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Safety Spotlight

*Winter Maintenance Operator Fatigue: Challenges & Solutions*¹

Winter maintenance is a fact of life for local highway and public works departments throughout New York State. Before, during, and after winter weather arrives there are many things local agencies have to consider in order to keep the roads (reasonably) clear and safe for motorists. There is a large amount of planning that agencies must undertake to prepare for winter weather such as equipment and supply purchases, salt stockpiling, and staff training. While all of these planning and operational items are important, safety is always a primary consideration for departments.

Safely undertaking winter maintenance operations involves many unique challenges. The large size of plows, dangerous winter conditions, and other motorists are just some of the hazards winter maintenance operators deal with when they venture out to clear the roads. Every year, we hear reports about snow plows or salt truck being involved in accidents. To be clear, local transportation agencies do a great job of operating their equipment safely on the roads, especially in the face of dwindling resources and growing responsibilities. One area critical to the safety of both winter maintenance drivers and other motorists is driver fatigue. It can be easy to lose focus on the dangers of driver fatigue when department supervisors and elected officials face the public's expectation of a high level of service despite their limited resources and staff. In today's world we accept fatigue as being a fact of life that we must overcome to get the job done but in reality, ignoring driver fatigue can lead to deadly consequences for public employees and citizens alike.

Managing employee fatigue in today's workplace is an important topic. In transportation, medicine, construction, and many other sectors there are policies, rules, guidelines, and even laws in place to prevent problems in the workplace associated with a lack of sleep.

According to the National Safety Council:

"Thirteen percent of workplace injuries can be attributed to fatigue, and 43% of Americans admit they may be too tired to function safely at work.²"

Now more than ever, there are numerous research-backed strategies focused specifically on winter maintenance equipment operators that you can use to mitigate fatigue for your drivers in the field.

¹ Cornell Local Roads Program. "Winter Maintenance Operator Fatigue: Challenges & Solutions." January 2020. PDF. ² Fatigue: What Employers Can Do? (n.d.). Retrieved from https://www.nsc.org/work-safety/safety-topics/fatigue/calculator/ what-can-employers-do.

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Winter Maintenance Operator Fatigue: Challenges & Solutions

There are numerous challenges facing local transportation agencies in New York State that can put more pressure on departments and, as a result, cause fatigue for drivers in the field.

Operational Challenges

NYS has a large road system that encompasses over 113,559 centerline miles of roadway.³ Eighty-five percent of the highway miles in New York State are locally owned and managed and 17% of the lane miles under the jurisdiction of the New York State Department of Transportation (NYSDOT) are maintained in the winter by local transportation agencies under contract with the state.^{3,4}

Snow plow drivers are exempt from laws mandating limitations on hours of operation. Although a maximum time of 10 hours of operation is the limitation set in the Federal CDL Law, municipal winter maintenance equipment operators are not engaged in "Interstate Commerce" and therefore are exempt.⁵ No limitations on hours of operation combined with the need to maintain large sections of road during heavy weather events can result in drivers working long shifts. If a crash occurs, the amount of time operators have been driving may be taken into consideration if liability or legal issues follow.

Of course driving large, heavy snow plows during winter weather is a challenge in itself. Fully equipped trucks can weigh 12-25 times more than the average car and typically travel between 25mph and 35mph. Depending on the type of plow and the features it is equipped with, there may be multiple systems drivers must manage during operations. It is important to remember that all of this is occurring during periods of low-visibility, on slippery roads, and around other drivers who may be less equipped to safely travel during winter weather events. Budget limitations also take a toll on local agencies. Lack of adequate extreme winter recovery funding, limited manpower, multiple long-duration extreme winter events in a season, increases in the price of materials, and escalating capital equipment costs all pressure departments in ways that can lead to more strain and fatigue for drivers. Historically, there has been a downward trend in local agency funding as a percentage of an overall budget. In 1977, 8 percent of state and local spending went to highways and roads (nationally) compared to 6 percent in 2016.⁶

³ New York State Department of Transportation. (n.d.). Department of Transportation. Retrieved from https://www.dot.ny.gov/divisions/engineering/ technical-services/hds-respository/Tab/Highway_Mileage_Report_2017,pdf.

- ⁴ Annual Survey of State Winter Maintenance Data. (n.d.). Retrieved from https://clearroads.org/winter-maintenance-survey/.
- ⁵ Electronic Code of Federal Regulations. (2019, December 6). Retrieved from https://www.ecfr.gov/cgi-bin/
- retrieveECFR?gp=1&ty=HTML&h=L&mc=true&=PART&n=pt49.5.395#se49.5.395_12.

⁶ Highway and Road Expenditures. (2019, March 28). Retrieved from https://www.urban.org/policy-centers/cross-center-initiatives/state-and-localfinance-initiative/state-and-local-backgrounders/highway-and-road-expenditures.

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New York State encompasses some of the snowiest regions in the continental United States.





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Environmental Challenges

New York State encompasses some of the snowiest regions in the continental United States. There are numerous climatological and geographical challenges that vary across the state including lake effect snow, rural roadways with steep grades in the Adirondack and Catskill regions, and the low-lying coastal regions of Long Island. New York State must contend with bomb cyclones, nor'easters, and even the occasional hurricane. In general, winter weather is by far the single greatest meteorological hazard for motorists and is the cause of the largest number of weather-related fatalities. One recent study found that areas of upstate New York had a higher than average rate of fatal vehicle crashes during winter precipitation events.⁷





⁷ Black, A. W., & Mote, T. L. (2015). Characteristics of Winter-Precipitation-Related Transportation Fatalities in the United States. Weather, Climate, and Society, 7(2), 133–145. doi: 10.1175/wcas-d-14-00011.1

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Unfortunately, it is likely that snow and ice events will become more frequent and severe in the future. Numerous studies using historical observations, field research, and statistical modeling predict that the additional moisture and heat injected into the atmosphere due to man-driven climate change will cause more numerous extreme winter weather events in the northeast. According to the National Center for Environmental Information:⁸



"The frequency of extreme snowstorms in the eastern twothirds of the contiguous United States has increased over the past century. Approximately twice as many extreme U.S. snowstorms occurred in the latter half of the 20th century than the first...also, some recent research has shown that increasing surface temperatures and reductions in Arctic sea ice may produce atmospheric circulation patterns that are favorable for development in winter storm the eastern United States,"

Start planning for fatigue early! The point of highlighting these challenges is simple: For NYS local transportation agencies, more will be expected from fewer people with less resources available to them in the future. Many of these challenges are outside of the control of Highway Superintendents and Public Works Directors but employing strategies that mitigate fatigue now will go a long way towards keeping winter maintenance crews, and the drivers who share the roads with them safer in the future.



Approximately twice as many extreme U.S. snowstorms occurred in the latter half of the 20th century than the first half...





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⁸ Climate Change and Extreme Snow in the U.S. (n.d.). Retrieved from https://www.ncdc.noaa.gov/news/climate-change-and-extreme-snow-us.

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Sleep-related fatigue is defined by the relationship between the quantity, frequency, and quality

of sleep received by an individual and the fatigue they experience (or don't experience) as a result.

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The Different Types, Causes, and Effects of Fatigue

The term "fatigue" can have a variety of meanings depending on the situation. Regardless of the term or definition, fatigue is universally understood to have negative effects on an individual's behavior, performance, and attention. While we do recognize that overall, fatigue has undesirable consequences, it is important to understand that there are different types of fatigue, which have different causes and require different solutions. In order to efficiently manage and mitigate fatigue, we need to understand what the different types of fatigue are in order to implement the appropriate solutions required to address each specific type and cause. There are two major types of fatigue that should be distinctly defined:¹²

Sleep-Related Fatigue is defined by the relationship between the quantity, frequency, and quality of sleep received by an individual and the fatigue they experience (or don't experience) as a result. Fatigue that is sleep-related normally results in a person exhibiting symptoms of sleepiness or drowsiness. While drowsiness is a natural part of the body's sleep-wake cycles (also known as circadian rhythms), when experienced by workers undertaking winter maintenance operations; there can be deadly results.

- Causes:
 - » Sleep-related fatigue is caused by a lack of sleep (also known as sleep deprivation) due to too little sleep at any one time, irregular sleep, poor sleep, or from a person remaining awake beyond the point when their body naturally needs sleep. For winter maintenance operators, sleep deprivation often stems from work schedules that do not take in to account an expected decline in attention and performance due to sleep-related fatigue.
 - » Overly long shifts, shifts that are scheduled too close together, or shifts that alter the operator's sleep schedule without an adjustment period (switching from days to nights without a period of adjustment) are some key contributors to sleep-related fatigue.

¹⁰ Camden, M. C., Hickman, J. S., Soccolich, S. A., & Hanowski, R. J. (2017). Identification and Recommendations for Correction of Equipment Factors Causing Fatigue in Snowplow Operations. Blacksburg, VA: Virginia Tech Transportation Institute on behalf of the Clear Roads Institute. http://clearroads.org/wp-content/uploads/dlm_uploads/FR_CR.15-02_Final.pdf

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⁹ Camden, M. C., Medina-Flintsch, A. S., Hickman, J. undefined, Bryce, J. undefined, Flintsch, G. undefined, & Hanowski, R. undefined. (2014). Environmental Factors Causing Fatigue in Equipment Operators During Winter Operations. Blacksburg, VA: Virginia Transportation Institute on behalf of the Clear Roads Institute. http://clearroads.org/wp-content/uploads/dlm_uploads/11-05-Factors-Causing-Fatigue-Final-Report_MnDot.pdf

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- Effects
 - » There has been a large body of research conducted on the negative effects of sleeprelated fatigue on drivers, and more recently, on winter maintenance operators. The effects of sleep-related fatigue include impaired judgment, slower response times, memory impairment, poor decision making, and erratic operating behaviors. For winter maintenance operators, the effects of sleep-related fatigue may lead to errors that can create dangerous situations for employees, and other drivers on the road.
 - » A particularly dangerous result of sleep-related fatigue can come in the form of microsleep. Microsleep is a temporary incidence of sleep or unconsciousness often caused by severe sleep deprivation and is especially dangerous when afflicting drivers. Drivers may lose control of a vehicle for several seconds during periods of microsleep veering off the road or crashing into other vehicles.
- Other aspects of sleep-related fatigue that should be considered are:
 - » <u>Sleep inertia</u> Refers to the amount of time a person needs to become fully alert, aware, and reactive immediately after awakening. While this time may vary, for most people it lasts between 15 30 minutes.¹¹ This period is also commonly known as grogginess and should be taken into consideration by supervisors and operators before beginning operations.
 - » <u>Sleep debt</u> The total effect of sleep deprivation caused either by not receiving enough sleep across multiple successive periods (numerous consecutive nights with inadequate sleep) or the effect of not receiving enough sleep for an elongated period of time. Sleep debt should be considered when evaluating an individual's ability to perform work over a period of time because, even if that person has received some sleep, their overall sleep debt may result in fatigue and subsequent drowsiness.
- Facts and Statistics on Sleep-Related Fatigue:
 - » According to a report compiled by the Governor's Highway Safety Association, a motorist who has been awake for an extended period of time will likely experience performance deficits similar to that of someone who has been drinking. For example, a motorist who is up for a continuous 18 hours will typically exhibit performance levels similar to that of a person with a Blood Alcohol Concentration (BAC) level of 0.05%. After 21 and 24 hours without sleep, performance mimics a BAC of 0.08% and 0.10%, respectively (Dawson & Reid, 1997; Arnedt et al., 2001).¹²

¹¹ Tassi, P., & Muzet, A. (2000). Sleep inertia. Sleep Medicine Reviews, 4(4), 341–353. doi: 10.1053/smrv.2000.0098
¹² Fischer, P. (n.d.). Wake Up Call: Understanding Drowsy Driving and what States can do. Wake Up Call: Understanding Drowsy Driving and what States can do. Governor's Highway Safety Association.

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Microsleep is a temporary incidence of sleep or unconsciousness often caused by severe

sleep deprivation and is especially dangerous when afflicting drivers.

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Task-related fatigue is a distinct fatigue in that the fatigue comes from operational/ environmental

SOURCES as opposed to sleep and is more psychological in nature.



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- » According to the National Sleep Foundation's 2005 Sleep in America poll, 60% of adult drivers about 168 million people say they have driven a vehicle while feeling drowsy in the past year, and more than one-third, (37% or 103 million people), have actually fallen asleep at the wheel! In fact, of those who have nodded off, 13% say they have done so at least once a month. Four percent approximately eleven million drivers admit they have had an accident or near accident because they dozed off or were too tired to drive.¹³
- » According to the National Highway Traffic Safety Administration, in 2015, 2.3 percent (824) of the fatalities that occurred on U.S. roadways are reported to have involved drowsy driving.¹⁴

Task-Related Fatigue ^{9,10,15} is distinct from sleep-related fatigue in that the fatigue comes from operational/environmental sources as opposed to sleep and is more psychological in nature. It is important to understand that a lack of sleep can exacerbate the effects of task-related fatigue. It is also important to note that extreme environmental conditions such as cold-temperatures, wind, and precipitation can also increase an individual's sensitivity to task-related fatigue which means winter maintenance operators can be especially vulnerable.

 Types of Task-Related Fatigue:

 Active Task-Related Fatigue is the result of over-stimulus and/ or mental overload. The stress of multi-tasking in challenging environments combined with the inherent danger of operating large winter maintenance machinery can cause the operator to fatigue over the course of time.



 Passive Task-Related Fatigue results from either no meaningful external stimulus or from continuous, unchanging external stimulus that causes fatigue over time such as unrelenting vibrations or noise in the cab of a winter maintenance vehicle. Monotonous, unchanging road conditions can lead to passive task-related fatigue (i.e., "highway-hypnosis"). A related type of passive task-related fatigue is safetyalarm fatigue.

¹³ Facts and Stats. (2019, October 23). Retrieved from https://drowsydriving.org/about/factsand-stats/.

¹⁴ Traffic Safety Facts. (2017, October). Retrieved from https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812446

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- Causes of Active Task-Related Fatigue
 - » Challenging environmental conditions which require constant adjustments to snow and ice conditions while driving.
 - » Monitoring and adjusting equipment such as salt spreaders and plow wings.
 - » Low-visibility or "white out" conditions combined with challenging terrain and obstacle avoidance.
 - » Dense traffic, especially amongst motorists who are not equipped to safely travel on roadways during winter weather. Drivers who crowd, pass, or otherwise pressure the operational area of the plow.
- Causes of Passive Task-Related Fatigue
 - » Vibrations, mechanical sounds, or warnings that continue in an unchanging manner or pattern over a long period of time (it should be noted that vibrations can either elevate active task-related fatigue in a high stress environment or interrupt passive task-related fatigue if intermittent or unexpected).
 - » Automation or computer assisted operational systems.
 - » Monotonous, unchanging driving conditions such as those that occur on long stretches of highway.
- Effects of Active Task-Related Fatigue
 - » Cognitive stress.
 - » Increased error rates.
 - » Lowered-attention to detail on individual tasks.
 - » Delayed reaction time due to drive focus on other tasks.

• Effects of Passive Task-Related Fatigue

- » Disengagement and an overall lack of attention to driving tasks.
- » A lower level of situational awareness and, as a result, a slower response time when reacting to unexpected encounters on the road.
- » Desensitization to the status of equipment or external conditions which lead to a greater propensity for overlooking or not-identifying a problem.

¹⁵ Saxby, D. J., Matthews, G., Warm, J. S., Hitchcock, E. M., & Neubauer, C. (2013). Active and passive fatigue in simulated driving: Discriminating styles of workload regulation and their safety impacts. Journal of Experimental Psychology: Applied, 19(4), 287–300. doi: 10.1037/a0034386

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One cause of active task-related fatigue include dense traffic,

especially amongst motorists who are not equipped to safely travel on roadways during winter weather.







Equipment-related solutions include dimmable interior

lights, headed windshield, and dimmable warning lights, amongst others.







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The following is a list of low-cost solutions for mitigating winter maintenance operating fatigue compiled following research conducted in two studies by the Clear Roads Institute.^{16,17}

Equipment-Related Solutions

- **Dimmable interior lighting.** Interior lighting, including LCDs, should be dimmable to near black or have the ability to be turned off. Winter maintenance operators should be instructed to dim the interior lights according to their individual preference during nighttime operations. Research and self-reporting from operators have shown that eye discomfort and strain from glare increased fatigue.
- Heated windshield. Winter maintenance vehicles should be equipped with heated windshields. Winter maintenance operators should be instructed to use the heated windshield to prevent snow and ice buildup. A heated windshield offers another method to eliminate snow and ice buildup on the windshield. In studies, winter maintenance operators have reported that traditional defrost systems were ineffective in heavy snow.
- **Dimmable warning lights.** Winter maintenance vehicles should be equipped with warning lights that have a nighttime setting (i.e., dimmable). Winter maintenance operators should be instructed to use the nighttime setting during night driving in winter emergencies to reduce back-reflected light from the warning lights. Winter maintenance operators have reported that warning lights significantly increased fatigue.
- Install a CD player or satellite radio. All winter maintenance vehicles should have a CD player or satellite radio installed (a simple AM/FM radio may also work in locations with a wide variety of radio stations and good reception). Winter maintenance managers should instruct winter maintenance operators to listen to their preferred music/radio selections while operating the snow plow. However, listening to music/ talk radio should be considered a short-term fatigue countermeasure. Studies have shown that listening to preferred music significantly reduced subjective sleepiness, especially during the first 30 minutes.
- Install snow deflectors. Snow deflectors should be installed on plows to reduce the amount of snow blown onto the windshield. Blowing snow or snow/ice buildup on the

¹⁷ Camden, M. C., Hickman, J. S., Soccolich, S. A., & Hanowski, R. J. (2017). Identification and Recommendations for Correction of Equipment Factors Causing Fatigue in Snowplow Operations. Blacksburg, VA: Virginia Tech Transportation Institute on behalf of the Clear Roads Institute. http://clearroads.org/wp-content/uploads/dlm_uploads/FR_CR.15-02_Final.pdf

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¹⁶ Camden, M. C., Medina-Flintsch, A. S., Hickman, J. undefined, Bryce, J. undefined, Flintsch, G. undefined, & Hanowski, R. undefined. (2014). Environmental Factors Causing Fatigue in Equipment Operators During Winter Operations. Blacksburg, VA: Virginia Transportation Institute on behalf of the Clear Roads Institute. http://clearroads.org/wp-content/uploads/dlm_uploads/11-05-Factors-Causing-Fatigue-Final-Report_MnDot. pdf

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windshield has the potential to significantly reduce visibility which increases fatigue. Studies show that snow deflectors with an angle less than 50 degrees eliminated 50% of the accumulating snow on a vehicle's windshield by reducing the amount of snow blown over the plow.

- Use LED bulbs for exterior lighting. Winter maintenance agencies should replace headlights, plow lights, and other auxiliary light bulbs with LEDs. Operators have indicated in studies that reduced visibility was an important source of fatigue and winter maintenance operators have reported that LED lights produced greater visibility similar to daylight.
- Narrow-beam auxiliary lighting. Winter maintenance agencies should install LED narrow-beam spot lights to reduce back-reflected light.
- More ergonomically designed seat with vibration dampening/air-ride technology. Winter maintenance vehicles should be equipped with an ergonomically designed seat that includes vibration dampening or an air-ride technology. Winter maintenance operators indicated that an air-ride/vibration dampening seat may be the most effective solution to reduce fatigue associated with vibration. Several studies demonstrated the importance of an operator's seat in reducing vibrations.

Non-Equipment Solutions

- Encourage the use of breaks and naps. Winter maintenance operators should be instructed to take a 15 to 30 minute break every 4 to 5 hours (at a minimum) or when they experience the early signs of being fatigued. Despite the importance of sleep in reducing fatigue, breaks from driving also reduce fatigue. Even a 15 minute break from driving (e.g., stopping to get a cup of coffee, getting out of the vehicle to stretch, talking to coworkers, etc.) can reduce fatigue. In fact, heavy vehicle research has shown the only reliable non-sleep method to reduce the impact of fatigue was via a break and a number of studies have investigated the effectiveness of breaks to reduce driver fatigue and improve safety.
- Train winter maintenance operators to identify signs and symptoms of fatigue. Winter maintenance operators should be provided education and training in identifying signs of fatigue. The North American Fatigue Management Program (NAFMP) driver module (Module 3) provides a free resource that may be used by managers (see www. nafmp.org).

¹⁵ Saxby, D. J., Matthews, G., Warm, J. S., Hitchcock, E. M., & Neubauer, C. (2013). Active and passive fatigue in simulated driving: Discriminating styles of workload regulation and their safety impacts. Journal of Experimental Psychology: Applied, 19(4), 287–300. doi: 10.1037/a0034386

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Winter maintenance agencies should install LED narrow-beam spot lights to reduce backreflected light.







Encourage winter maintenance operator fatigue reporting.

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- Investigate reduced shift lengths, start and end times, and overtime rules/ limits. Winter maintenance agencies should limit shift lengths to a maximum of 12 consecutive hours. Additionally, winter maintenance operators should be provided with an opportunity to obtain two full nights of sleep after 7 consecutive days of restricted sleep. Finally, shift start times between 12:00 a.m. and 6:00 a.m. should be avoided. If a 12-hour shift length is not feasible, winter maintenance operators should be instructed to take more frequent (e.g., every 3 to 4 hours) mandatory breaks.
- Create a fatigue management policy. All winter maintenance agencies should create a written policy regarding shift lengths, mandatory breaks, number of consecutive days performing snow removal operations, operator training, etc.
- Encourage winter maintenance operator fatigue reporting. A system, possibly confidential, should be developed to encourage and reinforce winter maintenance operators' self-reports of fatigue. Questionnaire results from a 2014 Clear Roads study showed that managers underestimated the impact of fatigue in winter maintenance operators.¹⁶ This may be due to winter maintenance operators under reporting fatigue and fatigue-related incidents.
- Investigate methods to provide winter maintenance operators with earlier notification of an impending swing shift. If possible, winter maintenance operators that work night shifts during winter emergencies should not come in to work the morning prior to the first snow removal shift (e.g., swing shift).
- Encourage healthy lifestyles (e.g., diet, exercise, sleep). Winter maintenance operators should be encouraged to avoid fried and processed food with excessive amounts of saturated fat and sodium. Better food options include whole grains, fruits, vegetables, low-fat milk products, lean meats, fish, and nuts. They should also be encouraged to get at least 2.5 hours of exercise per week and 7 to 8 hours of sleep per night.
- Encourage winter maintenance operator input in equipment purchases. Winter maintenance operators are the primary users of equipment; thus, they have insight that will assist in equipment purchases that are likely to reduce fatigue.
- Provide a dedicated place for operators to rest at each terminal. If possible, each terminal should have a room where operators can rest or nap when time allows. This room should have a comfortable place for winter maintenance operators to lie down, limit light from entering, dampen outside noise, and be temperature controlled.

Winter Maintenance Operator Fatigue: Challenges & Solutions

Other Things to Keep in Mind

- Caffeine, Energy Drinks, & Stimulants. While there is no substitute for adequate rest, studies have shown that caffeine can have a positive effect in reducing drowsiness when ingested strategically and in certain amounts.¹⁹ While caffeine may be an important potential short-term solution for alleviating fatigue, it should not be used as a replacement for good physical health behaviors such as receiving adequate sleep. It is also important to note that caffeine can have a disruptive effect on individual's sleep which may increase sleep-related fatigue for drivers during future shifts.
- Alcohol. Drivers should be encouraged by supervisors not to consume alcohol the night before a shift and/or should not operate winter maintenance equipment if experiencing "hangover effects" from a previous night of drinking. While it is commonly understood that alcohol consumption prior to, or during the operation of a motor vehicle impairs a drivers ability to safely operate the vehicle, there is research suggesting that heavy alcohol consumption the night before an individual operates a motor vehicle can have a negative effect on performance.¹⁸ Heavy alcohol consumption not only degrades the quality of sleep, but can lead to overall cognitive impairment the next day, even if no alcohol is present in the bloodstream.
- Role of Technology. Today, there are numerous emerging technological options for addressing driver fatigue, mitigating distraction, or increasing overall driver safety. Crash avoidance systems, fatigue management systems, lane tracking and deviation alert technology, driver input fatigue management systems, and driver kinematics are all newly emerging technologies that may be available now, or soon become available to municipalities in the future. Organizations are recommended to carefully evaluate and research such technologies before purchasing and implementing them.
- Creating a Culture of Promoting Healthy Sleep and Reasonable Limits. Perhaps the most important method is changing attitudes towards long schedules and expectations about employee's ability to perform at an acceptable level while dealing with fatigue. In today's culture, admiration is often shown for people who work long hours, overnight, or even seemingly days on end. There is an belief in many occupations that working through fatigue is a necessary part of being successful. Changing these beliefs and expectations through good management practices, encouraging healthy sleep schedules, and not asking operators to push themselves beyond reasonable limits can be a key first step towards effectively managing institutional employee fatigue.

¹⁸ Gunn, C., Mackus, M., Griffin, C., Munafò, M. R., & Adams, S. (2018). A systematic review of the next-day effects of heavy alcohol consumption on cognitive performance. Addiction, 113(12), 2182–2193. doi: 10.1111/add.14404

¹⁹ Aidman, E., Johnson, K., Paech, G., Vedova, C. D., Pajcin, M., Grant, C., ... Banks, S. (2018). Caffeine reduces the impact of drowsiness on driving errors. Transportation Research Part F: Traffic Psychology and Behaviour, 54, 236–247. doi: 10.1016/j.trf.2018.01.008



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Sample Fatigue Management Policy

Extracted from NAFMP: Implementation Manual

(Organization Name) Fatigue Management Policy

______ (*Organization Name*) is committed to the health and safety of all personnel and others impacted by our work activities. The purpose of this policy is to protect the health and safety of ______ (*Organization Name*) employees and others by restricting company drivers from operating vehicles while impaired by fatigue.

This policy applies to all Company employees and outlines responsibilities for management, supervisors, and drivers.

While not all employees will be affected by fatigue in the same manner, studies have shown that fatigue may lead to:

- Reduced concentration
- Impaired coordination
- Compromised judgment
- Slower reaction times

All Company employees must know the signs of fatigue and how to recognize them, how fatigue can affect a driver's ability to safely operate a vehicle, and what actions can be taken to manage fatigue.

Responsibilities

- Management responsibilities
 - » Conduct fatigue risk assessments and implement appropriate preventative measures
 - » Consult with staff, including drivers, when assessing risk of fatigue and developing preventative measures
 - » Provide employees with education, training and resources to manage fatigue
 - » Implement driver work schedules with adequate rest time between shifts to mitigate the risk of fatigue
 - » Provide fatigue management information to all drivers and staff to help them better prepare for work

Winter Maintenance Operator Fatigue: **Challenges & Solutions**

Sample Fatigue Management Policy (cont'd)

Extracted from NAFMP: Implementation Manual

- Supervisor/Dispatch responsibilities
 - » Ensure drivers know how to manage fatigue and have the necessary resources to follow fatigue management procedures
 - » Respond appropriately to observed or reported signs of driver fatigue
 - » Monitor job performance of drivers based on workload, routes, shifts, etc.
- Driver responsibilities
 - » Participate in fatigue risk management processes
 - » Carry out work according to fatigue management policy and safe work procedures
 - » Report any signs of fatigue to supervisor/dispatch
 - » Practice good fatigue management between work shifts
 - » Refuse work when impaired by fatigue

Printed Name: ______

Signed:

Date: Next review date:



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60% of adult drivers about 168 million people - say they have driven a vehicle while feeling drowsy in the past year, and more than one-third, (37% or 103 million people), have actually fallen asleep at the wheel! - - -

