TechBrief

OFFICE OF MOTOR CARRIER SAFETY

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Impact of Sleeper Berth Usage on Commercial Driver Fatigue, Task 1

The mission of the Office of Motor Carrier Safety is to develop and promote, in coordination with other Departmental modes, data-driven, analysis-based, and innovative programs to achieve continuous safety improvements in the Nation's highway system, intermodal connections, and motor carrier operations. The Office of Motor Carrier Research and Standards manages the safety regulatory program and the central research management function for Motor Carrier Safety.

There are eight major research and technology focus areas: regulatory evaluation and reform; compliance and enforcement; driver training and performance management; driver alertness and fatigue; driver physical qualifications; car-truck proximity; HAZMAT safety and cargo tank integrity; and crash causation and profiling.

Driver alertness and fatigue **primarily supports current and future hours-of-service rule-making activities, along with fatigue outreach and fatigue management technology development.**

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Introduction

Driver fatigue is recognized as a major factor in the safety of long-haul commercial driving. Sleeper berths are often provided on tractors to allow the driver to sleep and rest when not driving. However, the sleeper berth environment and/or the manner in which drivers actually use sleeper berths may effect the quality of their sleep.

This tech brief summarizes the first task in a 4-year study to assess the impact of sleeper berth usage on the level of driver alertness and driving performance. This task consisted of a literature review and 10 focus groups conducted with 74 long-haul commercial motor vehicle (CMV) drivers. Researchers sought to gain an understanding of the issues affecting the quality and quantity of sleep drivers receive, as well as other issues that may affect drivers= levels of fatigue and driving safety.

Methodology

Researchers first reviewed some prominent literature in the area of fatigue, as it relates to the commercial motor vehicle driver. Five large-scale studies related to fatigue were critically reviewed to identify factors relevant to the current research effort; they found that two criticisms dominated four of the five study reviews: the general intrusiveness of some of the fatigue detection measures, and the required presence of an experimenter. This reinforced a need to develop nonobtrusive means of assessing driver fatigue.

Researchers held 10 focus groups in 8 cities, across 7 States, between September 1997 and February 1998. The cities were selected to geographically represent drivers and the long-haul trucking industry within the contiguous United States. Seventy-four drivers participated, ranging in age from 27 to 70 years old. Participants were told that the focus group was part of a federally-funded study to examine the impact of sleeper berth usage on driver fatigue.

Sleeper berths are often provided on tractors to allow drivers to sleep when they are not driving.

Findings

Focus group discussions were open and unstructured. Comments were then categorized into various areas of interest, such as sleep/duty/rest cycle issues, equipment issues, and other fatigue-related issues. The following are some of the main findings:

Sleep/Duty/Rest Cycle Issues

Team versus single driving was identified as a very important factor for drivers

Researcher
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Distribution
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Availability
The study final report will be available from the National Technical Information Service, telephone: (703) 605-6000.

Key Words
sleeper berth, team driving, driver fatigue, sleep, long-haul driving, duty cycle.

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relating to quality of sleep. Almost without exception, drivers seemed to either love or hate team driving. Drivers who preferred team driving tended to state that they had no problems sleeping in a moving truck and trusted their driving partner. Conversely, drivers who did not like team driving stated that they could not sleep in a moving truck, citing reasons such as a lack of confidence in their partner=s driving ability and a partner=s inability to drive smoothly (e.g., smooth gear shifting, lane changing and braking maneuvers).

Drivers also commented that coming back to work after a few days off was problematic if the team did not decide beforehand who would drive first; if both drivers were up during the day and came into work at night, one of them would still have to drive. Also, if drivers are teaming and the team is driving in shifts of 10 hours, drivers commented that even if they are feeling fatigued, they would continue to drive because it was their "turn."

Equipment Issues

In general, drivers felt that conventional and longer wheel-base truck cabs created more comfortable sleeping arrangements than did cabovers. Also, air-ride trucks were said to be more comfortable for both driving and sleeping than are spring-ride trucks. Noise insulation of the sleeper berth was mentioned by several groups. Drivers explained that uninsulated walls or curtains were insufficient to block out noise within the cab, and that trucks should have better insulation against the heat and cold.

Other Fatigue Issues

- Drivers often commented that the time they spend loading and unloading the vehicle could be better used for resting or sleeping. One issue highlighted by every focus group was that drivers should be able to sleep in the sleeper berth while waiting to load/unload without losing their place in line.

- Most drivers expressed a desire to stop as infrequently as possible while driving, but stated that when they do stop, there are often not enough facilities. Other reasons that drivers found rest areas inadequate: noise from other vehicles and drivers, unclean bathroom/shower facilities, and concerns that the facilities were unsafe.

- Regulatory and enforcement issues were discussed by drivers as factors that influence their level of stress, attitude, and fatigue. In particular, inconsistent laws and interpretations of laws from State to State were mentioned as stressors on several occasions.

Further Research

Field data collection will begin in fall 1999. Using two instrumented vehicles and 48 truck drivers over a 10-day period, researchers will establish a baseline of sleep quality in existing equipment, and assess the effect of variations in sleep quality on driver performance. Different sleep schedules, stationary versus in-motion sleep, and (for 12 drivers) the introduction of innovative sleeper berth technologies will be assessed for their influence on sleep quality.

A number of physiological measurements will be used to track the drivers en route. Measures will be taken via real-time, in-cab video monitoring of drivers and alertness monitoring using a dashboard-mounted eye activity (PERCLOS) camera. During sleep, monitoring using actigraphy and an ambulatory electroencephalographic sleep monitoring device ("Nightcap") will be employed. The study will also automatically record lane deviation, steering position and velocity, vehicle speed, braking applications, and "critical incidents." Finally, drivers will be asked to subjectively assess their level of alertness, fatigue, and physical activity during the experiment.