

Solutions

Latest Technologies for Enhancing Motor Carrier and Highway Safety

BY TIM ADAMS

FOR THE PAST SEVERAL YEARS, THE FEDERAL Motor Carrier Safety Administration (FMCSA) has been working with jurisdictions and commercial motor carriers to improve motor carrier safety and highway safety. Many technologies have been pilot-tested and implemented as they prove to be valuable and economically feasible to implement. The truck coming off the assembly line today is a much different vehicle than in years past, with many of the new technologies being installed at the manufacturer's level.

The goal of FMCSA is to reduce commercial vehicle crash fatalities on the nation's highways to 1.65 or less per 100 million miles of truck travel by 2008. To achieve this goal, there are numerous ways that both the motor carrier industry and jurisdictional law enforcement agencies must work together to ensure safer highways.

Advancements in technology have helped to reduce truck crashes and fatalities. Additionally, helpful human factors include increased safety belt usage by commercial truck drivers and educating the general public on how to operate around commercial motor vehicles. The FMCSA "Share the Road Safely" and "No-Zone" programs strive to improve the knowledge of all highway users to minimize the likelihood of a crash with a large truck.

With the ongoing effort to reduce fatalities in crashes involving commercial motor vehicles (CMVs), there are many devices being developed to notify the driver of unsafe conditions that could lead to crashes. Such technologies include lane departure warning systems, brake monitoring and testing devices, rollover stability systems, forward collision warning systems, and other devices to avoid safety hazards on the highways.

In addition to on-vehicle safety systems, many states have implemented new technologies to monitor vehicles at inspection facilities. Systems have been developed and deployed to identify and screen trucks using on-vehicle transponders and roadside read-

ers, with red-light/green-light indications provided to the driver. This technology provides both economic and safety benefits to motor carriers and enforcement agencies. Keeping the safe and legal carrier on the highway allows law enforcement officials to focus on the unsafe and non-compliant motor carriers.

Improving Safety and Security

The events of 9/11 changed the way all of us look at safety and security. The focus on commercial motor vehicles expanded from an emphasis on safety and credentials to a broader perspective that also includes homeland security concerns. Several programs have been developed to try to identify motor carriers and drivers that might be considered a security risk. In addition, efforts have been strengthened to try to identify haulers of hazardous materials and track those hazardous materials shipments on our highways.

The Kentucky Transportation Cabinet has developed and deployed an integrated system to bring together the critical elements of safety and security monitoring of commercial vehicles. In July 2005, the Integrated Safety and Security Enforcement System (ISSES) came online at the London, Kentucky weigh-station on Interstate 75. The technology includes:

- ▶ **RADIATION PORTAL** monitors to detect radioactive material.
- ▶ **AN INFRARED** monitoring system to detect apparent brake deficiencies.
- ▶ **AN AUTOMATED** license plate reader.
- ▶ **AN AUTOMATED** system using Optical Character Recognition (OCR) technology to read the U.S.DOT number.
- ▶ **A LASER** scanner to measure and classify the vehicle.

The ISSES integrates all these technologies into a single system, with one user interface. Enforcement personnel can use the system to determine if there are any problems with a vehicle as it passes through the weigh-station. Additionally, the vehicle's

weight is measured using a weigh-in-motion (WIM) scale on the ramp as the vehicle approaches the scale house.

The ISSES technology helps law enforcement officers address safety and homeland security issues related to vehicle condition, company safety/security record, and the presence of radioactive materials on board. If such hazards are detected, the vehicle is pulled in for a more detailed inspection.

How the Technology Works

As the vehicle approaches the ISSES scale house, the vehicle's brakes can be monitored (using the infrared images) to detect any inoperable brakes. This removes the guesswork from visual prescreening and allows inspectors to focus on vehicles with apparent brake deficiencies. In about three seconds, the inspector can identify if the vehicle's brakes are functioning properly.



Top, each vehicle is scanned as it passes through ISSES scanners and data is passed to a computer located in the scale house. Bottom, an example of the Infrared Image that is displayed on a video terminal located in the weigh station.



The Infrared camera passes the Infrared and color image to a video terminal located in the weigh station.

The principle behind this technology is simple—the absence of detectable heat emanating from a braking system is an indication of brake failure. Using an image from the infrared camera, the inspector can determine that a more thorough inspection of the vehicle's brakes is warranted and identify which brakes to concentrate on.

Many jurisdictions, including Kentucky, have implemented such infrared technology mounted on mobile units to make the systems usable in multiple locations. At the ISSES site in Kentucky, the infrared technology was installed at a fixed location with the display and controls being inside the scale house.

Brake problems are the primary reason for vehicles being placed out of service from a safety inspection. The use of infrared technology gives enforcement officials a great tool to identify vehicles that need a more detailed inspection and improve the efficiency of their screening program.

Identification Is Key

Proper identification of the vehicle and operating carrier is another vital piece of the puzzle to improve safety and security on the highways. Using a digital camera and Optical Character Recognition technology, the ISSES system takes images of the side of the vehicle and scans those images to automatically find and read the U.S.DOT number.

This information can be checked against state or federal databases to obtain motor carrier information, thus eliminating the need for manual data entry.

Using the U.S.DOT number, the carrier name, safety rating and other vital information on the carrier can be determined to ensure that the motor carrier is in good standing and has not been placed out of service. Additionally, based on several criteria, a determination can be made on whether the enforcement official should stop the vehicle for further inspection of the carrier's credentials.

The ISSES system also utilizes an automated license plate reader to read the vehicle's license plate number. This number can be checked against appropriate databases to determine the validity of the vehicle registration, the vehicle identification number, vehicle type and other vital information.

The Kentucky Transportation Cabinet has contracted with the University of Kentucky Transportation Center to evaluate the

ISSES system and to work with the vendor to improve and enhance the system to make it a seamless part of the weigh station operations. The ISSES system is an example of multiple technologies being deployed and integrated to improve the efficiency and effectiveness of the operations while making great strides in improving highway safety, security and compliance.

In addition to the facility on I-75 in London, Kentucky, two more ISSES units have been installed in Kentucky—one on I-75 in northern Kentucky at the Kenton County weigh station and the other on I-65 north at the Simpson County weigh station. A fourth ISSES unit is planned for installation in May 2007 on I-24 in western Kentucky at the Lyon County weigh station.

For detailed information on the ISSES system, contact David Jackson, Deputy Commissioner of the Kentucky Transportation Cabinet, Department of Vehicle Regulation, at (502) 564-7000, or Tim Adams, AAMVA Program Director for MCS, at (502) 845-0398. ■

The Kentucky Transportation Cabinet has contracted with the University of Kentucky Transportation Center to evaluate the ISSES system and to work with the vendor to improve and enhance the system to make it a seamless part of the weigh station operations. The ISSES system is an example of multiple technologies being deployed and integrated to improve the efficiency and effectiveness of the operations while making great strides in improving highway safety, security and compliance.