The Utility Connection

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NOVEMBER 2017

A TECHNICAL PUBLICATION OF ASSE'S UTILITIES PRACTICE SPECIALTY

The Risk of Driving While Fatigued

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One challenge within the utility industry is the need to perform emergency work on infrastructure and continuous shift work to keep a utility operational. Utility workers often work extended shifts, with no regulatory limit on the hours worked (except in the nuclear industry, as regulated by the Nuclear Regulatory Commission), then drive on public roadways, exposing the fatigued workers and the public to the hazard of driving while drowsy.

Many workers in the U.S. and throughout the world drive a motor vehicle as a part of their regular occupation. Some workers may drive passenger vehicles to commute to and from work, while others may operate long-haul trucks or heavy equipment through treacherous conditions or emergency vehicles to aid those in need. The risk of motor vehicle incidents does not discriminate, as the hazard exists in most current day occupations across various industries.

With the continued development of transportation companies and retail delivery service, more drivers are on the road for occupational reasons than ever. Motor vehicle crashes are the leading cause of work-related injury deaths in the U.S., accounting for 23,865 deaths from 2003-2015 (Bureau of Labor Statistics, 2015). As the leading cause of workplace fatalities, much research has focused on motor vehicle safety, but the amount of research performed around the effects of fatigue from shift work has not been explored and needs further research. Management of fatigue while driving is difficult and nuanced because there are not clear exposure limits and fatigue management techniques are usually guidance based and not prescribed by regulatory bodies or legislation (Williamson, Friswell, Olivier, et al., 2014).

For many workers, driving may be the most hazardous activity that they perform as part of their occupation daily. Unfortunately, most current research on fatigue studies while driving involve people working in the medical profession, particularly interns, doctors and nurses who work extended shifts. Research around fatigue and driving is lacking in many of the industries

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that are most affected and likely devastated by the effects of extended shifts and lack of quality sleep, like the transportation and utility industries. A study by Barger, Cade, Ayas, et al. (2005), found that the odds that interns will have a documented motor vehicle crash on the commute after an extended work shift were more than twice the odds after a shift that was not extended, while near-hit incidents were more than five times as likely to occur after an extended work shift as they were after a shift that was not extended.

Shift work is detrimental to human performance, which is a vital factor in safe motor vehicle operation by workers. Phillips and Houghton (2007) argue that shift work is necessary, but it has been found to be unhealthy; to be a direct causal factor for poorer performance and alertness; and that understanding the circadian cycle and how the body reacts to shift work is essential for making schedules to help workers adapt to shift work schedules.

As of 2009, utility workers who operate or maintain nuclear facilities are restricted to working 12-hour shifts, 6 days in a row, with the seventh day being scheduled as off. These rules have written with plenty of room to be circumvented, as there are often exceptions for the employer to still meet the guideline while having workers put in more than 72 hours per week on nuclear-safety-related equipment.

When utility workers are responding to emergencies such as fires or storm, they must be prepared to continually assess and evaluate changing conditions and hazards. Being able to evaluate risk on a consistent basis requires workers to be at a level of peak performance to ensure personal and public safety. A study shows that acute sleepiness makes a considerable contribution to the burden of car cash injuries and that if simple evidence-based messages that warned against drowsy driving have the potential to reduce the likelihood of injuries or deaths in car incidents by up to 19% (Connor, Norton, Ameratunga, et al., 2002). If the utility industry condones and accepts drowsy driving as the norm, then the risk of motor vehicle incidents involving shift workers will be ever-present and fatigue will continue to be difficult to manage effectively.

There is a significant need for new research about fatigued driving compared to other highway safety problems (e.g., distracted driving) because fatigued driving has not received as much attention and public recognition. Many of the studies most often cited and used as the source of estimates of the odds ratio of motor vehicle crashes that involve a drowsy (fatigued) driver are now more than 15 years old (AAA, 2010). As the 24/7 society continues to evolve, new epidemiological studies are needed on fatigued driving.

Dawson and Zee (2005) argue that fatigue-related risk must be a shared responsibility between the organizations and the employees, ensuring consistency with occupational health and safety legislation. This is important to consider because current industry policy is not usually systemic in nature. Not only does fatigue-related policy need to address shift hours (hours worked), but fatigue risk management systems also must address the timing and duration of employees' sleep cycles, among other interventions that do not involve hours worked. Fatigue-related interventions must be systemic in nature, addressing the complexity of the hazard exposure that involves many aspects both on and off the job. In fact, the researcher believes that there needs to be further research performed around the difference between fatigue policy versus fatigue risk management systems, as policies are not as inherently protective as systems.

Further issues complicate the research needs around night shift work and driving safety. Often, the fatigue of employees involved in workplace motor vehicle incidents is difficult to measure because the definition of fatigue is controversial and the general measurement of fatigue has not been extensively researched (Zhang, 2016). This means that further research must be performed in this area for consistency in fatigue management application and worker safety while on the road. The general definition of fatigue needs further alignment. Organizations such as NIOSH's Center for Motor Vehicle Safety should continue its work around motor vehicle safety and define fatigue as it relates to occupational driving. It also would be beneficial for workers safety and health if OSHA addressed fatigue in a standardized format. As the leading cause of workplace fatalities, driving motor vehicles should be addressed in the Code of Federal Regulations.

Utility organizations and organizations that have exposure to shift work and fatigued driving should also be able to provide a legally defensible position of their current work scheduling practices. Putting employees on the road after working extended shifts could make companies liable and legally responsible for motor vehicle crashes. Driving while fatigued is a high-risk exposure that should be controlled with a management system.

With the advances in technology and the findings of fatigue research, organizations must be aware that driving motor vehicles while fatigued is a serious safety and health risk. Under federal OSH regulations, employers are obligated to identify and control hazard exposures that affect their workforce.

Current research notes that workers are not necessarily sensitive to self-reporting fatigue and that public interventions, like drowsy driving campaigns, can help aid people in recognizing fatigue. Workers who self-reported a lack of sleep (sleeping less than 5 hours a day) did not report acute sleepiness at an increased level, as the researchers expected (Di Milia & Kecklund, 2013). This finding infers that cultural perceptions around fatigue in the workplace are not necessarily self-internalized and realized by the fatigued person.

The Stanford Sleepiness Scale can be used so that the workers can effectively self-identify and quantify their level of sleepiness (Hoddes, Zarcone, Smythe, et al., 1973). Using this scale will allow workers to clearly identify their state of sleepiness, helping the researcher understand the levels of fatigue that the workers are personally experiencing, as compared to the observational data collected through their organization's safety management system. Using such a tool will aid the researchers in developing a more accurate snapshot of self-reported fatigue in night shift and day shift workers.

The lack of understanding around how drowsy or fatigued a driver is adds to the risk of increased motor vehicle incidents and near misses. For future studies, occupational health and safety researchers should focus more on ocular technology in workplace vehicles. The ocular technology could work as an alert system to drivers, providing automatic feedback on the state of their physiological fatigue. This strategy, in addition to work hour restrictions and public awareness campaigns centered on eliminating drowsy driving, should be considered if organizations are developing fatigue risk management systems. Finding an effective, multipronged approach to managing the risk of fatigue in the workplace would be highly advantageous to the OSH and business communities. ■

The Stanford Sleepiness Scale

1 FELT ACTIVE, WIDE AWAKE

2 WAS FUNCTIONING AT A HIGH LEVEL, BUT NOT AT PEAK

3 FELT RELAXED, AWAKE BUT NOT FULLY ALERT

4 FELT A LITTLE FOGGY HEADED

5 FELT FOGGY HEADED, HAD DIFFICULTY STAYING AWAKE, WAS BEGINNING TO LOSE TRACK

6 FELT SLEEPY, WOULD HAVE PREFERRED TO LIE DOWN, WOOZY

7 COULD NOT STAY AWAKE, SLEEP ONSET WAS IMMINENT

References

American Automobile Association (AAA) Foundation for Traffic Safety. (2010). Asleep at the wheel and the prevalence and impact of drowsy driving. Retrieved from www.aaafoundation.org/pdf/2010DrowsyDrivingReport.pdf

Barger, L.K., Cade, B.E., Ayas, N.T., et al. (2005). Extended work shifts and the risk of motor vehicle crashes among interns. *The New England Journal of Medicine, 352*(2), 125-134.

Bureau of Labor Statistics [2003-2015]. (2016). Fatal occupational injuries resulting from transportation incidents and homicides, all United States [Table A-2].

Connor, J., Norton, R., Ameratunga, S., et al. (2002). Driver sleepiness and risk of serious injury to car occupants: Population based case control study. *BMJ: British Medical Journal, 324*(7346), 1125.

Di Milia, L. & Kecklund, G. (2013). The distribution of sleepiness, sleep and work hours during a long-distance morning trip: A comparison between night- and non-night workers. *Accident Analysis and Prevention, 53*, 17-22.

Dawson, D. & Zee, P. (2005). Work hours and reducing fatigue-related risk: Good research vs. good policy. *JAMA, 294*(9), 1104-1106.

Hoddes, E., Zarcone, V., Smythe, H., et al. (1973). Quantification of sleepiness: A new approach. *Psychophysiology, 10*(4), 431-436.

Phillips, H.L. & Houghton, P.M. (2007). Establishing a safe and effective shift schedule. *The Behavior Analyst Today, 8*(4), 528.

Zhang, G. (2016). Traffic accidents involving fatigue driving and their extent of casualties. *Accident Analysis and Prevention, 87*, 34-43.

Williamson, A., Friswell, R., Olivier, J., et al. (2014). Are drivers aware of sleepiness and increasing crash risk while driving? *Accident Analysis and Prevention, 70*, 225.

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