Report on DOE Motor Vehicle Fatalities, Injuries, and Damage CY 2005-2009

Supplement: Hazard Controls

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APPENDIX 1. HAZARDS CONTROLS

The traditional hierarchy of hazard controls is to

- eliminate the hazard,
- apply engineering controls,
- implement administrative controls, and
- use personal protective equipment.

When the safest control, i.e., elimination of the hazard is not feasible, the preferred solution is to sequentially evaluate the next three control strategies, rejecting each only if it is not feasible. Succeeding controls are not generally as protective as those higher on the list. In the case of motor vehicle operation at DOE, hazard elimination is not feasible. Transportation and travel are essential functions. Recognizing this, the role of hazard controls is to prevent injury and damage and to reduce severity when it occurs. The discussion below presents some of the control options that are currently available.

ENGINEERING CONTROLS

While elimination of hazards is the most effective means of reducing risk, engineering controls are the second most effective means. Engineering controls for motor vehicle safety encompass *roadway design* and *vehicle design*. DOE roads are designed and maintained according to national and local highway standards. Unsafe road conditions may be recognized by the site and individually corrected. Some DOE security controls have been associated with vehicle damage and employee injury, including gates and pop-up barriers.

Other roadway sources of vehicle damage and injury include speed bumps, poles, manhole covers, cut-off valves, and other obstacles in a driver's pathway that might or might not be visible to the driver, as well as, ditches and objects located on either side of roads that are struck when a vehicle leaves the roadway. Various Occurrence Reporting and Processing System (ORPS) reports have recommended site-specific corrective actions to improve signage and visibility, improve crosswalks, and relocate barriers. One onsite injury was caused by a vehicle striking a Jersey barrier. Without further information about this incident, it is not possible to determine if the barrier prevented greater damage by preventing a rollover or striking obstacles off-road, or if the barrier created a hazard when the vehicle left the lane of travel.

Ice and snow are perhaps the most dangerous roadway hazards and require ongoing maintenance whenever wintry conditions exist. Over the 5-year period of 2005-2009, there was just one motor vehicle injury reported in the Computerized Accident/Incident Reporting System (CAIRS) that was associated with icy conditions on DOE roadways. It occurred the morning after Christmas, suggesting that the holiday may have played a role in disrupting road maintenance. Safe roads are essential for safe driving.

Vehicle design continues to evolve and improve. One DOE challenge is to maintain an awareness of these changes and replace obsolete vehicles that lack newer safety controls. The Sections that follow discuss vehicle design improvements. One consideration should be to alert DOE drivers to differences in the DOE vehicles compared to their own vehicles. Owners may be used to newer safety features in their own vehicles and assume that the older DOE-assigned vehicles are equally equipped, or conversely, drivers may not be familiar with the safety features on DOE vehicles. Examples include electronic stability controls, air bags, and antilock brakes.

The other vehicle engineering design challenge is to be sure that DOE drivers are familiar with the operation and handling of vehicle types that are different from their own vehicles. The Accident Investigation Board found that the Lawrence-Livermore National Laboratory (LLNL) driver who was fatally injured in the pickup truck while backing in a parking lot was unfamiliar with driving that type of truck.

Drivers who become used to various safety technologies, such as radar-based parking-assistance systems, antilock braking systems, or lane departure systems, may be more prone to driver error when they drive vehicles that do not have these technologies. In testimony to the National Highway Traffic Safety Administration (NHTSA) the American Automobile Association's (AAA) Managing Director of Government Relations and Traffic Safety Advocacy, reported examples of drivers backing into other vehicles or objects when driving a vehicle without a parking assistance system "because they had grown accustomed to receiving a warning if they were in danger of striking another vehicle or object while backing up. Might drivers of vehicles with lane-departure warning systems, for example, become accustomed to receiving warnings, and consequently be more likely to crash in the event of driving a non-equipped vehicle, or might such technology result in their devoting less attention to the driving task and thus increasing their risk of being involved in other types of crashes not addressed by the technology? In the most general terms, we must acknowledge the possibility that behavioral adaptation may attenuate the safety benefits of new safety technologies, and find ways to mitigate this."[1]

What this may mean for DOE drivers is that their privately owned vehicles may be equipped with safety devices not common to the DOE vehicles they have been assigned, or vice versa. The DOE employee asked to perform driving functions in an unfamiliar vehicle may suddenly encounter critical situations which warrant locating emergency brakes, defoggers, windshield wipers, etc. Drivers new to the vehicle may also require education regarding the function and performance of antilock braking systems, backup and parking assistance systems, air bags, seat belts, vehicle stability controls, and tire pressure monitoring in varietal driving conditions. Adapting to these differences on is more than just developing a familiarity with the use of the DOE-assigned vehicle controls and handling characteristics; it requires continual mindfulness while driving.

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[1] Testimony submitted by Jill Ingrassia, Managing Director Government Relations and Traffic Safety Advocacy of the AAA, to NHTSA on January 4, 2010 http://www.regulations.gov/search/Regs/home.html#docketDetail?R=NHTSA-2009-0171)

Electronic Stability Controls

What is electronic stability control?

> *Electronic Stability Control (ESC) is a safety system designed to recognize adverse driving conditions by 1) continuously measuring and evaluating the speed, the steering wheel angle, the yaw rate, and the lateral acceleration of a vehicle from various sensors and 2) using those measured data to compare a driver's steering input with the vehicle's actual motion. If an unstable situation is detected, then ESC automatically intervenes to assist the driver and stabilize the vehicle by applying the brakes to individual wheels as needed and possibly reducing engine torque. This technology is expected to reduce the number of crashes due to driver error and loss of control, because it has the potential to anticipate situations leading up to some crashes before they occur and the capability to automatically intervene to prevent them. A major benefit should be the reduction of single-vehicle crashes that involve losing control and running off the road.*[2]

All passenger cars, sports utility vehicles (SUVs), vans, and trucks with a gross weight less than 10,000 pounds manufactured on or after September 1, 2011 must have electronic stability controls installed, according to 49 CFR 571.126. This standard was promulgated in 2007 and provided a phase-in for 2008-2011, requiring that at least 55 percent of these vehicles manufactured on or after September 1, 2008 be so equipped, with increasing percentages each year until 2011.[3]

According to the Insurance Institute of Highway Safety, a nonprofit researcher funded by insurers, 100 percent of new SUVs in 2009 were equipped with electronic stability control systems, as were 74 percent of cars.[4] The technology is particularly useful on SUVs which tend to be top-heavy and more prone to rolling over.

"In Institute studies, ESC has been found to reduce fatal single-vehicle crash risk by 51 percent and fatal multiple-vehicle crash risk by 19 percent for cars and SUVs. Many single-vehicle crashes involve rolling over, and ESC effectiveness in preventing rollovers is even more dramatic. It reduces the risk of fatal single-vehicle rollovers by 75 percent for SUVs and by 72 percent for cars. If all vehicles were equipped with ESC, as many as 9,000 fatal crashes could be avoided each year."[5]

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2 Dang, J.N. 2007. Statistical analysis of the effectiveness of electronic stability control (ESC) systems – final report. Report no. DOT HS-810-794. Washington, DC: National Highway Traffic Safety Administration. Accessed on 1/13/2010 at www-nrd.nhtsa.dot.gov/Pubs/810794.pdf

3 49 CFR Part 571.126. Electronic stability control systems.

4 Insurance Institute for Highway Safety. Vehicles equipped with Electronic Stability Control (ESC). Accessed on 1/13/2010 at http://www.iihs.org/ratings/esc/esc.aspx

5 Insurance Institute for Highway Safety. Q&As: Electronic stability control. Accessed on 1/13/2010 at http://www.iihs.org/research/qanda/esc.html

NHTSA estimates ESC will reduce single-vehicle crashes of passenger cars by 34 percent and single vehicle crashes of sport utility vehicles (SUVs) by 59 percent, with a much greater reduction of rollover crashes. It also estimates that ESC will save 5,300 to 9,600 lives and prevent 156,000 to 238,000 injuries annually in all types of crashes once all light vehicles on the road are equipped with ESC.[6]

"About half of the fatal passenger vehicle crashes that occur each year involve a single vehicle. Equipping vehicles with ESC can reduce the risk of involvement in these crashes by more than 50 percent."[7]

Electronic stability control on medium and large trucks and buses has potential to prevent some rollover crashes associated with lateral skidding, but the benefits have been estimated to apply in only 1 to 1.5 percent of all crashes.[8]

Tire Pressure Monitoring Systems

It is widely recognized that proper tire pressure is important for safe vehicle operation because deviations from the manufacturer's recommended tire inflation pressure can impact vehicle safety in vehicle handling and stopping distances. It can also increase the incidence of blowouts and tread separation. Vehicle studies have revealed that 28 percent of light vehicles, such as passenger sedans, vans, and SUVs, have at least one underinflated tire. A recent NHTSA study on the effectiveness of tire pressure monitoring systems (TPMS) demonstrated that while these systems reduce tire under-inflation, a side effect is an increase in over-inflation, although not at dangerous levels. In vehicles equipped with TPMS, 57 percent of the vehicles had correct tire pressure, compared with only 43 percent without TPMS.

In 2005, NHTSA required installation of a TPMS in all vehicles with a gross weight less than 10,000 pounds manufactured after September 1, 2007, with a phase-in during 2005-2007. "This final rule requires installation in all new light vehicles of a TPMS capable of detecting when one or more of the vehicle's tires, up to all four tires, is 25 percent or more below the manufacturer's recommended inflation pressure (placard pressure) or a minimum activation pressure specified in the standard, whichever is higher."[9] The warning system alerts the driver to the need to inspect the vehicle's tires and to correct the inflation pressure. It should be noted that this alarm system only signals when a tire is more than 25 percent underinflated. It cannot be relied upon to alert drivers to lesser degrees of under inflation that could still adversely affect safety performance and fuel economy. This new engineering control requires that drivers know how to respond to alarm activation because a TPMS does not correct the problem; it only alerts the driver. As TPMS becomes more widespread, DOE

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6 49 CFR Parts 571 & 585. Accessed at: http://www.nhtsa.gov/Laws+&+Regulations/Electronic+Stability+Control+(ESC)

7 Ibid.

8 NHTSA. Crash Problem Definition and Safety Benefits Methodology for Stability Control for Single-Unit Medium and Heavy Trucks and Large-Platform Buses. Accessed on 1/13/2010 at www.nhtsa.dot.gov/staticfiles/DOT/NHTSA/NRD/Multimedia/PDFs/Crash%20Avoidance/2009/811099.pdf

9 49 CFR Part 571.138. Tire pressure monitoring systems.

employees will become accustomed to it in their own vehicles and expect their DOE vehicles to also have the system. They may not perform tire checks because they will assume that the DOE vehicle will provide a warning if pressures are low.

Although the value of TPMS in preventing significant under inflation has been validated, tire pressures still need to be manually checked and NHTSA recommends doing so once a month and before setting out on a long trip[10]. The recommended tire pressures are posted on the driver's door frame for ready reference. Drivers who observe the TPMS warning indicator lighting up should check their tire pressures and fill the tire(s) as soon as it is feasible to do so. Provision of a tire gauge in each vehicle, along with use instructions, would help drivers ensure that tire pressures meet the manufacturers' recommended levels. A possible cause of the overinflated tires mentioned above is the inaccuracy of service station gauges at their air pumps.

Air Bags

Air bags were introduced in the mid 1990s and have been standard equipment on new vehicles since 1998. For passenger cars, air bags have been required since 1997, while trucks, buses, and multipurpose vehicles with a gross weight of 8,500 pounds or less were required to have passenger and right front passenger air bags in all vehicles manufactured not later than 1998.[11]

NHTSA calculated that air bags reduce fatalities by 17 percent (for drivers with front corner or offset frontal impacts who wore seat belts) to 36 percent (for unbelted right front passengers in a direct frontal crash). For direct frontal impacts, the combination of seat belts and air bags reduce fatalities by 74 percent. For front corner or offset frontal crashes, the seat belt and air bag combination reduces fatalities by at least 48 percent. Overall, NHTSA estimates that for all frontal crashes, fatalities are reduced by 61 percent, relative to an unrestrained occupant without air bags.[12]

Seat Belts

Seat belts are both an engineering control and a personal protective device, installed in nearly all highway vehicles except buses. Seatbelt use is discussed later in the section on personal protective equipment.

On November 16, 2009, NHTSA recommended rulemaking to require the installation of seat belts on motor coaches to improve occupant protection.[13] DOE has about 200 buses

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[10] NHTSA. Tire Pressure Maintenance - A Statistical Investigation. DOT HS 811 086. (April 2009). Accessed at: http://www-nrd.nhtsa.dot.gov/cats/listpublications.aspx?Id=C&ShowBy=DocType

[11] 49 CFR Part 571.208

[12] NHTSA. Fatalities in Frontal Crashes Despite Seat Belts and Air Bags. September 2009. DOT HS 811 202. Accessed from: http://www-nrd.nhtsa.dot.gov/cats/listpublications.aspx?Id=C&ShowBy=DocType

[13] NHTSA. Motor Coach Safety Action Plan. 11/16/2009. http://www.nhtsa.dot.gov/portal/site/nhtsa/template.MAXIMIZE/menuitem.f2217bee37fb302f6d7c121046108a0c/?javax.portlet.tpst=1e51531b2220b0f8ea14201046108a0c_ws_MX&javax.portlet.prp_1e515

in its government fleet that are each driven an average of 19,600 miles per year, plus additional buses that are contractor-supplied. Buses transport employees between sites and buildings, as well as out to remote sites on a daily basis.

The ORPS report on the January 29, 2008 head-on bus crash in Idaho that produced multiple injuries noted that "management examined the need to retrofit its motor coach fleet with after-market seat belts… Documents reviewed were accredited lessons learned and motor coach safety standard reports from the NTSB, and the NHTSA".[14] At that time, seat belts were not required by any regulatory authority, although NHTSA was in the process of evaluating the need for passenger restraint systems on large motor coaches. Since the time of that evaluation, NHTSA has now completed its study and as noted above, now recommends seat belts on buses.

Backing Up and Parking Assistance Systems

Using cameras, sonar, or radar backup and electronic parking systems alert the driver when an object is in the rear travel path. Some devices emit a warning sound as the vehicle approaches closer than a pre-set distance. Manufacturers claim that these devices prevent crashes during backing up because they warn the driver of obstacles in the path of travel. General Services Administration (GSA) CRASH data indicate that backing up is a significant source of vehicle damage for DOE government–leased vehicles[15].

Antilock Braking Systems (ABS)

ABS allows the driver to maintain steering control under heavy braking by preventing a skid. In vehicles with ABS, the brakes should be steadily and firmly applied, but in vehicles without antilock brakes, the brake must be pumped when the vehicle starts to slip or slide in order to engage the brakes without skidding. In an emergency, a driver accustomed to ABS, but driving a vehicle without ABS, might apply strong steady pressure to the brake pedal, which could lock the brakes and cause loss of steering control. Conversely, a driver not accustomed to ABS brakes may feel the vibrations when strongly applying the brakes of an ABS-equipped vehicle and start pumping the brakes. This action interferes with the braking system and may cause loss of control. The improved vehicle control provided by ABS may promote more aggressive driving since the driver knows that the vehicle can stop quickly. If this driving behavior is then applied in a vehicle without ABS, more near misses and collisions are likely to occur.

NHTSA recommends the following for better braking:

31b2220b0f8ea14201046108a0c_viewID=detail_view&itemID=3d3fe742eaee4210VgnVCM1000002fd17898RCRD&pressReleaseYearSelect=2009

[14] ORPS Report Number NE-ID--BEA-STC-2008-0001 (1/29/2008)

[15] General Services Administration. Printout of CRASH data for DOE vehicles for the time period 1/1/2002-1/27/2010. Obtained from Helene Mattiello, DOE Fleet Coordinator, on 2/2/2010.

- "To know if a vehicle is equipped with ABS, and what type, read the owner's manual or check the instrument panel for a yellow ABS indicator light after the ignition is turned on.
- When you buy, lease, rent or are assigned a vehicle, always ask if it comes equipped with ABS.
- After consulting the owner's manual for more details, give the ABS a mini-road test. In an unobstructed parking lot, drive the vehicle at a speed above which the antilock brake system activates (usually above 10 mph) and apply the brakes firmly. The antilock brake system is speed-sensitive and will not activate at very slow speeds. Also, it's easier to activate ABS on a wet and slippery surface. The antilock system should prevent the wheels from skidding. Practice NOT pumping the brake."[16]

Onboard Driving Monitors

Onboard driving monitors, sometimes known as electronic on-board recorders or event data recorders (EDR), are electronic devices that record vehicle operation, such as speed, accelerations, decelerations, time spent at top speeds, driving times, and distance travelled. More sophisticated monitors can detect lane departures, following distance and other vehicle movements, as well as indicators of operator attentiveness, such as eye movements. Monitors can be programmed to alert the driver when pre-set parameters are exceeded. This provides feedback to the driver and might help the driver correct unsafe behaviors in the future. Analysis of the records can be used to identify drivers who need additional training or counseling about their driving performance. Schlumberger Corporation, a worldwide oilfield service company, reported that driving monitors "contributed greatly to a reduction in average fleet speed and are partly responsible for the reduction in the severity of accidents. It is believed that the monitors have also contributed to decreased fleet maintenance."[17] The Department of Homeland Security (DHS) Office of Detention and Removal Operations (DRO) is installing GPS monitoring devices on its vehicles to track each vehicle's location, direction of travel, speed, and other telemetric data to help DHS monitor its far-flung fleet. "In addition to providing vehicle locations, the FMS system will help DRO improve fleet maintenance and alert supervisors to bad driving habits, such as speeding, hard braking, and jackrabbit starts that can be dangerous, add to vehicle wear and tear, and waste fuel."[18]

More than 60 percent of all vehicles that are equipped with airbags are also equipped with a "black box" that records data immediately before, during, and after a crash where

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[16] NHTSA. Antilock Brake Systems (ABS). Accessed on 2/1/2010 at: http://www.nhtsa.dot.gov/CARS/PROBLEMS/Equipment/absbrakes/page1.html

[17] Tate, D. Building a Global Driving Program that Delivers Superior Results. Society of Petroleum Engineers. (SPE 86750) March 2004. Accessed at: http://www.slb.com/content/services/resources/technicalpapers/spe/86750.asp

[18] Homeland Security Tracks Fleet via Satellite. In Government Fleet. January 2010. Accessed at: http://www.government-fleet.com/Article/Print/Story/2010/01/Homeland-Security-Tracks-Fleet-via-Satellite.aspx

air bags are deployed.[19] The data typically include vehicle speed, throttle position, air bag deployment, whether brakes were applied, and if the driver was wearing a safety belt. These data can be important for accident investigators, but until recently, their use has been restricted by the need for proprietary data retrieval systems, lack of standardization, and by legal questions about who owns the data. This situation is changing, as NHTSA will require all vehicles with a gross weight under 8,500 pounds manufactured after September 1, 2012 that are equipped with an EDR to meet specified data element criteria, for the owners' manual to contain information about these devices for the consumer, and for manufacturers to make a tool commercially available to access and retrieve the data.[20] The data are the property of the vehicle owner, not the driver, and may also be accessed with a search warrant.

ADMINISTRATIVE CONTROLS

Administrative controls are policies, procedures, work practices, schedules, and training that control hazards. Administrative controls require ongoing management and supervisory attention and employee compliance and because of these attention requirements, tend to be less effective than engineering controls in controlling hazards. Various administrative controls are discussed in the sections below.

Established Programs

DOE requires its contractors and sites to have specific motor vehicle safety programs, based on a self-analysis of their needs. At a minimum, the program must address mandatory licensing requirements, use of seat belts, training for specialty vehicle operators, requirements for vehicle inspection and maintenance, traffic and roadway signs, onsite traffic rules, awareness and incentive campaigns to promote safe driving, and enforcement provisions.[21] OSHA recommends all of these steps and offers a few additional recommendations: top-level management attention and employee involvement, driver agreements, motor vehicle record checks, and vehicle selection.[22] Driver agreements require the driver to sign an acknowledgement of awareness of understanding of the organization's traffic safety policies, procedures and expectations. Driver motor vehicle record checks are intended to screen out unsafe drivers, but it requires both establishing an organization's criteria and performing period record checks. Vehicle selection should consider prior experience with similar vehicles and availability of engineered safety features. For large trucks, noise control should be evaluated in the selection process, as loss of hearing has been documented in CAIRS among a few DOE employees who were exposed to excessive noise in trucks.

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[19] Consumer Reports. Black Box 101: The basics of Event Data Recorders. March 18, 2010. Accessed at http://blogs.consumerreports.org/cars/2010/03/black-box-101-how-event-data-recorders-edrs-work.html

[20] NHTSA Event Data Recorders. 49 CFR 563 Accessed at: http://www.access.gpo.gov/nara/cfr/waisidx_09/49cfr563_09.html

[21] Department of Energy. Worker Safety and Health Program. Appendix A. 10 CFR 851. Accessed at: http://hss.energy.gov/HealthSafety/WSHP/rule851/851final.html

[22] Occupational Safety and Health Administration. Guidelines for Employers to Reduce Motor Vehicle Crashes. Accessed at : http://www.osha.gov/Publications/motor_vehicle_guide.html

Safety campaigns use attention-getting techniques to communicate information that is repeated in a variety of media, such as meetings, posters, brochures, newsletters, fairs, blogs, You Tube, etc. The "Click It or Ticket" campaign to promote seat belt use that grew to a nationwide campaign in 2003, for example, was credited with increasing public awareness and usage.[23] Within the Federal government, the "Every Belt, Every Ride" campaign reminds Federal employees to wear their seat belts when on official travel.[24] At the Idaho National Laboratory, an employee-lead initiative on building awareness of driver blind spots won national recognition.[25]

Training

All drivers of GSA-owned vehicles are invited to take a free 4-hour online defensive driver training course developed by the National Safety Council[26]. Many DOE sites provide general and specialized training in safe driving. Corporate leaders in employee motor vehicle safety often require extensive training for their drivers. UPS requires its new tractor-trailer drivers to receive 80 hours of computer-based and on-road training before operating equipment and its package car drivers must complete 20 hours of computer-based and on-the-road training, plus three safety ride evaluations during their first 22 days on the job and training continues throughout a driver's career.[27] Many companies, such as UPS, Federal Express and Wal-Mart, sponsor the American Trucking Association's National Truck Driving Championships (NTDC) in which drivers with a 1-year accident-free record can compete in local, state, and national competitions to demonstrate their driving skills and knowledge through a written exam, personal interview, pre-trip inspection and highly visible field test. [28] These competitions promote leadership and skills in safe driving and are a fun way for drivers to measure their skills against other safe drivers.

Job Hazard Analysis

Job, or task hazard analysis, is a formal administrative control tool whereby each step in a job or task is identified and analyzed for hazards. Controls for each hazard are then identified and the finished hazard analysis is documented and becomes part of the work

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23 U.S. Department of Transportation National Highway Traffic Safety Administration. Click It or Ticket. Accessed at: http://www.nhtsa.dot.gov/portal/site/nhtsa/menuitem.ce4a601cdfe97fc239d17110cba046a0

24 Occupational Safety and Health Administration. Travelling on federal Business? Accessed at: http://www.osha.gov/SLTC/motorvehiclesafety/seat_belt_flyer.html

25 Idaho National Laboratory. INL employee wins national award for vehicle safety campaign. Oct. 5, 2009. Accessed at: https://inlportal.inl.gov/portal/server.pt?open=514&objID=1555&mode=2&featurestory=DA_508764 .

26 General Services Administration. Driver Training. Accessed at: http://www.gsa.gov/Portal/gsa/ep/contentView.do?programId=15277&channelId=-24550&ooid=19349&contentId=23298&pageTypeId=17110&contentType=GSA_BASIC&programPage=%2Fep%2Fprogram%2FgsaBasic.jsp&P=FFF1

27 UPS. Training for Safety. Accessed at: http://www.responsibility.ups.com/Safety/Training+For+Safety .

28 American Trucking Associations. About National Truck Driving Championships. Accessed at: http://www.truckline.com/programs/ntdc/Pages/default.aspx

package. Periodically, or as conditions change, the analysis is updated. The job hazard analysis tool is applicable to motor vehicle operation. Schlumberger Corporation reports that its worldwide fleet uses a journey management plan to identify local driving risks; local regulations; local policies and procedures, including night driving and convoy practices; management of contract drivers; client requirements; an audit plan; and journey approval by local management. An Internet reporting system for hazard and near miss reporting by the drivers provides data to the local safety committees to gauge potential risks, develop preventative measures, and communicate these.[29]

The Department of Defense developed the Travel Risk Planning System (TRiPS), an interactive online tool for assessing and reducing the risks of long distance travel. The prospective driver completes an online questionnaire regarding destination; length of trip, time of day, type of vehicle; age of driver; driver training; type of roads to be driven (highway, two lane, etc.); amount of sleep during the prior 12 hours; use of medications; and planned use of seat belts, alcohol, and frequency of breaks, etc. Upon submission, the TRiPS program recommends specific risk-reduction measures. The program also requires that the supervisor inspect the vehicle and approve the TRiPS plan before starting the journey. The Army reports that it "currently has 763,177 registered users with over 2,375,000 completed assessments and six fatalities reported during assessed trips"[30]. The Navy implemented TRiPS in August 2006 and as of December 28, 2009, the Navy has nearly 110,000 registered users who have completed more than 159,000 risk assessments with no fatalities. Within the Navy, the use of TRiPS is voluntary, but Navy motor vehicle accident reports require information on whether a TRiPS assessment was performed prior to the travel.[31] In FY 2009, the Navy had its lowest number of military off-duty private motor vehicle fatalities in 9 years and for the first time, no on-duty military or civilian motor vehicle fatalities.[32]

Cell Phone Use and Texting

On January 12, 2010, the National Safety Council (NSC) published its estimate that "at least 28 percent of all traffic crashes – or at least 1.6 million crashes each year – are caused by drivers using cell phones and texting. NSC estimates that 1.4 million crashes each year are caused by drivers using cell phones and a minimum of 200,000 additional crashes each year are caused by drivers who are texting." Janet Froetscher, president and CEO of the NSC stated, "We know that cell phone use is a very risky distraction and texting is an even higher risk. We now know that cell phone use causes many more

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29 Tate. Op. Cit.

30 The Naval Safety Center. Travel Risk Planning System TRiPS. A PowerPoint presentation. Accessed at: http://www.safetycenter.navy.mil/ashore/motorvehicle/TRiPS/TRiPS_overview-ver4_files/frame.htm

31 The Naval Safety Center. Safety Quarterly October-December 2009. Accessed at: http://www.safetycenter.navy.mil/media/monthly/downloads/1st-10.doc

32 The Naval Safety Center. Motor Vehicle Tables. (2/11/2010) Accessed at: http://www.safetycenter.navy.mil/statistics/ashore/motorvehicle/tables.htm

crashes than texting. The main reason is that millions more drivers use cell phones than text. That is why we need to address both texting and cell phone use on our roads."[33]

Research by the NSC and others have shown that hands-free cell phone use is nearly as distracting as hand-held usage[34], and the American public is getting the message. In 2009, about 50 percent supported total bans on cell phones and 80-97 percent supported bans on texting. In recent years, the public perception has changed to rate cell phone use as more serious than other driver distractions.[35] This support doesn't necessarily translate into behavior, as recent surveys have shown that 11 percent of drivers at any one time are using cell phones while driving and 1 percent is texting.[36] A survey in 2008 found that nearly 80 percent of cell phone owners admitted that they used their cell phone while driving.[37] However, as new information becomes disseminated, various initiatives are gaining traction. In January 2009, the NSC called upon its membership to ban all cell phone use and texting while driving. Over 2,000 NSC members responded to a 2009 survey about employee use of wireless communication devices while driving. Major findings were that 469 member companies prohibit both hand-held and hands-free devices while driving for some or all employees and 99 percent said productivity did not decrease.[38]

The NSC offers a "Cell-Phone Policy Kit" for its members which guides them in building widespread support for a ban. As a first step in enacting a phone-free policy, the NSC recommends a series of open meetings with employees to discuss the need for such a policy and to discuss potential barriers and solutions. Top management support is essential for success.

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33 National Safety Council. National Safety Council Estimates that At Least 1.6 Million Crashes are Caused Each Year by Drivers Using Cell Phones and Texting. (1/12/2010). Accessed on 1/26/2010 at: http://www.nsc.org/Pages/NSCestimates16millioncrashescausedbydriversusingcellphonesandtexting.aspx

34 National Safety Council. Cell Phone Fact Sheet. Accessed at: http://www.nsc.org/Pages/NSCestimates16millioncrashescausedbydriversusingcellphonesandtexting.aspx

35 National Safety Council. Public Calls to Reduce Distraction. (Public Opinion Fact Sheet) Accessed from: http://www.nsc.org/Pages/NSCestimates16millioncrashescausedbydriversusingcellphonesandtexting.aspx

36 National Safety Council. National Safety Council Estimates that At Least 1.6 Million Crashes. Op.Cit.

37 Nationwide Insurance. Almost all Americans believe they are safe drivers, yet almost three-quarters guilty of distracted driving, finds survey from Nationwide Insurance. (5/19/2008). Accessed at: http://www.nationwide.com/newsroom/press-release-almost-all-americans-believe-they-are-safe-drivers-2008.jsp

38 National Safety Council. Cell Phone Policy Kit for Employers. Accessed on 2/1/2010 at: http://www.nsc.org/safety_road/Distracted_Driving/Pages/EmployerPolicies.aspx

Hand-held cell phone bans are in effect in California, Connecticut, District of Columbia, New Jersey, New York, Oregon, Utah, and Washington.[39] Texas bans hand-held cell phones in school crossing zones.

Nineteen states have banned texting. They are: Alaska, Arkansas, California, Colorado, Connecticut, District of Columbia, Illinois, Louisiana, Maryland, Minnesota, New Hampshire, New Jersey, New York, North Carolina, Oregon, Rhode Island, Tennessee, Utah, and Virginia[40]. Most of these states enforce this ban as a primary offense.

Two Federal regulatory bans on texting while driving have recently been made. The President banned all texting by Federal government employees while driving on official business or while driving government-supplied vehicles at any time.[41] This ban is now in effect and applies to DOE Federal employees. A DOECAST was issued on January 27, 2010 to inform all employees of this ban.[42] Further, DOE is directed by the Executive Order to encourage its contractors to also ban texting while driving. The Department of Transportation banned texting while driving a commercial motor vehicle in interstate commerce, effective January 27, 2010.[43] Both requirements contain limited exceptions for employees engaged in, or used for, protective, law enforcement, or national security responsibilities or on the basis of other emergency conditions.

The DOT ban on texting was based on a DOT Federal Motor Carrier Safety Administration study of commercial drivers in video-equipped vehicles on normal delivery runs published in September 2009[44]. The study was undertaken because there was insufficient data on distracted behaviors by drivers of commercial vehicles, compared with the numerous studies of light-vehicle drivers. The study examined 4,452 commercial vehicle safety-critical events (crashes, near-crashes, crash-relevant conflicts, and unintentional lane deviations) and found that 81.5 percent had some type of driver distraction listed as a potential contributing factor. The most risky distraction was found to be the driver engaged in text messaging. Text messaging made the driver 23.2 times more likely to be involved in a safety-critical event, when compared with 19,888 baseline observations of non-events during normal driving. A key factor in this risk is the longer duration of time, relative to other distracting tasks, that the driver is not watching the

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39 Insurance Institute for Highway Safety. Cell phone Laws January 2010. Accessed on 2/1/2010 at: http://www.iihs.org/laws/cellphonelaws.aspx .

40 Ibid.

41 Executive Order 13513 of October 1, 2009. Accessed at: http://edocket.access.gpo.gov/2009/E9-24203.htm

42 DOECAST. Federal Leadership on Reducing Text Messaging While Driving. Distributed on 1/13/2010.

43 Department of Transportation Federal Motor Carrier Safety Administration. 49 CFR Chapter III. Regulatory Guidance Concerning the Applicability of the Federal Motor Carrier Safety Regulations to Texting by Commercial Motor Vehicle Drivers. Federal Register 75:17. Pp. 4305-4307. January 27, 2010.

44 Department of Transportation Federal Motor Carrier Safety Administration. Driver Distraction in Commercial Vehicle Operations. September 2009.Accessed at: http://www.fmcsa.dot.gov/facts-research/art-public-reports.aspx?

roadway. On average, text messaging diverted the drivers' eyes from the road for 4.2 seconds during a 6-second interval, potentially allowing a travel distance of 1000 yards if moving at 55 mph. Other risk factors and the increased risk posed by the activity were: using a dispatching device (9.9x), writing (9.0x), using a calculator (8.2x), looking at a map (7.0x), dialing a cell phone (5.9x), and reading (4.0x).

The report found that talking/listening to a hand-held cell phone or a hands-free phone was not associated with increased risk, although reaching for and dialing a cell phone were risk factors. The authors hypothesized that while reaching for a phone and dialing a phone require substantial visual attention, i.e., taking the eyes off the road; but listening and talking engage the driver and may provide an alerting mechanism. Smoking also reduced risk, again, perhaps by providing an alerting mechanism.

When the frequency of performing the behaviors was factored into the analysis, reaching for an object in the vehicle was the highest risk, because it was performed so often. The second highest risk was driver interaction with a dispatching device. The authors recommended that this task should not be performed and/or that design be improved. In contrast, CB radio use while driving did not increase the risk of being involved in a safety-critical event. Drivers typically kept these devices within close reach.

15-Passenger Vans

DOE has 2,172 passenger vans, with an average age of 11.6 years (i.e., older than 1997).[45] The GSA Federal Fleet Report does not indicate how many of these vans are 15-passenger. Fifteen-passenger vans have a higher rate of rollover than smaller passenger vans and minivans under certain conditions. Because of these increased risks, drivers and passengers need to be aware of the handling characteristics and pay greater attention to tire maintenance and road conditions.

<u>Rollover hazard</u>: National Highway Traffic Safety Administration (NHTSA) data shows a significant increase in rollover risk when the van is fully loaded with drivers and passengers. NHTSA took steps to reduce this risk by requiring electronic stability control (ESC) systems on all new 15-passenger vans phased in during 2008 to 2011. Until this phase-in is complete, drivers need tailored instruction, practice, and reminders to maintain vehicle control to prevent rollovers.

<u>Drivers</u>: NHTSA recommends that "15-passenger vans should only be operated by trained, experienced drivers who operate these vehicles on a regular basis… A 15-passenger van is substantially longer and wider than a car, and thus requires more space to maneuver. It also requires additional reliance on the side-view mirrors for changing lanes… 15-passenger van drivers need additional training since these vehicles handle differently than passenger cars, especially when fully loaded."[46]

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[45] GSA. Federal Fleet Report, FY 2008.

[46] NHTSA. 15-Passenger Van Safety. 5/9/2008. Accessed on 1/13/2010 at www.nhtsa.dot.gov/cars/problems/studies/15PassVans/15-PassengerVanConsumerPiece.pdf

Tires: "Fatal rollovers of 15-passenger vans are most likely to involve tire failures. NHTSA research shows that tires on 15-passenger vans are often under inflated and in use past their service life. Aged tires are more prone to failure even if they appear to be new (as in the case of original spare tires). Owners and drivers of these vans need to be especially diligent in maintaining correct tire pressure and must be aware that tires deteriorate over time regardless of use. Some vehicle manufacturers recommend that tires be replaced every 6 years regardless of tread depth. In addition, a number of tire manufacturers cite 10 years as the maximum service life for these tires."[47]

Tire age can be determined by inspecting the DOE code stamped on the inboard sidewall of every tire. The code begins with the letters "DOT" and ends in three or four digits. These denote the date of manufacture, with the first two digits denoting the week of manufacture and the last one or two digits, the year. Thus "168" would mean that the tire was manufactured during the 16th week of 1998 and "2603" would mean that the tire was manufactured during the 23rd week of 2006.

NHTSA recommends that tire pressure be measured before each use. The recommended tire pressures for front and rear wheels are posted on the driver's side door frame. To assist in complying with this recommendation, NHTSA recommends placement of a tire gauge in each van. The NHTSA-required installation of a tire pressure monitoring system (TPMS) is expected to contribute significantly to 15-passenger van safety by providing a warning when tire pressures are too low.

Occupants: Seating is limited to 15 occupants, including the driver. Each occupant needs to wear a seat belt. "An unrestrained 15-passenger van occupant involved in a single-vehicle crash is about three times as likely to be killed as a restrained occupant."[48] For greater stability, passengers should sit in seats that are in front of the rear axle when the van is not fully occupied. Similarly, cargo should be placed forward of the rear axle.

Defensive Driver Training

Defensive driver training and specialized techniques training are highly touted for effectiveness in improving driver-safe performance. Yet, few unbiased studies are available to support this contention. Clearly, there are numerous types of training and perhaps even more variable are the individual skills that licensed drivers already possess. Many organizations sponsor driver training and express satisfaction with the outcomes, but hard data regarding effectiveness are elusive. Anecdotal results abound, including several at DOE, such as the Idaho bus driver who controlled the collided bus to prevent a rollover and a Bonneville Power Administration driver who survived a head-on collision. As with most training, it is most effective when a need is established, learning objectives are identified and measured, and the learning experience is interactive. Three specific training skill needs identified from the CAIRS injuries and CRASH damages are: backing up, dealing with animals in the roadway, and driving in wintery conditions.

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[47] Ibid.

[48] Ibid.

Driver Fatigue and Drowsiness

Fatigue is widely recognized as a major factor in motor vehicle crashes, yet the impact is hard to measure because of subjectivity and the lack of physical symptoms.[49] According to data in the CAIRS system, at least four (4) DOE employees and contractors were injured during the past 5 years because a driver fell asleep at the wheel. Two of these injured employees had injuries severe enough to result in lost or restricted work days. These are the documented cases of lack of sleep as a causal factor in motor vehicle injury; in many cases, the reason for the crash was not specified in the CAIRS report. One DOE traffic death in the past 5 years might have been caused by the driver falling asleep; this cause was suggested by the police investigator, as no other causes were apparent. The driver was returning to the site from a nearby off-site location, driving a government vehicle, and failed to follow a curve in the road, crossing over into oncoming traffic. The DOE driver was killed on impact as the vehicle hit a truck head-on. The collision occurred shortly after 4 p.m. and according to the Police Traffic Collision report, the conditions were: clear weather, daylight, dry roadway, and temperature of 108 degrees Fahrenheit. The heat may have contributed to drowsiness.

NHTSA studies have provided data on the effects of driver fatigue. A study of single vehicle fatal crashes that involved the vehicle running off the road found that sleepiness tripled the probability of this event. In fact, of all the factors studied, including alcohol use, straight vs. curved roads, speed, rural vs. urban, number of lanes, weather conditions, time of day, number of vehicle occupants, inattentiveness, over-correction of vehicle, crash avoiding, driver age, driver gender, and type of vehicle, sleepiness was the single most significant factor.[50]

Crash risk rises with hours of driving, with time of day, and with inadequate sleep. "Two related studies of the trucking industry concluded that number of hours driven had the strongest direct effect on crash risk. Crash likelihood increased steadily after 4 hours of driving, with risks in the 9th and 10th hours that were 80 percent and 130 percent higher, respectively, than those for the first 4 hours… Work practices such as driving for more than 10 consecutive hours, taking fewer than 8 hours off duty, and driving greater numbers of hours over a 7-day period were highly predictive of falling asleep at the wheel in a group of 593 long-distance truck drivers."[51] The Department of Transportation restricts the hours of driving for commercial drivers, but no regulatory limits exist for all other drivers. Commercial drivers may not drive more than 11 hours (for property-carrying vehicles) or 10 hours (for passenger-carrying vehicles) after 10 or 8 consecutive off-duty rest hours, respectively. Hour limits are also imposed for driving

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[49] NIOSH. Work-Related Roadway Crashes - Challenges and Opportunities for Prevention. NIOSH Publication No. 2003-119. Chapter 4, Special Topics. Accessed on 1/26/2010 at: http://www.cdc.gov/niosh/docs/2003-119/default.html#top

[50] NHTSA. Factors Related to Fatal Single-Vehicle Run-Off-Road Crashes. DOT HS 811 232. (November 2009). Accessed from: http://www-nrd.nhtsa.dot.gov/cats/listpublications.aspx?Id=C&ShowBy=DocType.

[51] Ibid.

duties mixed with non-driving duties; and weekly driving hour limits also apply. Despite these hours limits, NHTSA reports that "Insufficient sleep during off-duty time before and during a trip as well as chronic, accumulated fatigue are recognized crash-risk factors that fall outside the scope of hours-of-service regulations in the United States and other nations…a 1995 National Transportation Safety Board study reported that the three most important predictors of fatigue involvement in large truck crashes were the duration of sleep in the last sleep period before the crash, the total hours of sleep obtained in the 24 hours before the crash, and the presence of split sleep periods"[52]

NIOSH concluded that "for employers not covered by the motor carrier regulations whose workers are expected to drive on the job, a driver fatigue management program is a critical element of the overall safety program."[53]

Medical Conditions

Although driver medical emergencies account for just 1.3 percent of highway crashes, these crashes tend to be more severe and the drivers were more likely to be more severely injured or to die as a result of the crash. A NHTSA study of the National Motor Vehicle Crash Causation Survey for the period July 3, 2005-December 31, 2007 reported that, "Incidence of incapacitating injuries is estimated at 24 percent of the drivers who had crashes precipitated by medical emergencies compared to an estimate of 10 percent among other drivers. The fatality rate among drivers who had crashes precipitated by medical emergencies was estimated at 4 percent compared to an estimated fatality rate of 1 percent among other drivers."[54] At least one DOE single vehicle fatality within the past 5 years was precipitated by a driver medical emergency (heart attack).

Crashes precipitated by driver medical emergencies differ from other crashes in a few significant aspects as displayed in the following table[55]:

[52] NIOSH. Work-Related Roadway Crashes - Challenges and Opportunities for Prevention. NIOSH Publication No. 2003-119. Chapter 4, Special Topics. Accessed on 1/26/2010 at: http://www.cdc.gov/niosh/docs/2003-119/default.html#top

[53] NIOSH. Op.Cit.

[54] NHTSA. The Contribution of Medical Conditions to Passenger Vehicle Crashes. DOT HS 811 219. (November 2009) Accessed from: http://www-nrd.nhtsa.dot.gov/cats/listpublications.aspx?Id=C&ShowBy=DocType. Page 9.

[55] Ibid. Page iii.

Crash Descriptors	Crash Driver Characteristics	
	Driver Medical Emergency	Driver with No Medical Emergency
Were in single-vehicle crashes	62%	17%
Driver was sole occupant of vehicle	85%	69%
Departed the roadway before the collision	69%	17%
Crash occurred from 6 a.m. to 11:59 a.m.	More	Fewer
Extent of driver injury:		
Killed	4%	1%
Incapacitating injury	24%	10%
Non-incapacitating injury	27%	14%
Possible injury	24%	22%
No injury	14%	49%

Seizures, blackouts or diabetic reactions (hypoglycemia or hyperglycemia) accounted for 82 percent of the crashes associated with driver medical emergencies. The table below, from a recent NHTSA study, provides estimates of the distribution of driver emergency medical conditions that led to crashes. Seventy-four percent of the drivers in crashes caused by their medical emergency knew that they had preexisting diagnosed medical illnesses.[56] Age is also a factor in medical emergencies.

An estimated 19 percent of the drivers with medical emergencies in crashes reported feeling fatigued, drowsy or irritated prior to the crash, compared to an estimated 5 percent of other drivers who crashed. Age and gender are also factors. NHTSA reported that drivers aged 65 and older had 4.1 percent of their crashes precipitated by medical emergencies, compared to 1.8 percent for drivers aged 25 to 64. Male drivers are overrepresented in crashes precipitated by medical emergencies when compared to other drivers without medical conditions (67 percent versus 54 percent).

For its study of crashes involving medical emergencies, NHTSA concluded that "crashes precipitated by drivers' medical emergencies are not related to vehicle design or roadway integrity as indicated by the type of crashes and manner of collisions. Patient education by health care providers on early warning signs of a health crisis, such as warning signs before seizure attacks, diabetic or hypoglycemic comas, and potential side effects of medications are recommended as the most effective countermeasure."[57]

56 Ibid.

57 Ibid. Page 13.

PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) is generally the last line of defense in hazard control for two reasons: it depends on employee reliability and it is the final barrier to harm. If the PPE fails, the employee may be harmed. Other engineering or administrative controls prevent or reduce hazards, but PPE reduces harm when exposed to hazards. Seat belts are a type of PPE because they require vehicle occupants to actively put on their seatbelts. They do not prevent crashes, but do prevent much of the damage associated with crashes. They are the last barrier to injury. As such, they are highly effective. However, they only work when used.

Seat Belts

Seat belts have been proven to save lives, if worn. DOE requires the use of seat belts where they are provided in vehicles. NHTSA estimates that 84 percent of U.S. drivers wear seat belts (2009). DOE has conducted few recent surveys of seatbelt usage, mostly because informal observations show widespread use. This assumption was challenged in a 1-day DOE Savannah River survey of 200 employees that found about 90 percent seat belt usage in 2009[58]. Greater outreach is planned with a follow up survey in 2010.

In its investigation of seat belt use during the "Type A" investigation of the pickup truck driver who was killed when he fell out of the truck while backing up in a LLNL parking lot, the team discovered that employees have different perceptions about when to buckle up. Some reported that they buckled up as they were leaving, rather than at the time of ignition.[59] As with all personal protective equipment, seat belts must be worn at all times when there is exposure to hazard, which would be at all times when the vehicle is in operation.

Motorcycles

Employees occasionally use their privately owned motorcycles on official travel. Personal protective equipment, such as helmets and outerwear can be mandated by the employer as a condition of operation. A written Job Safety Analysis (JSA) or hazard assessment with personal protective equipment assignment can be used, just as for any other work-related hazard.

Protective Eyewear

Blowing dust and debris can be eye hazards. At least seven DOE employees reported medical treatment for debris blown or thrown into their eyes by vehicles in operation over the past 5 years. Two of these injuries were severe enough to result respectively in 1 day and 2 days away from work or restricted work activity. Eyeglasses or sunglasses can help prevent eye injuries while driving and should be considered if driving with the window down or during dusty conditions. While not as serious as other motor vehicle

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[58] U.S. Department of Energy. Annual Report. Op.Cit. Page 16.

[59] Williams, Tom. Personal Communication.

injuries, dust blown into the eye can interrupt work performance and cause pain and discomfort, sometimes requiring medical treatment. Eyewear can be helpful in preventing this. In addition, properly selected sunglasses can prevent glare and eye fatigue from the sun.

Ergonomic Aids

Accessories that reduce discomfort or vibration may offer relief from the prolonged postures of riding in a vehicle. These are usually individually selected, but if discomfort is reported, an ergonomic assessment may help the employee select appropriate cushions, supports or other aids.

SUMMARY AND CONCLUSIONS

Motor vehicle safety is important to DOE to prevent fatality and injury. With its successes in controlling other work hazards, deaths from motor vehicle crashes have become the number one cause of fatality at DOE, accounting for half of the work-related deaths over the past five years. An analysis of the 187 injuries reported in CAIRS during 2005-2009 that are related to moving motor vehicles show a wide variation in the event characteristics, making control of these varied hazards a challenge.

Just as there are many causes for motor vehicle injuries, there are many possible hazard controls. Not all would be applicable to every site, as each site has a unique mix of driving tasks, vehicles, road and traffic conditions, and driver abilities. The examples of individual site needs analyses documented in recent ORPS recurrence reports on motor vehicle operation attest to the complexity of the challenges ahead.

Seat belt use is the most effective means to reduce injury and fatality in a motor vehicle crash and seat belt campaigns increase utilization by drivers and passengers. An information campaign should alert drivers and passengers to the need to buckle up before putting the vehicle into gear, as opposed to waiting until the vehicle is actually in motion. Last year's parking lot fatality might have been averted had the driver been wearing his seat belt before he started backing out of the parking space. Seat belt use surveys promote awareness and identify vulnerabilities. Installation of seat belts on DOE buses, as now recommended by NHTSA, and reminders for passengers to buckle up when they ride these buses may save lives and will prevent some serious injury in the event of a crash. Air bags are another effective means to save lives and reduce injury in the event of a crash. Air bags reduce fatalities by 17 percent when seat belts are worn. Some DOE vehicles were manufactured before air bags were made compulsory in 1998, and front seat occupants of those vehicles are at increased risk every time those vehicles are driven.

Driver skills and behaviors are critical to safe vehicle operation. Drivers need to be familiar with any vehicle assigned to them. Driver training, provision of information sheets, and use of checklists to assess familiarity with assigned vehicles before authorizing vehicle use promotes greater competence in handling the assigned vehicle. Because vehicle safety improvements change the handling characteristics or recommended driver actions, drivers should be alerted to these differences and encouraged to practice driving before setting out on the road. A special emphasis should be paid to backing up unfamiliar vehicles. The size and visibility of different vehicles make this a particular challenge for drivers. Installation of backup alerting systems may improve safety.

All DOE personnel need to understand the DOE ban on texting and the disciplinary measures announced. All on-the-road communication expectations need to be explored to understand the uses of texting, dispatching, and mobile phones so that the need to use them while operating a vehicle is eliminated. Work planning and establishing schedules for drivers to pull off the road to communicate safely will need to be worked out in team meetings. Awareness campaigns about texting and cell phone usage can provide drivers with positive suggestions for managing communications while driving and remind employees to refrain from talking on the phone with anyone who is driving.

A challenge for DOE is to increase driver safety awareness and sense of responsibility for driving safely. Five specific target issues are vehicle familiarity, pre-trip vehicle inspections, distracted driving, drowsy driving, and awareness of personal limitations due to medical conditions and medication use. Occupational medical clinics can play a significant role in outreach to improve awareness about fitness for driving by addressing sleep, aging, medication effects, hydration, nutrition, and exercise and to encourage individual consultations on these matters.

Engineering controls continue to improve vehicle safety by improving vehicle control and protecting occupants in a crash. Electronic stability controls, tire pressure monitoring systems, air bags, and antilock braking systems are standard equipment on newer vehicles and provide demonstrated benefits in crash and injury reduction. Phase-out of vehicles lacking these engineered safety controls will increase fleet safety and contribute to reductions in motor vehicle crash injury and vehicle damage at DOE. Although DOE has modernized much of its fleet, there are still vehicles in the inventory that lack current safety features. The average age of DOE's owned and GSA-leased fleet was 9.2 years at the close of FY 09, meaning that half of the fleet was manufactured prior to the 2001 model year. Passenger vans average over 10 years in age and consequently, lack electronic stability controls and tire pressure monitoring systems, both proven to be especially important in controlling the higher risks of rollovers by these vehicles.

Provision of a tire gauge and instructions for its use within each vehicle enables drivers to verify safe tire pressures and to respond appropriately to vehicle tire pressure monitoring system alerts. Tire pressure awareness campaigns to remind drivers of the importance of correct tire pressures, to check their tire pressures, to demonstrate where to find the manufacturer's recommended pressures for their vehicle, and how to use a tire gauge may increase awareness of, and attention to, proper tire pressures. Tire pressure is an especially critical element in 15-passenger van safety.

Administrative controls are varied and must be tailored to the site's environment. Driving is a task, just like every other task, and requires setting expectations for outcomes, planning, providing safe and well-maintained equipment, assessing skills, analyzing hazard, and establishing procedures. Use of a JSA process for official business driving heightens awareness of fatigue factors, trip planning factors, driver experience with the vehicle, and specific concerns identified by drivers at that location, as well as opportunities to consider the appropriate vehicle for the task. Periodic license and driving record checks are helpful in identifying potentially unsafe drivers. The use of onboard driving monitors can provide feedback to drivers on unsafe behaviors and alert supervisors to the need for intervention, either to award safe driving or to correct unsafe driving. Visibly promoting safe driving by awards and incentives provides a positive motivation for driver safety improvement. Documented vehicle maintenance and periodic safety inspections should be made available to drivers so they know they are being assigned safe vehicles and are responsible for the vehicle while it is under their control. The Department of Defense significantly reduced its traffic fatalities by offering an online trip planning tool. Its advantage is that it personalizes the risk analysis for the specific trip and driver, and provides appropriate suggestions to reduce that risk. Involvement of the supervisor in approving each trip offers opportunities for safety considerations.