



## Safety Priority Statement Comprehensive Underride Protection

**Proposed Position:** All commercial motor vehicles (trailers, semitrailers, and single-unit trucks with a gross vehicle weight rating of more than 10,000 pounds) – new and existing – are equipped with comprehensive underride protection.

**Background:** Truck underride arises from the structural mismatch between large commercial motor vehicles (CMVs) and smaller passenger vehicles. Commercial trucks sit higher off the ground than passenger vehicles chiefly due to the much larger tire size trucks require to carry large cargo loads. This height mismatch can result in underride crashes in which a smaller passenger vehicle travels under the body of a truck when a crash occurs. In 2016, there were 204 occupant fatalities in passenger vehicles in crashes involving large truck(s) where the passenger vehicle experienced an underride<sup>1</sup>. However, underride fatalities may be underreported.<sup>2</sup>

Crush zones, such as the front (engine compartment) of a passenger vehicle, are structural areas that are designed to absorb energy upon impact in a predictable way. However, in a collision with a commercial truck, a car can go under the truck and the first point of impact may be the passenger occupant space rather than the crush zone. The passengers are left vulnerable to injuries, some of which may be fatal.

The majority of semi-trailers manufactured each year (316,000 in 2017) have minimally-compliant rear guards and no side underride guards, while most trucks do not have front underride protection. Single-unit trucks have no federal requirements for underride protection of any type. Each CMV that operates on U.S. roadways with deficient rear, side, and front guards puts other roadway users at increased risk of underride in a collision.

**Opportunity:** Truck underride crashes could be more survivable with effective underride guards. Improved rear underride guards<sup>3</sup> and side underride guards<sup>4</sup> have been crash tested by IIHS and crash dummies emerge from these tests with survivable injury outcomes. With comprehensive underride protection installed on the entire large truck fleet, the U.S. would see a significant decrease in truck underride fatalities each year, along with a reduction in debilitating injuries.

Comprehensive underride protection standards, including single-unit trucks, would create a safer environment for not only passenger vehicles, but for other vulnerable road users, such as pedestrians, cyclists, and motorcyclists.

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<sup>1</sup> Occupant fatalities in passenger vehicles in crashes involving a large truck(s) where the passenger vehicle experienced an underride by crash year and compartment intrusion, Fatality Analysis Reporting System (FARS) 1994-2015 Final and 2016 ARF.

<sup>2</sup> Underride is underreported in FARS. Padmanaban, J. (2013, September). [Estimating Side Underride Fatalities Using Field Data](#). Brumbelow, M. and Blonar, L. (2010, November). Evaluation of U.S. rear underride guard regulation for large trucks using real-world crashes. Brumbelow, M. (2012, November). Potential benefits of underride guards in large truck side crashes.

<sup>3</sup> (2013, July 02). [Inside IIHS: Understanding underride](#).

<sup>4</sup> (2017, May 09). [Benefits of side underride guards for semitrailers](#).

## **Strategy #1: Improve Rear Underride Protection Systems**

### **Goal #1: Federal Requirements for Rear Underride Protection Systems are Strengthened**

**Current Situation:** Rear underride guard protection has been a federal requirement for semi-trailers since 1952, though the requirement did not contain explicit strength standards, only dimensional requirements. In 1996, rear underride guard standards were published setting explicit requirements for guard strength and size<sup>5</sup> on semi-trailers, but these current standards can be strengthened. In 2015, NHTSA issued a notice of proposed rulemaking to strengthen rear underride guards to prevent underrides by cars travelling at up to 35 miles per hour but has taken no action since then.<sup>6</sup> The National Transportation Safety Board has recommended that NHTSA develop rear and side underride guard standards for single unit trucks as well.<sup>7</sup>

**Opportunity:** The Insurance Institute for Highway Safety (IIHS) has highlighted the insufficiencies of current US regulation as well as the upgrade proposed by NHTSA in 2015 by conducting extensive crash testing of rear underride guards at 35 mi/h.<sup>8</sup> A guard designed to the existing standard failed in a center impact, while several guards designed to meet the proposed standards failed in tests where there was not full horizontal overlap between the trailer and passenger vehicle. Many trailer manufacturers have made voluntary changes to their rear guard designs in order to improve performance in the tests. This demonstrates that improved safety is feasible, but regulation may be needed to ensure the improvements are extended throughout the trailer fleet. While some manufacturers are equipping their trailers with their improved guard design as standard equipment, others continue to fit their older designs as standard while offering the improved guards as options for their customers.<sup>9</sup> No single-unit trucks are known to have a rear underride guard that would meet the existing or proposed standards for semi-trailers.

**Member Actions:** NHTSA is currently undertaking research into underride guard performance. Coalition members should encourage the continuation of this work as well as support for the findings to result in an upgraded rear underride protection system.

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<sup>5</sup> *Code of Federal Regulations*, Title 49, Parts 571.223 and 571.224

<sup>6</sup> 80FR4363

<sup>7</sup> NTSB SS-13/01

<sup>8</sup> <http://www.iihs.org/iihs/news/desktopnews/new-crash-tests-underride-guards-on-most-big-rigs-leave-passenger-vehicle-occupants-at-risk-in-certain-crashes>

<sup>9</sup> <http://www.iihs.org/iihs/ratings/Truck-underride-guard-evaluations>

## Strategy #2: Improve Side Underride Protection Systems

### Goal #2: Truck and Trailer Manufacturers Make Side Underride Protection Systems Standard Equipment

**Current Situation:** There are no federal standards for side underride protection on large trucks or trailers. Some US municipalities have introduced requirements for single-unit trucks operating under their jurisdiction. There are manufacturers that make side guards as aftermarket equipment for semi-trailers, and there are side skirts designed for aerodynamics that have failed to prevent underride in crash tests.

**Opportunity:** Many US cities that have adopted a Vision Zero plan have moved toward requiring “lateral protective devices” on single-unit trucks operating under city contracts and subcontracts. These side guards must be in accordance with guidelines set by the Volpe Center of the Department of Transportation (DOT)<sup>10,11</sup> and are intended to prevent drive-over crashes of pedestrians and bicyclists. While it is too soon to determine efficacy of the side guard implantation in select Vision Zero cities, effectiveness has been seen abroad. The United Kingdom adopted a national side guard mandate in the 1980s. Its introduction was part of a suite of traffic safety improvements to both commercial vehicles and infrastructure measures. Following implementation, there was a drop in both cyclist and pedestrian fatalities in side-impact collisions with trucks.<sup>12</sup> Although vehicle and roadway designs in the UK are different from those in the US, these findings suggest that side guards may have the potential to improve safety for vulnerable road users.

In addition to pedestrians and bicyclists, around 300 passenger vehicle occupants are killed each year when their vehicles strike the side of a tractor-trailer.<sup>13</sup> Research suggests that side underride guards have the potential to improve injury outcomes in around three-fourths of crashes with the side of a truck or trailer.<sup>14</sup> IIHS has demonstrated the effectiveness of an aftermarket side guard at preventing underride in crash tests at 35 and 40 mi/h.<sup>15</sup> Separately, one of the largest semi-trailer manufacturers in the US has displayed a prototype side underride guard that it plans to bring to market.<sup>16</sup> These designs have the potential to reduce the loss of life and serious injury in crashes involving the side of a semi-trailer.

**Member Actions:** Coalition members should encourage truck and trailer manufacturers to make side underride protection systems standard equipment.

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<sup>10</sup> U.S. DOT Volpe Center: [Truck Side Guards Resource Page](#)

<sup>11</sup> U.S. DOT: [Truck Sideguards for Vision Zero, Technical Recommendations](#)

<sup>12</sup> <https://trl.co.uk/publications?reportid=5450>

<sup>13</sup> <http://www.iihs.org/iihs/topics/t/large-trucks/fatalityfacts/large-trucks>

<sup>14</sup> Brumbelow, M. (2012, November). Potential benefits of underride guards in large truck side crashes.

<sup>15</sup> <http://www.iihs.org/iihs/news/desktopnews/side-guard-on-semitrailer-prevents-underride-in-40-mph-test>

<sup>16</sup> <http://www.trailer-bodybuilders.com/trailers/wabash-prototype-side-underride-guard-aero-skirt>

### **Strategy #3: Improve Trailer Underride Protection System Legislation**

**Goal #3:** Pass a Comprehensive Underride Protection Bill.

**Current Situation:** As previously discussed, the federal requirements for rear underride protection systems are outdated, and stand to be improved. Additionally, there is currently no federal requirement for commercial motor vehicles to have side or front underride guards.

**Member Actions:** In order to help this bill pass, Road to Zero Coalition members can:

1. Sign on to the RTZ Coalition Safety Priority Statement for underride protection
2. Write their own Letter of Support and submit it to Congress (Senator Gillibrand, Senator Rubio, Congressman Cohen, and Congressman DeSaulnier), or AnnaLeah & Mary for Truck Safety (marianne@annaleahmary.com), or Stop Underrides (stopunderrides.com).
3. Issue a Call to Action via national, local, and social media – asking individuals and organizations to sign the STOP Underrides! online petition (<https://www.thepetitionsite.com/104/712/045/congress-act-now-to-end-deadly-truck-underride/>).
4. Contact stakeholders in the trucking industry to raise their awareness of the underride problem and solutions, and ask for their support of this technology that will prevent future underride.

#### **Resources:**

[Estimating Side Underride Fatalities Using Field Data](#)

[Regulation No. 93 of the Economic Commission for UN/ECE](#)

[IIHS – Understanding Underride \(video\)](#)

[IIHS – Benefits of Side Underride Guards for Semitrailers \(video\)](#)

[Semi-Trucks: By the Numbers](#)

## Supporters of Road to Zero Coalition Priority Statement on Underride

Organization	Organization URL
AAA	<a href="http://aaa.org">aaa.org</a>
Advocates for Highway and Auto Safety	<a href="http://saferoads.org">saferoads.org</a>
American Association of Motor Vehicle Administrators	<a href="http://aamva.org">aamva.org</a>
American Association of State Highway and Transportation Officials	<a href="http://transportation.org">transportation.org</a>
Commercial Vehicle Safety Alliance	<a href="http://cvsa.org">cvsa.org</a>
Global Automakers	<a href="http://globalautomakers.org">globalautomakers.org</a>
Governors Highway Safety Association	<a href="http://ghsa.org">ghsa.org</a>
Institute of Transportation Engineers	<a href="http://ite.org">ite.org</a>
Insurance Institute for Highway Safety	<a href="http://iihs.org">iihs.org</a>
Intelligent Car Coalition	<a href="http://intelligentcarcoalition.org">intelligentcarcoalition.org</a>
International Association of Chiefs of Police	<a href="http://theiacp.org">theiacp.org</a>
MADD	<a href="http://madd.org">madd.org</a>
National Association of City Transportation Officials	<a href="http://nacto.org">nacto.org</a>
National Association of County Engineers	<a href="http://naco.org">naco.org</a>
National Association of State Emergency Medical Service Officials	<a href="http://nasemso.org">nasemso.org</a>
National Safety Council	<a href="http://nsc.org">nsc.org</a>
Vision Zero Network	<a href="http://visionzeronetwork.org">visionzeronetwork.org</a>
AnnaLeah & Mary for Truck Safety	<a href="http://annaleahmary.com">http://annaleahmary.com</a>
Stop Underrides In Loving Memory of Roya	<a href="https://stopunderrides.org/">https://stopunderrides.org/</a>