The Bridge

A quarterly newsletter from Michigan's Local Technical Assistance Program

ELECTRONIC CONTENT

T*he Bridge* newsletter is one channel through which Michigan's LTAP shares timely, relevant information with local road agencies in Michigan. Occassionally we have important, urgent, or seasonal content that will not fit in the eight printed pages of *The Bridge*, so we make that content available as a PDF download.

If you have comments, questions, or suggestions about *The Bridge*, or any other of our broad range of support services, please send an email to ltap@mtu.edu, or call 906-487-2102.

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Reduce Risks of Drowsy Driving

Safety behind the wheel during extended snow events includes makingsure plow operators are rested and able to stay alert throughout what can be a long shift to get the job done.

Center for Technology & Training

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The Center for Technology & Training is part of the Department of Civil & Environmental Engineering at Michigan Technological University in Houghton, Michigan. The mission of the CTT is to develop technology and software, coordinate training, and conduct research to support the agencies that manage public infrastructure. In support of this mission, the CTT houses Michigan's Local Technical Assistance Program, which is part of a national effort sponsored by the Federal Highway Administration to help local road agencies manage their roads and bridges.

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Feeling sleepy behind the wheel is a serious concern for plow operators and a potential liability for the local governments that employ them, especially during a long-lasting storm event. A tired driver is at greater risk of losing control and causing a crash.

Professor John Lee from the Department of Industrial and Systems Engineering in the College of Engineering at the University of Wisconsin–Madison researches driver distraction and notes that performance decreases substantially after someone operates a vehicle for 10 continuous hours. Doing so for 24 hours straight is the equivalent of driving under the influence. Lee says the general rule is that operators need to break at least every two hours to avoid driving drowsy.

A recent study commissioned by the U.S. Department of Transportation Federal Motor Carrier Safety Administration analyzed data on driver fatigue and crashes. Researchers compared commercial truck driver logs from one to two weeks preceding crash incidents to a random sample of logs for drivers not involved in crashes. They found that drivers experience increased crash odds starting in the sixth hour of driving. The odds continue to rise with a large increase in the eleventh hour. Rest breaks between driving events helped reduce crash odds.

A study in Australia also compared fatigue to alcohol impairment. Subjects kept awake for a 28-hour period and tested at intervals for hand-eye coordination showed the impairment of a person awake for 17 hours straight is equivalent to a blood alcohol level of 0.05 percent. After 24 hours, the impairment equaled 0.10 percent.

Managing Fatigue a Priority

Driving tired is preventable if highway and street departments make fatigue management a priority. A good starting point is to follow practices found in commercial fleet operations. A Transportation Research Board (TRB) synthesis report on commercial truck and bus safety found three key components in fatigue management programs:

1. Scheduling and dispatching practices that take sleep needs into account.
2. Attention to driver health and wellness that includes medical screening and counseling for sleep disorders.
3. Better awareness of fatigue signals through education and training.

Fatigue management resources developed for the commercial sector provide management practices and specific tools that identify risks of fatigue. *A Toolbox for Transit Operator Fatigue* developed through TRB's Transit Cooperative Research program targets bus fleet operations but the tips for healthy sleep, a self test for fatigue and sleep disorders, and other tools to prevent drowsy driving can apply to street and highway operations.

Scheduling Strategies

During a snow event, local agencies may split crews into two shifts of 12 hours on and off, run crews for 16 hours or remain on-duty until the storm subsides. Operating until the job is done during a major storm can put a driver at a greater risk of an accident or crash caused by sleepiness. Tight

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budgets make it hard to add staff so the choices are to pull trucks and equipment off the road for rest or plan ahead with creative staffing alternatives. One common approach local agencies use is to recruit staff from other departments to work relief shifts. Training a group of relief drivers in advance is an effective way to counter the impact of a big storm.

Carl Gruber, Sauk County, Wisconsin safety risk manager, says his county's highway department usually schedules plow operators for 12-hour shifts during a snow event and 16 hours at the most during a severe or sustained storm. He explains the approach depends on available manpower. To maximize the number of people ready to operate plow equipment, they train drivers to prepare for long shifts. This includes getting extra rest when they anticipate a storm, but also recognizing when they are too fatigued to run the equipment safely and request relief.

Brief breaks help fend off sleepiness by breaking the monotony of the driving task and getting the driver to walk and stretch to improve blood flow and reduce muscle fatigue.

TABLE 1

Signs of Sleepiness

- Excessive yawning
- Difficulty staying in lane
- Hard time keeping eyes open
- Feeling irritable
- Hard time concentrating on driving task
- No memory of driving last few miles

TABLE 2

Tips for Delaying Fatigue

- Stay hydrated
- Circulate fresh air in cab
- Keep cab temperature cool
- Maintain good posture
- Take a break to walk and stretch

Consider Sleep Cycles

It helps to understand something about the mechanisms of sleep when setting schedules and policies. A person's internal body clock signals two times during a 24-hour period when the sleep drive is strong. For someone who works a daytime shift, these times likely fall between 2 to 4 AM and 1 to 3 PM. Professor Lee saw the effects of these cycles in his recent research on drowsiness detection. "Even some of the well-rested drivers in the study became dangerously drowsy during the day and many more of them became drowsy during late-night driving," he reports. "Everyone needs to be vigilant to fatigue."

Know Your Limits

"If someone is feeling tired, they know to ask for a break," Gruber notes. "We don't want anyone out on the road who could possibly be more of a hazard than the snow." Having a seasoned workforce that know their limits is a plus, he says. Experienced staff members help mentor newer employees on safe driving practices. Supervisors stay in regular contact with drivers during a storm event so they can check on people's alertness level.

Table 1 shows typical signs of sleepiness. Training employees and supervisors to recognize these signs in themselves and others, and making it clear the organization supports employees' decisions not to drive when drowsy are central to the success of efforts to reduce accident risks. Sauk County's policy requiring drivers to prepare for long shifts by getting adequate sleep reflects industry recommendations.

Once a driver becomes drowsy, the only solution is rest. See steps for delaying the onset of fatigue behind the wheel in Table 2.

Gruber says Sauk County's plow drivers make regular stops to reload salt, fuel up or clean their truck's windshield. These brief breaks help fend off sleepiness by breaking the monotony of the driving task and getting the driver to walk and stretch to improve blood flow and reduce muscle fatigue. "We also encourage them to drink plenty of fluids and I know some crew members plow with the windows open to let in fresh air."

Compliance via Policies

Sauk County has a *Fitness for Duty* policy that requires employees to report for work physically and mentally able to do the job assigned and to comply with all safety requirements. Policies like this help local governments address safe practices behind the wheel and demonstrate their commitment to risk prevention. They work best when employees are trained to follow them, supervisors are trained to recognize the symptoms of tiredness in crew members, and the agency effectively implements the policy.

Solutions That Fit

Snow season in Wisconsin puts major resource demands on local road and street operations. Plow operators, supervisors, mechanics, and other crew members can find themselves stretched thin during major storms or a period of repeated snowfalls. When this happens, the risk of a drowsy operator having an accident or causing a crash increases. Local road officials should develop fatigue management solutions that fit their operation. Even basic prevention techniques—like training employees to respond appropriately to the signs of drowsiness, promoting healthy sleep habits and scheduling manageable shifts—reduce the risks and liabilities associated with drowsy driving. ■

Resources

Hours of Service and Driver Fatigue: Driver Characteristics Research, Penn State University for the U.S. Department of Trans- portation Federal Motor Carrier Safety Administration, May 2011
www.fmcsa.dot.gov/facts- research/research-technology/ report/ HOS-Driver-Fatigue.pdf.

Effective Commercial Truck and Bus Safety Management Techniques: A Synthesis of Safety Practice, 2003, Transportation Research Board of the National Academies. Summary of commercial truck and bus safety management techniques includes information on fatigue management practices.
http://pubsindex.trb.org/view/2003/M/661879

Toolbox for Transit Operator Fatigue, 2002. Transportation Research Board of the National Academies. Documents the principles, techniques and strategies transit operators use to develop fatigue-mitigation plans. Includes a how-to section for designing, implementing and evaluating plans.
http://pubsindex.trb.org/view/2002/M/723711

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