Biennial Report to Congress and the Secretary of the Advisory Committee on Underride Protection

06.18.2024

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I. Majority Report of the Advisory Committee on Underride Protection

Crashes involving large commercial trucks are a leading cause of traffic-related death in America today with over 5,900 fatalities in 2022 (the last year for which data is available), representing an increase of 75% since 2009.[1] Over 160,000 people were injured,[2] causing estimated economic losses well over $170 billion, adjusted for inflation.[3] [4] A subset of those crashes is especially deadly: underride crashes in which victims experience life-threatening injuries to their heads and torsos due to the intrusion into the passenger vehicle occupant survival space of the high bottom edge of the trailers and the wheels of large commercial trucks or their cabs. Passenger compartment intrusion (PCI) can result in traumatic brain injuries, decapitation, Le Fort facial fractures, severe crush injuries, especially due to extended treatment and extrication time, as well as burning to death from fiery crashes.

The problem of lethal underride crashes has been known to the U.S. Department of Transportation (DOT) since its founding in 1967. Actress Jayne Mansfield died in an underride crash in that year. Thousands more have been killed or seriously injured due to underride since then and continue today. The National Highway Traffic Safety Administration (NHTSA) maintains the Fatality Analysis Reporting System (FARS), which contains data on all crashes involving a motor vehicle on a public road that results in the death of a vehicle occupant or non-occupant within 30 days of the crash. As DOT, until very recently, never encouraged the collection of underride crash data, exact figures of underride fatalities over time do not exist. However, a conservative overall estimate of underride crashes and fatalities over the 50 years since NHTSA was formed can be made utilizing FARS data: 25,100 underride crashes and 31,500 corresponding fatalities from side underride, rear underride, and front override crashes, averaging 630 underride-caused fatalities per year. They break down as follows:

- 7,850 side underride crashes and 8,950 corresponding fatalities, averaging 179 per year;

- 10,050 rear underride crashes and 14,350 corresponding fatalities, averaging 287 per year; and

[1] Overview of Motor Vehicle Traffic Crashes in 2022, NHTSA, Apr. 2024, DOT HS 813 560.
[2] Id.
[3] 2022 Pocket Guide to Large Truck and Bus Statistics, FMCSA, Dec. 2022, RRA-22-007.
[4] CPI Inflation Calculator, BLS, Jan. 2020 to Jan. 2023, available at <https://www.bls.gov/data/inflation_calculator.htm>

- 7,200 front override crashes and 8,200 corresponding fatalities, averaging 164 per year.[5]

In addition, NHTSA counts hundreds of thousands of incapacitating injuries per year due to vehicle crashes.[6]

Underride fatalities are caused by the physical mismatch between the dimensions of large commercial trucks (their sides, rear and front bumpers) and the passive safety features of other vehicles that share the roads with them. Bumpers, crumple zones, and restraint systems (airbags and seat belts) do not prevent PCI of the semitrailer's bottom edge (in the case of side and rear-underrides) or the truck cab (in the case of front underrides). Decades of public and private sector crashworthiness research, standards, rules, and technological innovation are useless in protecting passenger lives due to the physical mismatch that causes underrides.

Pedestrians, bicyclists, and motorcyclists are even more vulnerable (known as Vulnerable Road Users or VRUs) and can be crushed to death under the rear axles of large commercial trucks and trailers due to the lack of a physical barrier preventing them from sliding under the trailer boxes of single-unit and tractor-trailer trucks.

Underride deaths are gruesome and horrific. Underrides crashes are also extremely costly. Municipal emergency medical services and police incur much greater strain on resources when underrides occur compared to crashes that do not involve underride. More emergency personnel must be assigned to underride crashes for longer periods of time, and all of those costs are borne by taxpayers. The trucking industry also pays a high price for underrides, in the form of delayed delivery of transported goods, vehicle damage, civil lawsuits, loss of commercial driving license, and even jail time. It is worth noting that most long haul carriers have the ability to install underride protection systems without exceeding their weight limits. DOT research has found that "most long haul truck shipments cube-out before they weight-out", despite protestations from industry saying otherwise.[7]

Reducing the number of underrides crashes and increasing survivability is an attainable goal. Addressing the mismatch between the high bottom edge of large commercial truck trailers or their massive cabs and the bumpers of passenger vehicles is necessary to permit passenger vehicle passive restraints to protect human lives. Crumple zones and restraint systems can only work as intended when light passenger vehicles strike a physical barrier that provides sufficient vertical overlap. Automobile and motorcycle automatic braking technologies only work when their radar systems detect a

[5] Letter from Eric Hein to James Myers, Apr. 30, 2024, available in Appendices (online at https://www.regulations.gov/comment/NHTSA-2023-0012-2092).

[6] See Table 15, "KABCO-to- MAIS Translators, 2022 Update," DOT HS- 813 420 (Apr. 2023)(online at https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813420).

[7] USDOT Comprehensive Truck Size and Weight Study (Vol 3, Chap.4, p. IV-20), FWHA, August 2000.(available online at https://www.fhwa.dot.gov/reports/tswstudy/Vol3-Chapter4.pdf).

physical obstacle. The gaping open space under large commercial trucks defeats these safety innovations, many of which are deployed due to government-mandated rules. Physical underride guards, known as rear impact, side impact, and front impact guards, are necessary. Their effectiveness will be augmented when they are combined synergistically with truck crash avoidance technologies such as properly maintained conspicuity tape and automatic emergency braking on trucks to mitigate the closing speeds of crashes when they occur.

In 1999, known as the "second founding" of the DOT, Congress required that the Department pursue "safety as the highest priority, recognizing the clear intent, encouragement, and dedication of Congress to the furtherance of the highest degree of safety in motor carrier transportation."[8] In 2021, Congress passed Section 23011(d) of the Infrastructure Investment and Jobs Act (IIJA), creating the Advisory Committee on Underride Protection.[9] Section 23011(d)(1) required the Secretary of Transportation to establish the ACUP to "provide advice and recommendations to the Secretary on safety regulations to reduce underride crashes and fatalities relating to underride crashes." Section 23011(d)(6) required the ACUP to submit a biennial report to the Senate Committee on Commerce, Science, and Transportation and the House Committee on Transportation and Infrastructure that:

> (A) describes the advice and recommendations made to the Secretary; and
> (B) includes an assessment of progress made by the Secretary in advancing safety regulations relating to underride crashes.

This report satisfies Section 23011(d)(6).

The Advisory Committee on Underride Protection (ACUP) utilized a simple majority standard to adopt motions for Advice and Recommendations to the Secretary. Every controlling authority that imposes requirements on the ACUP does not use or define the word "consensus." The word does not appear in Section 23011 of the Infrastructure Investment and Jobs Act which created the ACUP. Similarly, there is no reference to "consensus" in the Federal Advisory Committee Act, which is the law that governs federal advisory committees. Additionally, the word "consensus" does not appear in guidance documentation produced by the General Services Administration that governs federal advisory committees. Finally, there is no consensus definition or requirement found in the ACUP Charter of its By-Laws.

[8] Pub. L. No. 106-159 (1999), codified at 49 U.S.C. § 113.
[9] Pub. L. No. 117-58 (2021), Section 23011(d).

The only mention of the word consensus that does occur, is in a Federal Register Notice, which has no legal effect or requirement. The Notices Section of "Federal Register 101," a US government publication reads as follows:

> The final section [of the Federal Register] contains documents describing official actions and functions of an agency that affect the public or provide important information, **but do not amend the CFR [Code of Federal Regulations]**. They **do not impose requirements with general applicability and legal effect** and do not affect a rulemaking proceeding. Some notices are required to be published by law, for example, advisory committee meeting notices, notices of the availability of environmental impact statements, and certain orders or decisions affecting named parties.
> (https://www.federalregister.gov/uploads/2011/01/fr_101.pdf)

The ACUP was created by an Act of Congress that explicitly defines the various categories of stakeholders whose views merit representation on the ACUP and the number of representatives each category is allotted. The majority of ACUP representatives agreed that in order to provide the most impactful advice and recommendations on "safety regulations to reduce underride crashes and fatalities relating to underride crashes" (per Sec 23011 of the IIJA) a simple majority standard for "consensus" was required.

A. Advice and Recommendations to the Secretary

The ACUP advises and recommends the following actions (as adopted by a majority of ACUP members and grouped by subject).

1) Rulemaking

Side underride

- NHTSA should withdraw its previously submitted advance notice of proposed rulemaking (ANPRM) or reissue a revised ANPRM and cost-benefit analysis that acknowledges and accommodates critiques made by commenters that the cost-benefit approach taken artificially constrained the number of lives saved and also failed to account for cost-savings (such as fuel efficiency gains provided by side underride guards).

- NHTSA should complete a new side impact guard cost-benefit analysis and rulemaking that counts previously omitted underride victim categories, including pedestrians, bicyclists, and motorcyclists.

- NHTSA should require all new semitrailers and single-unit trucks that have crash-incompatible open space(s) along the side(s) to be equipped with side guards capable of preventing injurious passenger compartment intrusion (PCI) when struck by a midsize vehicle at any angle, at any location, and at any closing speed up to and including 40 mph.

- NHTSA should require semitrailers, and single-unit trucks manufactured after 1998 that have crash-incompatible open space(s) along the side(s) to be equipped with side guards capable of preventing injurious passenger compartment intrusion (PCI) when struck by a midsize vehicle at any angle, at any location, and at any closing speed up to and including 40 mph.

- NHTSA should require side guards to also prevent a vulnerable road user (VRU) from passing underneath the guarded vehicle in an interaction with the side of the vehicle.

Rear underride

- The 2022 Rear Impact Guard Rule should be amended to require that all new trailers meet the IIHS TOUGHGUARD test protocol or equivalent, which includes the ability to withstand a 30% rear overlap crash at 35 mph.

- NHTSA should review and update FMVSS 223/224 standards in response to advancements in technology.

- All trailers manufactured between 1998 to the current time that do not have IIHS TOUGHGUARD awarded rear impact guards should be retrofitted with crash-proven reinforcement device(s). These reinforcement devices, at minimum, should be tested and proven to prevent underride, mitigate PCI and create crash compatibility consistent with a TOUGHGUARD awarded rear impact guard when attached to a minimally compliant FMVSS 223 rear impact guard.

- NHTSA should regulate single-unit trucks (SUTs) with the same rear impact guard standards that currently only apply to semitrailers.

- FMCSA & NHTSA must expeditiously complete Heavy Vehicle Automatic Emergency Brake Rulemaking for all classes of Commercial Motor Vehicles.

- FMCSA should issue stronger conspicuity tape requirements, at a minimum, a requirement to maintain and replace conspicuity tape every 5 years. [*Note – Industry commonly states the lifespan of a trailer is ten years, this equates to one replacement per lifespan of the trailer as conspicuity tape is notoriously poorly maintained]*

- FMCSA should require Single Unit Trucks to adhere to conspicuity tape requirements

Front underride

- NHTSA should issue an Advanced Notice of Proposed Rulemaking on Front Impact Guards.

- NHTSA may harmonize with global front override regulations, including UNECE-93 and any revisions to it, in order to provide improved motor vehicle safety, as indicated in Section 24211 of the IIJA:

> *The Secretary shall cooperate, to the maximum extent practicable, with foreign governments, nongovernmental stakeholder groups, the motor vehicle industry, and consumer groups with respect to global harmonization of vehicle regulations as a means for improving motor vehicle safety.*

2) <u>Research</u>

- NHTSA should expeditiously conduct rear impact guard testing at "highway speeds" (up to 65 mph) as IIJA already directed NHTSA to do (Sec 23011 (b)(2)(A,B) and publish the results within two years

- The ACUP shall recommend in its report that NHTSA create a field in the Fatality Analysis Reporting System to determine if an underride crash occurred involving a large truck and a pedestrian/cyclist.

- NHTSA should conduct a study to research how the survivability rate of rear underride crashes will change with increased passenger vehicle adoption of Automatic Emergency Braking at currently tested speeds (35 mph) as well as highway speeds (up to 65 mph).

- NHTSA should conduct comprehensive research on U.S. underride crash characteristics, including the frequency of 30 percent overlap crashes.

- DOT should continue research into Enhanced Rear Signaling Systems that could help better prevent rear underride crashes.

- DOT should research the efficacy of high visibility Clearance Lamps that illuminate the rear of a CMV to assist with potential Clearance Lamp rulemaking for all CMVs.

- DOT should conduct research into efficacious methods of reducing Distracted Driving such as flashing lamps.

- The department should conduct a study of conspicuity tape in service. This study focuses on actual rates of compliance with the regulated minimum reflectivity requirements, the ability of enforcement personnel to accurately and adequately enforce these requirements, and make recommendations on how to reduce the most common forms of non-compliance found.

- NHTSA should assess risks associated with deflection into adjacent lanes associated with partial offset rear crashes as well as side underride crashes. Final results should be made public.

- The ACUP shall recommend in its report that NHTSA request that the Department of Transportation's Volpe Center evaluate the effectiveness of a side underride guard to determine if their effectiveness is similar or greater than Lateral Protective Devices in mitigating the severity of pedestrian, cyclist, and motorcyclist fatalities.

- NHTSA should work with the Federal Railroad Administration to conduct research on potential impacts of side underride guards during highway-rail grade crossings and that research be made publicly available.

- NHTSA should investigate the potential for collision mitigation technologies for light and heavy-duty vehicles to prevent or reduce the risk associated with side underride crashes.

- The ACUP shall recommend in its report that DOT explore the need for Federal weight limit weight-based exemption for side underride guards.

3) <u>Miscellaneous</u>

- The ACUP shall recommend that DOT disseminate educational material in additional to existing brochure for law enforcement to help them identify and record side underride crashes.

- FMCSA should work with State law enforcement and other stakeholders to emphasize education and the need to issue rear impact guard violation citations and encourage maximum fines for violations affecting safety.

- NHTSA/DOT should provide the ACUP with all scoping documents, directions, and discussions between NHTSA/DOT and Elemance with regard to the rear guard analytical work between 2018 and 2024.

- NHTSA/DOT should provide the ACUP with all scoping documents, directions, discussions, test results, data, memoranda, reports and/or notes generated before, during, and following quasi-static testing of trailer rear underride guards conducted by Karco or other contractors on behalf of NHTSA/DOT between 2016 and 2024.

- NHTSA/DOT should produce all documents related to rear guard standards including test data, contracts, studies, scoping documents, analyses, reports, memoranda, and/or other communications or references related to trailer and/or straight truck rear guard strength, design, quasi static or dynamic testing, and/or test protocols between 1970 and 1998.

- NHTSA, per the Modernizing Regulatory Review Executive Memo and corresponding guidance, must fully account for regulatory benefits that are difficult or impossible to quantify when conducting rulemaking analysis.

- The ACUP report shall reflect whether each committee member concurs or does not concur with the report by allowing each member to make a statement of concurrence or non-concurrence with the report. The ACUP report include such documentation in an Appendix.

B. Assessment of DOT's Progress in Advancing Safety Regulations Relating to Underride Crashes

The United States lags behind many nations in adopting requirements for impact guards designed to prevent injuries and deaths from underride crashes.[10] DOT has not lead any significant requirements for underride protection since 1996. NHTSA's 2022 rear-impact guard final rule merely imitated a 2004 Canadian standard that had been adopted in previous decades by nearly all trailer manufacturers. NHTSA's 2023 ANPRM on side impact guards, while technically still an open rulemaking, concluded that the benefits of preventing side underride deaths are far outweighed by the costs, making further side impact guard regulation highly unlikely (more on that below).

Pressure from the truck and trailer industry has been a factor. In 1970, DOT began a rulemaking to require commercial trucks to be equipped with rear impact guards capable of withstanding 50,000 lb test force along all points of the guard, from the center to the outer edge.[11] But the trucking industry influenced the agency to withdraw it. According to a contemporaneous New York Times article, "Abandonment of the proposal was a victory for organized truckers and manufacturers of heavy trucks and trailers. They had vigorously opposed it on grounds that the cost would be unjustifiably high and that it would prove to be an excessive economic burden on the industry. They had also challenged its value in saving lives and reducing injuries."[12] DOT would not try again until 1996. When they did, the standard they proposed was weaker than the previous one by nearly 80%.[13]

In 2004, Transport Canada departed from its history of deferring to its southern neighbor and issued a standard for rear impact guards that would take the U.S. another generation to adopt.

In the meantime, private-sector safety advocates developed even more protective safety standards. The Insurance Institute for Highway Safety (IIHS) developed performance standards and carried out transparent safety testing for their

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[10] Forty-three nations, in addition to the countries of the European Union, have adopted UN Regulation 73, which requires trucks to be equipped with lateral protective devices having a maximum ground clearance of 550mm. Brazil, Peru, China have similar laws. Since 1979, Japan has required trucks and trailers to install lateral protective devices allowing for no more than 450mm of ground clearance. See Appendix A of A Literature Review of Lateral Protection Devices on Trucks Intended for Reducing Pedestrian and Cyclist Fatalities, Federal Motor Carrier Safety Administration (May 2020) (online at https://rosap.ntl.bts.gov/view/dot/49250).

[11] National Highway Safety Bureau, Notice of Proposed Rulemaking, 49 CFR Part 571, Rear Underride Protection, Trucks and Trailers (Aug. 13, 1970).

[12] *Agency Drops Safety Plan Opposed by Trucking Men*, New York Times (July 19, 1971)(online at https://www.nytimes.com/1971/07/19/archives/agency-drops-safety-plan-opposed-by-trucking-men.html).

[13] Comparison of rear impact guard standards, 1970, 1993, 2022, presentation by Aaron Kiefer, Collision Safety Consulting, "Rear Underride Prevention," available in Appendices.

TOUGHGUARD rear impact guard. This performance standard required underride prevention when the rear of the trailer was struck at 35 mph by a midsize passenger car with a horizontal overlap of 100%, 50%, and 30%. It was eventually voluntarily adopted by nine major semitrailer manufacturers, some of which offer compliant guards as standard, others as an option.

Yet when DOT finally adopted the 19-year-old Canadian standard, it rejected Congress' encouragement to modernize it with the safety advances developed by trailer manufacturers in response to IIHS testing. As a result, the 2022 rear impact final rule scarcely made a perceptible advance in public safety, since nearly all trailer manufacturers had already complied with the Canadian standard. NHTSA has not moved forward with meaningful rear-impact guard requirements for single-unit trucks, leaving these large trucks without any underride guard requirement other than a 1953 rule issued by the now-defunct Interstate Commerce Commission that contains no strength requirements for the guards.

Prior Assessments

Over the past decade, components within the U.S. government have expressed frustration at NHTSA's slow and inadequate response to underride crashes.

In 2013 and 2014, the National Traffic Safety Board (NTSB) recommended that the NHTSA issue regulations requiring rear impact guards that prevent underride "from full-width and offset trailer rear impacts," side-impact guards, and "visibility enhancement systems" to enable truck operators to detect passenger cars, bicyclists, motorcyclists, and pedestrians.[14] But NHTSA did not follow all of NTSB's recommendations, so NTSB wrote in 2015, "We are disappointed by the lack of progress you have made toward requiring a side underride protection system and are concerned that you consider this issue a secondary priority." More than two years later, NTSB wrote again to NHTSA, observing, "We are disappointed that you have not updated us regarding your progress toward developing performance standards and requirements for…side underride protection systems." NTSB deemed NHTSA's resistance to taking recommended action on side underride guards to be "unacceptable."[15]

The Government Accountability Office (GAO) has also criticized NHTSA and questioned NHTSA's basis for rejecting NTSB's side guard recommendation, concluding that, "NHTSA has not performed research on the overall effectiveness and

[14] National Traffic Safety Board Recommendations, H-14-001-007 (Apr. 13, 2014). NTSB first recommended that NHTSA require side guards in 1971 (National Transportation Safety Board Recommendation #H-71-042 (1971) Washington, DC (online at http://www.ntsb.gov/doclib/recletters/1971/H71_34_42.pdf).

[15] National Traffic Safety Board Recommendation Report, Recommendation # H-13-013, relaying correspondence to NHTSA, dated Mar. 30, 2015 and Nov. 13, 2017, publicly released on Feb. 27, 2023, pursuant to the Freedom of Information Act request of Marianne Karth (NTSB reference #R-2023-00004).

costs associated with or the design of side underride guards." GAO also questioned NHTSA's rear impact rulemaking, noting that IIHS had concluded, "NHTSA overestimated the additional weight of the rear guards, thereby overestimating the cost by about 35 to 40 percent. IIHS also stated that due to concerns with the underlying data, NHTSA underestimated the number of crashes into the rear of single-unit trucks with passenger compartment intrusion."[16]

ACUP's Assessment

During the period of ACUP's charter, but prior to NHTSA's convening the first meeting of the ACUP, DOT issued a final rule on rear underride protection and an advance notice of proposed rulemaking on side underride protection. These rulemakings did not significantly advance safety, and NHTSA declined to produce the basis for critical subjective assumptions it relied on when they were issued stating that the ACUP did not merit access to review deliberative materials. This conclusion is contested (see Appendix C), and NHTSA declined the ACUP's appeals to the contrary.

1. Rear Underride Protection

The Department promulgated a final rule on rear impact guards, published on July 15, 2022. That action came in response to a law passed in 2021 by Congress, which required the DOT to end a five-year delay in publishing a final rule mandating the installation of rear impact guards on tractor-trailers meeting standards established in its 2015 NPRM. In the 2021 law, Congress gave the Secretary discretion to determine whether rear impact guards should be even more protective and prevent death and injury in crashes where "30 percent of the width of the passenger motor vehicle overlaps the rear of the trailer or semitrailer." The Department had declined to require that standard in its 2015 NPRM. In 2022, Congress again directed the Department to publish its final rule on rear impact guards, but went further and required the Department's rule to meet the testing standards of the Insurance Institute for Highway Safety, which include the 30% overlap scenario, allowing for the DOT Secretary's discretion.[17]

But the final rule did not require rear impact guards to meet a 30% overlap standard.[18] It merely requires trailer manufacturers to meet standards that 94% of the

[16] Government Accountability Office, Truck Underride Guards: Improved Data Collection, Inspections and Research Needed (GAO-19-264)(Mar. 2019) (online at https://www.gao.gov/assets/gao-19-264.pdf).

[17] Joint Explanatory Statement, Division L, Consolidated Appropriations Act of 2022, Pub. L. No. 117-103 (Mar. 15, 2022) (online at https://docs.house.gov/billsthisweek/20220307/BILLS-117RCP35-JES-DIVISION-L.pdf).

[18] Federal Motor Vehicle Safety Standards; Rear Impact Guards, Rear Impact Protection, 87 Fed Reg 42339 (Jul. 15, 2022) (to be codified at 49 CFR Part 571) (online at https://www.federalregister.gov/documents/2022/07/15/2022-14330/federal-motor-vehicle-safety-standards-rear-impact-guards-rear-impact-protection).

industry already voluntarily meet to comply with 2004 Canadian regulations.[19] According to the Insurance Institute for Highway Safety, "NHTSA's updated rule does not go far enough to be meaningful... While the new standard is an improvement over the old one, nearly all newly manufactured guards on trailers already meet this new standard."[20]

NHTSA relied upon a number of unsupported assumptions in the final rule to justify its decision not to require protections meeting the 30% overlap scenario. To assess the agency's progress in advancing public safety, the ACUP formally requested NHTSA's basis for these methodological assumptions. NHTSA responded that the ACUP "should review" technical documents and published standards that are available online. These documents left much to be desired in terms of increasing the ACUP's understanding behind NHTSA's rationale and remains an open question:

- NHTSA excluded from its cost-benefit analysis the 30% overlap impact protection design marketed by Stoughton Trailers, which the manufacturer claims does not add weight or fuel costs.[21] Furthermore, NHTSA made the following unsupported assertion:

  > It does not appear feasible engineering-wise for the additional material (two steel vertical members on the outer edge of the horizontal member that is bolted to a reinforced undercarriage) not to add weight or cost to the trailer. Accordingly, NHTSA decided not to include this guard design in this analysis.

- NHTSA concluded that "trailers that have the main vertical supports for the guard more outboard *may not perform as well* in full overlap crashes as trailers that have the vertical supports more inboard" (emphasis added).

- NHTSA applied a 50% reduction in estimating the incremental beneficial effectiveness of rear guards meeting a 30% overlap standard.

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[19] According to IIHS, "While the new standard is an improvement over the old one, nearly all newly manufactured guards on trailers already meet this new standard, which is similar to a longstanding Canadian requirement." IIHS press release, "New Federal Rule on Truck Underride Protection Does Not Go Far Enough," (July 6, 2022) (online at https://www.iihs.org/news/detail/new-federal-rule-on-truck-underride-protection-does-not-go-far-enough).

[20] Insurance Institute for Highway Safety press release, *New Federal Rule on Truck Underride Protection Does Not Go Far Enough* (July 6, 2022) (online at (https://www.iihs.org/news/detail/new-federal-rule-on-truck-underride-protection-does-not-go-far-enough).

[21] Stoughton Trailers website, "Rear Impact Guard," (online at https://www.stoughtontrailers.com/products/rear-impact-guard). Stoughton Trailers claims, "The rear guard resists compartmental intrusion of an automobile when the location of impact is at 30% to 100% overlap of the width of the car to the underride guard," with "no added weight," "no negative impact on aerodynamics," and "no additional costs."

- NHTSA did not explain its decision to use telephone interview data collected by the University of Michigan Transportation Research Institute (UMTRI) to establish estimates of overlap and underride, in direct opposition to the advice of UMTRI researchers, who stated: "Collecting the data by means of telephone interview with people on the scene well after the fact probably is not sufficient to accurately measure degrees of underride."[22]

- NHTSA did not apply a 28% reduction to the estimated cost to account for NHTSA's estimate of the percentage of newly manufactured trailers and semitrailers that already met the 30% overlap standard, as expressed in footnote 19 of the final rule ("There were 211,807 new trailers sold in 2020, among which 65 percent (137,675 = 211,807 x 0.65) are required to be equipped with rear impact guards. Among applicable trailers, 28 percent are already equipped with guards that mitigate PCI in 30 percent overlap crashes").

- NHTSA did not explain how its estimate of underride guard weights exceeded the actual measured weights of guards by over 60%[23]

- NHTSA did not explain its basis for establishing that rear underride guards would have zero effectiveness at any speed above 35 mph

- NHTSA concluded that "available data do not show that a standard for a 30 percent overlap crash at 35 mph would be reasonable, practicable, or appropriate for *all* the vehicles subject to FMVSS No. 223 and FMVSS No. 224" (emphasis in original).

2. Side Underride Protection

On April 21, 2023, NHTSA issued an ANPRM on side underride protection. NHTSA concluded that the costs of side underride guards outweighed their benefits. NHTSA wrote, "On a per trailer basis, the total discounted lifetime costs of equipping new trailers and semitrailers with side underride guards is *six to eight times* the corresponding estimated safety benefits" (emphasis added) and a mere 17.2 preventable deaths per year. While technically still an open rulemaking, NHTSA's cost-benefit conclusion all but precludes a future side-guard requirement.

The ANPRM, while supported by the truck and trailer industry, raised serious questions by other industry stakeholders. IIHS's Matthew Brumbelow submitted as a

[22] Daniel Blower and Kenneth L. Campbell, "Underride in fatal rear-end truck crashes," SAE Technical Paper 2000-013521 (2000)(online at https://www.jstor.org/stable/i40194386).

[23] See Table 2 in IIHS comment to NHTSA Docket 2015-0070 (online at https://www.regulations.gov/comment/NHTSA-2015-0070-0019).

public comment an eight-page analysis identifying serious deficiencies that led NHTSA to severely undercount preventable fatalities and also presented slides to the Committee:

- excluding multiple vehicle crashes, which likely account for around 25% of side underride deaths;

- excluding crashes that involved an initial impact with the passenger vehicle's side, roof, or any preceding impact with another object;

- excluding crashes occurring at the 1 o'clock, 5 o'clock, 7 o'clock, and 11 o'clock locations on the tractor trailer, which increase the number of deaths by 50%;

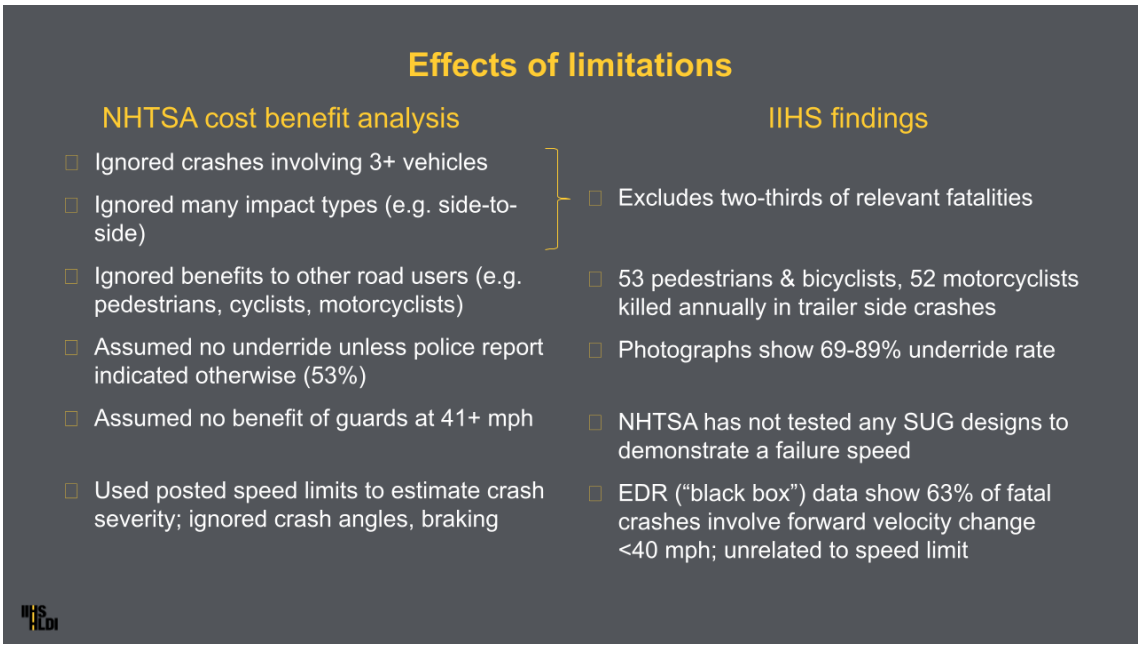
- excluding pedestrian, bicyclist, and motorcyclist fatalities involving the side of a trailer, which account for over 100 deaths per year;

- failing to utilize photographic crash documentation from the Large Truck Crash Causation Study or another source to establish underride incidence and severity rather than relying on phone interviews;

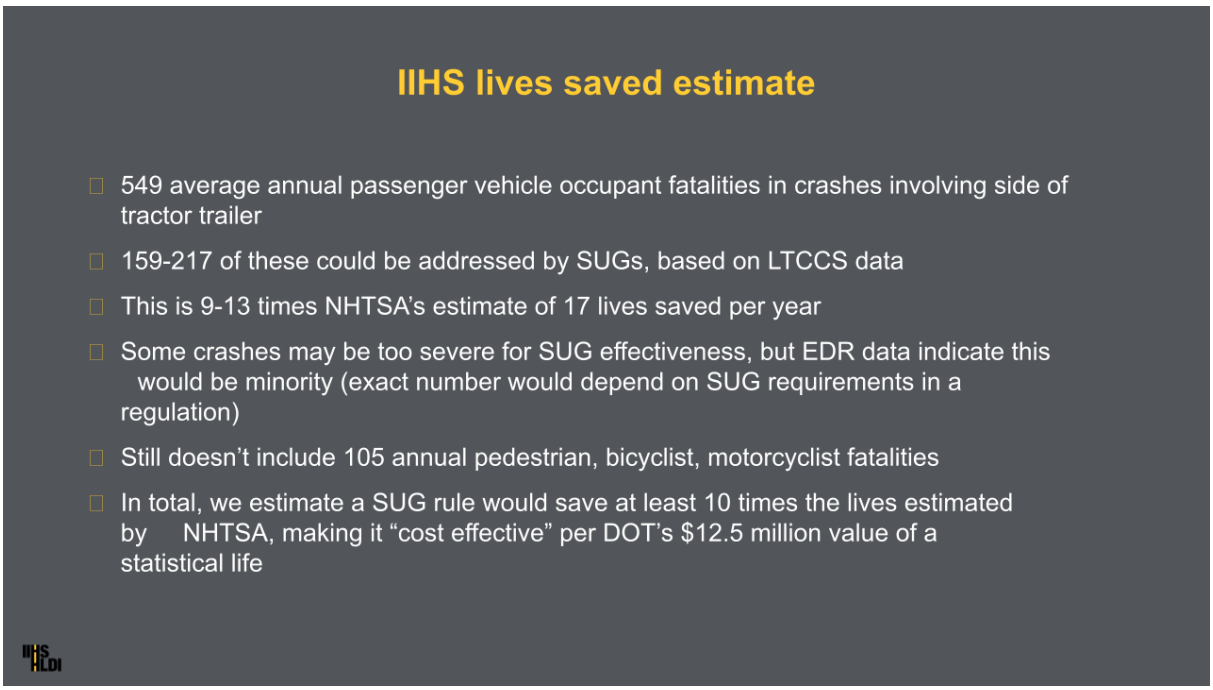
- assuming that underride did NOT occur, unless FARS database evidence indicated otherwise when academic studies have documented that underrides constitute the majority (69-89%) of side impact crashes;

- assuming that side impact guards would have zero beneficial safety effect at speeds over 40 mph.;

- utilizing unreliable estimates of impact speed (posted speed limit, police pre-crash estimates, evidence of braking, witness statements) while not utilizing electronic Event Data Recorder recordings of actual crash severity. IIHS studied EDR data contained in crash databases maintained by NHTSA and found no statistical correlation between crash severity and posted speed limits in fatal crashes as well as gross errors of police pre-crash estimates, causing NHTSA to exclude two-thirds of fatalities on the basis of speed.



The remainder of the IIHS public comment provided a detailed alternative analysis, with tables, graphs, and data. Correcting for NHTSA's unnecessarily restrictive approach, IIHS found, "relevant fatalities are roughly 9-13 times the 17.2 lives NHTSA estimated could be saved by a standard." Mr. Brumbelow spelled out IIHS's analysis and conclusion — that side impact guards are cost-effective.



To assess the agency's progress in advancing public safety, the ACUP requested from NHTSA its basis for assumptions that were identified as unjustified in IIHS's public comment. NHTSA responded that the ACUP "should review" technical documents and published standards that are available online, which were less than satisfactory, leaving this an open question. Ultimately, NHTSA declined to produce to the ACUP the basis for its reliance on the following methodological assumptions underlying the agency's conclusion that the costs outweigh the benefits of requiring side guards.

- NHTSA's cost-benefit analysis did not include fatalities from side-underride crashes involving: 1. pedestrians; 2. bicyclists; and 3. motorcyclists, thereby reducing the benefit of preventing underride fatalities.

- NHTSA did not count fatalities from crashes involving single-unit trucks, which reduced the benefit as well as the cost of preventing underride fatalities.

- In determining the number of preventable fatalities, NHTSA assumed that none of the side impact crashes it studied involved a side underride, unless evidence from police reports indicated to the contrary, in spite of academic findings that most side impact crashes (69-89%) result in underride.

- NHTSA counted only crashes with an estimated speed of up to 40 mph, assuming that side impact guards would have no protective value in crashes exceeding that speed, even though a 2018 NHTSA report demonstrated the effectiveness of side impact guards at speeds up to 50 mph.

- NHTSA failed to use their 2022 survey and reporting of all the semitrailer manufacturers regarding their side underride data, tests, analyses, and studies.

- NHTSA used posted speed limits and police estimates to determine the speed of crashes, rather than data from modern electronic event data recorders. Those recorders enable the determination of the change in velocity experienced by the passenger car, which is the effective speed of its crash and the force causing fatalities. According to IIHS, this oversight alone reduced the number of preventable fatalities and their benefit value in NHTSA's cost-benefit analysis by a factor of three.

- Although the Office of Management and Budget requires that baseline economic costs of Federal regulatory rulemaking actions are measured, NHTSA ignored

this requirement in the cost-benefit analysis, leaving the societal cost of side underride crashes and fatalities unclear and ambiguous.

- NHTSA did not make use of all relevant taxpayer-funded research to improve the accuracy of its estimate of the number of preventable fatalities. According to IIHS, had NHTSA drawn from federal data sources such as the Large Truck Crash Causation Study, its estimate of the number of preventable fatalities would have been 10 times greater. Correcting this oversight alone would have led NHTSA to conclude that the benefits of side underride guards outweigh the costs.

- NHTSA ignored the benefits of cost savings from fuel efficiency attributable to aerodynamic side skirts on side impact guards.

- NHTSA excluded from its consideration a currently available side guard-equipped trailer from a major manufacturer (Utility Trailer). It opted instead to base its cost calculation only on one retrofit product (AngelWing), rather than applying a discount that reflected reasonable economies of scale. NHTSA implausibly explained the exclusion this way:

> [They] have not been included in this analysis of guard costs and benefits because information needed for conducting the analysis are not available for these designs.

- In 2022, NHTSA denied a Petition to promptly initiate a safety defect investigation of semitrailers lacking side underride guards by concluding in a Federal Register notice that the issues raised in the Petition would be best addressed by a forthcoming Advisory Committee on Underride Protection.[24] However, NHTSA never informed the ACUP of the Petition, nor did NHTSA reveal the responses to its survey of all semi trailer manufacturers, which gathered submissions of side underride data, tests, analyses and other relevant information.

3. Front Underride Protection

[24] *See* National Highway Traffic Safety Administration, "Denial of petition for a defect investigation," Docket No. NHTSA–2022–055 (July 5, 2022) 87 FR 39899-39901 (online at https://www.federalregister.gov/documents/2022/07/05/2022-14165/denial-of-motor-vehicle-defect-petition-dp21-004). *See also* National Highway Traffic Safety Administration, Letter from the Office of Defects Investigation to Wabash National Corporation regarding a Defect Petition (DP21-004) concerning the lack of side underride guards on select semi-trailers and to request certain information. NEF-106ns (Dec. 9, 2021) (online at https://static.nhtsa.gov/odi/inv/2021/INIM-DP21004-86397P.pdf).

Front underride protection is designed to prevent a large commercial truck from riding up over the vehicles into which it crashes, supplementing the truck's inadequate front bumper. NHTSA has never issued a rule on front underride protection.

However, publicly-financed research undertaken in 2002 by the University of Michigan Transportation Research Institute (UMTRI) found that "Crashes involving the truck's front … account for most fatal and serious injuries." UMTRI also found that a "reduction of up to 27%-37% in fatality counts is possible by preventing underride."[25]

In 2009, the NTSB investigated a front underride crash in Miami, Oklahoma in which a semitrailer killed 10 occupants in three vehicles. The NTSB formally recommended in 2010 that NHTSA "develop performance standards for front underride protection systems for trucks with gross vehicle weight ratings over 10,000 pounds" and "require that all such newly manufactured trucks be equipped with front underride protection systems meeting the performance standards."[26] NHTSA has still not acted satisfactorily on those recommendations. In 2020, NTSB rejected the agency's request to accept its ongoing research into crash avoidance systems and close the open recommendations due to NTSB's "concern by the slow pace of your progress."[27]

In 2014, in response to a petition for comprehensive rulemaking on rear, side, and front underride protection, NHTSA said it was "still evaluating the Petitioners' request to improve…front override guards and will issue a separate decision… at a later date."[28] To date, ten years later, NHTSA has not issued the promised decision.

4. Automatic Emergency Braking

On April 29, 2024, NHTSA finalized a new Federal Motor Vehicle Safety Standard (FMVSS) that will make automatic emergency braking (AEB) standard on all passenger vehicles by September 2029.[29] These AEB systems will be required to

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[25] "Heavy Truck Aggressivity Reduction: Statistics, Analysis, and Countermeasures," Final Report, University of Michigan Transportation Research Institute, (Nov. 25, 2002)(online at https://trid.trb.org/view/702653).

[26] National Traffic Safety Board, "Truck-Tractor Semitrailer Rear-End Collision Into Passenger Vehicles on Interstate 44, Near Miami, Oklahoma, June 26, 2009," Highway Accident Recommendations #H-10-012 and H-10-013, Report NTSB/HAR-10/02, Washington, DC (2009)(online at https://www.ntsb.gov/investigations/AccidentReports/Reports/HAR1002.pdf).

[27] "Webpage: NTSB Open Recommendations to NHTSA" (online at https://www.nhtsa.gov/ntsb-open-recommendations-nhtsa)(accessed April 27, 2024), and NTSB Safety Recommendation #H-10-013, "Official Correspondence" (May 26, 2020)(online at https://data.ntsb.gov/carol-main-public/sr-details/H-10-013).

[28] "Federal Motor Vehicle Safety Standards; Rear Impact Guards, Rear Impact Protection," Docket No. NHTSA-2014-0080 (July 10, 2014)(online at https://www.federalregister.gov/documents/2014/07/10/2014-16018/federal-motor-vehicle-safety-standards-rear-impact-guards-rear-impact-protection).

[29] NHTSA, Final Rule, Federal Motor Vehicle Safety Standards; Automatic Emergency Braking Systems for Light Vehicles, 49 CFR Parts 571, 595, and 596 (online at https://www.nhtsa.gov/sites/nhtsa.gov/files/2024-04/final-rule-automatic-emergency-braking-systems-light-vehicles_web-version.pdf).

detect and brake to avoid or mitigate a crash with a stopped lead vehicle or with a pedestrian. Crashes with stopped lead vehicles must be completely avoided at speeds up to 62 mph and mitigated at speeds up to 90 mph.

In the past both NHTSA and representatives of the trucking industry have suggested AEB on passenger vehicles and/or large trucks could serve as an alternative to adequate underride protection.[30] While the new FMVSS undoubtedly will reduce the number of crashes between passenger vehicles and large trucks and, therefore, the number of underride fatalities, crash prevention and underride protection must be pursued concurrently to provide the maximum safety benefit. On its own, the new FMVSS represents an incomplete response to the societal harm caused by underride crashes for the following reasons:

a) The FMVSS requires passenger vehicle AEB systems to respond to stopped lead vehicles, when that lead vehicle is another passenger vehicle. Large trucks and trailers are not included as part of FMVSS testing. Research by IIHS has indicated that current AEB systems are less effective at preventing crashes with large truck lead vehicles.[31]

b) Even when passenger vehicle AEB systems are capable of detecting a stopped large truck, crashes will still occur in many scenarios. Examples include: crashes on curves or with offset alignment, which are not included in the FMVSS scenarios; higher speed crashes, which may be mitigated but not completely avoided; situations where evasive action taken by the driver results in AEB deactivation but does not prevent the crash; or crashes where a preceding impact results in the passenger vehicle striking the trailer.

c) Passenger vehicle AEB systems are unlikely to operate in most of the common scenarios that produce large truck side underride. In his presentation to the ACUP, Matthew Brumbelow shared research indicating almost half of trailer side impacts involved a “parallel” configuration in which the passenger vehicle and

[30] In its comment to NHTSA’s side underride guard ANPRM, the American Trucking Associations stated: “ATA believes that efforts to decrease and eliminate side underride crashes should be focused on preventing the crash from occurring in the first place. The mitigation method proposed by NHTSA [side underride guards] would force the trucking industry to expend limited resources on unproven designs with limited potential benefits, when we could instead focus efforts on proven and emerging mechanisms to reduce the likelihood of crashes occurring altogether. The transportation industry’s focus should be on crash avoidance achieved by advanced driver assistance systems (ADAS), such as automatic emergency braking.” (online at https://www.regulations.gov/comment/NHTSA-2023-0012-2063). *See also*, NTSB Safety Recommendation #H-10-013, “Official Correspondence” (May 26, 2020)(online at https://data.ntsb.gov/carol-main-public/sr-details/H-10-013).

[31] Cicchino, J. B., & Kidd, D. G., “Are front crash prevention systems less effective at preventing rear-end crashes where trucks and motorcycles are struck?” Traffic Injury Prevention (2024)(online at https://doi.org/10.1080/15389588.2024.2321910).

truck were initially traveling the same direction and one of the vehicles entered the adjacent lane. Another 25% of crashes involved a configuration in which the vehicles were initially traveling opposite directions prior to the passenger vehicle impact with the side of the trailer.[32]

d) While NHTSA has indicated that it is pursuing a separate rulemaking for large truck AEB, it has not yet been issued when this report was published, so front underride crashes remain unaddressed by crash avoidance regulation. Equipping large trucks with AEB is an important part of a comprehensive approach to preventing these crashes, but on its own, the technology will be subject to similar limitations as those mentioned above for passenger vehicle AEB systems.

e) Even with AEB requirements for new vehicles, it will take many years for this technology to be fully deployed in the U.S. vehicle fleet. Based on a voluntary commitment made by passenger vehicle manufacturers, nearly all of their vehicles produced in the year up to September 2023 were equipped with AEB.[33] The Highway Loss Data Institute has predicted it will be 2045 before 95 percent of all registered vehicles have the technology.[34] Improved underride protection on commercial trucks and trailers has the potential to reduce injury and fatality risk immediately for all passenger vehicles, regardless of their AEB status.

5. Allegations of Suppression of Underride Research Received by the ACUP

During the ACUP's deliberations, on June 13, 2023, FRONTLINE/ProPublica aired an investigative documentary, *America's Dangerous Trucks*, which made the revelation that a DOT research report on side guard protections intended to prevent underride fatalities of bicyclists and pedestrians had been heavily edited at the request of trucking industry lobbyists. When the Department published the report in 2020, major portions were "stripped and the results were changed. Most of the work was never published," according to an anonymous source inside DOT.[35]

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[32] "An Alternative Estimate of the Lives that Could be Saved by a Side Underride Guard standard," Matthew Brumbelow, IIHS. See appendices.

[33] IIHS, "Automakers fulfill autobrake pledge for light-duty vehicles,"(Dec. 21, 2023)(online at https://www.iihs.org/news/detail/automakers-fulfill-autobrake-pledge-for-light-duty-vehicles).

[34] "Predicted availability of safety features on registered vehicles — a 2023 update," (online at https://www.iihs.org/media/d14b1461-8b21-4d54-908d-6ebdcc25b82d/1NXhqg/HLDI%20Research/Collisions%20avoidance%20features/40-02-feats.pdf).

[35] "America's Dangerous Trucks," FRONTLINE/ProPublica (Jun 13, 2023)(online at https://www.pbs.org/wgbh/frontline/documentary/americas-dangerous-trucks/). See also Thompson, A.C., and K. Mehrotra, "DOT Researchers Suggested a Way to Make Big Trucks Safer. After Meeting With Lobbyists, Agency Officials Rejected the Idea," ProPublica and FRONTLINE (Jun 22, 2023)(online at https://www.pbs.org/wgbh/frontline/article/department-transportation-truck-side-guards-trucking-lobbyists-safety/).

In April 2024, Mr. Quon Kwan, the retired FMCSA project manager who conceived, proposed, and oversaw this research, submitted notarized statement to the ACUP and offered to testify before the ACUP to present the findings that DOT removed from the final publication and their potential implications to subsequent cost-benefit analyses. NHTSA did not allow the ACUP to discuss or hear his statement and referred the matter to the Department's Office of Inspector General.

These are very serious allegations that potentially have significant impacts to regulatory efforts. The unpublished Volpe Center final report's finding of cost-effectiveness would have been relevant to the agency's 2023 rulemaking on side impact guards, if the rulemaking's cost-benefit analysis had included the benefits of preventing pedestrian and bicyclist fatalities and achieving fuel efficiency cost savings with aerodynamically-designed side impact guards on both semitrailers and single-unit trucks. But it did not. The exclusion of those benefits led in significant part to the rulemaking's conclusion that the costs of regulation outweigh the benefits. The entirety of Mr. Kwan's statement and materials supplied to the ACUP are included as appendices to this report (Appendices C & D).

It is the assessment of the ACUP that NHTSA excluded relevant data from its cost-benefit analysis for its ANPRM on side impact guards. Disturbing allegations have been made regarding the potential suppression of or interference with publicly funded side-underride guard research by the Volpe Center that needs to be assessed by an impartial investigator. **The fact cannot be ignored that very little has changed regarding side underride guard advancements in the last 50 years and no substantial progress has been made by DOT to prevent these horrific crash fatalities and injuries.**

Majority Report authored by Lee Jackson, ACUP Chair

II. Minority Report