



Safety: The Trucking Industry's New Frontier

Since U.S. traffic deaths leveled off in 1995 after falling for several years, the federal highway safety agency has been finding that technology can address most traffic accidents. And because trucks are involved in 12% of all fatal traffic accidents annually (2006 statistics: 5,000 deaths in 43,443 traffic fatalities), trucking has to play a major role in adopting preventive technologies. Actually, Class 7 and 8 trucks are involved in 90% of fatal truck accidents.

However, from 1975 to 2007, large-truck registration increased 68 percent and fatal crashes increased 11 percent. This statistical comparison indicates a 148 percent reduction in fatal crashes per 100 million miles driven.

The improvement indicates that the industry is getting safer: better trucks, safer roads, a higher level of driver professionalism, and more informed fleet management. The common denominator driving these improvements is technology.

In addition to saving lives—the number one reason for continued safety improvement—there is a financial incentive. The average cost of a crash involving a truck in 2008 was \$100,470 (U.S. Federal Motor Carrier Safety Administration's 2005 cost adjusted by the Bureau of Labor Statistics for 2008 equivalent).

24/7 Safety Inspections on the Horizon

The December 2007/January 2008 issue of *Light and Medium Truck* magazine article predicted that new technology would radically change truck safety in coming years. Two federal highway safety regulators explained in the article that these innovations would lead to wireless government inspections of every truck two or three times a day rather than the current rate of once every five or six years.

Even though they did not anticipate financial support for the trucking industry, they speculated that enough information gathered by their agency would demonstrate that new safety devices lowered truck accidents significantly. This information is likely to prompt the insurance industry to extend some kind of discount to trucks that have extra safety devices.

One regulator envisioned a possible nationwide system in which every truck will be equipped with a monitoring device enabling it to communicate with all other trucks, fleet headquarters and government devices. He added that the government plans to install roadside devices able

to read the onboard monitors along all the nation's highways. The agency already tested the concept and is conducting more extensive testing.

One regulator went so far as to say that eventually, in five or 10 years, these monitoring devices can do away with spot inspections by police officers or inspectors at weigh stations. If the data shows that the truck has no problem, the driver will receive a signal to continue driving. If there's a problem, the device will send the driver a red light, indicating a stop is warranted, so authorities can inspect the truck.

Free Enterprise Response

Necessity is the mother of invention, and free enterprise generally responds by creating solutions for problems. In the trucking industry's case with its need to improve safety, there are a growing number of systems that automate safety and address the top seven causes of fatal accidents involving trucks:

- Fatigue, drowsiness, sleep
- Failure to keep in the proper lane
- Speed exceeds the posted speed limit or road conditions
- Insufficient attention (talking, eating)
- Failure to yield right-of-way
- Failure to obey traffic signs
- Following improperly

These systems initiate actions—without driver intervention—that either prevent accidents or warn drivers of unsafe conditions. These include cruise control, lane-departure warning systems, collision-avoidance warning devices, and electronic driver logs. This paper will discuss safety-boosting products in the sections that ensue.

But a discussion of these products should begin with a pivotal—and promising—technology that generates data about driver behavior, serving as an early warning system about driver behaviors that may pose safety threats. The electronic onboard recorder (EOBR) happens to be the most debated safety resource as well. It's an issue that has been knocked around since the mid-1990s.

The Federal Motor Carrier Safety Administration (FMCSA) in 2004 proposed that EOBRs be installed in carriers with poor safety records. The proposal was extremely controversial with owner-operators and smaller fleets especially concerned over the cost of these devices. Others worried about 'Big Brother' keeping tabs on them. The anticipation that the junior President Bush was going

to legislate that EOBRs be installed in heavy-duty trucks before he left office was unfulfilled. The Obama administration seems to be in favor of the initiative and is reviewing it.

The FMCSA's "2009 Federal Most Wanted List" includes the National Transportation Safety Board's (NTSB) initiative to get all interstate commercial vehicle carriers to use EOBRs to collect data on both driver hours of operation and accident conditions. As the agency that deals with the aftermath of crashes, the NTSB wants more data about truck crashes on par with what they get from "black boxes" onboard airplanes and railcars.

Evolution of EOBRs

The arguments against EOBRs have lost their luster as the cost of minimally compliant devices has dropped and become quite affordable. In fact, many independent drivers embrace EOBRs because it relieves them of onerous paperwork associated with logbook entries.

The view that EOBR data provided too much fodder for attorneys to bring legal actions against trucking firms and drivers has evolved. The new-school perspective sees this data as a way to protect drivers from frivolous or unfounded legal actions and clear them from legal responsibility.

Even industry naysayers can't argue that data such as speed, shifting patterns, RPMs, and electronic driver logs minimizes the margin for manipulation and improves information accuracy. When used to reshape driver behavior through mentoring, coaching and training, this data is extremely valuable in helping fleets operate more safely and therefore more efficiently.

However, information without action will not generate improvement. Managers need to address driver-performance issues as they happen to be most effective, and electronic real-time information is the ticket. It's the catalyst for generating driver awareness and focus, as well as getting to the root causes of undesirable behavior/performance that may lead to safety violations and accidents.

Perhaps the most effective action for spawning desired behavior is tying it to compensation. Then drivers will appreciate the opportunity to learn from information, because behavior is often rote and not conscious.

A convenient training tool for drivers to learn and adopt safe driving behaviors is a series of truck safety training programs that run on in-cab computers. Tied to EOBRs, these modules run only when a vehicle is at rest and automatically shut off when the motor is running. The fleet manager can easily monitor the driver's progress with the ability to see which modules the driver completes within an allotted time frame.

Recorded Event Data: Proactively Preventing Accidents

Three types of events—sudden acceleration, sudden deceleration and customized speed triggers—activate recordings. These events reflect driving behavior that is closely aligned with accidents and thus provide fleet managers a tool to proactively manage and monitor driver behavior in the moment and ultimately take corrective action to prevent accidents.

Recorded onboard event data enables proactive behavior management by reconstructing events using time of event, odometer reading, vehicle speed, engine speed, GPS location, and heading. Which data (and specific threshold) is urgent and should be immediately transmitted, and which can be transmitted in the next scheduled download, is determined by fleet management.

A second-by-second recorded view of an incident helps managers reconstruct, analyze, and determine driver reaction by accessing key variables. Onboard events may never be erased.

As a post accident information resource, the real-time communication informs safety managers about an accident before anyone else, allowing them to make decisions when they need to be made. The recorder can capture information occurring 60, 120 or 170 seconds before the event, and 30 seconds after the event to accurately reconstruct accidents. The data is available for viewing through a Web interface or PDF, or may be downloaded in a .csv file to customize reports.

Speed Monitoring: Minimizing High-Risk Behavior

Over 40 percent of all crashes involving trucks occur at truck speeds at and above 55 miles per hour and excessive speed is a major factor in 30 percent of all fatal truck accidents. Each year, speed-related crashes result in nearly 1,600 deaths and \$6 billion in lost productivity in the U.S. In addition, it is a leading contributor to poor fuel economy and vehicle maintenance costs.

A speed monitoring service helps fleets identify and minimize high-risk driving behavior associated with accidents. Tied to GPS tracking, the service enables managers to view events on a map, and monitor, rank and rate drivers on all types of roads, nationwide.

The context (where excessive speeding occurs) and comparative analysis enable safety managers to control speeding on highways, residential streets, in school zones or even by weather conditions. It provides reporting and analytical tools to help quickly identify problem areas for training drivers and tracking their improvement over time. Managers can program speed thresholds for event reporting. Together with its mapping capability, the service generates a report every morning of events—where they occurred, how many, and the severity of each.

Analysis across hundreds of millions of vehicle miles and different vehicle types shows sustained month-over-month improvements in driver behavior derived from the use of a speed monitoring service. It reduced excessive speeding by 50 percent and significantly reduced the expected accident rate. When used as part of a fleet safety program, this service has the potential to improve insurance rates and coverage.

Electronic Driver Logs: Preventing Accidents Caused by Fatigue

Driver fatigue, drowsiness and sleep are some of the most common causes of accidents involving trucks. There are strict regulations governing hours of service designed to prevent these causes. An electronic driver log system is the most effective way to monitor and document HOS, because it is a far cheaper and faster approach than paper logs. But most important, it is accurate—so much so it has become the de novo standard for law enforcement personnel, because it forces certification compliance between drivers and dispatchers.

Instead of drivers taking time to manually enter data, the EOBR records the data. Drivers save 20-40 minutes each day, or an average of 50 hours annually, in pre-trip preparation, duty status changes at each stop, preparing for roadside inspections, crossing borders, and calculating load assignments.

In addition to saving time for drivers, electronic driver log systems streamline back office processes. The annual 51 million hours that the industry's back office personnel spend reviewing and storing log records time savings for the industry adds up to \$63.3 million in not having to review paper logs for mistakes to ensure accuracy and scanning/imaging them into an electronic system.* Paper is eliminated, and the system automatically purges log data after the required six-month period.

* Source Data: Tear Up the Paper, iFOCUS Electronic Onboard Recorders, iTECH, December 2004/January 2005

Lane Departure Warning: Keeping Drivers Focused

Research by the American Association of State Highway and Transportation Officials (AASHTO) revealed that 58 percent of total automotive-based fatalities were related to lane departures in 2006. The organization estimates that a lane departure occurs every 21 minutes in the U.S. Lane departure warning (LDW) systems help reduce the number of motor vehicle crashes and the severity of crash-related injuries.

The LDW is designed to address inadvertent lane change, sideswipe or run-off-road accidents, and has the potential to save thousands of lives every year. In fact, five fleets have reported over 712 million combined miles with their LDW systems and have recognized an average 77% decrease in LDW-preventable accidents.

The LDW system is a small, integrated unit consisting of a camera, onboard computer, image recognition software and proprietary algorithms. The LDW system can detect when a vehicle begins to drift toward an unintended lane change. When this occurs, the unit automatically emits a distinctive “rumble-strip” sound — alerting the driver to make a correction. It works effectively both day and night and in most weather conditions where lane marks are visible.

Truck drivers report that it is a big help in fog, rain and other low-visibility conditions. The LDW system warns drivers of these unintentional drifts anywhere there are lane markings. It warns on the shoulder-line, centerline and between lanes, and picks up both solid and dashed lines; even if the lines are heavily faded. Truck drivers also report that the LDW is an effective warning about the onset of fatigue, nudging them to get off the road and take a break.

The system captures driver performance data, which can be delivered directly to fleet operators through integration with onboard and mobile communications systems and the LDW system's data server. When combined with electronic driver log information, fleet and safety managers have the tools to identify driver specific behavior and patterns.

Vehicle Control

In addition to managing driver behaviors, controlling the vehicle promotes safety at the same time protecting against cargo theft, which exceeds \$10 billion annually in the U.S. There is technology that enables dispatchers to shut down a vehicle remotely and safely. It reduces the vehicle's speed in preset increments (e.g., 10 mph every 30 seconds), which allows the vehicle to be slowly and safely brought to a controlled stop. Prior technologies have allowed only for instant shutdown of the vehicle, which has exposed carriers to liability.

This same company offers a passive system that automatically engages without driver intervention to secure an unattended, idling vehicle. It prevents normal operation until proper driver authentication has been provided in an onboard keypad. A dispatch center can manage the system, which offers features such as remote driver code change and tamper notification to dispatch.

Together, these technologies provide an unprecedented level of control for the trucking industry.

Tying it All Together

Each technology provides its own rewards, but the totality generates a comprehensive picture that works in tandem to optimize safety. A system that can synthesize and report all data from all behavioral areas (speed, deceleration, acceleration, location) can be used for ranking driver performance and predictive analytics.

A customizable dashboard and/or reporting system that conveys all of the information in a single snapshot or text report makes the information even more helpful. The fleet's safety leader can rank/prioritize certain behaviors and thresholds to create a driver scorecard for each driver. These scorecards can be compared to the goals of the terminal, region, and fleet, as well as to other drivers' performance in the terminal, region, or fleet to identify drivers that demonstrate risky behavior. Terminal and regional managers may need limited versions of these dashboards/reports/scorecards.

As "proof," these reporting tools are effective for raising driver awareness and coaching drivers for behavior modification. The information can also drive predictions about which driver is more likely than the fleet average to have an accident and how much more likely the occurrence is. A flexible system that ties all the information together enables management to configure reporting formats, frequency, etc. to meet their needs is key to leveraging the full power of the information.

More robust technology will keep safety managers better informed to help make trucks, drivers, and roads safer. Accident reduction means the trucking industry saves more lives and spends less money—the best of all worlds.

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