as to reduce your risk exposure and the miles driven.

2. Prior to setting out, consider the following factors that may introduce risk: vehicle maintenance (oil and fluid levels, tires, etc.), road condition, journey timing and duration, terrain, weather, visibility, personal safety/security, traffic density, presence of animals, presence/density of pedestrians, environment, communications (if at all possible, make calls before starting the journey), and availability of emergency services along your route.
3. If you are assigned a new territory, be sure to talk with your supervisor about the safest and most efficient way to manage your daily routine.
4. Plan which customers you will visit and the routes you will take. Allow for extra time to avoid rushing. Plan alternate visits and routes, just in case you run into traffic or encounter an unforeseen event on the road.

D. Planning Driving and Work Times and Rest Periods

The following recommendations for driving hours, working hours, and rest periods are tailored for employees who operate light- and medium duty vehicles and for whom driving is not the primary job duty. They are significantly more conservative than what is allowed under regulatory requirements for professional drivers who spend all of their time behind the wheel.

1. Maximum Daily Working (Driving and Non-Driving) Hours: eight hours, including breaks; not exceeding 40 hours (in one week) is recommended, including breaks.
2. Maximum Consecutive Hours of Driving: two hours. Take a break of at least 15 minutes after every two hours of driving.
3. Minimum Time Off (no driving): The minimum amount of time off after eight hours of driving should be at least 11 hours.

E. Estimating Travel Time

1. Prior to your trip, try to utilize on-line mapping programs to estimate the time it will take for you to travel to and from a destination. Never input GPS data into GPS units while driving. This should be done in advance of your trip or while parked in a safe location.
2. Schedule an overnight stay when your plan requires long workdays. Before you travel, check with your supervisor if you have any questions about guidelines for overnight stays.

Assuming an average speed of 45 miles or 72 kilometers per hour and an eight-hour working day, the following table gives approximate driving times required for certain journey lengths, and indicates the relationship between distance driven and the time available for work purposes. In simple terms, the more time you spend on the road, the less working time you have available, and the more fatigued you are likely to be. As well as increasing your risk level, it is also likely to impact on the potential quality of the work you are able to undertake.

Trip Distance (Miles)	Trip Distance (Kilometers)	Hours Driving	Non-driving Work Hours
45	72	1	7
90	145	2	6
135	217	3	5
180	290	4	4
225	362	5	3
270	435	6	2
315	507	7	1
360	579	8	0

Driving for four or more hours (highlighted in yellow) may not be the safest, most economical or most efficient use of your time, and driving between five and eight hours (highlighted in red) indicates that other alternatives should be considered, such as conducting the meeting via teleconference, video conference, or flying.

F. Anticipating Unplanned Events and Circumstances

1. When planning your travel, consider other factors such as construction zones, heavy congestion and poor weather. These will increase your drive time and require extra concentration, which itself can increase fatigue. Make sure you have allowed time for these interruptions, and consider them when determining whether an overnight stay is warranted.
2. Keep in mind that GPS destination arrival estimates do not account for possible delays, so be sure to take this into consideration as part of your journey planning.

On the Job and On the Road

A. Drive Time Flexibility

If unforeseen events increase your workday and/or your drive time beyond what you have planned, do not try to “push on” with your original plans for that day. It is better to stop and stay overnight than to risk driving fatigued.

B. Managing Fatigue

The most effective way to avoid fatigue and sleepiness while driving is to get the right amount of good-quality sleep. However, if you do experience the warning signs of fatigue while you are driving, take the following steps:

Best option: Stop driving—pull off at the next exit or rest area.

1. Depending on time of day and availability of accommodations, consider staying overnight.
2. Otherwise, park the vehicle in a safe location and take a nap. A restful nap is about 20 minutes. (Napping for more than 20 minutes can make you groggy for 15 minutes or more after waking).
3. If you are traveling with a co-worker, change drivers when you stop for rest breaks.

Second option: Consume caffeine.

The equivalent of two cups of coffee can increase alertness for several hours. It usually takes about 30 minutes to enter the bloodstream. Caffeine is available in various forms (coffee, tea, soft drinks, energy drinks, chewing gum, tablets), and in various amounts. For example, the amount of caffeine in one cup of coffee (about 135 mg) is about the same as two to three cups of tea or three to four cans of regular or diet cola. **Research suggests that combining a short nap with caffeine consumption is a more effective way to increase alertness than caffeine consumption alone.**

Strategies such as rolling down the window or listening to loud music are **not** effective ways to manage fatigue. They only temporarily mask your fatigue.

For your personal safety: Be certain that any area where you stop to nap is safe and secure (e.g., well-lit store parking lots and designated rest areas). Look for areas with higher volumes of pedestrian traffic; many crimes occur where there are few witnesses. Turn off the ignition, store any valuables from view, lock the doors, and roll up the windows (allowing for ventilation on hot and sunny days).

5. OTHER FACTORS TO CONSIDER

A. Vehicle Use and Work Time after Air Travel

Jet lag is a condition that travelers may experience when flying across time zones. All employees traveling by air internationally, overnight or on flights with significant time zone adjustment or late-night arrival are likely

to experience jet lag and fatigue. These employees should not operate a motor vehicle after extended periods of air travel.

Road safety tips for jet-lagged travelers:

1. Do not operate a motor vehicle immediately upon arrival at your destination. Collision risks may be particularly high in locations where driving is on the other side of the road or signage is unfamiliar.
2. Avoid hiring a rental vehicle unless there is no other form of transport compatible with the business requirement, especially immediately on arrival after a long journey. Local shuttle services are generally a safe, reliable, and cost-effective option for ground transport to hotels, workplaces, home and other destinations. Express rail links to and from airports should also be used when suitable.
3. If you are arriving home late at night or early in the morning from a long flight, arrange for someone to pick you up at the airport or take a taxi or public transportation.
4. When employees arrive early in the morning after a trans-Atlantic or other long flight, consideration should be given to allowing them a suitable rest period before work duties commence. The hours spent travelling by air should be counted as part of the work shift.

B. Medical Conditions

Be aware of, and plan accordingly for, any medical conditions that may influence your ability to stay alert while you are driving (e.g., diabetes, high blood pressure, heart disease, depression, sleep apnea). Your medical professional can assist you in dealing effectively and responsibly with your situation. Ultimately, you are accountable to take the proper precautions and to inform your Human Resources or Occupational Health departments if you have a condition that could jeopardize the safe operation of a vehicle while driving on company business. (Human Resources should be contacted if special work accommodations or alternate work are required.)

Health effects of long periods of inactivity: Deep-vein thrombosis

Long hours of driving and long periods of travel without physical activity also have adverse health effects. Long trips by air are associated with the risk of deep-vein thrombosis, which is a blood clot that forms deep in the body, usually in the leg. If a clot breaks off, it can travel to the lung, causing serious lung damage or death. For prevention tips, see <http://www.nhlbi.nih.gov/health/health-topics/topics/dvt/prevention.html>.

C. Medications

Some prescription and over-the-counter medications can cause drowsiness. Discuss all side effects of medications with your health professional or pharmacist. Also, read all labels on over-the-counter medications to find out if drowsiness is a possible side effect. If you are starting a new medication, see how that medication affects you before taking it while driving. It is your responsibility to take these precautions. **You should never drive on company or other business if you are taking a medication that may cause drowsiness.**

D. Stress

Work and home-based stress and conflicts can lead to difficulty in having a restful sleep, and may result in sleep deprivation and inability to concentrate on the task at hand. If you are experiencing high levels of stress or conflict at work or at home, contact a mental health professional, your physician, or your [INSERT COMPANY NAME] Employee Assistance Program where provided.

E. Food and Beverage

Certain “comfort foods” have been linked to poor sleep. Avoid consuming large, spicy, salty or greasy meals, especially within three hours before sleep. Sleep-interfering foods include fried foods, garlic, tomato sauce and chocolate. For tips on eating for sustained energy, please refer to “**Eating for Sustained Energy**” (below). Caffeine is a stimulant and does not supply the body with energy. It can provide a false sense of energy and

suppress your natural hunger signals. Caffeine should be used in moderation. Its aftereffects include tiredness, irritability, and compromised energy levels.

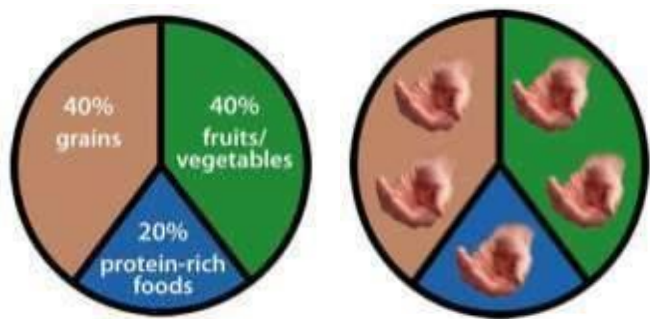
Alcohol is a mood-altering depressant that will magnify the effects of fatigue. Drinking alcohol before bed can interrupt sleep, as it affects blood sugar levels. **Never drive a vehicle after consuming any amount of alcohol.**

Eating for Sustained Energy

The Human Performance Institute provides the following recommendations regarding eating for sustained energy:

Use the palm of your hand or a handful to estimate the right serving size for each food group at meals.

Imagine a plate, divided into three sections like a peace sign. There is room for five handfuls; two for grains, two for fruits and/or vegetables, and one for protein. Now let's picture your handfuls on a plate at breakfast. Maybe you're having one handful of scrambled eggs, one slice of toast, one handful of fresh mixed berries, and one cup/handful of orange juice.



Savor that breakfast by chewing your food slowly, putting down your fork between bites, and engaging in conversation. A “five handfuls” breakfast eaten within one hour of waking will jump start your metabolism for the day and provide a balance of nutrients for your physiological needs.

Timing is everything. To effectively sustain your energy throughout the day, you should eat light and eat often. Between meals, you may need a small (about 100 -150 calories maximum) healthy snack every two to three hours, preferably a low glycemic snack such as yogurt, dried apricots, apple, or celery with peanut butter. Snacks are not meant to fill you up; instead, you should use them to bridge the gap between meals and maintain your energy levels.

Ideally, you never want to go more than four hours without eating, so plan ahead when you travel and remember that you are the one in control of your food. Good nutrition is easy if you remember to eat light, eat often and use your handy measuring tool.

For additional information, check the Human Performance Institute website at <http://www.hpoinstitute.com/>.

6. RESOURCE MATERIALS

A. ‘White Paper’ on Driver Fatigue

The European Sleep Research Society has developed a white paper titled *Sleepiness at the Wheel*, which provides a good overview of the scientific evidence related to drowsy driving and suggests behavioral and technology-based methods for addressing driver fatigue in organizational settings: http://www.esrs.eu/fileadmin/user_upload/publications/Livre_blanc_VA_V4.pdf.

B. North American Fatigue Management Program (NAFMP)

Developed jointly by the U.S. Department of Transportation and Transport Canada, the North American Fatigue Management Program (www.nafmp.com) provides free online courses and resource materials to help motor carriers, drivers, and others in the supply chain to better manage driver fatigue. These materials were developed primarily for the freight transport industry, but they are also useful for other companies whose employees drive for work. NAFMP topics include:

- How to develop a corporate culture that supports reduced driver fatigue
- Fatigue management education for drivers, drivers' families, carrier executives and managers, shippers/receivers, and dispatchers
- Sleep disorders screening and treatment
- Driver and trip scheduling
- Fatigue management technologies

C. Regulations on work and rest time in the United States and European Union

U.S. regulations for operators of large trucks and buses: <http://www.fmcsa.dot.gov/rules-regulations/administration/fmcsr/FmcsrGuideDetails.aspx?menukey=395>

Information from the European Commission on driving and working time regulations: http://ec.europa.eu/transport/modes/road/social_provisions/working_time_en.htm

Source: Network of Employers for Traffic Safety

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