Sleep Health 1 (2015) 311–313

Contents lists available at ScienceDirect

Sleep Health

Journal of the National Sleep Foundation

journal homepage: http://www.elsevier.com/locate/sleh

Regulating danger on the highways: hours of service regulations

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ARTICLE INFO

Article history:
Received 21 August 2015
Received in revised form 17 September 2015
Accepted 18 September 2015

Keywords:
Hours of service
Regulations
Truck drivers
Drowsiness
Sleepiness
Circadian rhythm
Crashes
Fatigue
Canada
Australia
European Union
United States

ABSTRACT

Objectives: Current hours of service regulations governing commercial truck drivers in place in the United States, Canada, Australia, and the European Union are summarized and compared to facilitate the assessment of the effectiveness of such provisions in preventing fatigue and drowsiness among truck drivers.
Methods: Current hours of service provisions governing commercial truck drivers were derived from governmental sources.
Results: The commercial truck driver hours of service provisions in the United States, Canada, and the European Union permit drivers to work 14 hours and those of Australia permit drivers to work 12 hours a day on a regular basis. The regulations do not state what a driver may do with time off. They are consistent with a driver being able to drive after 24 hours without sleep. They do not take into account circadian rhythm by linking driving or rest to time of day.
Conclusions: Current hours of service regulations governing commercial truck drivers leave gaps—permitting drivers to work long hours on a regular basis, permitting driving after no sleep for 24 hours, and failing to take into account the importance of circadian rhythm, endangering the public safety and the truck drivers themselves.

Introduction

Long work hours, sleep deprivation, and circadian misalignment may cause fatigue, drowsiness, and impaired performance in truck drivers, increasing crash risk. Truck drivers become fatigued, performance degrades, and crash risk increases after prolonged driving.[1–3] Almost half of the truck drivers in the United States admit that they have fallen asleep while driving.[4] We summarize and compare the hours of service provisions in the United States, Canada, Australia, and the European Union. This information is intended to help assess the effectiveness of these regulations in preventing fatigue and drowsiness among truck drivers.

Methods

The summary of US hours of service provisions is from a Federal Motor Carrier Safety Administration's summary of hours of service regulations for property-carrying drivers.[5]

The summary of Canadian hours of service provisions is from Canada's Commercial Vehicle Drivers Hours of Service Regulations (SOR/2005-313).[5] The regulations in Canada differ in respect to driving north or south of latitude 60° N.[6] Only those pertaining to south of latitude 60° N are considered here. These regulations are most appropriate for purposes of comparison in that they govern practices in the most populated area of Canada by far.

The summary of hours of service regulations for Australia is obtained from the National Heavy Vehicle Regulator applicable in South Australia, Queensland, New South Wales, the Australia Capital Territory, and Tasmania.[7] Australia has adopted a new scheme with 3 levels of regulations governing commercial truck drivers: Standard Hours, Basic Fatigue Management, and Advanced Fatigue Management. Operators who implement auditable accredited systems to manage driver fatigue are permitted greater flexibility under the latter 2 levels of regulation. No similar schemes are in place in the other jurisdictions under consideration, so the Standard Hours option for solo driver regulations are summarized here as the most appropriate regulations for comparison. (Although regulations under Australia's new management scheme are not addressed here, it is noted that it will be interesting to see whether, under Australia's new regulations, operators can reduce or at least hold constant the number of commercial truck crashes by adopting certain management practices while they are allowed greater flexibility and drivers are allowed to work even longer hours than under Standard Hours. This would

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http://dx.doi.org/10.1016/j.sleh.2015.09.008
2352-7218/

suggest that management practices might be a solution to the problems identified in this review.)

The summary of European Union hours of service regulations is derived from a European Commission summary of Regulation (EC) 561/2006.[8]

Results

Fatigue and drowsiness are generally addressed in hours of service regulations limiting the number of hours a truck driver may drive and otherwise work. Hours of service regulations of the United States, Canada, Australia, and the European Union are outlined below.

United States

Regulations provide that a driver may drive a maximum of 11 hours after 10 consecutive hours off duty. Following 10 consecutive hours off duty, a driver may not drive beyond the 14th consecutive hour. The 14-hour period is not extended by off-duty time. In other words, in 24 hours, a driver may drive for 11 hours and may work for 3 additional hours. A driver may not drive after 60 hours on duty in 7 consecutive days or 70 hours on duty in 8 consecutive days. A driver may restart a 7- or 8-day consecutive period after taking 34 or more consecutive hours off duty.[5]

Canada

In Canada, a driver may drive 13 hours a day and may not accumulate more than 14 hours of on-duty time (including driving and nondriving time). An operator is required to designate that each driver follows either a 7-day or a 14-day cycle. If a driver follows a 7-day cycle, he or she may not drive again in that cycle after accumulating 70 hours of on-duty time. The driver must take off 36 hours at the end of the cycle before being allowed to restart the cycle. If a driver follows a 14-day cycle, he or she may not drive again in that cycle after accumulating 120 hours of on-duty time, and the driver must take off 72 hours at the end of the cycle before being allowed to restart the cycle again.[6]

Australia

Under the National Heavy Vehicle Regulator, for any period of 24 hours, a driver must not work for more than 12 hours with 7 continuous hours of stationary rest. For any period of 7 days, a driver must not work for more than 72 hours with 24 hours of continuous stationary rest; and for any period of 14 days, a driver must not work for more than a total of 144 hours with 2 night rest breaks and 2 night rest breaks taken on consecutive nights.[7]

The European Union

Regulation (EC) 56/2006 provides that the daily driving time shall not exceed 9 hours with 11 hours of continuous rest, except driving time can be extended up to 10 hours twice a week. Daily rest can be split into 3 hours of rest followed by 9 hours of rest (totaling 12 hours of daily rest). Weekly rest is 45 continuous hours but can be reduced every second week to 24 hours (Table 1).[8]

Discussion

In the United States, Canada, and the European Union, drivers are permitted to work 14 hours a day. Allowed driving time varies: 11 hours in the United States, 13 hours in Canada, and 9 hours in the European Union.[5,6,8] Australia allows only 12 hours of work per day, and "work" includes driving and any other work.[7]

All considered jurisdictions provide work/driving limitations for specified extended schedules. For 7-day consecutive periods, work/driving times are limited to 60 hours in the United States, 70 hours in Canada, and 72 hours in Australia.[5–7] The European Union limits driving time to 56 hours in a week but does not prohibit work other than driving.[8] Only the United States provides for an 8-day schedule, allowing 70 hours of work/driving time.[5] In a 2-week schedule, Canada allows 120 hours (equal to two 1-week periods in the United States) and Australia allows 144 hours of work driving time.[6,7] In the European Union, drivers are only allowed to drive 90 hours, but other work is not prohibited.[8]

All considered jurisdictions have a restart provision, a required off-duty period before a regular schedule starts anew. Only the United States allows truckers to restart their schedules at any time by taking off 36 continuous hours.[5] Canada links restart periods to alternate schedules—36 hours for the 7-day cycle and 72 hours for the 14-day cycle.[6] Both Australia and the European Union provide for a 24-hour restart period every 2 weeks.[7,8] With regard to the alternate week, the European Union establishes a 45-hour restart period.[8] Australia has a more unusual provision requiring 4 night rests for any 14-day period.[7] This is the only provision under consideration that links rest (or driving) to time of day.

All considered jurisdictions provide for breaks, but the provisions differ. Whereas Australia requires a break within 5½ hours and the European Union requires a break within 4½ hours of beginning work, the United States does not require a break until 8 hours of work has been completed.[5,7,8] Canada allows the most flexibility: 2 hours off-duty per day in blocks of at least 30 minutes and break time may be deferred.[6]

None of the regulations state what a driver may do with time off. Consistent with all provisions under consideration, a driver might be driving after not sleeping for more than 24 hours. A driver might be awake for the last 12 hours of a restart period (or an entire 12-hour restart period) and drive/work for 12 hours, ending up driving at 24 hours of no sleep.

What to do about this is a difficult question to answer. A driver might be required to rest, but there is no guarantee that he or she will fall into a beneficial sleep. Could operators set requirements for off-duty behavior in any event? Could they set such requirements without pay? If a requirement that drivers be fit for duty when reporting to work were imposed, how would this fitness for duty be defined, and how could an operator determine whether the driver is fit for duty?

Other than one Australian provision (requiring 4 night rests in a 14-day period), none of the regulations link driving or time off to time of day. Because of circadian rhythm, there is a period of vulnerability in the latter half of the night, and people have trouble sleeping during the day.[9] Crashes are more likely to occur in the early morning hours.[3,10,11] However, other than the Australian provision, none of the provisions under consideration take into account circadian rhythm as they could by prohibiting driving during the night or requiring time off, particularly at night. Indeed, consistent with the regulations, a driver could be driving late at night or early in the morning after having been awake for 24 hours.

All of the regulations under consideration are consistent with driving long hours in a given day. Long hours of driving may increase crash risk.[1–3] There is evidence that drivers become fatigued and their performance degrades and crash risk increases after 5 hours of driving.[3]

All of the regulations under consideration are consistent with truck drivers driving long hours over days, weeks, months, and years. Long-haul truck drivers do not get much sleep. One study showed drivers working a 5-day schedule, averaging 5.18 hours in

Table 1
Fatigue, drowsiness, and the law summary of hours of service regulations.

	United States	Canada	Australia (Standard Hours option/solo drivers)	European Union
Work time per day	May work 14 h but only 11 h can be driving time	May drive 13 h and work 14 h a day	12 h with 7 h of continuous rest	May drive 9 h with 11 h of continuous rest (some variation allowed)
Overall schedule	May not drive after 60 h on-duty in 7 consecutive days or 70 h in 8 consecutive days	7-d cycle: 70 h on-duty maximum 14-d cycle: 120 h on-duty maximum	For any 7-d period, may not work more than 72 h For any 14-d period, may not work more than a total of 144 h	Weekly driving time may not exceed 56 h May not drive more than 90 h in 2 wk
Restart periods	May restart schedule by taking 34 h off-duty	7-d cycle: 36 h off 14-d cycle: 72 h off	For any 7-d period, must take 24 h of continuous rest For any 14-d period, must take 4 night rests	Weekly 45 h of continuous rest, but can be reduced every second week to 24 h
Breaks	Must take a 30-min break after working 8 h	2 h off-duty per day may be taken in blocks of no less than 30 min (may defer)	5½ h: 15-min break 8 h: 2 15-min breaks 11 h: 4 15-min breaks	45 min every 4½ h can be broken to 15 and 30 min

bed per day and 4.78 hours of electrophysiologically-verified sleep per day.[12] Chronic sleep deprivation has adverse consequences.[13,14] In addition to general problems arising from steadily working long hours, fatigue and drowsiness problems are exacerbated when drivers work on night shifts, as would be expected in light of what is known about circadian rhythm.[3,15]

None of the jurisdictions take into account other facts that statistically increase the risk of crashes such as weather conditions, light conditions, surface conditions, time of year, and day of week.[16,17]

Review of the details of the hours of service regulations in place in the United States, Canada, Australia, and the European Union raises an important question: Are these rules adequately protecting the public and truck drivers?

Conclusion

The United States, Canada, Australia, and the European Union all address the prevention of fatigue and drowsiness among truck drivers through similar hours of service provisions. These regulations leave gaps; they are consistent with steadily working long hours and driving after no sleep for 24 hours, and they do not take into account circadian rhythm. Creative rule-making based upon solid research would better protect the public and truck drivers from crashes.

Disclosure

Neither Daniel Mansfield nor Dr. Meir Kryger have conflicts of interest to disclose with respect to this manuscript.

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