

The vision of the Office of Motor Carriers is to help move people, goods, and commercial motor vehicles on our Nation's highways in the most efficient, economical, and crash-free manner possible. The OMC research and technology program focuses on improving safety in interstate commercial motor vehicle operations and serves a trucking and motor coach industry that carries more than 40 percent of all intercity freight.

Studies are conducted in the following areas: commercial driver human factors, health, and performance needs; new and emerging driver and vehicle technologies; safety-related data collection and analysis needs; and performance-based changes to the Federal Motor Carrier Safety Regulations.

The OMC's technology research promotes safety by identifying, collecting, and communicating information about technological advances.



Office of Motor Carrier Research and Standards

400 Seventh Street, SW
HCS-30; Room 3107
Washington, DC 20590

Electronic Recorder Study

Introduction

The Insurance Institute for Highway Safety (IIHS) petitioned the Federal Highway Administration (FHWA) in 1986 to initiate rulemaking to mandate the use of electronic recorders in all commercial motor vehicles (CMVs) required to maintain logbooks. The FHWA considered the request and a rulemaking was initiated the next year to allow the use of "automatic on-board recording devices" instead of paper logbooks on a voluntary basis.

In August 1995, several other organizations joined the IIHS to renew the petition for mandatory use of on-board electronic recorders (ERs). The petition asserted that required use of ERs would improve CMV driver compliance with the FHWA hours-of-service (HOS) regulations. This tech brief summarizes an FHWA research project initiated in response to this petition; the final report of the study is now available from the National Technical Information Service.

Purpose

To respond to the petition, the FHWA felt it was important to gather information from carriers on the current extent of ER usage within the motor carrier industry. The objectives of this study were to query trucking industry associations on the costs and benefits of the use of ERs for compliance with HOS regulations and to assess industry attitudes toward mandatory use of ERs.

Methodology

Researchers sought the cooperation of bus and trucking industry associations to gather information on ER use from their members. Five associations agreed to participate in the study: National Private Truck Council (NPTC), Owner Operator Independent Drivers Association (OOIDA), Independent Truck Drivers Association (ITDA), American Bus Association (ABA), and United Motorcoach Association (UMA).

In order to provide more comprehensive coverage of truck fleets, researchers obtained a census file from the FHWA Office of Motor Carriers (OMC) that listed the names of all carriers with interstate operating authority, both private and for-hire. A sample of about 6,500 carriers from the census file was randomly selected to supplement the membership of the participating organizations. Carriers were broken down by fleet size into small (less than 9 trucks, or unknown size), medium (9–100 trucks), and large (more than 100 trucks) categories. **Table 1** shows the 11 associations/census groups surveyed by this study.

Researchers developed a questionnaire that focused on the costs and benefits of the use of ERs to record HOS. Three versions of the questionnaire were developed to specifically address for-hire trucking firms, owner-operators, and bus fleets. The questionnaire collected basic descriptive information about the type of company or operation, then asked participants more specific questions about ER use, their means for recording drivers HOS, and asked for a description of the effects mandatory ER use would have on their business. In January 1997, the participating organizations



Table 1.
Groups surveyed for Electronic Recorder Study

Association/Census Group	Population (N)	Selection (N)
NPTC	941	941
Large Private	1,006	931
Medium Private	17,560	1,032
Small Private	192,152	1,000
Large For-Hire	1,411	1,411
Medium For-Hire	15,711	1,047
Small For-Hire	129,372	1,002
OOIDA	9,510	1,500
ITDA	150	150
ABA	727	727
UMA	850	850
Total		10,591

sent out questionnaire forms to members, each with a cover letter encouraging a reply.

Findings

Response Rates

Approximately 10,000 questionnaires were mailed; researchers received about 1,200 responses. Response rates for the 11 groups ranged from 3.1 percent for small private fleets, to 24.4 percent from OOIDA members. The overall response rate was 11.8 percent, which was much lower than expected. Although forms were sent to a representative cross section of the industry, the information obtained can only be considered as representative of the responses received due to the low response rate.

Electronic Recorder Use

Of the 1,200 responding fleets, 175 reported using ERs: 137 truck fleets, 24 bus fleets, and 14 owner-operators. Carriers equip their fleets with ERs for a variety of economic, regulatory, and operational reasons, such as managing vehicle operating costs and for business management functions. At least one-third of the large truck fleets or NPTC member respondents reported use of ERs, but ER use is much lower in all other groups queried.

There is a clear pattern of decreasing use of ERs as fleet size decreases. Only a small percentage of small truck fleets and owner-operators reported using the technology. The association between fleet size and the use of ERs is significant, because approximately

90 percent of all carriers regulated by the FHWA operate less than nine trucks. Survey responses also suggest that private fleets are more likely to use ERs with the HOS function.

Among respondents with ERs, the following observations were made with regard to the HOS function:

- Of the 137 truck fleets with ERs, a little over half (57 percent or 78 fleets) used recorders equipped with the HOS function.
- Only 37 truck fleets out of 1,200 responses use ERs as their primary method of HOS compliance.
- Most of the truck fleets that used ERs for HOS were NPTC members, and the rest were large or medium private truck fleets.
- None of the responding for-hire fleets or owner-operators used ERs as the primary method for HOS compliance.
- Only one bus fleet used ERs as the primary method for HOS compliance.

Cost

Data from this survey suggest that ER acquisition and installation cost is approximately \$2000 per vehicle, but this cost can vary substantially depending when the unit is acquired and the types of functions available. Electronic HOS recording typically requires an ER with the capability to support multiple functions.

Table 2.
Primary methods for recording driver HOS.

Method	Trucking Firms		Owner-Operators		Bus Fleets	
	N	Percent	N	Percent	N	Percent
Logbook	395	74.8	363	98.1	256	92.8
Timecard	77	14.6	3	0.8	14	5.1
ER	37	7.0	0	0.0	1	0.4
Other	11	2.1	4	1.1	5	1.8
Mixed	8	1.5	0	0.0	0	0.0
Total	528	100.0	370	100.0	276	100.0

(12 companies missing)

Annual operating and maintenance (O&M) costs of ERs include costs for the routine operation of the recorder, as well as routine servicing, calibration, and repair. Survey respondents estimated the annual O&M costs per vehicle to be around \$200. Use of the module for HOS recording did not appear to increase the cost of acquiring and owning recorders.

Benefits

Assuming that HOS are captured accurately using either manual or electronic methods, the primary operational benefit of electronic HOS recording is the time required for drivers to record HOS and the administrative time fleet managers spend summarizing, storing, retrieving, and auditing HOS records. Each time a driver changes driving status (e.g., driving to off-duty, driving to riding, sleeper-berth to driving), a driver's log entry must be made to record the time, location, and status change. Every carrier is required by law to maintain HOS records so that regulatory and enforcement agencies can review these records to ascertain HOS compliance. **Table 2** illustrates the primary methods by which carriers maintain HOS records.

This survey indicates that drivers with electronic logs spend about 20 minutes less time per day recording HOS than do drivers with paper logs. Fleet managers with fleets using electronic HOS recorders save an additional 20 minutes per driver per month in time needed to administer HOS records at the fleet level.

Qualitative Responses

In addition to questions with categorical or numerical answers, carriers were asked to respond to several open-ended questions dealing with mandatory use of electronic HOS recording devices. The questionnaire responses indicated that carriers saw no significant operational benefits of mandatory use of ERs for recording drivers HOS, and believe such a requirement would result in high initial and system

maintenance costs, while having little or no effect on commercial vehicle safety.

Carriers without ERs for recording HOS overwhelmingly cited excessive cost as the reason for not using the technology. After excessive cost, carriers most frequently responded that their current systems already maintain adequate records of a driver's HOS.

Conclusions

A primary objective of this study was to determine if carriers thought ERs were cost-effective for recording HOS compliance. Of the approximately 1,200 responding fleets, only 37 used ERs as the primary method of keeping HOS records, and the use of ERs seems to decrease as fleet size decreases. Approximately 90 percent of all carriers regulated by the FHWA operate less than nine trucks, and this study found only two small fleets using ERs to record HOS, providing no evidence that ERs are cost-effective in small fleets.

As for the second objective, the overwhelming view of fleets of all sizes is that mandatory use of ERs would require an excessive expenditure with minimal benefits. ERs are useful in controlling HOS only to the extent that carrier management is committed to controlling HOS. An ER provides information about HOS, but the information has no impact if it is not reviewed and acted upon.

Due to the low response rate, the information obtained in this study can only be considered representative of the responses received. This study does not address the relationship of ERs to compliance with HOS, nor the relationship of compliance with HOS regulations to fatigue or safety. The relationship of HOS to fatigue and safety is complex and is the subject of other research programs.

Researcher

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Distribution

This Tech Brief is being distributed according to a standard distribution. Direct distribution is being made to the Resource Centers and Divisions.

Availability

The study final report is available from the National Technical Information Service, Telephone: (703) 605-6000, Order No. PB99-111866.

Key Words

electronic recorder, hours of service, fleet size, truck, bus.

Notice

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