

The goal of the Federal Motor Carrier Safety Administration (FMCSA) is to reduce the number and severity of large truck-involved crashes through more commercial motor vehicle and operator inspections and compliance reviews, stronger enforcement measures against violators, expedited completion of rulemaking proceedings, scientifically sound research, and effective CDL testing, recordkeeping, and sanctions. The Office of Research and Technology manages research and technology development and deployment programs for the FMCSA.

There are eight major research and technology focus areas: crash causation and profiling; regulatory evaluation and reform; compliance and enforcement; HAZMAT safety and cargo tank integrity; driver training and performance management; driver alertness and fatigue; driver physical qualifications; and car-truck proximity.

Driver training and performance management includes research on driver recruiting, selection, training, testing, licensing, and safety performance management.



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The Potential Application of Behavior-Based Safety in the Trucking Industry

Introduction

Behavior-based safety (BBS) is a set of methods to improve safety performance in the workplace by engaging workers in the improvement process, identifying critical safety behaviors, performing observations to gather data, providing feedback to encourage improvement, and using gathered data to target system factors for positive change. Most BBS initiatives have been implemented in industrial environments in which workers are in groups; however, a significant number have been successful with workers who are in remote locations, using self-observation.

In August 1998, the Federal Motor Carrier Safety Administration (FMCSA; formerly the Office of Motor Carriers, Federal Highway Administration) sponsored a group of seminars on BBS as part of its human factors research program on driver performance enhancement; the seminars were conducted by Dr. Thomas Krause, CEO, Behavioral Science Technology, Inc. In particular, FMCSA is interested in ensuring the safe, effective use of current and advanced in-vehicle driver performance monitoring devices (e.g., speed monitoring, headway monitoring, alertness monitoring). Performance monitoring offers an opportunity to improve driver safety and productivity by measuring and providing feedback to drivers on critical performance variables. The use of performance feedback, developed via a team approach, is central to BBS; it is a powerful tool and has been shown to influence behavior effectively in both short and long term settings.

Summary

Performance measurement is a critical and essential ingredient in performance enhancement. BBS looks for ways that safety-critical worker behaviors can be measured and managed systematically. Typically, certain "benchmark" behaviors are identified as critical by teams of workers, supervisors, management, drivers, and others. Once established, the organization then employs these benchmark behaviors for purposes of worker self-management, training, general management, information data mining, performance evaluations, and awards or corrective actions.

In this manner, organizations may use behavioral benchmarks as a management tool, as opposed to relying primarily on outcome measures to affect behavior change. Outcome measures, such as crashes or safety violations, are not always as measurable or reliable as behaviors, and therefore are not always a sound basis for affecting behavior changes. However, outcome measures are overwhelmingly used by the trucking industry today as the principal measure of driver performance and overall safety. In BBS, crash rate would be considered a "downstream" measure whereas in-vehicle performance data would be "upstream" measures. Upstream measures are more reliable indices of true safety risk and are the targets of BBS interventions. When upstream indices (i.e., safety-related behavior) change, downstream outcome changes

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Availability

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Key Words

commercial motor vehicle (CMV), driver performance, behavior-based safety, total quality management, actigraphs, alertness monitors, electric on-board recorders, black boxes, highway safety.

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inevitably follow. Essentially, BBS will help management practices to shift from reactive to proactive.

Performance monitoring as a self-management tool requires that an employee be an active and involved participant in the improvement effort. When this happens, the effect of performance feedback is to allow for and facilitate positive change. BBS principles are supported by management, but implemented with the involvement of employees from the beginning.

Behavior-based safety methods have been implemented with great success in industrial settings and have tremendous potential for improving safety and productivity in the trucking industry. For example, if speed maintenance was identified as a safety-critical benchmark behavior, speed would be monitored and both drivers and their managers would receive frequent feedback on drivers' degree of speed compliance. Drivers demonstrating acceptable behavior/performance would be recognized and rewarded so that the overall management atmosphere is positive and facilitative of the desired behavior. Many new in-vehicle technologies are available, or will soon be commercially available (e.g., actigraphs, alertness monitors, and electronic on-board recorders) to potentially provide accurate safety-relevant and productivity-relevant behavior benchmarks.

The potential to improve truck driving safety and performance is enormous, particularly when BBS principles are used in conjunction with these new technologies. Unfortunately, such devices may be viewed negatively as "surveillance" and an unwarranted intrusion into driver privacy. Driver-involved implementation of these technologies will help overcome this potential bias by demonstrating to drivers the benefits of their use and the value of performance feedback as a self-management aid and tool for greater autonomy. In most BBS applications, behavioral observations supporting BBS are separate from the supervisory/discipline process, removing much of the intimidation associated with BBS observations of worker safety.

Continuing Research

The FMCSA is sponsoring a project to consider existing and emerging on-board safety monitoring technologies and identifying behavioral management practices that facilitate driver acceptance of these technologies, as well as driver cooperation, compliance, and positive behavior change. This study will help guide near-and long-term FMCSA programs relating to driver performance measurement, performance-based management and regulations, and application of safety technology within the trucking industry.

Another project with ties to BBS principles is the Canadian Truck Driver Safety Incentive Program. In Canada, studies have reviewed the potential to improve trucking safety and profitability through safety incentive programs; a new pilot test of incentive programs for commercial drivers will be initiated this year. Although a few elements of these incentive programs differ from BBS, there are many similarities and common concepts. As both approaches are tested, there will be opportunities to compare results and lessons learned.

The Federal Railroad Administration has also begun a project, using BBS principles, to demonstrate the applicability of this promising safety-enhancing methodology to Yard and Terminal operations and Right-of-Way maintenance. The project will provide critical information on the jobs/occupations, locations, and behaviors that are most at-risk for accidents in these work settings.