Tenth International Conference on Managing Fatigue: Abstract for Review

Winter Maintenance Operators' and Managers' Opinions and Perceptions of Fatigue

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PROBLEM

Previous research has shown fatigue to be the primary cause or a contributing factor in up to 31 percent of truck crashes.[1;2] Although there is growing body of research regarding fatigue in commercial motor vehicle operations, research concerning fatigue in winter maintenance operators is sparse. The purpose of this project was to investigate winter maintenance operators' and managers' opinions and perceptions of fatigue during winter emergencies.

METHOD

Two parallel questionnaires were developed to assess major facets of fatigue, work and rest schedules, and how work schedules related to winter maintenance operator fatigue. The first questionnaire targeted winter maintenance operators, and a second parallel questionnaire targeted winter maintenance managers. These questionnaires were designed to capture their opinions and perceptions about:

- Scheduling practices in normal operations versus emergency situations (e.g., work hours, breaks, rest periods, overtime, etc.),
- Type of equipment used,
- Freedom to refuse work due to fatigue,
- Fatigue awareness and training,
- Medical issues,
- Existing monitoring practices of operator fatigue, and
- Fatigue management strategies used.

Questionnaire Distribution

The researchers worked with Clear Roads member states to recruit winter maintenance operators and managers. Web links to both surveys were provided to each Clear Roads member state. Each member state subsequently distributed the appropriate link to its winter maintenance operators and managers. Completed questionnaire responses were automatically entered into a secure online database. All responses were anonymous as the questionnaire did not collect any personal identifying information. Additionally, paper-based versions of the questionnaires were made available for those individuals without reliable access to the Internet. Paper-based questionnaires were returned via mail and a researcher entered the responses into the secure database.

RESULTS

A total of 1,043 winter maintenance operators and 453 managers from 24 states completed the questionnaires. The states highlighted in Figure 1 participated in the questionnaire data collection effort.

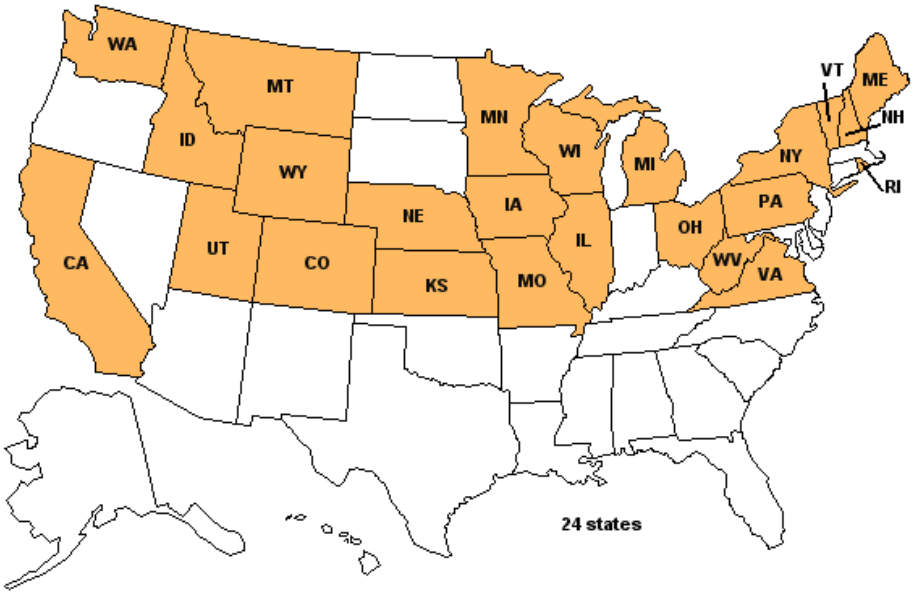

Figure 1. Participating States

Data from both questionnaires provided valuable insight into the perceptions and opinions of winter maintenance operators and managers regarding fatigue in winter maintenance operations. Below are some of the key results.

- The majority of winter maintenance operators and managers indicated fatigue had a "moderate impact" on winter maintenance operations. Winter maintenance operators were more likely than managers to report greater impacts of fatigue.
- Most winter maintenance operators and managers reported that fatigue was "sometimes" experienced while operating a snow plow during winter emergencies. However, managers indicated fatigue was experienced more frequently by winter maintenance operators than winter maintenance operators' self-reports. Additionally, winter maintenance operators that experienced fatigue while operating a snow plow were more likely to report greater impacts of fatigue.
- Managers indicated that winter maintenance operators had more frequent lapses in concentration while operating a snow plow during a winter emergency when compared to the winter maintenance operators' self-reports.
- Vibration, seat type, noise, heavy traffic, lights, too much technology, and nighttime operations were all reported to be important sources of fatigue by winter maintenance operators and managers.
- In general, winter maintenance operators and managers indicated adequate knowledge concerning effective strategies to combat fatigue. However, winter maintenance operators reported limited use of those strategies shown to be most effective in reducing fatigue (e.g., taking breaks, moving one's body, and naps).

DISCUSSION

The questionnaire results show operators and managers believe fatigue is present during winter emergencies and adversely impacts winter maintenance operations. Furthermore, the results

support many research findings regarding sources of fatigue while driving. For example, previous research has shown whole-body vibrations,[3] vehicle seat type,[4] noise,[5] traffic conditions,[6;7] and complexity of work tasks[8] may have an adverse impact on driver fatigue. Winter maintenance operators and managers indicated all these factors were important sources of fatigue during winter emergencies.

The following list of cost-effective, realistic recommendations for reducing or eliminating winter maintenance operator fatigue was derived from a literature review and the winter maintenance operator and manager questionnaires (listed in no specific order).

- **Encourage use of breaks/naps:** Management should continue to encourage winter maintenance operators to take breaks/naps when fatigued/tired. Results from the questionnaires revealed there was little emphasis on the use of body movement and breaks/naps to reduce fatigue.
- **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 showed that managers underestimated the impact of fatigue in winter maintenance operators.
- **Increased vehicle maintenance:** Winter maintenance operators and managers suggested increased vehicle maintenance as a method to reduce unnecessary truck vibrations and noise. Care should be taken to ensure that components used to reduce fatigue, such as those that reduce outside noise and minimize whole-body vibrations, are kept in a good state of repair.
- **Investigate winter emergency shift start/end times (including shift length):** Research shows an increased risk of winter maintenance operator fatigue during circadian lows (between 2:00 a.m. and 6:00 a.m.).[9;10] Shift start and end times should be assigned with consideration of circadian lows. Additionally, shift length should take into consideration any possible non-driving responsibilities.
- **Offer shift options:** Winter maintenance operators' rest periods preceding their shifts should be taken into account when scheduling shifts. Research shows sleep schedules that do not correspond to the circadian rhythm tend to provide inadequate amounts of rest.[10]
- **Involve winter maintenance operators in the decision-making process:** Managers suggested involving winter maintenance operators in the decision-making process. Winter maintenance operators have first-hand knowledge of the impact of fatigue and often have thoughtful suggestions about operational improvements. Additionally, involving winter maintenance operators in the decision-making process will help develop an effective safety culture.
- **Increase personal interactions with winter maintenance operators:** Managers suggested increased personal interactions with winter maintenance operators as a method to reducing fatigue. This interaction will help managers identify fatigued winter maintenance operators and develop an effective safety culture that minimizes winter maintenance operators' fatigue.

- **Free Resources:** There are several education and training resources available to assist safety managers in dealing with fatigue and implementing some of the recommendations described above, including the North American Fatigue Management Program and the Commercial Motor Vehicle Driving Safety training module on driver drowsiness and fatigue.

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