



Evaluating the Potential Safety Benefits of Electronic Hours-of-Service Recorders

The study quantitatively evaluated whether trucks equipped with electronic hours-of-service recorders (EHSRs) have a lower (or higher) crash and hours-of-service (HOS) violation risk than those without EHSRs. The safety benefits of EHSRs were quantitatively evaluated by comparing the crash risk for two exposure groups (i.e., EHSRs were considered to improve safety if the trucks with EHSRs showed a lower crash risk than trucks without EHSRs).

This project conducted a literature synthesis on EHSRs and an effectiveness evaluation on EHSRs. Data were obtained through a third-party vendor that compiled previously-generated compliance data

regarding participating motor carriers. For this project, EHSRs were defined as any device that electronically records drivers' HOS. There have been many variations of EHSRs over the years, such as automatic onboard recording devices (AOBRDs), electronic onboard recorders (EOBRs), and functions included in fleet management systems. Each of these devices has specific functionality that may or may not be embodied by the term EHSR.

For this report, the research team actively collected data on basic EHSRs. Table 1, below, displays results for the five research questions examined in this study.

Table 1. Basic findings for the five research questions examined in this study.

Research Question	Study Findings
Do individual CMVs equipped with EHSRs have a significantly lower total crash rate than CMVs without EHSRs?	Yes; 12% Lower
Do individual CMVs equipped with EHSRs have a significantly lower "preventable" crash rate than CMVs without EHSRs?	Yes; 5% Lower
Is there a significant difference in the HOS violation rates between CMVs equipped with EHSRs and CMVs not equipped with EHSRs?	Yes; Driving-related HOS Violations (e.g. exceeded allowable hours): 53% Lower Yes; Non-driving-related HOS Violations (e.g., general/form and manner log violations): 49% Lower
Do individual CMVs equipped with EHSRs have a significantly lower U.S. Department of Transportation (USDOT)-recordable crash rate than CMVs without EHSRs?	Not Enough Data for Assessment
Do individual CMVs equipped with EHSRs have a significantly lower rate of fatigue-related crashes than CMVs without EHSRs?	Not Enough Data for Assessment

RESULTS

The study findings are based on results of data collected from 11 participating carriers. The final data sets included a total of 224,034 truck-years that drove a total of 15.6 billion miles and had 82,943 crashes and 970 HOS violations. The average mileage per truck per year was approximately 69,600 miles. Although this mileage may seem somewhat low, trucks that were taken off the road mid-year counted toward this average.

As depicted in Table 1, EHSR-equipped trucks had a 12 percent significantly lower total crash rate than non-EHSR-equipped trucks for all crash types ($p < 0.001$) and a 5 percent significantly lower crash risk than non-EHSR-equipped trucks for preventable crashes ($p = 0.001$).

Similar analyses were conducted for HOS violation risk. Two types of HOS violations were evaluated, including driving-related HOS violations (i.e., 11-, 14-, 16-, and 60/70-hour rule violations) and non-driving-related HOS violations (i.e., driver's record

of duty status [RODS] not current, general/form and manner log violations, driver failing to retain previous 7 days of logs, false report of driver's RODS, no driver's RODS, and no log book). EHSR-equipped trucks had a 53 percent significantly lower driving-related HOS risk than non-equipped trucks ($p = 0.01$) and a 49 percent significantly lower non-driving-related HOS violation risk than non-equipped trucks ($p < 0.001$). All models included potential effect modifiers, including year, carrier index, onboard safety system status, and long-haul/regional indicator.

Small sample sizes limited the ability to detect significant differences between the EHSR cohort and the non-EHSR cohort for USDOT-recordable and fatigue-related crash rates.

The current study clearly shows a safety benefit for EHSRs with respect to crashes and HOS violations.

To read the complete report, please visit:

<http://www.fmcsa.dot.gov/safety/research-and-analysis/publications?keywords=&title=&author=&year=&to=&page=0>