Introduction

Distracted driving events are an emerging cause of motor vehicles crashes and present safety issues for our employees while commuting to/from work or while using a motor vehicle to perform work duties. Members of the Transportation Practice Specialty’s Distracted Driving Committee will participate in a panel discussion on Distracted Driving.

ASSE recognizes that operating a motor vehicle while distracted is a safety issue. The following excerpts from the “ASSE Position Statement on Distracted Driving in Motor Vehicles” highlight the Society’s concerns about the hazards presented by distracted driving.

The American Society of Safety Engineers (ASSE), dedicated to the protection of people, property, and the environment since 1911, recognizes the improved safety of the nation’s roadways that has come from legislative and regulatory initiatives arising out of the commitment of people like our member safety, health and environmental professionals to transportation safety.

Significant debate is now taking place regarding the use of electronic devices for calling and texting while operating a vehicle. The issue is worthy of public
debate, since the inappropriate use of an electronic device while a vehicle is in motion can have catastrophic consequences for individuals and families as well as for employers who fail to enact and enforce policies prohibiting the use of electronic devices while working in a moving vehicle.

The Society's view is that operating a vehicle while distracted is always a potentially unsafe act, and all drivers should be cognizant of the hazards associated with distracted driving. However, ASSE's view is that focusing attention simply on electronic devices in the public debate on distracted driving, though purposeful and well meaning, can also be unfortunate since the same safety risks posed by cellular phones also holds true for a vehicle operator who drives in an unsafe manner while eating, drinking, putting on makeup, reading a newspaper, operating any other electronic device, or some other type of distracting activity where the driver's mind, eyes, and hands are engaged elsewhere than the road ahead and the steering wheel (ASSE 2001; updated 2005, revised 2009).

The panel includes the following speakers:

- Daryl Wigington, Ben E. Keith Company, Vice President of Risk Management
- Tim Healey, Hartford Steam Boiler Inspection and Insurance, Director of Safety
- Nancy Bendickson, Aon, Senior Consultant-Casualty Risk Control

The topics to be addressed include:

1. Overview of Distracted driving issues and impact on organizations with vehicle operations
2. Distracted driving: visual, manual, cognitive distractions
3. NHTSA: Key issues discussion: Research (focused on mobile phone use), voluntary guidelines & regulation update
4. Overview of distracted driving policy enforcement approaches:
   a. Monitoring phone usage data to driving data
   b. Motor vehicle (MV) incident investigation practices; how phone use is evaluated and how to measure other forms of distraction at time of incident
   c. Technology enforcement
   d. Corrective action

The key learning outcomes are to:

- Update on distracted driving issues and their impact on organizations represented by panel members
- Identify driver actions that represent cognitive, visual, and manual distractions
- Update on NHTSA voluntary guidelines and research topics
- Understand different approaches to developing, implementing, and enforcing distracted driving policy
Defining Distracted Driving

Distraction while driving is not a new issue; however, evolution of technology available to drivers has increased opportunities for distraction. Distractions occur when a driver’s attention is diverted away from driving by a secondary task that requires focusing on an object, event, or person not related to driving. Distractions can be categorized by the following types:

- **Visual**: Takes your eyes off road.
  - Reading a map, looking up a number on cell phone, reading a sign
- **Manual**: Takes your hands off the wheel, or feet off the pedals
  - Texting, adjusting radio, dialing your phone, eating, reaching for something dropped on floor, or using vehicle telematics system
- **Cognitive**: Takes your mind off the road
  - Focusing on conversation with passengers, or while talking on cell phone, writing a response to text message, thinking about problem at home or work

Texting is of greatest concern because it involves all types of distraction, and requires a driver to spend more time looking at the phone versus the road. Driving involves three main tasks: **perception, decision, and action**. Texting causes divided attention, which slows down all decisions, making it harder to execute your driving decision.

Distracted Driving from the Employer’s Perspective

For the motoring public, distracted driving has emerged as a major contributing factor in the increase in traffic accidents and deaths for the last ten years. The impact is probably more closely monitored within the business environment. The devastating impact on lives, families, and company operations requires drastic action to reverse this trend.

The U.S. Department of Labor, Bureau of Labor Statistics (BLS) has said that transportation incidents accounted for more than 2 out of every 5 fatal work injuries in 2012. The Transportation and Warehousing Sector of industry has the second highest rate of fatal occupational injuries after the Construction Sector. Driver/sales workers and truck drivers are the occupations with the highest number of fatal work injuries.

Another U.S. Department of Labor entity, the Occupation Safety & Health Administration (OSHA) has stated that year after year, the leading cause of worker fatalities is motor vehicle crashes.

Employers are striving to increase employee safety and eliminate unnecessary risks behind the wheel. There have always been distractions during driving, such as talking with passengers, adjusting controls, looking at the scenery, smoking, and drinking. However, in the last decade, the proliferation of and seemingly human addiction to electronic devices has caused an unprecedented increase in accident risk.

According to the National Highway Traffic Safety Administration (NHTSA), drivers are four times more likely to get in an accident when using a cell phone. Researchers at the
University of Utah have concluded that using a cell phone while driving results in the driver missing important driving cues, including regulatory signs and needs for braking, etc. Ultimately, they suggest that cellular phone use disrupts driving performance by drawing certain amounts of brain processes (up to 37 percent) away from the complex task of driving. Further, a 2005 University of Minnesota study concluded that drivers using cell phones demonstrate a higher level of impairment than an intoxicated driver.

Companies have responded to this risk by implementing a wide variety of controls. These include employee training programs, the creation and enforcement of distracted driving prevention policies, use of emerging technologies to block cell signals/lock phones while moving, the prohibition of cell phone/texting while driving, and the use of other technologies, such as in-cab cameras, to police prohibited use.

As this new risk has grown, so will the tools and approaches used to control the risk.

**NHTSA Distraction Guidelines**

NHTSA is concerned about the effects of driver distraction on motor vehicle safety. Crash data show that 17 percent (an estimated 899,000) of all police-reported crashes involved some type of driver distraction in 2010. Of those 899,000 crashes, distraction by a device or control integral to the vehicle was reported in 26,000 crashes (3% of the distraction-related, police-reported crashes).

For a number of years, NHTSA has been conducting research to better understand how driver distraction impacts driving performance and safety. This research has involved original equipment (OE), and portable devices, various task types, and both visual-manual and auditory-vocal tasks (i.e., tasks that use voice inputs and provide auditory feedback). Additionally, both NHTSA and the Federal Motor Carrier Safety Administration (FMCSA) have sponsored analyses focused on distracted driving, using data from naturalistic driving studies performed by the Virginia Tech Transportation Institute (VTTI).

In June 2012, NHTSA released a “Blueprint for Ending Distracted Driving,” summarizing steps that NHTSA intends to take to eliminate crashes attributable to driver distraction. This document was an update of the “Overview of the National Highway Traffic Safety Administration's Driver Distraction Program” that was released in April 2010 (both documents available at [www.distraction.gov](http://www.distraction.gov)). These two documents summarize NHTSA's planned steps to “help in its long-term goal of eliminating a specific category of crashes—those attributable to driver distraction.” NHTSA's work to eliminate driver distraction-related crashes consists of four main initiatives:

1. **Improve the understanding of the extent and nature of the distraction problem.** This includes improving the quality of data NHTSA collects about distraction-related crashes and improving analysis techniques.

2. **Reduce the driver workload associated with performing tasks using original equipment, aftermarket, and portable in-vehicle electronic devices by working to limit the visual, manual, and cognitive demand associated with secondary tasks performed using these**
devices. Better device interfaces will minimize the time and effort involved in a driver performing a task using the device. Minimizing the workload associated with performing secondary tasks with a device will permit drivers to maximize the attention they focus toward the primary task of driving.

3. Keep drivers safe through the introduction of crash avoidance technologies. These include the use of crash warning systems to re-focus the attention of distracted drivers as well as vehicle-initiated (i.e., automatic) braking and steering to prevent or mitigate distracted driver crashes. Research on how to best warn distracted drivers in crash-imminent situations is also supporting this initiative. NHTSA is also performing a large amount of research on forward collision avoidance and mitigation technologies such as forward-collision warning, collision-imminent braking, and dynamic brake assist.

4. Educate drivers about the risks and consequences of distracted driving. This includes targeted media messages, drafting and publishing sample text-messaging laws for consideration and possible use by the states, and publishing guidance for a ban on text messaging by federal government employees while driving.

One of the steps called for in Blueprint and Overview documents is the development of nonbinding, voluntary guidelines for minimizing the distraction potential of in-vehicle and portable devices. The NHTSA Driver Distraction Guidelines are meant to promote safety by discouraging the introduction of excessively distracting devices in vehicles.

NHTSA has opted to pursue nonbinding, voluntary guidelines rather than a mandatory Federal Motor Vehicle Safety Standard (FMVSS). NHTSA explained in the Initial Notice that voluntary guidelines are appropriate at this time because of the need for additional research on distraction and its effects on driving and because of the rapid pace of technology changes in the area of in-vehicle electronic devices. The agency also noted concerns with the sufficiency of existing data to estimate the benefits of an in-vehicle electronic device regulation and that driver distraction testing involves drivers with inherent individual differences. These individual differences present new challenges to NHTSA in terms of developing repeatable, objective test procedures to determine conformance. After carefully considering all of the comments, NHTSA continues to believe that voluntary guidelines are the appropriate action to take at this time in order to reduce the potential for driver distraction.

NHTSA has stated that guidelines would be developed in three phases. The Phase 1 Guidelines cover original equipment (OE) in-vehicle (i.e., integrated) electronic devices that are operated by the driver through visual-manual means (i.e., the driver looks at a device, manipulates a device-related control with his or her hand, and/or watches for visual feedback from the device). The Phase 2 Guidelines will apply to portable and aftermarket devices that are operated through visual-manual means and will be based on the same general principles as the Phase 1 Guidelines, namely:

- The driver's eyes should usually be looking at the road ahead;
- The driver should be able to keep at least one hand on the steering wheel;
- Any task performed by a driver should be interruptible at any time;
The driver should control the human-machine interface and not vice versa; and
Displays should be easy for the driver to see.

Since light vehicles comprise the vast majority of the vehicle fleet, NHTSA focused its distraction research on this type of vehicle, instead of heavy trucks, medium trucks, motorcoaches, or motorcycles. Therefore, the NHTSA Guidelines are only applicable to light vehicles, i.e., passenger cars, multipurpose passenger vehicles, and trucks and buses with a gross vehicle weight rating (GVWR) of not more than 10,000 pounds.

The NHTSA Guidelines list certain secondary tasks believed by the agency to interfere inherently with a driver's ability to safely control the vehicle. These include activities that are discouraged by public policy and, in some instances, prohibited by federal regulation and state law (e.g., entering or displaying text messages), activities identified in industry driver distraction guidelines which NHTSA agrees are likely to distract drivers significantly (e.g., displaying video or automatically scrolling text), and activities that are extremely likely to be distracting due to their very purpose of attracting visual attention but whose obvious potential for distraction cannot be measured using a task-timing system because the activity could continue indefinitely (displaying video or certain images). The NHTSA Guidelines refer to these activities as "per se lock outs." The NHTSA Guidelines recommend that in-vehicle devices be designed so that they cannot be used by the driver to perform these inherently distracting activities while driving. The list of activities considered to inherently interfere with a driver’s ability to safely operate the vehicle includes:

- Displaying video not related to driving;
- Displaying certain graphical or photographic images;
- Displaying automatically scrolling text;
- Manual text entry for the purpose of text-based messaging, other communication, or internet browsing; and
- Displaying text for reading from books, periodical publications, web-page content, social media content, text-based advertising and marketing, or text-based messages.

**Estimation of Distraction Crash Risk via Naturalistic Driving Studies**

One approach to estimating the driving risks due to various types of distraction is naturalistic driving studies. NHTSA’s focus in developing these visual-manual guidelines has been on data and measures that most closely link to crash risk. Naturalistic data collection is currently the best method available for determining the crash risks associated with distracted driving because it combines two key data sources for estimating crash risk: crash data, and direct observation of drivers to link actual behaviors to consequent crashes and near-crashes. No other method can establish the direct association of distracting behaviors while driving under real-world, non-contrived conditions and crash risk. In naturalistic driving studies, drivers are observed in their natural environment, and, therefore, they are free to drive where they wish. Unlike commanded-task testing (e.g., simulator and test-track studies), in which an experimenter instructs a test participant when to perform a task, test participants perform tasks at will in naturalistic studies. Test participants volunteer to drive a vehicle, their own or one provided to them, fitted with unobtrusive data recording instrumentation to record
their driving behavior. Drivers can be observed in this manner for long periods of time, only
be limited by the amount of data storage available in the data recording system and the
capacity of the researchers to handle the potentially large volumes of data collected.
Naturalistic driving research is labor intensive to conduct. It is also lengthy in duration if
crash or near-crash events are of interest, since these events are relatively rare.

For light vehicles, the NHTSA-sponsored 100-Car Naturalistic Driving Study,
performed by the Virginia Tech Transportation Institute (VTTI), provided information about
the effects of performing various types of secondary tasks on crash/near crash risks.
Secondary tasks include communication, entertainment, informational, passenger
interaction, navigation, and reaching (e.g., for an object) tasks (along with many others). For
the 100-Car Study, VTTI collected naturalistic driving data for 100 vehicles from January
2003 through July 2004. Each participant's vehicle was equipped with a data acquisition
system, including five small video cameras and sensors to measure numerous vehicle state
and kinematic variables at each instant of time. The vehicles were then driven by their
owners during their normal daily activities for 12 to 13 months while data were recorded. No
special instructions were given to drivers as to when or where to drive and no experimenter
was present in the vehicle during the driving. All of this resulted in a large data set of
naturalistic driving data that contains information on 241 drivers (100 primary drivers who
performed most of the driving and 141 secondary drivers who drove the instrumented
vehicles for shorter periods of time) driving for almost 43,000 hours and traveling
approximately 2 million miles.

Data from the 100-Car Study provides the best information currently available about
the risks associated with performing a variety of secondary tasks while driving light vehicles
(vehicles under 10,000 pounds GVWR). While this was a large, difficult, and expensive
study to perform, it was small from an epidemiological viewpoint (100 primary drivers, 15
police-reported, and 82 total crashes, including minor collisions). Drivers from only one
small portion of the country, the Northern Virginia-Washington, DC, metro area, were
represented.

The 100-Car Study was deliberately designed to maximize the number of crash and
near-crash events through the selection of participants with higher than average crash or
near-crash risk exposure. This was accomplished by selecting a larger sample of drivers
below the age of 25, and by including a sample that drove more than the average number of
miles.

Due to the rapid pace of technological change, some devices (e.g., smart phones) and
secondary tasks of great current interest (e.g., text messaging) were not addressed by 100-
Car Study data because they were not widely in use at the time.

Subsequent to the 100-Car Study, the Federal Motor Carrier Safety Administration
(FMCSA) sponsored an analysis of naturalistic driving data to examine the effects of driver
distraction on safety for commercial motor vehicles (three or more axle trucks, tractors-
semitrailers (including tankers), transit buses, and motor coaches). This analysis used data
collected during two commercial motor vehicle naturalistic driving studies. Since the data
analyzed was collected during two studies, this study will, hereinafter, be referred to as the
“Two-Study FMCSA Analyses.”
The Two-Study FMCSA Analyses combined and analyzed data from two large-scale commercial motor vehicle naturalistic driving studies: the Drowsy Driver Warning System Field Operational Test and the Naturalistic Truck Driving Study. The combined database contains naturalistic driving data for 203 commercial motor vehicle drivers, 7 trucking fleets, 16 fleet locations, and approximately 3 million miles of continuously collected kinematic and video data collected over a period of three years (May 2004 through May 2007). This data set was filtered using kinematic data thresholds, along with video review and validation, to find safety-critical events (defined in this report as crashes, near-crashes, crash-relevant conflicts, and unintentional lane deviations). There were a total of 4,452 safety-critical events in the database: 21 crashes, 197 near-crashes, 3,019 crash-relevant conflicts, and 1,215 unintentional lane deviations. In addition, 19,888 time segments of baseline driving data were randomly selected for analysis.

One major source of differences in the results obtained from analyses of the 100-Car Study with those obtained from the Two-Study FMCSA Analyses is the different time frames in which their data collections were performed. The 100-Car Naturalistic Driving Study data collection was from January 2003 through July 2004. The Drowsy Driver Warning System Field Operational Test collected data from May 2004 through September 2005, and the Naturalistic Truck Driving Study collected data from November 2005 through May 2007. Due to the rapid changes occurring in consumer electronics, the specific types of electronic-device-related distraction observed across studies, while similar, were not identical. For example, while the Two-Study FMCSA Analyses found a high safety-critical event risk due to drivers engaging in text messaging, there was no text messaging observed during the 100-Car Study. This is because the widespread popularity of text messaging did not occur until after the 100-Car Study data collection was completed.

Other sources of differences between the results obtained from analyses of the 100-Car Study and those obtained from the Two-Study FMCSA Analyses are that one of the heavy truck studies (the Drowsy Driver Warning System Field Operational Test) covered sample situations likely to produce drowsiness (e.g., long nighttime drives in uneventful conditions). In addition, both truck studies involved work situations.

**Summary of Naturalistic Driving Study Distraction Risk Analyses**

Figure 1 provides a graphical representation of some of the secondary task risk odds ratios determined from the 100-Car Study and the Two-Study FMCSA Analyses. In this figure, a risk odds ratio of 1.00 (shown as “1” in the figure) equates to the risks associated with typical undistracted driving. Risk odds ratios above 1.00 indicate secondary tasks that increase driving risks, while risk odds ratios below 1.00 indicate protective effects (i.e., performing these secondary tasks makes a crash or near-crash event less likely to occur than driving and not performing any secondary task.) This figure provides a quick, visual summary of the risks associated with performing a variety of secondary tasks while driving both light and heavy vehicles.
The various naturalistic data study analyses established several important points about driver distraction that are directly relevant to the NHTSA Guidelines for reducing driver distraction due to device interface design.

Secondary task performance is common while driving. They were observed during the majority (54%) of the randomly selected baseline time segments analyzed during the 100-Car Study analyses. Some secondary task performance involves the use of electronic devices; these secondary tasks are the primary focus of this document. Secondary task performance while driving has a broad range of risk odds ratios associated with different secondary tasks. The observed risk odds ratios range from 23.2, indicating a very large increase in crash/near-crash risk, to 0.4 indicating a large protective effect. Again, a risk ratio of 1.0 means that a secondary task has the same risk as average driving; a risk ratio of 23.2 means that risk associated with performance of this secondary task is increased by 2,220 percent compared to average driving. Any value less than 1.0 indicates a situation with less risk than average driving, indicating a protective effect; a risk ratio of 0.4 means that risk associated with performance of this secondary task is reduced by 60 percent compared to average driving. This indicates that it may be possible to improve at least some secondary tasks with high risk odds ratios (i.e., risky tasks) so as to make them substantially safer to perform. The logical place to reduce crash/near-crash risk odds ratios for these secondary tasks is through improvements to their driver interface. Naturalistic driving research shows that the secondary tasks with the highest risk odds ratios have primarily visual-manual interactions with a relatively small cognitive component. While every secondary task results in some cognitive load, some tasks that may not require a lot of thought, such as reaching for a moving object, are towards the right side of Figure 1. The
secondary tasks, such as interacting with passenger and talking/listening on hands-free phone, create a low visual-manual load for the driver. Both of these secondary tasks have risk odds ratios that are statistically significantly less than 1.00 (at the 95-percent confidence level). These two secondary tasks appear to have protective effects. Since primarily visual-manual secondary tasks have the highest risk odds ratios, and because measurement of cognitive distraction needs further research, the NHTSA Guidelines will initially only apply to the visual-manual aspects of devices' driver interfaces. Phase 3 of these NHTSA Guidelines will cover the auditory-vocal portions of device interfaces.

Long glances (greater than 2.0 seconds) by the driver away from the forward road scene are correlated with increased crash/near-crash risk. When drivers glance away from the forward roadway for greater than 2.0 seconds out of a six-second period, their risk of an unsafe event substantially increases relative to the baseline.

**NHTSA Conclusion**

The goal of these Guidelines is to discourage the implementation of tasks performed using in-vehicle electronic devices, unless the tasks and driver interfaces are designed to minimize driver workload when performing the tasks while driving. These Guidelines specify criteria and acceptance test protocols for assessing whether a secondary task performed using an in-vehicle electronic device may be suitable for performance while driving, due to its minimal impact on driving performance and, therefore, safety. These Guidelines also identify secondary tasks that interfere with a driver's ability to safely control the vehicle, and to categorize those tasks as being unsuitable for performance by the driver while driving.

**Impact on Organizations and Overview of Distracted Driving Policy Enforcement Approaches**

Panel discussion will utilize the results of the ASSE Distracted Driving Survey administered in October 2013 to illustrate the impact on organizations and different approaches used to enforce distracted driving policies. The survey was anonymous, and we had 268 members complete the survey.

The survey covered these key areas:

- Importance of the issue of distracted driving within their organization;
- Existence of a written policy on mobile communication devices/distracted driving;
- Whether the policy includes a total ban on use of communication devices while the vehicle is in motion;
- How the policy is monitored or enforced: observation in vehicle, monitoring phone usage to driving data, technology to block texting/calls while vehicle in motion;
- Actions taken post incident to evaluate phone use;
- Action taken when violation is found;
- Use of technology to control cell phone use when vehicle is in motion and effectiveness;
- Share best practices.
Key Findings

- 53% of respondents said the issue of distracted driving is important to their organization.
- 87% of the respondents said that they have a written policy that addresses mobile communication device use and/or distracted driving.
- 53% have included total ban on use of communication device while the vehicle is in motion.
- 47% do not have a total ban on use of communication device while the vehicle is in motion.
- 18% ranked their program at 4 out of 10 for being effective at reducing use of communication devices while the vehicle is in motion. Additional scores: 17% ranked program effectiveness at 5 and 15% ranked program effectiveness at 3.
- 42% do not monitor or enforce the written policy on distracted driving.
- 57% of respondents do not have a formalized action plan to utilize post incident (crash) to evaluate cell phone use.
- 93% do not use technology to control cell phone use when the vehicle is in motion.

The survey respondents acknowledge that control of mobile communications use in vehicles is difficult. Drivers have access to both company-provided and personal devices. Several respondents emphasized that good communication is key. Companies need to ensure business expectations are in line with policy and success has been achieved when emphasizing the impact on their own family or the victims’ family.

Panel Summary

Representatives from the TPS Distracted Driving Committee will conduct a panel discussion and base their discussions on the topics addressed in the whitepaper. Our key discussion points will be to review distracted driving issues: impact on organizations, define forms of distractions, update on regulation/research, and provide an overview of approaches that can be used when developing, implementing and enforcing distracted driving policies.

Bibliography


