

Special issue: truck driver fatigue

STATUS

INSURANCE
INSTITUTE
FOR
HIGHWAY
SAFETY

REPORT

Vol. 32, No. 6

July 26, 1997

Truckers need more rest, less highway time

Ignoring substantial research linking long driving hours with increased crash risk, the Federal Highway Administration (FHWA) may relax rules governing truck drivers' time on the road.

Congress directed FHWA to reassess current hours-of-service rules in 1995 as the agency assumed some duties of the defunct Interstate Commerce Commission. While acknowledging only that modifications to current hours-of-service rules

are being considered, FHWA's advance notice of proposed rulemaking makes clear that motor carrier "efficiency" and "productivity" now rank with safety among FHWA priorities.

"FHWA's main focus has been, and will continue to be, on motor carrier safety, but now the FHWA must consider the economic vitality and productivity of the motor carrier industry, ..." the agency states in its notice.



"Hours-of-service regulations should be reassessed," says Allan F. Williams, Institute senior vice president. "But the evidence shows they should be strengthened, not weakened or replaced."

Long hours raise crash risk: Commercial vehicle drivers aren't permitted to drive more than 10 hours or work more than 15 hours at a stretch before taking an 8-hour rest. Drivers may not drive more than 60 hours during a 7-day period nor more than 70 hours during an 8-day period, depending on whether their carrier operates 6 or 7 days a week.

Some individuals and trucking organizations favor 12-14-hour driving periods. But allowing longer driving time isn't justified by existing scientific research, including a driver fatigue study by FHWA and the American Trucking Associations' Trucking Research Institute.

The study, which is the centerpiece of the current rulemaking, concludes fatigue is less related to the number of driving hours than to the time of day when driving took place. However, the Institute has identified numerous weaknesses in the study, as did a nine-member panel of experts assembled by FHWA to review it. These weaknesses in design, data collection, and data analysis limit the conclusions that can be drawn about driving hours (see page 3).

Numerous studies have demonstrated fatigue is related to the absolute number of hours driven regardless of time of day. For example, an Institute study found Washington state truck drivers behind the wheel for more than eight hours had a statistically significant twofold increase in crash risk. A case-control study in New Zealand found driving more than eight hours was associated with a significant — 2.6 times — increase in large truck crash involvement. Both studies matched the crash-involved trucks by time of crash to comparison trucks, so the results aren't attributable to time of day.

Technology no substitute for rules: The FHWA study relied extensively on technological devices to track driver alert-

ness and detect fatigue. These devices monitor eye closure, head nodding, reaction time, lane tracking, steering, or sleep duration. FHWA says eventually it would like to allow motor carriers to abandon hours-of-service rules in favor of technology determining drivers' fitness for duty.



But devices designed to detect alertness haven't been adequately tested, says Elisa R. Braver, Institute senior research analyst. FHWA in its study encountered a variety of problems with different devices and acknowledges "the driver alertness monitoring devices developed so far would fail to meet many of the [necessary operational and driver acceptance criteria]."

FHWA's notion that a performance-based system evaluating each driver is preferable to a prescriptive system with universal criteria such as hours-of-service rules is debatable, Braver says.

"To keep truckers at highest risk of fatigue impairment from driving, there needs to be a single, enforceable standard for all long-haul drivers," Braver says. "This standard must be objective, easily understood, and easily measured by enforcement agencies.

"Driving longer than 10 hours in one shift or longer than 70 hours within 8 days is a reasonable indicator of fatigue." Braver notes that determining fatigue im-

pairment is exceedingly complicated. "Attempting to implement a system based on individual performance will reduce both enforcement capability and deterrence against breaking rules designed to prevent fatigued driving," she says.

Truckers need more rest: Research also indicates FHWA should increase mandatory rest periods for interstate truck drivers from 8 hours to a longer period, preferably 12-14 hours.

For example, drivers in FHWA's fatigue study averaged 9.3 hours off-duty time between trips, of which actual sleep time averaged 4.8 hours. The mandated rest period must be long enough to allow drivers not only to sleep 8 hours but also to pursue normal activities.

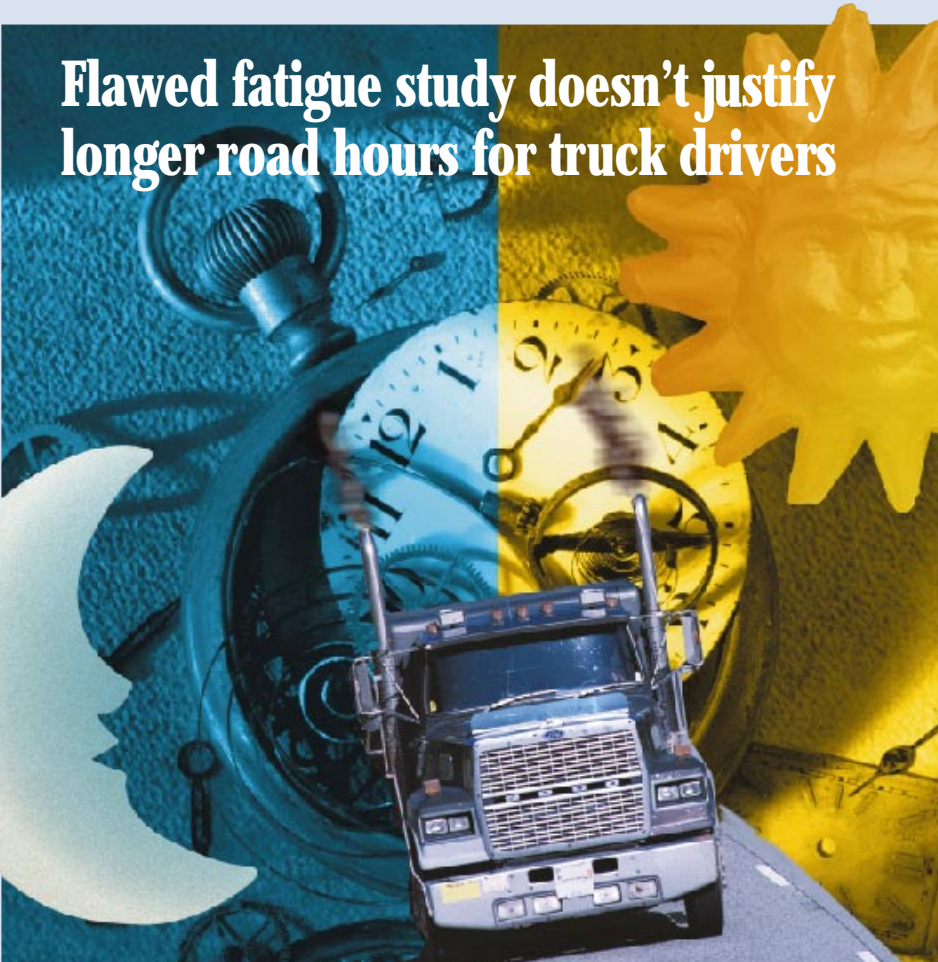
"Mandated 12-14-hour rest periods wouldn't guarantee drivers would sleep for 8 hours, but it would allow them to make this choice," says Braver. "Eight-hour rest periods guarantee drivers don't sleep enough."

However, mandating longer rest periods wouldn't accomplish its purpose if the mandate were frequently violated, a consequence of the well-documented inadequacies of handwritten logbooks. FHWA should enforce adherence by requiring onboard computers, which record vehicle travel time, in large trucks engaged in interstate commerce (see page 7).

"It's puzzling that FHWA would announce it intends to allow untested driver performance measurement devices while not proposing to require onboard computers, technology used successfully by motor carriers for many years," says Braver.

One size fits all: Some trucking industry representatives have criticized current hours-of-service rules as an approach based on "one size fits all." They contend FHWA should decide whether to apply rules to each individual motor carrier based on past safety records. But deciding which carriers merit exemptions and then enforcing different rules for different ones would be a logistical nightmare that would absorb scarce government resources. Moreover, using past (cont'd on p. 5)

Flawed fatigue study doesn't justify longer road hours for truck drivers



period. Four groups of 20 drivers followed different schedules. Factors thought to contribute to fatigue were studied, including time spent driving during a work period, number of consecutive driving days, time of day driving took place, and length of sleep periods.

The Institute agrees with the review panel that the fatigue study sample was unrepresentative and biased toward “better” drivers. For example, no one in the study drove more than 52 hours per week — no driver followed a typical long-haul schedule that permits 70 hours of driving over 8 days. And all were employed by less-than-truckload motor carriers with large fleets, which are trucking firms that typically have stronger safety programs, better and more highly paid drivers, and lower crash rates.

Drivers were all volunteers not randomly assigned to different groups. Random assignment of volunteers to different groups is the standard method used by experimental studies, says Braver. In failing to randomly assign drivers to different groups or rotate each driver through each group, the FHWA study violated basic scientific principles of study design.

As the review panel noted, the study wasn't designed to examine the effects of hours of driving while controlling for the effects of time of day. These two variables were inextricably linked. For example, night driving typically occurred after many hours on the road.

“If FHWA had chosen to devote its resources to good study design rather than to expensive and unnecessary measurements, such as electromyograms, vagal tone, and nitrogen dioxide, the study could have shed light on the critical question of the independent and combined effects of long hours of driving and time of day,” says Braver.

Also, the power of a study is determined by sample size and other factors. Although many different measurements were made, statistical power to find effects of fatigue is limited by the small size of the study sample — 80 drivers.

A flawed study being pushed by the trucking industry and federal regulators to justify diluting hours-of-service rules says time of day most influences truck driver fatigue, not hours of driving.

“The strongest and most consistent factor influencing driver fatigue and alertness in this study was time of day. ... Hours of driving (time-on-task) was not a strong or consistent predictor of observed fatigue.” This is the main conclusion of the Commercial Motor Vehicle Driver Fatigue and Alertness Study cosponsored by the Federal Highway Administration and the American Trucking Associations' Trucking Research Institute.

Some experts, including Insurance Institute researchers, believe the authors erred in reaching their conclusions. Both driving hours and time of day are important factors contributing to fatigue.

“This study contains useful information, but it does not justify either allowing

driver performance measurement devices to substitute for hours-of-service rules or allowing longer driving hours,” says Elisa R. Braver, Institute senior research analyst.

A review panel of nine outside scientists convened by FHWA in 1995 strongly criticized the study before the final report was prepared. The review panel summary report stated: “The Driver Fatigue and Alertness Study suffered from poor design and an inappropriate statistical approach to address its major objectives. ... The analysis plan is chaotic. ... Variables are confounded (e.g. time on task and time of day), and disconnected from the objectives. ... The definition of fatigue is problematic. ... The study sample is far from representative of drivers and motor carriers in the trucking industry and biased toward the ‘better’ ones.”

Eighty commercial motor vehicle drivers in the United States and Canada each were monitored over a four- or five-day

History of hours-of-service rules



1928: Interstate Commerce Commission (ICC) recommends federal regulation of motor carriers due to lack of uniform state regulations.

1935: Congress passes Motor Carrier Act authorizing ICC to regulate economic health and operational safety of motor carriers.

1939: ICC orders motor carriers to limit drivers to 10 hours of driving in any 24-hour period unless drivers are off duty for 8 consecutive hours immediately following 10 hours of driving. Drivers are limited to 60 hours on duty in any 7-day period and 70 hours in any 8-day period.

1962-63: ICC issues 15-hour rule. Drivers cannot be on duty more than 15 hours following 8 consecutive hours off duty. Oil field drivers are exempt from 60/70 hour rule.

1976: FHWA requests comments on hours-of-service rules.

1978: FHWA again requests comments on hours-of-service rules, suggesting several options including 12-14-hour off-duty periods and a 12-hour on-duty limit.

1980: FHWA requests comments on petition to weaken hours-of-service rules by increasing from 10 to 12 the number of driving hours permitted after 8 rest hours and from 70 to 96 the number of on-duty hours permitted in an 8-day period. Ninety-four percent of comments oppose these increases. Petition denied.

1981: FHWA terminates 1978 rulemaking, saying it would have a negative economic impact.

1986: Institute petitions FHWA to require onboard computers in large trucks. FHWA denies request based on survey of unrepresentative motor carriers.

1987: FHWA amends 60/70 hour rule to allow drivers to be on nondriving duty after the 60th or 70th hour in a 7- or 8-day period. Institute asks FHWA to reconsider denial of 1986 petition for onboard computers. Request refused.

1988: FHWA permits voluntary use of onboard computers as alternative to written logbooks.

1989: Institute petitions FHWA to require onboard computers for motor carriers transporting hazardous materials. Petition denied.

1992: In an attempt to weaken hours-of-service rules, FHWA proposes to allow the 60/70 hour on-duty time limits to restart after 24 hours off duty.

1993: FHWA withdraws proposal. Majority of nearly 68,000 comments strongly oppose changes.

1995: Institute and others petition FHWA for onboard computers. Petition under consideration.

1996: FHWA announces possible hours-of-service rules revisions suggesting it will relax regulations. FHWA exempts from these rules certain agriculture-related transport, groundwater drilling rigs, construction-related transport, and vehicles servicing public utilities.

1997: Institute urges FHWA to strengthen hours-of-service rules, mandate onboard computers, and adopt 12-14-hour mandatory rest periods.

Hours-of-service debate divides trucking industry and safety groups

(cont'd from p. 2) safety records of motor carriers is an inherently flawed approach. Safety records are based on what truck drivers report to FHWA, and there are obvious economic incentives to understate crash experience.

Fatigue management plans: Some truckers speak favorably of a proposal in Australia to revise hours-of-service rules. It would mandate 12-hour driving limits and 12-hour rest periods but would exempt those truckers with a "fatigue management system."

Carriers using fatigue management systems are supposed to educate drivers about the need for adequate sleep and consider driver rest needs when making schedules. No constraints on drivers' schedules are specified except that they must rest at least 6 hours in every 24.

No research has shown such exemptions will reduce fatigue-impaired driving. In fact, one Australian study reported truckers showed increasing fatigue during a 12-hour trip, whether or not they had to adhere to hours-of-service rules.

In a survey of 960 Australian truckers, a high percentage reported they don't comply with existing hours-of-service rules, in large part because of delivery deadlines. According to several different surveys, many Australian commercial drivers report taking stay-awake drugs to combat fatigue.

Substituting vaguely defined fatigue management systems for clearly specified hours-of-service rules would increase the economic pressures that lead Australian truckers to work excessive hours and use stimulants, Braver says. U.S. and Canadian drivers also report intense scheduling pressures that are linked with hours-of-service violations and drug use.

U.S. hours-of-service rules already have flexibility to deal with events like natural emergencies that may require longer driving hours. Also, the regulations set clearly defined limits on pickup and delivery schedules, keeping carriers who adhere to driving hour rules from being at a competitive disadvantage.

Trucking groups want federal regulators to relax rules dictating how much time truckers spend on the road and on duty. Safety groups advocate tightening hours-of-service rules because fatigue flourishes in the trucking industry.

The American Trucking Associations (ATA) and the Truckload Carriers Association propose for drivers a total maximum on-duty period that doesn't distinguish between driving hours and time on the job doing such things as loading or unloading a truck. Rules allow drivers 10 hours on the road and 15 hours on duty before resting 8 hours. ATA suggests allowing truckers to drive for up to 15 hours without sustained rest. The Truckload Carriers Association recommends 14 on-duty hours.

Motor carriers with "fatigue management systems" and good safety records should be allowed to disregard hours-of-service rules, trucking groups say. ATA advises regulators to retain the cap on the cumulative hours truckers work before taking required rest but erase or "restart" those hours whenever a driver has been off duty 24 hours. This means drivers could drive as much as 100 hours in 8 days. The carriers association proposes a 24-hour "day of rest" for drivers who have finished 70 hours of work.

One area in which trucking industry and safety groups agree is the need for longer rest periods for drivers to enable them to get 7-8 hours of sleep per day. However, most safety groups strongly oppose allowing longer hours behind the wheel.

"Driver fatigue is a killer," says the National Association of Independent Insurers. "Researchers, safety advocates, and government agencies ... generally oppose any 'solution' that allows tired drivers more road time or ... disrupts a natural circadian rhythm."

Advocates for Highway and Auto Safety points out, "Total duty hours are currently too long, and drivers are continuously importuned by employers, shippers, and consignees to log on-duty, nondriving time as off duty or are refused compensation for nonduty time, even when it involves ... loading or unloading freight."

Parents Against Tired Truckers suggests paying drivers by the hour instead of by the mile. "No matter how the hours-of-service rules are changed, as long as drivers are paid by the mile, the system, the shippers, the carriers, the receivers, and the drivers have a built-in incentive to violate the rules and push the limits of human capabilities."

The National Sleep Foundation warns FHWA not to rely on drowsy driver detection devices to prevent fatigue. "There are no 'bells and whistles' that can take the place of a driver understanding the importance of proper sleep habits and having work, economic, and social conditions that are conducive to obtaining enough rest to perform safely and efficiently."

Mandating onboard computers would encourage truck drivers and motor carriers to comply with hours-of-service regulations, safety groups say. ATA disagrees, saying onboard computers "may make good business sense for some, but for many others it will not be useful or cost-effective."



Program exempting medium trucks from logbook regulations could spur violations

Forget hours-of-service record keeping for drivers of medium trucks.

The Federal Highway Administration (FHWA) has embarked on a three-year pilot program that essentially lifts logbook regulations for interstate motor carriers operating medium trucks (those between 10,001 and 26,000 pounds).

Drivers employed by participating motor carriers won't have to record their driving, work, or rest hours in logbooks or onboard computers, although they still

must comply with hours-of-service rules. FHWA thinks these drivers will comply with the rules despite not being required to keep records.

Eliminating this requirement, FHWA says, "does not place the motoring public in danger. Safety investigators will rely more heavily upon other evidence, such as fuel and toll receipts, bills of lading, and trip reports to determine if on-duty or driving time violations are present."

Elisa R. Braver, Institute senior research analyst, notes hours-of-service rules now are widely flouted, and removing the logbook requirement is likely to increase these violations. "It is all too easy for drivers to tell inspectors they have no fuel or toll receipts to show the hours they've driven," she says.

FHWA plans to use the Motor Carrier Regulatory Relief and Safety Demonstration Project mandated by Congress in 1995 to help determine if medium weight trucks and their drivers should in the future comply with federal motor carrier safety regulations for interstate carriers (see *Status Report*, Vol. 31, No. 1, Feb. 3, 1996). The project will be evaluated after two years and "permanent rules resembling the guidelines of this project may be indicated at that time," FHWA says in its June 10 Notice of Final Determination.

Program participation is voluntary, and carriers must apply for admission. FHWA says it's limiting participation to "motor carriers which have exemplary safety histories" with crash rates "equal to or better than that of the top 25 percent of all motor carriers."

To be admitted, carriers must not have received an "unsatisfactory" safety fitness rating from FHWA. Carriers who have never been rated — about 65 percent of all carriers — are eligible to participate. Carriers must claim a crash rate equal to or less than 1.6 police-reported crashes per million miles traveled, averaged over the previous 36 months, and must recalculate their crash rates every six months.

Carriers also must have a written "safety control plan" detailing how they will ensure safety isn't compromised. FHWA says the plan "may entail no more than submitting pertinent portions of a company's current operating plan or similar document."

Braver says, "Particularly disturbing is FHWA's plan to rely on self-reports of motor carriers to determine if they qualify for these exemptions from logbook rules. Carriers have an obvious economic incentive to understate their crash rates."

Drivers employed by participating project carriers will be required to have driving records clear of all fatal crash-related driving offenses, alcohol or other drug violations, and felonies involving the use of a commercial motor vehicle.

"Drivers with multiple speeding and other moving violations could be eligible," Braver points out.



Onboard computers should reduce hours-of-service infractions

While the Federal Highway Administration debates new and untested technology to address the problem of truck driver fatigue, there's older technology that can mitigate this hazard.

In 1995, 1989, 1987, and 1986, the Institute petitioned the Federal Highway Administration to require onboard recording devices in large trucks to increase adherence to hours-of-service rules (see *Status Report*, Vol. 30, No. 7, Aug. 12, 1995). These devices are computers that electronically record driving times, vehicle speeds, and other parameters. They can be used to address the problem of falsified logbooks, as well as reduce record-keeping burdens.

A 1992 Institute survey of 1,249 truck drivers reported fewer than 20 percent thought written logbooks reflect the actual hours most drivers work (see *Status Report*, Vol. 27, No. 2, Feb. 8, 1992). In a 1997 survey conducted by researchers from the State University of New York at Albany, more than 40 percent of truck drivers reported they drive more hours than they record in logbooks. In contrast to logbooks, data from onboard computers cannot be falsified easily.

Since the 1980s, a number of motor carriers have voluntarily installed onboard computers, and their use is expanding rapidly to meet increased demand for improved communications between shippers and their customers. Rockwell Inter-

DRIVER'S DAILY LOG (One calendar day-24 hours)

ORIGINAL -File each day at home terminal
DUPLICATE -Driver retains in his possession for eight days

0 0 00 (Month) (Day) (Year) (Total mileage today) 508 (Total miles driven today)

I certify these entries are true and correct: John Doe (Driver's signature in full)

XYK FREIGHT SYSTEM, INC.
000 Packer Dr., Chicago, Ill. 00000 (Name of carrier or carriers) (Main Office Address)

Vehicle numbers-(Show each unit)

(Name of co-driver)

	MID NIGHT	1	2	3	4	5	6	7	8	9	10	11	NOON	1	2	3	4	5	6	7	8	9	10	11	Total Hours
1: OFF DUTY																									6 1/4
2: SLEEPER BERTH																									8
3: DRIVING																									9 3/4
4: ON DUTY (Not Driving)																									0

REMARKS: LOG DOES NOT SHOW NONDRIVING WORK (e.g., UNLOADING FREIGHT) AND SHOWS TIME IN SLEEPER BERTH THAT DRIVER WAS BEHIND THE WHEEL.

Shipping document, manifest number, or name of a shipper and commodity. Check the time and enter name of place you reported and where released from work and when and where each change of duty occurred. Explain excess hours.

FROM: Indianapolis, IN TO: Pittsburgh, PA (Starting Point or Place) (Destination or turn around point or place)

USE TIME STANDARD AT HOME TERMINAL

RECAP	
DAY NO.	9 3/4
DRIVING HRS TODAY TOTAL (Line 3)	9 3/4
DRIVING VIOLATION TODAY	9 3/4
ON DUTY HRS TODAY TOTAL LINES 3 & 4	9 3/4
70 HR/8 DAY DRIVERS	
A. TOTAL HRS ON DUTY LAST 7 DAYS INCL TODAY	
B. TOTAL HRS AVAILABLE TOMORROW 70 HRS MINUS A	
C. TOTAL HRS ON DUTY LAST 8 DAYS INCL TODAY	
60 HR/7 DAY DRIVERS	
A. TOTAL HRS ON DUTY LAST 6 DAYS INCL TODAY	
B. TOTAL HRS AVAILABLE TOMORROW 60 HRS MINUS A	
C. TOTAL HRS ON DUTY LAST 7 DAYS INCL TODAY	

DRIVER'S DAILY LOG (One calendar day-24 hours)

ORIGINAL -File each day at home terminal
DUPLICATE -Driver retains in his possession for eight days

0 0 00 (Month) (Day) (Year) (Total mileage today) 685 (Total miles driven today)

I certify these entries are true and correct: John Doe (Driver's signature in full)

XYK FREIGHT SYSTEM, INC.
000 Packer Dr., Chicago, Ill. 00000 (Name of carrier or carriers) (Main Office Address)

Vehicle numbers-(Show each unit)

(Name of co-driver)

	MID NIGHT	1	2	3	4	5	6	7	8	9	10	11	NOON	1	2	3	4	5	6	7	8	9	10	11	Total Hours
1: OFF DUTY																									1 1/2
2: SLEEPER BERTH																									4 3/4
3: DRIVING																									12 3/4
4: ON DUTY (Not Driving)																									5

REMARKS: Chicago Indianapolis (sleep) (trap-hook) Louisville (unload-load) Cincinnati (trap-hook) Columbus (wait) (unload-load) (break) Pittsburgh (unload-load) (off-duty)

Shipping document, manifest number, or name of a shipper and commodity. Check the time and enter name of place you reported and where released from work and when and where each change of duty occurred. Explain excess hours.

FROM: Chicago, IL TO: Pittsburgh, PA (Starting Point or Place) (Destination or turn around point or place)

USE TIME STANDARD AT HOME TERMINAL

RECAP	
DAY NO.	12 3/4
DRIVING HRS TODAY TOTAL (Line 3)	12 3/4
DRIVING VIOLATION TODAY	17 3/4
ON DUTY HRS TODAY TOTAL LINES 3 & 4	17 3/4
70 HR/8 DAY DRIVERS	
A. TOTAL HRS ON DUTY LAST 7 DAYS INCL TODAY	
B. TOTAL HRS AVAILABLE TOMORROW 70 HRS MINUS A	
C. TOTAL HRS ON DUTY LAST 8 DAYS INCL TODAY	
60 HR/7 DAY DRIVERS	
A. TOTAL HRS ON DUTY LAST 6 DAYS INCL TODAY	
B. TOTAL HRS AVAILABLE TOMORROW 60 HRS MINUS A	
C. TOTAL HRS ON DUTY LAST 7 DAYS INCL TODAY	

Logs are easily and often falsified. The top log shows how a driver might record fewer hours than actually worked. The bottom log shows actual work time needed to complete the trip from Chicago.

national Corporation reports nearly 200,000 onboard computers are already installed on commercial vehicles.

"It keeps everybody honest," says a spokesperson for Frito-Lay. The company has been using onboard computers for more than 10 years. "No one can cheat the system." Other motor carriers using the computers include United Parcel Service and Domino's Pizza.

Truck safety inspectors told Institute researchers dramatically fewer hours-of-service violations are found in audits of motor carriers using onboard computers. But most onboard computers aren't used

to track driving hours, and inspectors typically don't have the ability to check the devices during roadside inspections. If onboard computers were mandatory, they could be routinely checked during roadside inspections.

The cost of installing onboard computers is less than \$1,000 per truck. Onboard computers also allow motor carriers to save fuel costs by monitoring travel speeds and idle times and protect drivers and carriers from economic pressures to violate hours-of-service rules. The most significant benefit is their potential to increase adherence to hours-of-service rules.

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Vol. 32, No. 6, July 26, 1997

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ISSN 0018-988X

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