

The impact of driver performance and behavior on vehicular safety and crash risk

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Human performance and behavior are fully or partially responsible for over 90% of vehicular crashes. Recent research utilizing large numbers of vehicles equipped with highly sophisticated instrumentation, including multiple cameras, has provided much needed detail regarding the combination of driver, roadway, traffic, and environmental factors that lead to a large number of these crashes. For example, studies of both private and commercial drivers have shown that roughly 10% of drivers account for almost 50% of the crash risk. The major factors that contribute to this risk include: impairment (due primarily to alcohol), inattention and distraction, drowsiness, and judgment-related error. Two of these factors, driver drowsiness and inattention, are the focus of this presentation.

The role of driver drowsiness in both light and heavy vehicle crashes is a significant factor. For example, our research has shown that:

- Drowsiness is a major contributing factor in approximately 15%-20% of crashes and other safety-related incidents for long-haul trucking, local/short haul trucking and light vehicle driving.
- Driving while drowsy increases crash and near crash risk roughly eight times relative to driving while alert.
- Drowsiness occurs during all times of the day. For light vehicle drivers late night drowsy driving in combination with other sources of impairment (e.g., alcohol) and driving during morning commutes are the riskiest times.
- Although long-haul “team” truck drivers get poorer sleep quality because they often sleep in a moving truck, they sleep for longer periods and are generally safer than “single” drivers in part because they can switch drivers as needed to avoid driving while drowsy.
- In local/short-haul trucking a major cause of drowsiness is that drivers begin the work week in a tired state.

A number of promising countermeasures are under investigation to help alleviate the risks associated with drowsy driving. These include policy-based countermeasures (including hours-of-service regulation for long-haul truckers) and technology-based solutions including electronic log books for truckers and high-tech driver “alertness monitors” for all types of drivers.

Driver inattention is also a key contributing factor in crashes for both truck and light vehicles. Our research has shown that:

- The largest contributing factor to crashes, near crashes and other unsafe events for all types of driver is looking away from the roadway just prior to an unexpected event or condition. This accounts for somewhere between 70% and 90% of the cases depending on the type of vehicle and the type of event/condition.
- Engaging in activities that are unrelated to driving (i.e., secondary tasks”) account for most of the inattention-related risk. Activities which require that the drivers manipulate a control and look away from the roadway constitute the greatest risk. These include: cell phone dialing, text messaging, Ipod/MP3 manipulation, and internet interaction. Conversely, secondary tasks such as eating/drinking, talking to passengers, and even talking on a cell phone have much lower associated risk.
- All drivers are inattentive at times, however teen drivers are at the greatest risk. This risk is rapidly becoming an “epidemic” due to increases in the frequency with which teens perform complex secondary tasks while driving.

Promising countermeasures to counteract the high risks of inattention include: Laws banning the use of hand-held electronic devices, particularly for newly licensed teen drivers, and high-tech driver “eyes-forward” monitors, often used in combination with other crash avoidance technology, to warn drivers of unsafe circumstances.

The above-referenced examples show the importance of behavioral research in understanding the factors that contribute to crashes, and the relative risk of these factors. This knowledge can then be used to help identify and develop effective crash countermeasures of all kinds to save lives and reduce injuries and property damage on our nation’s roadways.

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