Insurance Institute for Highway Safety

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What can be done to improve large truck safety?

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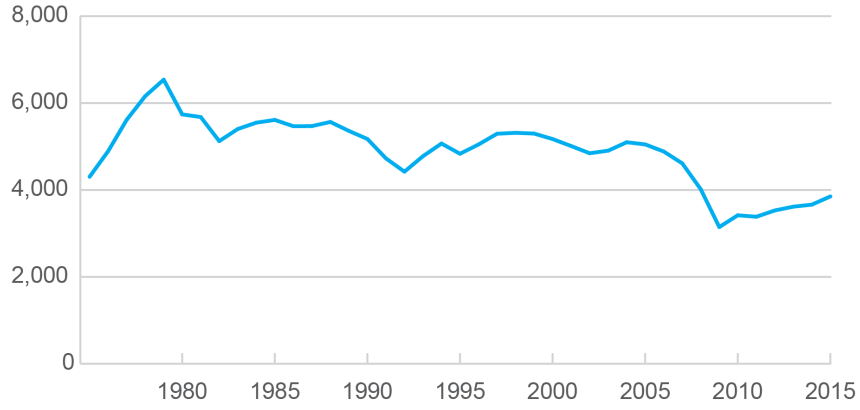
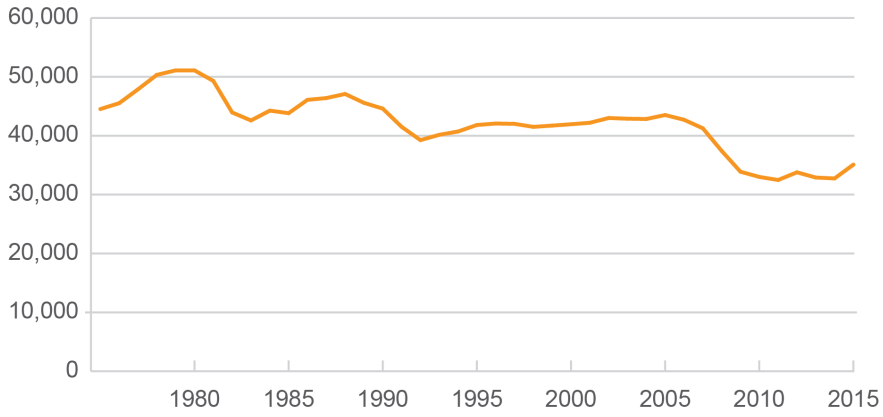
The Insurance Institute for Highway Safety (IIHS) is a nonprofit research and communications organization that identifies ways to reduce deaths, injuries, and property damage on our highways. We are supported by auto insurers. Thank you for the opportunity to testify on the safety of large trucks in the United States.

Motor vehicle crash deaths have increased in recent years to the highest level since 2008, with 35,092 deaths in 2015.[1] Of these, a total of 3,852 deaths involved crashes with large trucks. As the U.S. economy rebounded from recession, deaths in large truck crashes started to climb in 2009. What is especially concerning is that truck-related crash deaths are increasing faster than overall motor vehicle crash deaths. The number of people who died in large truck crashes was 22 percent higher in 2015 than in 2009, while crash deaths overall rose less than 4 percent. The vast majority of people who die in crashes between large trucks and passenger vehicles are people in passenger vehicles. Preliminary data for 2016 indicate that the highway death toll is still on the rise, and we expect that trucks are contributing to this disturbing trend. A variety of countermeasures, both old and new, could address the problem.

Deaths in U.S. crashes involving large trucks, 1975-2015



U.S. crash deaths, 1975-2015



Recent IIHS research – large truck crash factors

IIHS has been studying serious crashes involving large trucks for decades, and, although some aspects have improved, unsafe trucks and tired truckers persist. A recent IIHS study examined the risk factors for large truck crashes, such as defective equipment, safety technology, and carriers' crash history.[2]

Researchers compared large trucks involved in serious crashes in North Carolina during 2010-12 with a sample of similar trucks that weren't involved in crashes to estimate the relative prevalence of various factors and determine which ones are associated with increased crash risk.

Nearly three-quarters of the crash-involved trucks had vehicle defects identified during a post-crash inspection. Trucks with violations for any type of defect were more than 3 times as likely to be in a crash as trucks without such violations. Violations for brake, tire, and lighting system defects also were associated with increased crash risk. Risk was greater for violations severe enough to place the truck out-of-service.

Carriers with higher past crash rates were associated with an elevated current crash risk. Companies with at least 100 reported crashes per 1,000 power units (tractors or single-unit trucks) within the preceding 24 months had a 72 percent higher risk of crashing than carriers with fewer than 100 reported crashes per 1,000 power units.

Looking at driver-specific factors, researchers found that truckers age 60 and older had a higher crash risk than drivers ages 30-59, who made up 72 percent of the crash-involved drivers in the study. Truckers who reported driving after at least 12 hours since an extended sleep period were 86 percent more likely to crash than drivers who had been awake for less than eight hours. Truckers who reported driving more than five hours without stopping were more than twice as likely to crash as those who drove 1-5 hours.

Several safety features showed promise in reducing crash risk among the large trucks in the study. Antilock braking systems, which have been required since the late 1990s, reduced the risk of crashing by 65 percent. Benefits were also found for electronic stability control (ESC) and roll-stability control, electronic logging devices and speed limiters.

Vehicle stability control systems are designed to intervene when a truck's motion becomes unstable, possibly resulting in rollover, jackknife or other loss of control. ESC and roll-stability control are among the crash avoidance technologies that have been developed for large trucks. Others include forward collision warning/mitigation, blind spot detection, and lane departure warning/prevention. Based on an analysis of crashes during 2004-08, IIHS estimates that a combination of all four technologies could prevent or mitigate as many as 107,000 police-reported crashes each year, representing 28 percent of all crashes involving large trucks.[3] The technology could prevent or mitigate as many as 12,000 nonfatal injury large truck crashes and 835 fatal large truck crashes each year.

Speed

Few things carry more potential risk than a semitrailer barreling down the highway at 80 mph. Extreme speeds have become commonplace as states have set higher and higher limits. These higher speeds are even more dangerous for heavier vehicles. Large trucks have longer stopping distances than other vehicles, making it more difficult for them to avoid a crash. When a crash does occur, it is likely to be more severe. Even a lightly loaded 40,000-pound truck has 13 times the kinetic energy of a 3,000-pound car traveling the same speed, and this energy increases with the square of the vehicle speed.

Despite the deadly consequences of extreme speeds, the idea of lowering limits for all vehicles hasn't gained traction in state legislatures. Given this reality, we welcome the proposal by the Federal Motor Carrier Safety Administration (FMCSA) and the National Highway Traffic Safety Administration (NHTSA) to at least put a cap on the speeds of the biggest vehicles. Some critics of the proposed rule have raised concerns about different vehicles on the same road traveling at different speeds. But most trucks already travel at lower speeds on average than passenger vehicles. That is in part because many companies voluntarily use speed limiters to improve safety and fuel economy. In addition, seven states have lower maximum speed limits for trucks than for passenger vehicles.[4]

However, a small number of trucks do travel at very high speeds, putting their drivers and the people in vehicles around them at grave risk. We recently studied the effect of raising speed limits from 75 to 80 mph for all vehicles on certain road segments in Utah. We found that the proportion of large trucks exceeding 80 mph rose from 0.1 percent to 2.3 percent.[5] While still a small number, every truck traveling that fast represents a big risk because it has 50 percent more energy to manage in an emergency than if it were traveling at 65 mph. Speed limiters that physically prevent trucks from traveling that fast are one way to make roads safer for everyone.

Underride guards

Rear underride guards are important truck safety gear that is long overdue for an upgrade. An underride guard is the metal bumper that hangs from the back of a semitrailer. The idea is to stop a smaller vehicle from sliding beneath a high-riding trailer in a rear-impact crash. All underride guards must meet federal safety standards, but IIHS research and crash tests have shown that many underride guards can buckle or break off in a crash. When guards fail, the resulting underride crashes often result in death or serious injury to people in passenger vehicles.

In 2015, 427 of the 2,646 passenger vehicle occupants killed in large truck crashes died when the fronts of their vehicles struck the back of trucks.[6] Gaps in federal crash data make it difficult to pinpoint exactly how many of these crashes involve underride. An IIHS analysis of a smaller sample of fatal crashes involving the rear of a trailer equipped with an underride guard found that 94 percent produced underride.[7]

NHTSA has proposed a rule that would upgrade the rear underride guard regulations for tractor-trailers, but the proposal does not go far enough to ensure the guards withstand vehicle impacts, especially in offset crashes.[8] The proposal would align U.S. regulations with stricter ones in place in Canada since 2007. NHTSA estimates that 93 percent of new semitrailers sold in the U.S. already comply with the Canadian rules, based on information from the Truck Trailer Manufacturers Association. The agency estimates the rule would save one life and prevent three serious injuries a year. Ahead of an updated U.S. standard, IIHS has been evaluating underride guard designs. Our crash tests show that compliance with the Canadian standard does not mean the guards will prevent underride when cars run into the outer ends of a trailer, where the underride guards are weakest.

Trailer manufacturers have paid attention to our tests and have made significant improvements. To recognize their efforts, we created a new award for rear guards that successfully prevent underride in three progressively tougher test modes.[9] We presented the IIHS **TOUGH**GUARD award in March to five North American semitrailer manufacturers. All the changes these manufacturers have made to improve performance in our tests exceed current rules in place in the U.S. and Canada, as well as NHTSA's proposed new requirements. Highway safety would be better served by regulations that require underride guards to withstand even the most extreme offset crashes, which NHTSA's proposal does not address.

Summary and conclusions

Highway deaths have been on the rise as the economy has improved, but truck-related crash deaths are increasing faster than overall motor vehicle crash deaths. Vehicle defects, tired truckers and high travel speeds are factors that can influence the incidence and outcome of large truck crashes. Making sure that equipment is in good working order, drivers are properly rested, and truck speeds are reduced are important steps that would improve the safety of all road users. Strong rear underride guards are another lifesaving measure that should not be overlooked.

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