

# **Tenth International Conference on Managing Fatigue: Abstract for Review**

## **Flexible Sleeper Berth Pilot Program**

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### **Problem**

During listening sessions for the hours-of-service (HOS) rulemaking for commercial motor vehicle (CMV) drivers, the Federal Motor Carrier Safety Administration (FMCSA) heard from many drivers that they would like regulatory flexibility to be able to sleep when they get tired or to avoid congested traffic. The aim of the Flexible Sleeper Berth Pilot Program is to demonstrate whether and how HOS regulatory flexibility in conjunction with a fatigue management program (FMP) could be used to provide this flexibility and improve driver rest and alertness.

### **Method**

The Flexible Sleeper Berth Pilot Program involves a naturalistic field study in which 200 long-haul CMV drivers will be given temporary regulatory flexibility with regard to their sleeper berth time. Enrolled drivers will be issued an exemption from FMCSA for up to 90 days allowing them to split their daily required 10 hours off duty into two sleeper berth periods, with neither period less than 3 hours and together totaling at least 10 hours. The sample will include at least 200 drivers: 50 from small carriers (2–50 trucks), 50 from medium carriers (51–500 trucks), 50 from large carriers (>500 trucks), 25 owner operators, and 25 individuals who work as team drivers. Prior to enrollment, drivers must complete North American Fatigue Management Program modules 3 (Driver Education) and 8 (Driver Sleep Disorders and Management).

A custom electronic logging device (ELD) will be used for recording duty, driving, and rest hours. Drivers will document when and why they choose to use the flexible sleep exemption. Sleep will be measured with wrist actigraphy and a sleep log. Driving performance will be measured with an onboard monitoring system (OBMS). OBMS data will be scored for safety-critical events and observer ratings of drowsiness. Fatigue will be measured with the psychomotor vigilance test and Karolinska Sleepiness Scale. Roadside violations will be collected from the Commercial Driver's License Information System. Outcomes will be compared between duty periods in which drivers choose to split their sleep versus having one consolidated period of nighttime or daytime sleep.

## **Results**

The field study is based on previous laboratory studies, which have demonstrated that a split sleep schedule, with rest divided between two periods, can result in equal or greater sleep duration than a consolidated daytime sleep schedule with the same total hours dedicated to rest. In addition to providing equivalent amounts of sleep, split sleep schedules have been reported to produce less subjective sleepiness than consolidated daytime sleep and similar objective alertness compared to consolidated nighttime sleep. The Flexible Sleeper Berth Pilot Program is designed to reveal whether this holds in the naturalistic environment of real-world trucking operations.

We are currently finalizing procedures in preparation for the field study. Data collection is estimated to begin in July 2017. The project work plan has undergone peer review by experts in transportation and sleep research and in the trucking industry. An information collection request to the Office of Management and Budget is pending.

## **Discussion**

Drivers' hours of service are regulated by a number of criteria, including a maximum of 14 hours on duty with no more than 11 hours driving, and a minimum of 10 hours off duty per duty period. Under the current HOS regulations, napping during a duty period reduces the available work hours, as the 14-hour duty clock continues running through the sleep period. As such, under the current regulations, drivers are not motivated to stop for a nap when they are fatigued. Under the flexible sleeper berth allowance that will be piloted, drivers can pause the 14-hour duty clock while they take a portion ( $\geq 3$  hours) of their required rest period. Thus, neither the maximum duty hours nor the minimum rest hours are reduced while the driver is provided regulatory flexibility to accommodate sleep.

Many long-haul drivers work at night and fulfill their required sleeper berth hours during the daytime. Daytime sleep is often reduced in duration and quality, as the driver is trying to sleep while his/her endogenous circadian rhythm is promoting wakefulness. Additionally, increased ambient light and noise often disturb daytime sleep. Obtaining a portion of sleep at night may thus be particularly beneficial for nighttime drivers' rest and alertness.

## **Summary**

The Flexible Sleeper Berth Pilot Program aims to determine whether HOS regulatory flexibility can be used to improve truck drivers' rest and alertness. Participating drivers will be issued a temporary exemption to the sleeper berth provision, allowing them to split their 10 hours of required off-duty time into two sleeper berth periods. Drivers may choose to operate under either the flexible sleep exemption (split sleep periods) or the current HOS regulations (nighttime or daytime consolidated sleep periods) during each duty period. Sleep data will be collected with a wrist actigraph and a sleep log. Fatigue will be measured with the psychomotor vigilance test and Karolinska Sleepiness Scale. Safety impacts will be measured with an OBMS to

capture safety-critical events. Duty/driving/rest times and split sleeper berth time will be monitored with a custom ELD. Data will be analyzed between duty periods in which drivers choose split sleep versus consolidated sleep periods.