NETS® Network of Employers for Traffic Safety

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Managing Fatigue for the Fleet Safety Professional

How to Implement a Driver Fatigue Management Program

- Identify primary sources of driver fatigue
- Select appropriate fatigue management controls
- Review key performance indicators and update your program

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Managing Fatigue for the Fleet Safety Professional – 2022

Acknowledgments

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About NETS

The Network of Employers for Traffic Safety
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NETS is a 501(c)(3) organization, a partnership between the U.S. Federal government and the private sector. Established in 1989, NETS is dedicated to improving the safety of employees, their families, and members of the communities in which they live and work by preventing traffic crashes that occur on- and-off the job. Board member companies include Acertus, Chubb Insurance, ConEdison, Hess Corporation, Johnson & Johnson, Liberty Mutual Insurance, State Farm Insurance, Toyota Motor North America, UPS, and USIC. In addition, NHTSA and the National Institute for Occupational Safety and Health (NIOSH) serve as federal liaisons to the board of directors.

NETS is a member of the United Nations Road Safety Collaboration which provides guidance to the Second Decade of Action for Road Safety 2021-2030 global initiative.

Disclaimer

Dear Fleet Safety Professional,

As NETS Chairman of the Board, and someone who has worked in Road/Fleet Safety for over 25 years, driver fatigue continues to be a major contributor to global vehicle deaths, injuries and crashes.

Such crashes are fully preventable when we understand the effects and impacts of fatigue on the safety of our fleet drivers and take actions to mitigate this driver risk.

NETS is proud to launch a new guide, **Managing Fatigue for the Fleet Safety Professional**.

The guide encourages organizations to look at the gaps within their own organizational cultures related to fatigued driving in the spirit of a ”just” or non-blaming culture where employer and employees have mutual responsibilities to each other in the prevention of fatigued driving.

We hope you find this guide and the many referenced resources a useful tool to address this very important road safety issue, and we hope organizations with fleets begin to include driver fatigue in your fleet safety policies and strategies.

Gabriel T. Kardos

NETS Chairman of the Board
Global Director – Office and Road Safety
Johnson & Johnson

Key Takeaways

Motor vehicle crashes are the leading cause of death and a leading cause of injury in the workplace.

Driver fatigue is a major contributor to motor vehicle crashes, injuries, and deaths.

NETS members with fatigue risk management practices have lower crash rates.

The prevention of fatigue-related crashes will spare pain and suffering for employees, work teams, and their families, and save time and money for the employer.

Who is this guide for?

NETS developed this guide for safety professionals responsible for managing light, medium or heavy vehicle fleets who seek to: 1) understand how fatigue impacts the safety of workers who drive as part of their job, and 2) reduce the risk of crashes and injuries resulting from fatigued driving among their drivers.

The contents of this guide are based on current knowledge about fatigue, fatigue risk management principles, and the experiences of NETS members.

An atmosphere of "just culture"

Just culture is a concept that considers errors to be largely the result of a faulty organizational culture and rarely solely the fault of the employee. This guide approaches driver fatigue management from a just culture perspective, but also acknowledges that employers and employees share responsibility for preventing driver fatigue.

Disclaimer

Any reference in this guide to a specific commercial product or service or corporation name does not constitute endorsement, recommendation, or favoring by NETS.

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Section A. Background on Fatigue

The burden of motor vehicle crashes

Globally, there are no estimates on the number of deaths due to work-related crashes. However, about 1.3 million people die in road traffic crashes every year, which includes pedestrians, bicyclists, and other road users. Residents of low-income countries bear a disproportionate burden of road traffic deaths and are at a three times greater risk of dying in a road traffic incident than in high-income countries.[1] In the U.S., motor vehicle crashes are the leading cause of death at work.[2] Work-related crashes also result in a significant number of injuries, workers' compensation claims, lost productivity, and vehicle property damage.

The role of driver fatigue in crashes

Driver fatigue is a significant cause of motor vehicle crashes. AAA estimated that one in five crash fatalities involve driver fatigue.[3] The National Transportation Safety Board (NTSB) determined that fatigue was the probable cause or a factor in 40% of their recent highway crash investigations, a greater proportion than for any other mode of transportation (e.g., rail, air, maritime). [4]

What is fatigue and what are the effects of fatigue?

Fatigue affects everyone. One of the most common definitions of fatigue is **"the state of feeling very tired, weary or sleepy resulting from insufficient sleep, prolonged mental or physical work, or extended periods of stress or anxiety."**[5] Boring or monotonous activities can exacerbate feelings of fatigue.

The effects of fatigue include reduced ability to make decisions, errors in judgement, increased risk taking, increased reaction times, reduced attention and vigilance, inability to stay awake, and a failure to respond to changes in the environment. The effects of fatigue are similar to impairment from drugs or alcohol. In fact, **the cognitive impairment from being awake for 20 to 24 consecutive hours is equivalent to the impairment of someone with a blood alcohol content of .08 to .10.**[6]

[1] Global status report on road safety 2018: Summary (who.int)
[2] *Motor Vehicle Crash Facts | NIOSH | CDC*, 2021
[3] AAA, 2014
[4] Marcus and Rosekind, 2017
[5] Sprajcer et al., 2022
[6] Dawson and Reid, 1997

Driver fatigue can cause microsleeps (i.e., brief sleep episodes where your eyes may be open or closed). At its most severe, fatigue will lead the driver to fall asleep.[7]

What places people at risk for fatigue?

Factors ON the job:

A number of factors about the workplace put people at risk for fatigue because they interfere with getting enough sleep or they disrupt normal sleep patterns. Risk factors include:

- Long work hours
- Shift work (especially night)
- Rotating work shifts
- Timing or unpredictability of work schedules
- Jet lag from travel across time zones (3 hours or more).

There are other workplace contributors to fatigue that are unrelated to sleep:

- Working outdoors (in the heat)
- Monotonous activities
- Mental and physical job demands[8]

Factors OFF the job:

There are many aspects of peoples' personal lives that can also lead to fatigue:

- Sleep disorders such as sleep apnea
- Competing priorities with sleep, like an infant in the home or social engagements
- Long commutes
- Health conditions and medications
- Mental and physical stressors
- A diet heavy in fried foods, sugary snacks and beverages

Nonstandard working hours are hours outside of standard daytime Monday to Friday schedules.

Nonstandard work hours put workers at increased risk of a fatigue-related incident.

In high-income countries, 20-25% of workers have non-standard working times.

[7] NIOSH
[8] Sadeghniiat-Haghighi and Yazdi 2015

What are the main signs and symptoms of fatigue?[9]

Physical: rubbing of the eyes, head nodding, long eye blinks, yawning, sleepiness, headaches

Cognitive: inability to concentrate, lack of motivation

Emotional: irritability, giddiness

What are additional things to look for when driving that may indicate fatigue?[10]

- Drifting from your lane
- Forgetting the last few miles or missing an exit
- Getting tunnel vision (not seeing what's around you)
- Reacting more slowly to traffic conditions and hazards

[9] Caldwell, 2019
[10] Driver Fatigue | NIOSH | CDC

Why does sleep matter?

Sleep is critical for optimal health and well-being. Yet, estimates from five industrialized countries (Canada, Germany, Japan, UK, and U.S.) show that substantial proportions of residents suffer from insufficient sleep, leading to billions of hours of lost productivity.[11] Not getting enough sleep is also associated with workplace crashes and injuries, and negative physical and mental health effects.[12,13]

The National Sleep Foundation recommends that adults get 7 to 9 hours of sleep per night[14].

The quality of sleep you get also is an important factor in feeling rested. If you don't get enough sleep for multiple days in a row, you will begin to accumulate 'sleep debt.' Sleep debt can't be erased by one day with 8 hours of sleep; it takes several days of good sleep to regain optimal alertness.

Your alertness depends on these sleep factors:

1) How much sleep you've had recently.

2) How long it has been since you had sleep.

3) The time of day you obtained your sleep.

The lowest levels of alertness can occur when:

It is between 2 and 6 am.

You haven't had 7 or more hours of sleep for multiple days in a row.

You have been awake for 20 hours or more.

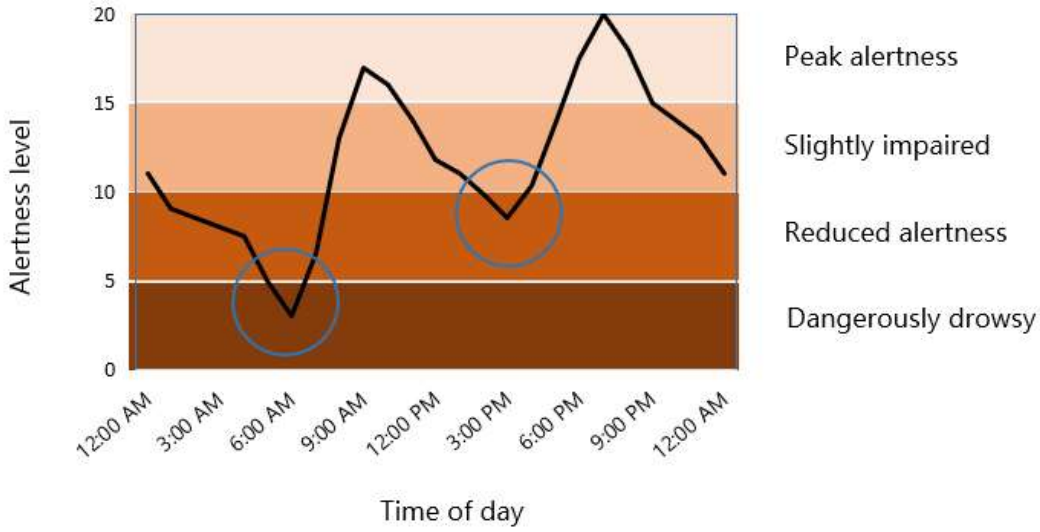
[11] Hafner, 2017
[12] Dembe et al., 2005
[13] Barger et al., 2005
[14] How Much Sleep Do We Really Need? | Sleep Foundation

The drive to sleep

The drive to sleep depends on the amount of recent sleep and the duration of time since the last sleep period. Individuals who are awake for 24 consecutive hours are likely to face acute negative effects to their reaction time, vigilance, and decision-making[15].

Another critical aspect of sleep is its timing. Our bodies operate on a natural circadian rhythm where the drive to sleep is greatest at night and early morning (2-6 am). There is also a small dip in the early afternoon (2-5pm). When work or other activities require that we are awake during these times, we can expect to have greater levels of fatigue. This is especially true for night shift workers and workers with unpredictable on-call schedules.

Figure 1. Circadian Rhythms: The Sleep-Wake Cycle



It is the combination of extended wakefulness with circadian low periods that contribute to the greatest decreases in alertness. Workers who drive under these conditions are at the greatest risk of a fatigue-related crash.

[15] Lim and Dinges, 2010

Sleep disorders

Sleep disorders are a significant source of fatigue and are a global health challenge. Obstructive sleep apnea, the most common type of sleep disorder, is estimated to affect almost 1 billion people around the world, and the prevalence of sleep apnea exceeds 50% in some countries[16]. A few signs and symptoms of a sleep disorder include excessive daytime sleepiness, irregular breathing during sleep, irregular sleep and wake patterns, and difficulty falling asleep. **People who experience these symptoms should speak to a health care provider for further assessment.** Employers should ensure that their employee healthcare plans include preventive care for sleep disorders.

[16] Benjafield et al., 2019

Is compliance with hours-of-service regulations sufficient to manage driver fatigue risk?

Many countries have established hours-of-service (HOS) regulations intended to manage fatigue for professional drivers of large trucks and buses. Regulations vary in scope and type, but often outline 1) limits on driving and work hours, 2) mandatory daily and weekly time off (or rest) and 4) daily breaks requirements.[17]

HOS regulations treat all drivers equally regardless of the individual, environmental, and organizational factors that might impact a driver's fatigue levels. HOS don't account for the fact that fatigue impacts people in different ways and at different levels of severity. Finally, many people who drive for work are not covered by such regulations. Using HOS regulations as the sole approach for managing driver fatigue is unlikely to prevent all, or even the majority, of fatigued driving events. **A more flexible and multi-pronged approach to reflect varying individual and operational circumstances of drivers is superior to an HOS approach alone.**

[17] Simonelli, 2018

Section B. Fatigue management

Guiding Principles of Fatigue Risk Management Systems (FRMS)[18]

FRMS are a set of management practices that systematically identify fatigue-related risks and apply risk-based control measures[19]. This approach is different than a strict set of compliance-based work hour or driving hour limits. Rather, an FRMS is designed to fit into a larger safety management system and fatigue is treated as a hazard to be managed, monitored, and mitigated in a variety of work settings. FRMS principles were drawn upon in the development of this guide. Smaller organizations or organizations who don't have a safety management system in place may not be ready to implement a full FRMS. However, the guiding principles of FRMS are important to include in the development of a driver fatigue management program.

Science-based, data-driven[1]: An FRMS is based on scientific evidence regarding fatigue and an assessment of fatigue risks in your operations.

Risk-based framework[1]: An FRMS is not solely a prescriptive set of rules for all workers. Rather, it is based on the level of fatigue of workers and the severity of consequence of a fatigue-related error. Fatigue has potentially severe consequences for drivers. Tasks other than driving, however, may have less severe consequences.

[18] Moore-Ede 2009, Caldwell 2019
[19] Sprajcer et al., 2022

Shared responsibility: Both employers and workers share in the responsibility to ensure workers are rested. However, employers have the primary responsibility for creating safe work environments. Organizational-level changes to reduce driver fatigue will be more effective than those which rely solely on the worker to get enough rest.

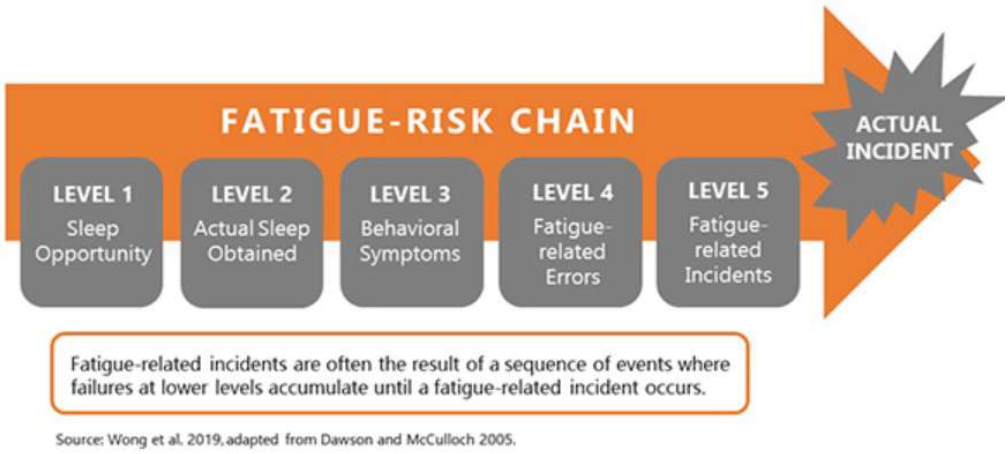
Collaboratively developed: Employees from all levels of the organization, especially those most vulnerable to fatigue, should participate in the development of an FRMS.

Incorporated into your larger fleet safety or overall safety management system.

Continuously evaluated and improved: An effective program will always be refined as opportunities for improvements are identified.

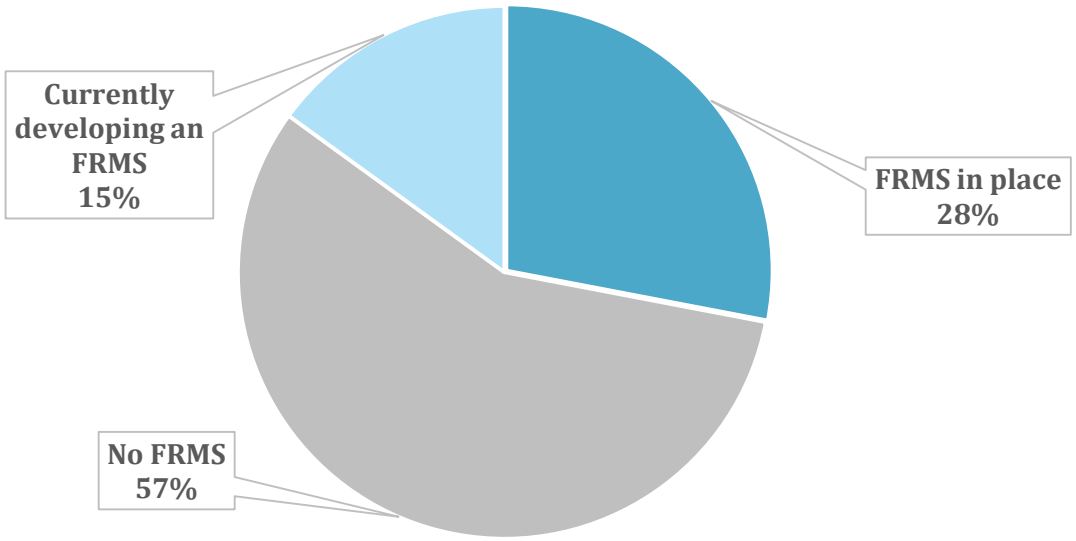
Supported by senior leadership**.**

Recognizes that no single countermeasure can eliminate fatigue: Instead, several layers of defense are needed to address fatigue. The potential for severe consequences increases with each of the five levels of fatigue shown in the fatigue-risk chain below (Figure 5). When multiple layers of defense are in place, the likelihood of a fatigue-related crash decreases.

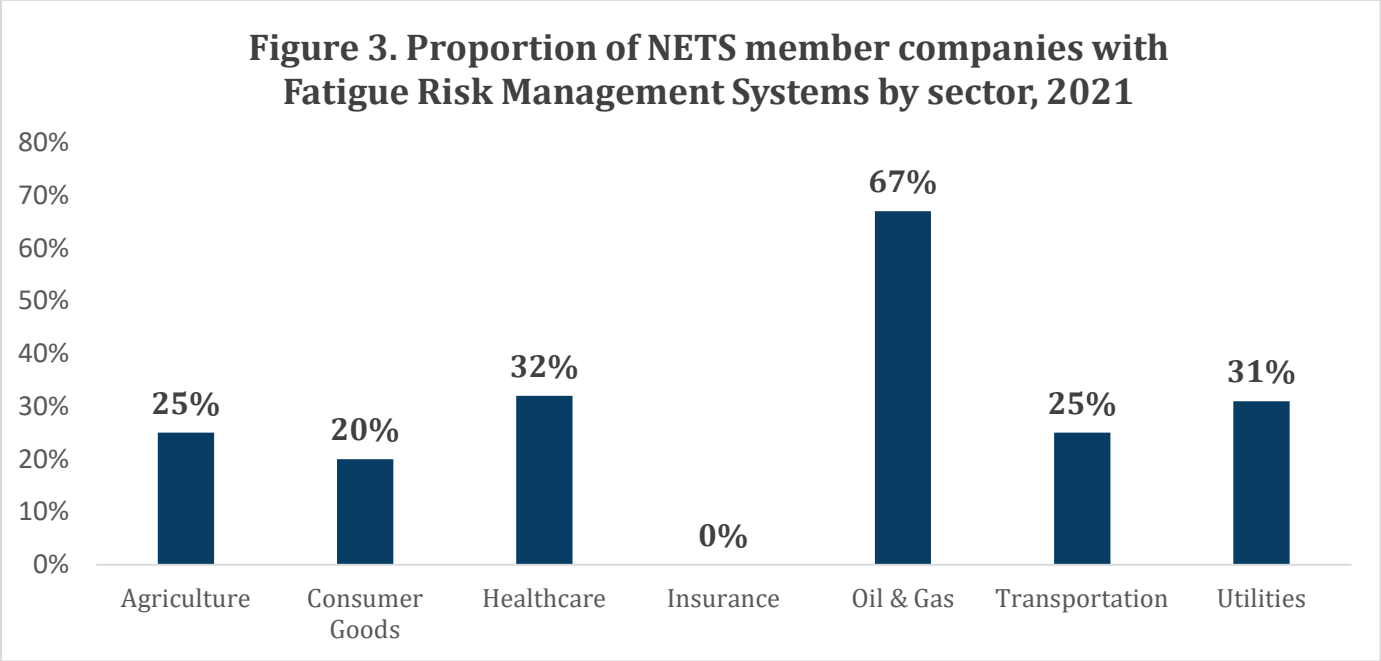


How common are Fatigue Risk Management Systems (FRMS) among NETS members?

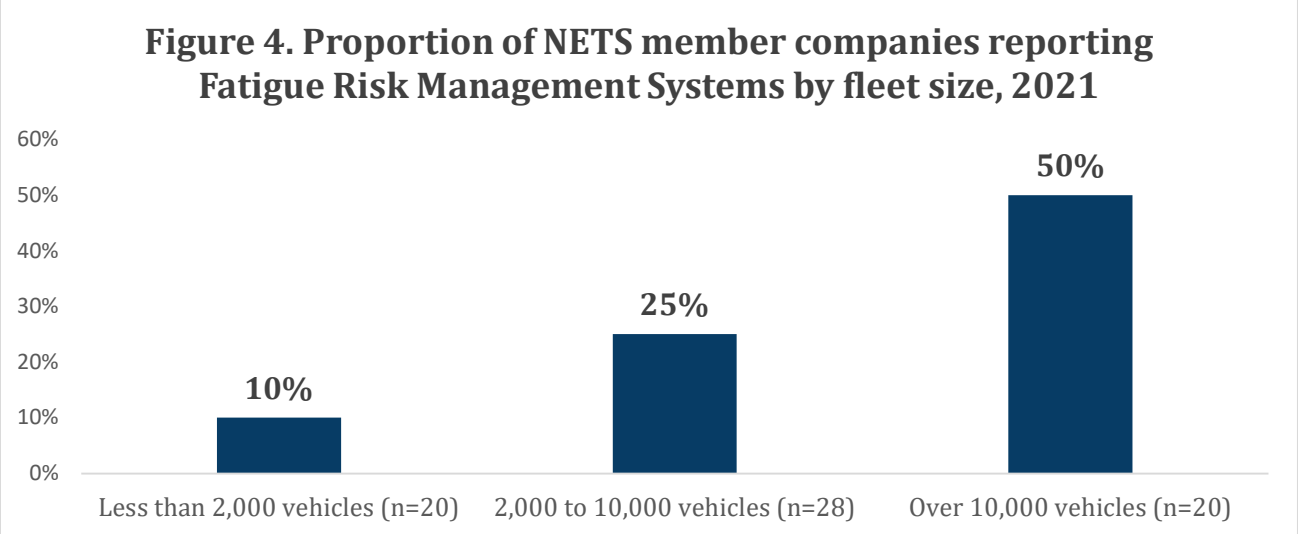
Figure 2. Proportion of NETS member companies with Fatigue Risk Management Systems (FRMS), 2021



As of 2021, over one-quarter of NETS members (28%) reported that they have an FRMS in place and another 14% are in the process of developing one (Figure 2). It should be noted that the NETS benchmark questionnaire does not include a specific definition of what constitutes an FRMS.



NETS Oil & Gas sector member companies have a greater proportion of FRMS programs in place than any other NETS member sector (Figure 3).



Among companies with fleet size less than 2,000 vehicles, only 10% have FRMS. Among companies with fleets over 10,000 vehicles, half have FRMS (Figure 4).

Fatigue management policies and practices: NETS Benchmark

NETS members who have fatigue management policies and practices consistently report lower crash rates.[20] Annual NETS benchmark reports as well as a separate scientifically rigorous study of the NETS benchmark data concluded that:

- Fatigue management policies and practices are strongly associated with positive fleet safety outcomes. These associations are equal to or greater than other road fleet safety practices evaluated in the NETS benchmark.
- Fatigue management practices are significantly associated with lower crash rates on all three types of outcomes which the NETS benchmark evaluates: collisions per million miles (CPMM), % of fleet involved in a collision (%fleet), and injuries per million miles (IPMM).
- The greater the number of fatigue management policies and practices in place for light vehicles, the lower the CPMM and % fleet.

In addition, longitudinal analyses of the NETS benchmark data by the National Safety Council[21] indicate that:

- Lower crash rates are sustained over several years following the implementation of fatigue management policies and practices.

[20] Vivoda, et al. 2019
[21] Kolosh, 2021

The 2021 NETS benchmark analyses found that the specific fatigue risk management policies and practices in Table 1 were significantly positively associated with lower CPMM, % fleet or IPMM for NETS members:

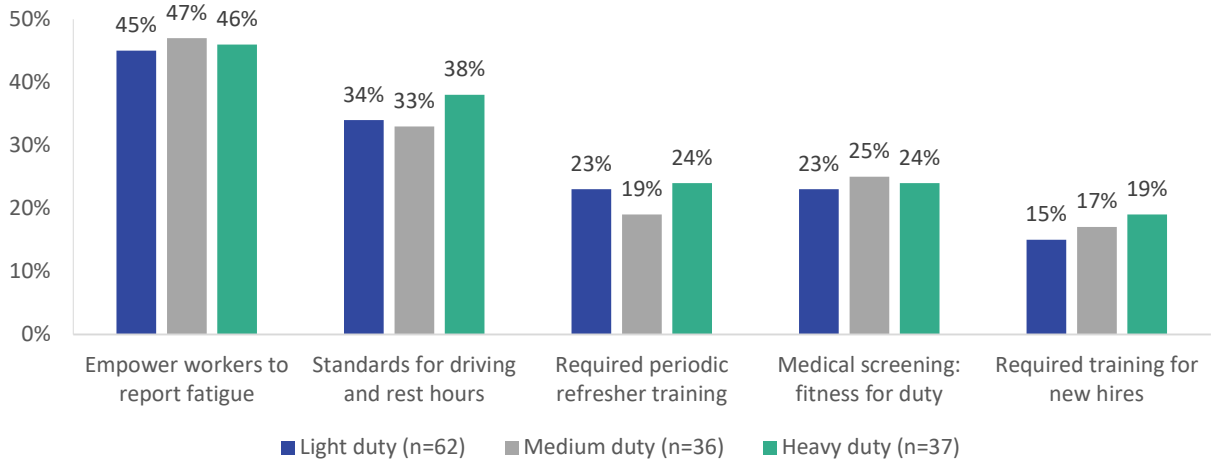
Table 1. Fatigue management policies and practices associated with lower light, medium or heavy vehicle fleet safety outcomes, 2021 NETS Benchmark*

Policy/Practice	Collisions per million miles (CPMM)	% of fleet involved in a crash	Injuries per million miles (IPMM)
Restrictions on night driving	Light	Heavy	Light
Empower workers to report fatigue			Medium, Heavy
Medical screenings for fitness for duty		Light	
Considering deploying fatigue technology	Medium		
Fatigue training:			
For new hires	Medium	Heavy	
Refresher for all drivers	Medium		Medium
Optional training			Medium, Heavy
Sum of all fatigue management practices	**Medium**	**Light, Medium, Heavy**	

* Statistically significant, p<.05 in bivariate analyses

What are the most common fatigue management policies and practices?

Figure 5. Five most common fatigue prevention measures NETS members with light, medium, and heavy duty fleets



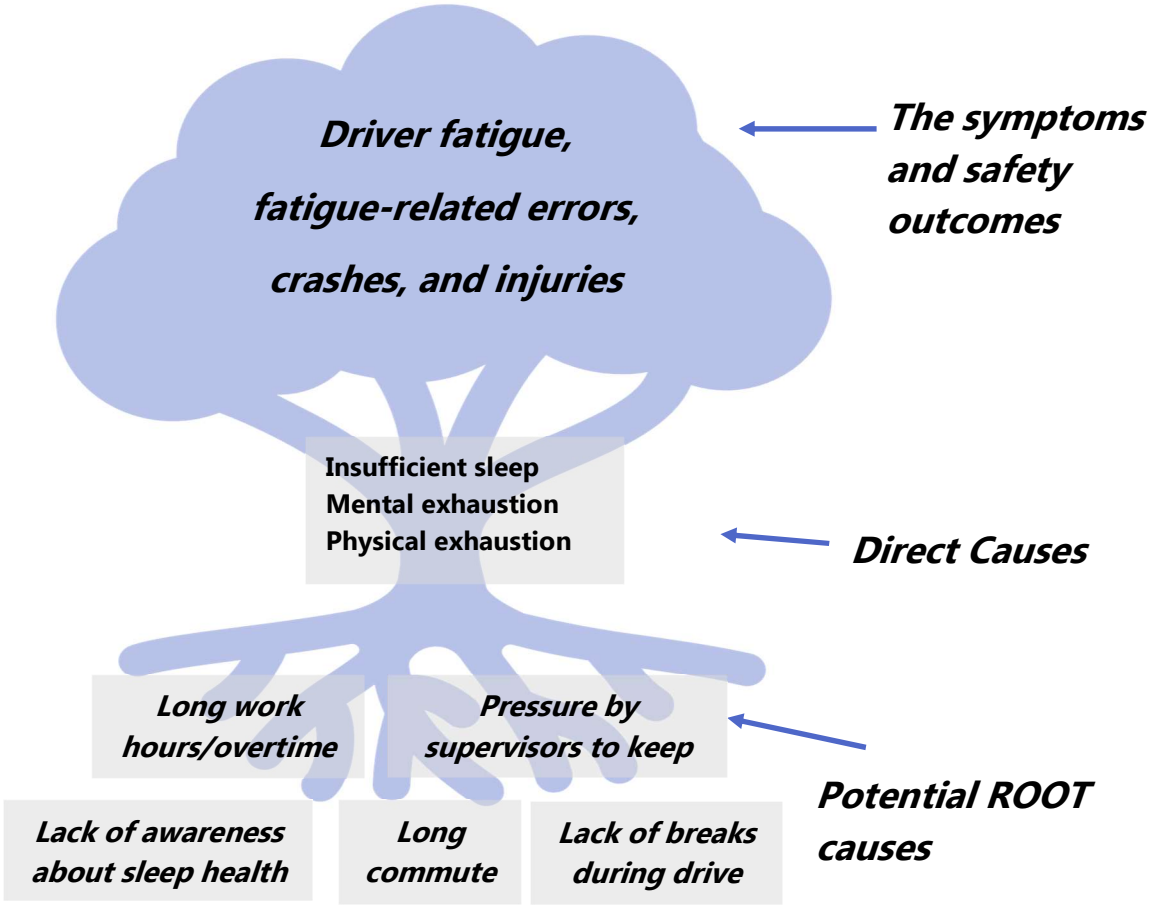
Nearly half of NETS members empower workers to report fatigue, and about one-third of companies have standards for driving and rest hours in place (Figure 5).

Three Steps to Implement a Driver Fatigue Management Program

1. Identify primary causes of driver fatigue

The first step in addressing driver fatigue is understanding the root causes for fatigue in the first place. Although drivers might be fatigued for numerous work-related and personal reasons, you will be able to identify common themes and address these. The driver fatigue root cause analysis tree describes some potential root causes.

Figure 6. Driver fatigue root cause analysis tree



Potential sources of information for identifying root causes include:

- Your employees! Ask them what is making them feel tired and why.
- Summaries of hours worked or overtime hours worked by employees in different divisions or occupations.
- Miles driven by employees per day.
- Claims data. Ask your insurer for an analysis of claims rates based on hours worked, time of day of injury, hours on shift and number of consecutive days on shift.
- A fatigue risk assessment of operations and driver fatigue assessments (See Section C).
- Data collected by in-vehicle monitoring systems or fatigue detection technology.
- Trip reports or data from a journey management system.
- Incident and near miss investigations that collect data on number of hours on shift, number of consecutive days on shift, and other fatigue-related factors.

2. Select appropriate controls. A multi-pronged approach is more effective.

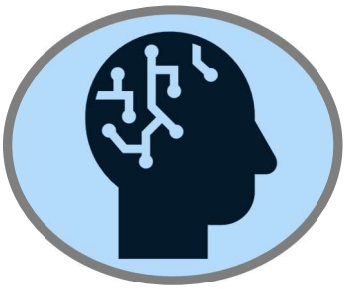
Key Fatigue Management Controls

Develop a fatigue management policy

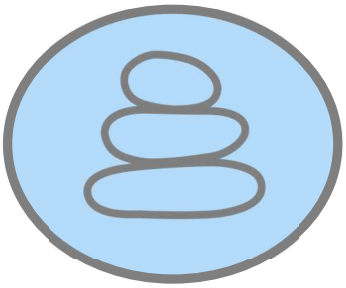
Provide fatigue awareness training and education

Limit work hours and fatigue-inducing schedules

Plan trips in advance



Monitor alertness for duty



Cultivate a culture of balance between work and rest

Select fleet vehicles with advanced driver assistance systems (ADAS)

Use IVMS and fatigue detection technologies

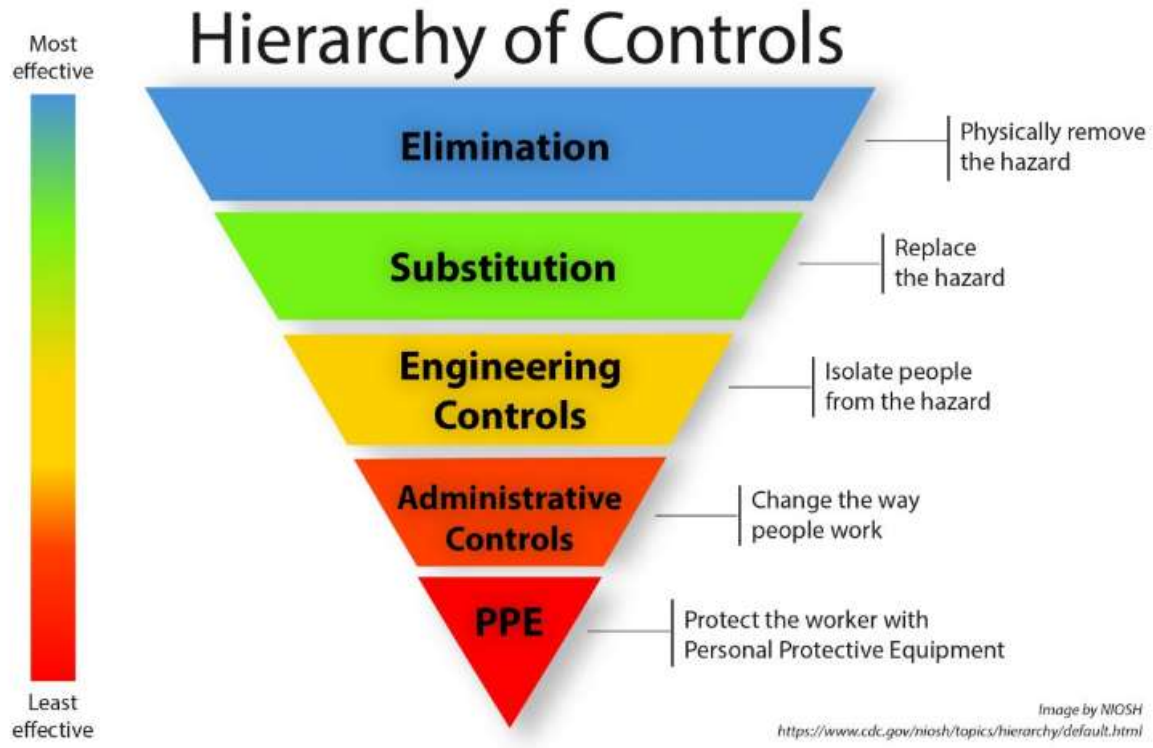
Assess role of fatigue in incident investigations

A. Develop a fatigue risk management policy

A company's fatigue risk management policy should:

- Include a fatigue risk assessment and appropriate controls for each business unit/operational area. Selection of controls can be guided by the ranking of effectiveness outlined in the Hierarchy of Controls (Figure 7).
- Explain the scope: who is covered, local relevant regulations, and roles and responsibilities of a policy champion, employees, supervisors, and leaders.
- Set limits for minimum off-duty hours before starting next shift, which includes enough time for commuting, sufficient sleep (7 or more hours), eating, and taking care of essential activities. **Consideration of extra time off should be given in situations that are more physically or mentally demanding (e.g., driving or working in extreme heat).**
- Set guidance and limits for hours of work, permissible overtime hours, the number of consecutive shifts allowed, and requirements for rest breaks and driving time. There should also be an escalating approval system (e.g., supervisor to director) when employees work beyond standard limits.
- Provide specific guidance for employees who work on call, who travel across three or more time zones, or who are employed as contractors.
- Provide guidance on commutes and when to seek alternative transportation if the driver has been awake for more than 20 hours.
- Include a set of key performance indicators (KPIs) specific to driver fatigue.

Figure 7: The Hierarchy of Controls



B. Provide fatigue awareness training and education

Employee training and education can be relatively inexpensive to implement. The NETS benchmark analysis suggests that training of workers and managers on fatigue and fatigue management is associated with lower CPMM, IPMM, and %fleet. The best educational programs are not one-time information sessions, but are information offered in a series of short lessons over time and include a personal behavioral change goal, like getting more sleep.

Who should receive training?

All employees should receive training on the causes and potential consequences of fatigue. Training of those who drive for work or work in safety sensitive positions should be the highest priority for training where resources are limited. Also, other employees who manage, schedule, and dispatch workers who drive need to have fatigue awareness and tools to address this hazard.

Equity considerations:

Make sure training is offered in a way that is accessible to all workers. For example, workers who drive at night often miss trainings, but this group is especially important because the risk of fatigue-related crashes is greater at night. Consider online trainings for these workers.

Key elements of a worker fatigue education training:

- Overview of the organization's fatigue management policy, driving and working hour limits, and other policy components;
- Sleep fundamentals and circadian rhythms;
- Awareness of the causes and effects of fatigue;
- Information about sleep disorders and when to seek medical care;
- Fatigue emergency countermeasures: caffeine/nap strategies;
- The role of lifestyle: nutrition, exercise, family life;
- The worker's responsibility for ensuring adequate rest and fitness for duty;
- How to identify and respond to fatigue symptoms in self and others.

Elements of management training:

- Your company's fatigue management risk policy and responsibilities of a manager;
- Controls in place to reduce driver fatigue;
- How to have open and caring communication with employees and empower workers to disclose fatigue.

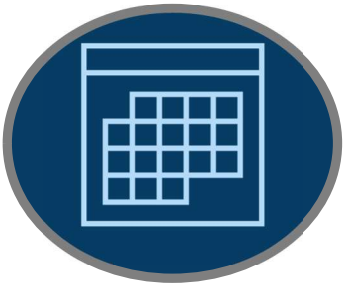
Cautions about this approach:

By itself, this strategy will do nothing to change the overall working conditions that may be contributing to insufficient sleep or other causes of fatigue. Also, training and education tends to have shorter-term impact on reducing fatigue as compared to organizational-change strategies.

Example key performance indicators to track success for this control

- Percent employees who completed training; knowledge test scores; self-reported sleep hours.

C. Limit work hours and fatigue-inducing schedules



The most frequent recommendation made by the National Transportation Safety Board (NTSB) following fatigue-related incidents is to implement scheduling policies.[22] There is a strong relationship between hours of work and the rate of injuries and crashes. Overarching principles to reduce fatigue-inducing work schedules are:

- Ensure schedules allow enough time for proper sleep, which is at least 7 or more hours per 24-hour period. Account for commute times and other essential activities (e.g., eating) when considering the amount of off-duty time workers need. The International Working Time Society states that shift workers need at least 11 hours between shifts in order to obtain 7 hours of sleep[23]
- Limit the number of consecutive shifts, especially night shifts. The more night shifts someone works in a row, the greater the risk of crashes and injuries. On the second night, it is 6% higher, third night is 17% higher, fourth night is 36% higher. Maximize recovery time after night work.[24]
- Design schedules that are consistent and predictable, as these schedules allow workers to better plan their lives to reduce fatigue risk.
- Provide some flexibility in working hours whenever feasible. People can then work around the hours that match their non-work demands (i.e., children) and their natural circadian rhythms (e.g., morning or evening preferences).[25] Flexible schedules also reflect an awareness of the variation in individual sleep needs and the varying effects of insufficient sleep on alertness and functioning.
- Consider allowing naps during extended shifts. The International Working Time Society suggests allowing naps to shift workers if they need it (also called 'sanctioned napping'). Where possible, provide quiet, dark, and comfortable nap facilities as well as guidance to workers on napping[26].

[22] Marcus and Rosekind, 2017
[23] Wong et al., 2019
[24] Folkard and Tucker, 2003
[25] Miller, 2006
[26] Ritonja et al., 2019

- Keep shift lengths short (under 12 hours).
- Consider contractor work schedules. Do contractors' work schedules and do the demands placed on them also provide sufficient time for adequate sleep and rest?
- Give quality time off. Try not to contact employees during their time off, and limit contact during late night hours. Leave weekends or other non-duty periods free whenever possible.
- Consider the use of scheduling tools that use biomathematical models to predict fatigue. Models use a set of equations based on work rest schedules, and where available, sleep quantity, sleep quality, and sleep/wake timing. These models are used in aviation, rail, and transportation. **Scheduling tools built on these models are promising tools to improve safety but can be quite costly and additional research on their effectiveness is needed.**

Example key performance indicators to track success of improved scheduling practices:

Ratio of scheduled work hours to actual work hours; number and proportion of workers with overtime hours; average hours worked per week; hours worked between midnight and 6 am; number of days worked in a row by employees.

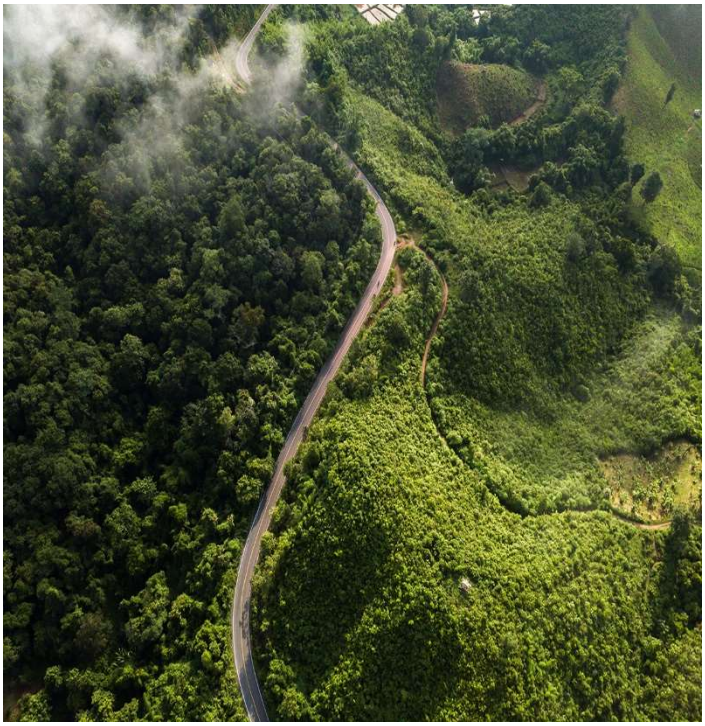
D. Plan trips in advance

NETS members report that trip planning is an essential component to managing driver fatigue. Trip planning is often conducted as part of an overall journey management program. Journey management can also be a useful tool in the reduction of fatigued driving. An example journey management form for planning a trip can be found in *Section C*. Key principles of trip planning and overall journey management are:

- Managers and drivers should systematically question the necessity and frequency of trips (e.g., ask whether a task can be done by videoconference). For trips that are necessary, a route planning process should be in place to ensure the driver has sufficient alertness to drive.
- Each trip has a plan for the route the driver will take and how and where they will take breaks. The route planning process will also make drivers aware of stretches of road where breaks are not safe or rest facilities are not available. Drivers are also empowered to take breaks if they become fatigued, even if it is not part of the set trip plan.
- Limits are established for maximum acceptable distances or maximum times to drive per day. Setting limits reduces the likelihood of drivers pushing themselves into fatigued driving situations.
- Long road trips should be completed in pairs as opposed to driving alone. Having a driving partner allows employees to trade driving duties, or at least to have a second set of eyes to notice when a driver is getting drowsy or not reacting quickly to driving situations.
- Monotonous road conditions can increase levels of fatigue. Therefore, trip planning should adjust frequency of breaks for monotonous, assuming there is a safe place to stop.
- Certain types of weather (e.g., winter and extreme heat) and stressful driving conditions can also result in greater levels of fatigue; increase the number of driving breaks and shorten overall driving time.

Example key performance indicators to track success of route planning

- Proportion of trips with journey management plan on file, miles or time driven per employee per day and per week, frequency of breaks during long trips.



E. Monitor alertness for duty before driving

There are a number of ways to monitor alertness of drivers before they get behind the wheel. It's best to use more than one strategy because fatigue can result from multiple sources. Three main objectives are:

- Identify drivers at high risk of fatigue before they drive.
- Learn trends about fatigue among drivers, such as times of higher fatigue risk.
- Contribute to monitoring effectiveness of your program.

No matter the type of measurement, you will want to be sure that your organization is equipped to respond effectively when fatigue is identified as a result of your monitoring efforts. Also, establish a scoring system with guidance on what actions to take for each score.

i) Self-report fatigue symptom checks

- Implement a fatigue self-reporting system. Encourage workers to report fatigue when they feel they cannot drive safely so that proper steps can be taken to ensure safety. An anonymous system could also be used to ask workers about work schedules and other factors that may have contributed to their fatigue and get honest suggestions for improvement.
- Provide drivers with brief fatigue symptom checks prior to driving. Some helpful times when fatigue symptom checks could be administered: when driving times are longer than established company limits; before overtime work begins; for drivers who work on call and alone; or for night shift workers.
- Select an already tested scale that takes into consideration both mental and physical fatigue to check fatigue levels. The 1-question Samn-Perreli scale (see Section C) has been used extensively in the aviation industry and was developed and validated among Air Force personnel[27]. Scales that are simple and clear will be easier to implement and require less training.

[27] Samn and Perreli, 1982

- It's important to note that drivers may not feel able to report fatigue honestly or accurately for many reasons, including a lack of interest, a fear of the potential repercussions for honest reporting, or misunderstanding the questions. Pilot-test your survey to ensure it is acceptable and understandable. Self-report fatigue symptom checks should not be the only way alertness is monitored. However, it can be a cost-effective tool.

ii) **Collect sleep history**

- While insufficient sleep is not the only cause of fatigue, sleep history is still an important piece of information for predicting a driver's alertness. Important questions to ask may be: How many hours have you slept in the past 24 hours? 48 hours?
- Sleep/activity data can be collected using a wrist-worn device. There are also many smartphones and smartphone apps that are able to track sleep quantity and quality.
- Equity consideration: Sleep data collected through technology is highly sensitive. These data should be used solely to manage fatigue for the individual or aggregated for the workforce. They should not be used for disciplinary purposes, nor should they be considered in career advancement decisions. Always adhere to local and company privacy requirements.

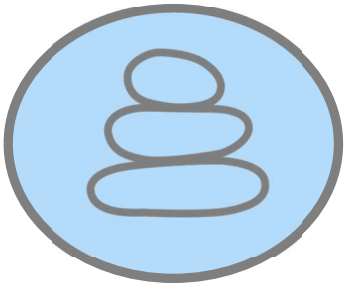
iii) Administer cognitive alertness tests, such as a Psychomotor Vigilance Test (PVT)

- Cognitive alertness tests can be administered using smartphone, tablet, or computer and they assess sustained attention. The psychomotor vigilance test (PVT) is considered the gold standard for fatigue detection. The tests can last for about 90 seconds, 5 minutes, or 10 minutes, however not all commercial PVT tests are validated. Cognitive tests usually measure accuracy and response time in pressing a button on a screen in response to visual stimuli. Regular administration of these tests allows an employer to identify declines in employee performance compared to their baseline alertness score.

- Cognitive alertness tests pick up reduced levels of alertness due to factors other than fatigue, including substance impairment, illness, side effects from medication or emotional distress. Data collected should **NOT** be used in a punitive manner, but for protecting the safety and health of the worker, in alignment with local privacy and worker councils or other requirements (if applicable).
- A procedure should be established for steps to take when a driver's alertness level deviates from the norm, such as alerting the supervisor. Decisions about the safest course of action can then be determined.

Cautions of this approach: Cognitive alertness tests may be costly to administer. Also, additional research is needed to establish the strength of the relationship between cognitive alertness test scores and poor driving performance. Finally, one NETS member reported that some drivers considered the cognitive test app to feel kind of silly and ultimately there was a lack of support from operations to implement the app widely in the organization following a pilot test.

F. Cultivate a culture of balance between work and rest



Historically, sleep and rest have been undervalued and working long hours has been revered. Health professionals and employers have come to recognize that well-rested employees work more safely, make fewer errors, are more productive, and have better morale. Here are a few tips for creating a culture with a balance between work and rest.[28]

- Company leaders can dismantle the culture that overworking is valued in your organization by modeling work-life balance.
- Discourage sending emails and calls during non-work hours, in particular during nighttime.
- Encourage employees to take time off to rest and recharge. Normalize taking time away from work by talking about it during meetings.
- If possible, allow flexible working arrangements that encourage more sleep and rest. This may involve flexible work hours, or remote work so that commute time can be replaced with extra sleep. Flexible work hours encourage alertness by increasing ability for workers to stick to their natural sleep patterns and meet personal demands.
- Provide guidance on breaks in your fatigue management policy and encourage drivers to take additional breaks when they feel fatigue.
- Consider allowing nap breaks to increase alertness for workers who have extended shifts. Where possible, provide a quiet, cool, comfortable place for employees to rest.
- Launch a sleep challenge with incentives by tracking this information. A few award-winning sleep apps include: SleepScore, SleepWatch (Apple Watch), Sleep++, Pillow, Sleep Cycle, PrimeNap (Android).[29] The IncentFit program offers financial rewards for getting sufficient sleep.
- Share rest and sleep promoting social media messages with workers (see Section C).

Example key performance indicator to track success of culture changes

- Proportion of vacation days earned vs. proportion of vacation days taken.

[28] How to Create a Workplace Culture That Values Sleep | Calm for Business
[29] VeryWellMind, 2022

G. Select fleet vehicles with advanced driver assistance systems (ADAS)

A fatigued or otherwise impaired driver is a risk. ADAS helps to protect drivers when alertness is impaired.

The following safety technologies are recommended by the U.S. National Highway Traffic Safety Administration (NHTSA) because they are proven to reduce crashes and injuries.

Collision Warning

Forward collision warning detects a potential collision with a vehicle ahead and warns the driver. This technology lowers front to rear crash rates by 27% and by 20% for injury crashes.[30]

Lane departure warning monitors the vehicle's position within a lane and warns the driver if the vehicle approaches or crosses lane markers. Studies by the Insurance Institute for Highway Safety (IIHS) indicate that lane departure warning technology reduces all single-vehicle, sideswipe, and head-on crashes by 11% and injury crashes by 21%.[31]

Cautions: Lane departure warnings can be turned off by drivers if they become irritating to them. Fleet managers should require they be left active. Also, technologies that provide warnings but do not intervene to avoid a potential collision are of no value if the driver has fallen asleep.

[30] Cicchino, 2017
[31] IIHS, 2017

Collision Intervention

Automatic Emergency Braking: applies the brakes when a forward collision is imminent. At lower speeds, automatic emergency braking reduced all front to rear crashes by 43% and injury crashes by 45%[32].

Caution: Research indicates that driver sleepiness can be exacerbated when driving partially automated vehicles, in particular at nighttime.[33]

Example key performance indicators to track success of using ADAS-equipped vehicles

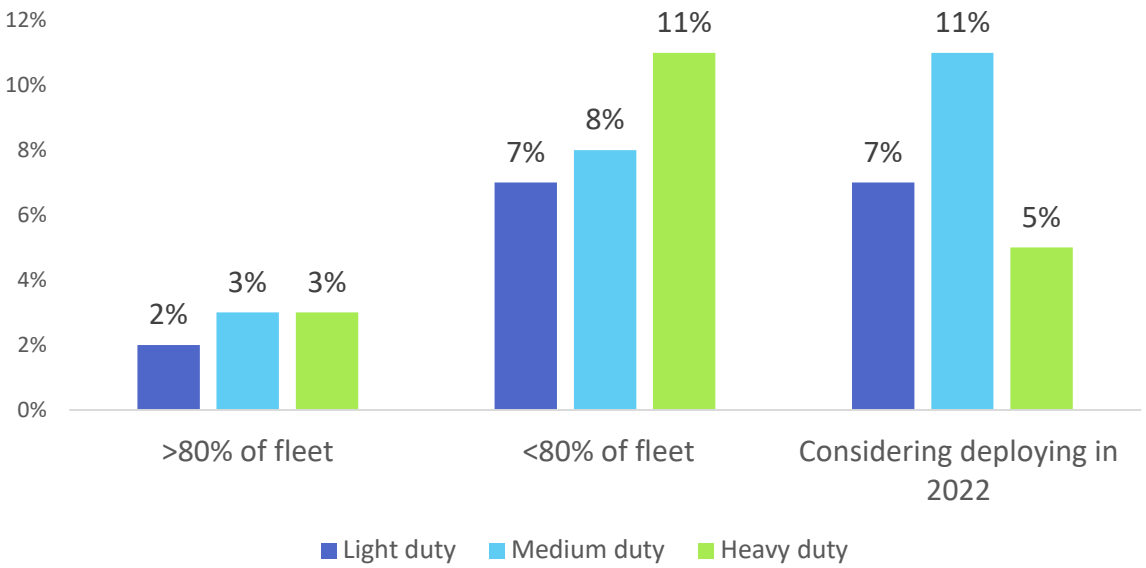
- The proportion of current fleet vehicles with driver assistance technologies; the proportion of newly purchased vehicles with driver assistance technologies.

[32] Cicchino, 2019
[33] Ahlstrom, 2021

H. Use IVMS and fatigue detection technologies

While not a singular solution to driver fatigue, manufacturer-installed and after-market IVMS and fatigue detection technologies in vehicles hold promise for identifying and warning a fatigued driver prior to a crash. There are two primary categories of technologies: those that monitor the driver's alertness and those that monitor the driver's performance.

Figure 8. Proportion of NETS members using fatigue detection technology in vehicles by fleet type



- The use of IVMS is common throughout NETS member companies. However, only a small proportion of NETS members currently use fatigue detection technologies (Figure 8). Approximately one in ten NETS members with heavy-duty fleets use this technology in a portion (<80%) of their vehicles.
- Careful consideration and selection of fatigue thresholds and the specific actions to be taken based on reaching those thresholds is critical.
- The intervention should combine real-time alerts to drivers with notification to management who can act.

Common measures of fatigue detection

Eye behavior: Monitoring of ocular measures, or eye behavior, is one of the most common ways that driver alertness is assessed. The duration and rate of blinks or the percent of eyelid closure are common measures.

> **Cautions:** Some ocular devices are limited by factors like ambient light and the use of prescription glasses or sunglasses.

Body posture and head orientation: Posture and head nodding technologies monitor the body changes as the neck muscles relax.

> **Cautions:** These devices are late warning devices, because once you are nodding, sleep onset is imminent and a microsleep has already occurred.

Brain activity: Monitoring of brain activity via the electroencephalograph (EEG) is recognized as the most successful method of detecting high fatigue levels, though less successful at recognizing low fatigue levels.

> **Cautions:** This method requires drivers to wear a baseball cap or headset, which often provides challenges for driver buy-in.

Task performance technologies

Potential indicators of fatigued driving include harsh braking, lane deviation, larger or more abrupt steering wheel corrections, and greater variability in speed or following distance. Many IVMS track such measures. A recent study of commercial drivers found that harsh braking increased by 8% for each incremental increase in fatigue levels.[34]

> **Cautions:** Technologies may be affected by sub-standard road conditions (e.g., non-paved roads or roads without pavement markings). In addition, task-based measures are measuring driver performance, which may or may not be closely correlated with driver fatigue. Lastly, fatigue detection alerts installed by vehicle manufacturers may not be validated or supported by scientific evidence (e.g., the coffee symbol on dashboards).

[34] Mollicone et al., 2019

Tips for selecting and implementing IMVS and fatigue detection devices[35]

- Develop a clear purpose for the technology so you can verify that the device you select will meet your needs. For example, do you want the technology to provide objective scores, or are subjective data enough? Do you want it to alert managers as well as drivers?
- Ask the vendor to share tests which illustrate the technology accurately measures what it purports to measure.
- Pilot test the devices in your operational conditions. Make sure the device's alerts are reliable and appropriate in your operational environment.
- Select devices that integrate into your fleet management system.
- Set camera-based systems to record only when triggered by an event, which can reduce privacy concerns of drivers.
- MOST IMPORTANTLY, talk to your drivers throughout the process to ensure the device is not too intrusive 'in the field.'

Example key performance indicators to track success of IVMS and FDT

Number and rate of fatigue-related events per million miles; number of actions in response to fatigued driving; number of coaching events on driver performance.

[35] https://www.cdc.gov/niosh/topics/fatigue/pdf/FMDT-Infographic-Jan2022.pdf

I. Assess the role of fatigue in incident investigations

The National Transportation Safety Board (NTSB) has established robust and reliable methods for assessing fatigue in crashes; the overarching ideas are described in this section.[36] Potential sources of data for investigations include interviews of drivers, passengers, and managers; along with IVMS data, logbooks, work schedules, CPAP device data, and cell phone records.

In accordance with the idea of a just culture, the aim of an investigation is to identify safety deficiencies in an organization and develop ways to remedy them, not to assign blame. An investigation should answer two questions:

1) Was the driver fatigued at the time of the crash? Examine:

- ☐ The driver's sleep/wake history and work schedules for the last 72 hours.
- ☐ Sleep opportunity based on work schedules and commute times.
- ☐ Time awake prior to incident.
- ☐ Circadian factors based on time of incidents.
- ☐ Health issues (e.g., sleep disorders, medications).
- ☐ Factors leading to mental or physical exhaustion.

2) Did the fatigue contribute to the crash?

- ☐ Evaluate driver performance and the extent to which it contributed to the incident.
- ☐ Determine if the driver or vehicle's actions and movements were consistent with symptoms of a fatigued driver.
- ☐ Consider alternative explanations for the incident.

Examine key performance indicators to track success of fatigue investigations

The number of crash investigations completed; the number of actions taken in response to investigations.

[36] Price and Coury, 2015

3. Review key performance indicators (KPIs) and update your program as needed

Fleet managers and others will want to review KPIs at least monthly to track the success of your FRMS. In addition to control-specific KPIs suggested in Section B, lagging indicators (post-fatigue indicators) like the ones below are also helpful to track:

- Self-reported fatigue events
- IVMS data
- Workers' compensation claims
- Vehicle crash and claims data

Audit your FRMS at least annually. Talk to workers, supervisors, and others to identify opportunities to refine your program. Key questions to ask during an annual audit include:

- Is the FRMS policy practical and working as intended?
- Which KPIs indicate areas that need improvement?
- Who is responsible for updates to the program and how will changes be shared with employees?

Encouraging messages from NETS members:

Take stock of what you already have, you have things in place...to respond to risks of driver fatigue.

Build on small wins!

Section C. Resources

Fatigue risk assessment tool for operations

Fleet safety or health and safety professionals can use this tool as a starting point to assess their local operations for driver fatigue risk. It may also guide the assessment team in the selection of appropriate fatigue management controls.

Scheduling

1) What proportion of employees' driving is done between midnight and 6:00am?

a. none b. only on occasion c. a small proportion d. regular practice

2) How many days in a row do your drivers typically work?

a. 5 or fewer b. 6 or7 c. more than 7

3) At your busiest time in a typical year, what proportion of drivers worked overtime in a given week?

a. 0% b. 1%-10% c. 11%-33% d. More than 33%

4) At your busiest time, what proportion of drivers work beyond 12 hours on a regular workday?

a. none b. less than 10% c. 10%-50% d. More than 50%

Driving and work environment

5) Are roads in your region monotonous? This means fairly straight, lacking in variation in scenery for extended distances, and limiting the need for active driving movements.

a. no b. some roads c. a large portion of roads

6) What proportion of drivers engage in somewhat rigorous physical activity in addition to their driving tasks?

a. None b. Less than 10% c. 10%-50% d. More than 50%

7) What proportion of drivers work outdoors and in extreme weather conditions when they occur (e.g., heat or cold)?

a. none b. less than 10% c. 10%-50% d. more than 50%

8) What proportion of drivers drive alone most of the time?

a. none b. less than 10% c. 10%-50% d. more than 50%

9) What proportion of your drivers commute more than one hour each way before and after work?

a. none b. less than 10% c. 10%-50% d. more than 50%

10) What proportion of your drivers are under the age of 25?

a. none b. less than 10% c. 10%-50% d. more than 50%

Point count: Add up points a) 0 points, b) 1 point, c) 2 points, d) 3 points

Possible point range: 0 points to 28 points

The greater the point total, the more risk factors your operation has for fatigue-related incidents.

Driver fatigue risk assessment tool for employees

Fleet safety or health and safety professionals can use this tool to survey their drivers and assess general driver fatigue risk. Individual data and aggregate data from this assessment can help to identify your drivers at highest risk of fatigue and guide the selection of appropriate fatigue management controls.

Please select the following that MAY apply to your regular (i.e., daily) work:

- ☐ I usually drive alone to/from sites
- ☐ I drive to/from sites at night
- ☐ I drive between 2 am and 6 am
- ☐ My regular daily work hours (including commute) exceed 15 hours on a regular day (check twice if >17 hours)
- ☐ My estimated time available for daily sleep is 6 or fewer hours for 2 consecutive nights or more during my workdays

If two or more checks, your fatigue/driving risk is high: check-in with supervisor or your local health and safety team.

Self-report fatigue measurement tools

These fatigue measurement tools have been widely used and validated. They can be used to track fatigue levels if administered regularly for a period of time. They may also be helpful to administer prior to authorization for a driver to proceed with an extended shift or overtime.

The one-question Samn-Perelli Fatigue checklist is a good fit to gauge the fatigue levels of drivers if you are concerned about both mental and physical fatigue.

1. Fully alert, wide awake
2. Very lively, responsive, but not at peak.
3. Okay, somewhat fresh
4. A little tired, less than fresh
5. Moderately tired, let down
6. Extremely tired, very difficult to concentrate
7. Completely exhausted, unable to function

The Karolinska Sleepiness Scale is a well validated scale to use if you are primarily concerned with fatigue due to sleepiness.

1. Extremely alert
2. Very alert
3. Alert
4. Rather alert
5. Neither alert nor sleepy
6. Some signs of sleepiness
7. Sleepy, no effort to stay awake
8. Sleepy, some effort to stay awake
9. Very sleepy, great effort to stay awake, fighting sleep

Sample fatigue management policy

(COMPANY NAME)

Prepared by:	**Authority:**	**Issuing Dept:**	**Document Number:**
Title: Fatigue Management			
Initial Issue Date:			
Revision date:			
Revision Number:			
Next Review Date:			
Pages:			

Purpose

To ensure our employees recognize to effect of fatigue as related to safely being able to perform work and to establish guidelines for work hours and equipment to reduce fatigue in our business and at our client locations.

Scope

This program applies to all (COMPANY NAME) (plus affiliates) projects and operations.

Policy

The guiding principles of fatigue management shall be incorporated into the normal management functions of the business and include the following:

- Employees must be in a fit state to undertake work
- Employees must be fit to complete work
- Employees must take minimum periods of rest to safely perform their work

These principles will be managed through:

- The appropriate planning of work tasks, including driving, vehicle and equipment maintenance, loading and unloading and other job-related duties and processes
- Providing appropriate equipment to help reduce stress and fatigue
- Regular medical checkups and monitoring of health issues as required by legislation
- The provision of appropriate sleeping accommodations where required
- Ongoing training and awareness of employee health and fatigue issues

Roles and Responsibilities

The following addresses the roles and responsibilities of workers to report tiredness/fatigue to supervision and that supervision take appropriate action to assist the worker.

(COMPANY NAME) (plus affiliates) Management

- Management accepts responsibility for the implementation of this fatigue management policy.

Site Manager

- Responsible for the implementation and maintenance of this program for their site and ensuring all assets are made available for compliance with the program.

Employees in Safety Critical Positions

- Employees must present in a fit state free from alcohol and drugs;
- Employees must not chronically use over-the-counter, prescription drugs and any other product which may affect an employee's ability to perform their work safely, including fatigue that sets in after the effects of the drug wear off.
- Employees shall report tiredness/fatigue and lack of mental acuity to supervision and supervisory personnel shall make safety critical decisions and take appropriate actions to prevent loss including replacement of tired employees, changing schedules, or forcing work stoppages.
- Employees need to be rested prior to starting work.
- Employees need to monitor their own performance and take regular periods of rest to avoid continuing work when tired.

Work Hour Limitations and Rest Breaks to Control Fatigue and Increase Mental Fitness

(COMPANY NAME) (plus affiliates) has set the following procedures limiting work hours and controlling job rotation schedules, also known as staff/work balance, to help control worker fatigue. (COMPANY NAME) (plus affiliates) will set work hour limitations and will control job rotation schedules to control fatigue, allow for sufficient sleep and increase mental fitness in an effort to control employee turnover and absenteeism.

1. Every Employee shall have necessary work breaks in order to avoid fatigue. These scheduled breaks will apply to both driving and on-site hours. The following shall be a minimum:

- 15 Minutes each 2.5 Hours
- 30 Minutes after 5 Hours
- 30 Minutes after 10 Hours

2. No Workers shall work more than:

- 12 hours per day
    - o Up to 13 hours per day with supervisor approval
    - o Up to 14 hours per day with manager approval

- o Up to 15 hours per day director approval
- o Greater than 15 hours per day requires vice president written approval

• 24 Days Continuous

- o Up to 28 days with manager written approval
- o Greater than 28 days requires vice president written approval

3. Workers should have at least 8 hours' time off between On Call clocked-in activity and returning to regular duty. Case by case scenarios of fewer hours during disaster recovery and storm work require special planning and manager written approval.

4. Unfamiliar or irregular work should be avoided.

Fatigue Risk Factors at a Glance

• Shift work: Night shifts, early morning shifts, rotating and irregular shifts disrupt the body clock.

• Long weeks: Working 50 or more hours a week.

• No rest breaks during shift: Short breaks allow teammates to rest and re-energize.

• Quick shift returns: Teammates need adequate rest time between shifts to recover.

• High-risk hours: Working at night or in the early morning, even infrequently.

• Sleep loss: Getting less than the necessary seven to nine hours of sleep a day.

- o Long shifts: Working 10 or more consecutive hours.
- o Demanding jobs: Work that requires sustained attention or is physically or cognitively demanding.
- o Long commutes: Driving more than 30 minutes.
- o Working overtime (more than 12 hours) two days in the previous week.

• Balancing shiftwork with family and social life can be stressful and make it hard to get adequate sleep. Family demands (e.g., illness) or personal problems (e.g., divorce) increase stress and the likelihood of becoming fatigued.

Use of Ergonomic Friendly Equipment

Ergonomic equipment will be used to improve workstation conditions such as anti-fatigue mats for standing, lift assist devices for repetitive lifting, proper lighting and controls of temperature and other ergonomic devices as deemed appropriate. Equipment to be used will be determined in the work task analysis.

Analysis of Work Tasks to Control Fatigue

Work tasks to control fatigue must be analyzed and evaluated periodically. (COMPANY NAME) (plus affiliates) will make any necessary changes to equipment, training or procedures based on the evaluation.

A3 and Time Out Authority

Assess, Analyze and Act – Report to your Supervisor if you have had less than 6 hours of sleep in 24 hours, or 12 hours of sleep in 48 hours, or have been awake for longer than 18 hours.

Use Time Out Authority when fatigue is affecting the safety or quality of the job.

Incident Analysis

If there is an incident there shall be an initial identification/assessment of evidence. Initial identification of evidence immediately following the incident might include a listing of people, equipment, materials involved and a recording of environmental factors such as weather, illumination, temperature, noise, ventilation, etc. and physical factors such as fatigue, age and medical condition.

Injury Rates

The estimated annual injury incidence rate per 100 workers is 7.89 for U.S. workers who usually sleep less than five hours per day, compared with 2.27 per 100 workers among those who tend to sleep between seven and eight hours, according to research from Lombardi and others, using data from the National Health Interview Survey.

Initial and Annual Training for Workers on Fatigue and Controlling Fatigue

(COMPANY NAME) (plus affiliates) is committed to ensuring that all employees are competent to perform their tasks including:

- Fatigue management and health issues.
- (COMPANY NAME) (plus affiliates) must provide initial and annual training on how to recognize fatigue, how to control fatigue through appropriate work and personal habits and reporting of fatigue to supervision.
- A record of individual fatigue training and competency will be maintained.

Sample Journey Management Plan

Journey Management Plan	**Trip High Level Description:** *Site visit by GM and HSE Advisor and return.*	**Names of Passengers** *(For Light Vehicles)*	**Alternate Driver?** *(Tick if Yes)*
Is the trip necessary? Why?	*Yes, contractual requirement*	1 *Mike Smith*	
Can it be combined with another trip? If not, why?	*No, no other trips today*	2	
Is there a need for night driving? If so, why?	*No*	3	
Name of person acting as Journey Manager:	*Joe Mitchell* Phone number: *12345678*	4	

Departure Date	**Departure Time**	**Vehicle ID**	**Is the Vehicle fit for the Trip?**	**Name of Main Driver (and Company if Contractor)**	**Is/are the driving licence(s) valid for the vehicle and country?**	**Is Defensive Driving Training for the Driver valid?** *(Yes/No/ N/A)*
04/25/11	*07:30*	*88-XT-VD*	*yes*	*Dave River*	*yes*	*Yes (10/10/11)*

Route Destination/Rest Area(s)	**Arrival Time**	**Departure Time**	**Rest Break?**	**Is Contact Required?**	**Known hazards to destination/rest area(s) and mitigation measures, specific instructions (e.g., contact notification details, place to stay overnight, etc.)**
Smithtown Office – Saltflat	*09:15*	*09:45*	*yes*	*yes*	*Slow for Roadwork at 100 km, Starbucks coffee*
Saltflat - Brownsville site	*11:00*			*yes*	*Security measures at site gates, passes needed.*

Did the Trip go as expected and if not, why?	**Driver Signature** (unless driver is also the journey manager)
No. The trip was delayed due to roadwork between Saltflat and site. Arrival time as 11:25.	

Emergency Response *(e.g. contact details, remote areas with no GSM coverage etc.)*
Journey manager: 12345678; Security manager - John Wayne: 23456 6789; Site Manager - Rob Keens: 34560987. Full GSM coverage.
Security *(e.g. hijack, robbery, cases of theft - load, vehicle, etc.)*
Starbucks in Saltflat renowned for vehicle smash and grab. No personal items to be left in view of public; lock vehicle.
Location and Timing *(e.g. driving times, impact of driving at night without properly lit roads, driving during Ramadan etc.)*
Local Environment and Circumstances *(e.g. weather, route condition, vehicle roll over risk etc.)*
Fast moving third-party traffic between Saltflat and site. Road narrows over Smiths Gap. Fog expected in Smiths Gap. Reduce speed and increase following distance to suit.
Loading/Unloading *(e.g. special risks as a result of the base or customer location lay-out etc.)*
After entry to site, first turn to left has loading dock entry on left. Beware of HGV movement in that area.

10 tips for better sleep

1. Have a consistent sleep/wake schedule.
2. Limit stimuli in bedroom (TVs, phones, etc.).
3. Make a “worry list” and a brief action item next to each item prior to bedtime.
4. Make a bedtime routine.
5. Create a comfortable sleep environment.
6. Simulate your home sleep environment when traveling.
7. Limit caffeine and alcohol intake within four hours of bedtime.
8. Avoid heavy meals within two hours of bedtime.
9. Avoid looking at the clock during wake-ups.
10. Get out of bed and go to a separate room within 20 minutes if you can’t sleep.

Five tips to support nutrition for fleet drivers

1. Offer drivers access to nutritional supports and education through your health insurance and employee assistance programs.
2. Supply all drivers with large, reusable, stainless-steel water bottles to take with them on the road to support hydration and reduce consumption of sugary drinks.
3. Supply drivers with healthy, energy-providing snacks such as fruit, nuts, and seeds.
4. Avoid offering fried foods, highly processed foods, and sugary sweets to drivers at company meetings and events. Instead, offer fresh fruits and vegetables, lean proteins, and complex carbohydrates. Dark chocolate is a great alternative to other sweets because it has less sugar and a little caffeine.
5. Identify convenience stores in your operating area that are well stocked with healthy snacks and fresh foods. Provide drivers with a map of these locations. Purchase gift cards for these stores as driver rewards or gifts.

Napping tips

During long periods of wakefulness, naps can significantly improve alertness and performance.

1. Only nap if you don't expect to get 8 hours of continuous sleep.
2. Time your nap ahead of your period of sleep deprivation if possible. For example, take a nap before your overnight shift, and make it as long as possible.
3. Naps are easiest to obtain when your body is in a circadian low.
4. Naps can often lead to sleep inertia, which is a feeling of grogginess and grumpiness when you wake up. Most sleep inertia goes away within approximately 35 minutes.[37] The intensity of sleep inertia depends on a number of factors: how sleep deprived the person is, how long the nap was, and the timing of the nap. For example, in the early morning, it can take longer to wake up from a nap.
5. Keep naps less than 45 minutes to increase chances of being in a lighter stage of sleep when being awakened. This will decrease the likelihood of experiencing sleep inertia.

[37] Akerstedt et al. 1989, Rosekind et al. 1995

Social media messages

- Up to one-third of motor vehicle crashes involve driver fatigue. The best prevention is to get 7 to 9 hours of sleep and take breaks during long driving trips.

- Good morning! How did you sleep? If you still feel tired after getting 7 to 8 hours of sleep, you may need sleep screening; talk to your health care provider.

- Are you taking prescription medications? Some medications will impact your alertness levels and affect your ability to drive safely. If you often feel sleepy, talk to your health care provider. #wecare #driverested.

- A number of factors at work can put you at greater risk of fatigue: long shifts or unpredictable work hours, night shifts, travel across time-zones, and physical and mental exhaustion. If that's you, remember to drive only when you feel alert and stop driving when you are drowsy.

- Drowsy driving crashes are most common between midnight and 6 a.m. This time is when the body's natural drive to sleep is greatest. Do you have to drive during these hours? If so, ensure you get enough sleep and stop driving when you get drowsy.

- If you get sleepy and you can't stop driving for long, drink one to two cups of coffee and take a 20-minute nap in a safe location. This will help you to regain alertness until you can reach a more permanent destination.

Other resources

- https://sleepisgoodmedicine.com/
- Fatigued driving GIF: https://go.usa.gov/xnQ6S (cdc.gov)
- How to Choose the Right Fatigue Detection Technology for Your Workplace (cdc.gov)

Complete toolkits

- North American Fatigue Management Program (nafmp.org)
- Fatigue Risk Management Toolkit - National Safety Council (nsc.org)
- Managing fatigue in the workplace | IOGP

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NETS Executive Board

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