

INSURANCE INSTITUTE FOR HIGHWAY SAFETY

NEWS RELEASE

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VNR: Tues. 3/1/2011 10:30-11 am EST (C) GALAXY 16/Trans. 23 (dl4160H)
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UNDERRIDE GUARDS ON BIG RIGS OFTEN FAIL IN CRASHES; INSTITUTE PETITIONS GOVERNMENT FOR NEW STANDARD

ARLINGTON, VA — New crash tests and analysis by the Insurance Institute for Highway Safety demonstrate that underride guards on tractor-trailers can fail in relatively low-speed crashes — with deadly consequences. The Institute is petitioning the federal government to require stronger underride guards that will remain in place during a crash and to mandate guards for more large trucks and trailers.

Rear guards are the main countermeasure for reducing underride deaths and injuries when a passenger vehicle crashes into the back of a tractor-trailer. In 2009, 70 percent of the 3,163 people who died in all large truck crashes were occupants of cars or other passenger vehicles. Underride makes death or serious injury more likely since the upper part of the passenger vehicle's occupant compartment typically crushes as the truck body intrudes into the vehicle safety cage.

"Cars' front-end structures are designed to manage a tremendous amount of crash energy in a way that minimizes injuries for their occupants," says Adrian Lund,



Institute president. "Hitting the back of a large truck is a game changer. You might be riding in a vehicle that earns top marks in frontal crash tests, but if the truck's underride guard fails — or isn't there at all — your chances of walking away from even a relatively low-speed crash aren't good."

The Institute has studied the underride crash problem for more than 30

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years, including mid-1970s crash tests demonstrating how then-current guards were ineffective in preventing underride.

In the latest study the Institute analyzed case files from the Large Truck Crash Causation Study, a federal database of roughly 1,000 real-world crashes in 2001-03, to identify crash patterns leading to rear underride of heavy trucks and semi-trailers with and without guards. Underride was a common outcome of the 115 crashes involving a passenger vehicle striking the back of a heavy truck or semi-trailer. Only 22 percent of the crashes didn't involve underride or had only negligible underride, a finding in line with prior studies. In 23 of the 28 cases in which someone in the passenger vehicle died, there was severe or catastrophic underride damage, meaning the entire front end or more of the vehicle slid beneath the truck.

The National Highway Traffic Safety Administration (NHTSA) has estimated that about 423 people in passenger vehicles die each year when their vehicles strike the backs of large trucks. More than 5,000 passenger vehicle occupants are injured.

Crash tests: The study raised questions about how and why guards failed and at what speeds, so the Institute conducted crash tests evaluating 3 semi-trailer rear guards complying with US rules. Two of the trailers also are certified to Canadian requirements, which are more stringent than the United States when it comes to strength and energy absorption. The tests involved crashing a 2010 Chevrolet Malibu into the rear of parked trailers.

The goal wasn't to evaluate the Malibu's crashworthiness. The midsize sedan is an Institute *TOP SAFETY PICK* and earns a 5-star safety rating in NHTSA's New Car Assessment Program.

"The aim was to see if some underride guards perform better than others and to identify what crash speeds and configurations produce different types of failure," Lund says. "Damage to the cars in some of these tests was so devastating that it's hard to watch the footage without wincing. If these had been real-world crashes there would be no survivors."

Decapitation is a serious threat in underrides. In 3 of the crash tests the heads of the dummies in the car made contact with either the intruding trailer or the car's hood after it tore free and pushed into the occupant compartment. One such test involved a Hyundai trailer whose underride guard bent forward, sheared its attachment



This is how a car looks after a 35 mph full-width crash into the rear of a Hyundai trailer with a weak underride guard.



This is a car after a 35 mph full-width crash into a Wabash trailer with a strong guard. The occupant compartment is intact.

bolts, and broke after the Malibu hit it in the center rear at 35 mph. This was the weakest guard tested. The trailer was manufactured by Hyundai Translead.

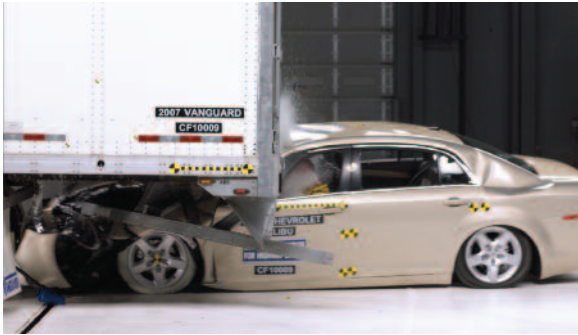
In contrast, a Wabash trailer outfitted with a guard certified to Canadian specifications successfully prevented underride of the Malibu's passenger compartment in a center-rear test at 35 mph. The trailer was made by Wabash National Corp. Its guard was the strongest of the 3 evaluated.

"Strong attachments kept the Wabash guard in place so it could engage the Malibu, allowing the car's structure to absorb and manage the crash energy," Lund says. "In the real world, this would be a survivable crash."

Offset tests: The Institute also ran tests with overlaps of 50 percent and 30 percent to find out what happens when a car hits the trailer with only part of its front instead of head-on.

In a 35 mph test with a 50 percent overlap, the guard on a Vanguard trailer allowed severe underride. The trailer was made by Vanguard National Trailer Corp., and the guard is certified to US and Canadian standards. In contrast, the Wabash trailer's guard successfully prevented underride in the same test. The outcome for the Wabash was different when the overlap was reduced to 30 percent. The struck end of the guard bent forward, and there was severe underride.

This test shows that even the strongest guard left as much as half of the rear of the trailer vulnerable to severe underride. The guard only worked as intended when the striking car engaged the center.



SEVERE UNDERRIDE was the result of this 35 mph, 50 percent overlap crash test with a Vanguard trailer. **NO UNDERRIDE** resulted when the car struck the back of the Wabash trailer in the same overlap test at 35 mph.

Offset tests stress guards' unsupported outboard ends. The vertical frame supports that attach guards to their trailer chassis are closer to guards' centers than ends. Preventing underride in narrow overlap crashes like these might mean devising a new way of attaching guards to trailers to utilize the side rails, in addition to requiring manufacturers to conduct compliance tests with guards on trailers.

"Under current certification standards, the trailer, underride guard, bolts, and welding don't have to be tested as a whole system," Lund says. "That's a big part of the problem. Some manufacturers do test guards on the trailer. We think all guards should be evaluated this way. At the least, all rear guards should be as strong as the best one we tested."

Another problem is that regulatory gaps allow many heavy trucks to forgo guards altogether. When they are present on exempt trucks, guards don't have to meet 1996 rules for strength or energy absorption.

"Underride standards haven't kept pace with improvements in passenger vehicle crashworthiness," Lund says. "Absent regulation, there's little incentive for manufacturers to improve underride countermeasures, so we hope NHTSA will move quickly on our petition."

End 4-page news release on truck underride guards

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