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Pete Buttigieg, Secretary
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Petition to investigate a safety defect from a lack of side underride guards on semi-trailers

Dear Secretary Buttigieg, Administrator Shulman, and Ms. Sullivan:

In accordance with 49 U.S.C. 30162 and 49 C.F.R § 552.1, the Institute for Safer Trucking hereby petitions National Highway Traffic Safety Administration (NHTSA) to promptly initiate a safety defect investigation of semi-trailers lacking SUGs, a known safety hazard and defect, resulting in death and significant injuries when passenger vehicles collide with or vulnerable road users ("VRUs"; pedestrians, bicyclists, or motorcyclists) underride semi-trailers. This investigation will demonstrate that NHTSA should issue a recall order pursuant to 49 U.S.C. §§ 30118(b), 30119, and 30120 for all van-type and box semi-trailers that lack side underride guards.

The Institute for Safer Trucking is a 501(c)(3) organization that is committed to:

- Educating the public about research-based solutions to reduce the frequency and severity of truck crashes in the United States;
- Providing information to survivors and families of victims after a truck crash; and
- Collaborating with motor carriers, technology companies, labor unions, truck drivers, safety advocacy groups, and other stakeholders to make trucking safer.

As background, in 2021, NHTSA was petitioned to investigate a safety defect of van-type and box semi-trailers[1] from a lack of side underride guards (SUGs; "2021 Petition"). Since then, evidence of SUG effectiveness to prevent fatalities and mitigate serious injuries has continued to accumulate (Epstein 2022; NHTSA 2023; Insurance Institute for Highway Safety (IIHS) 2023;

[1] The subject vehicles are van-type or box semi-trailers operated in the United States. The semi-trailers range from twenty-eight feet (28′) to fifty-three feet (53′) in length. Based on eight semi-trailer manufacturers surveyed, which represents 100 percent of the subject vehicle population, NHTSA (2022) estimated the total vehicle population to be 2.45 million semi-trailers.

Kwan (Volpe 2019); Kwan 2024; see also Hein 2023b). Additionally, the 2021 Petition may not have been evaluated appropriately given that the Office of Inspector General (2023) determined that NHTSA does not follow the written procedures necessary for investigators to evaluate the severity of risk posed by potential defects and may miss critical information for launching an investigation. Despite a high severity of risk resulting in frequent severe or fatal injuries from side underride crashes, NHTSA has taken no action to investigate recalling of semi-trailers without SUGs.

An "underride" collision occurs when a semi-trailer collides with a passenger vehicle causing the passenger vehicle to slide under the body of a semi-trailer, often crushing the vehicle and passengers within, or dragging the vehicle causing it to burn with passengers inside. Due to the height difference between passenger vehicles and semi-trailers (in addition to single unit trucks; see NHTSA 2013), a collision bypasses the car's safety features because the point of impact is the passenger compartment, not the front bumper of the car. The bottom edge of a semi-trailer is between forty-two and forty-five inches high, which is about eye height for passengers of a motor vehicle. Side underride guards work by engaging safety accessories like airbags, crash avoidance sensors, and other features of cars as well as preventing vehicles from going under the truck and encountering the semi-trailer body or rear wheels, increasing the chance of survival with these types of collisions, many of which would be minor collisions if not for the underride. Without engaging a car's safety features which would otherwise absorb the force of the collision, the passenger compartment can be crushed when it contacts the semi-trailer, resulting in death or severe injuries for the occupants.

NHTSA is directed by Congress to protect the safety of the driving public against unreasonable risk of death or injury that may occur because of the design, construction, or performance of a motor vehicle or motor vehicle equipment and, is charged with reducing deaths, injuries, and economic losses resulting from motor vehicle crashes (49 U.S.C. § 30102). NHTSA acknowledges many deaths and serious injuries occur annually from underride crashes (NHTSA 2023). Shockingly, there are hundreds of deaths and serious injuries annually from passenger vehicle and VRU collisions with semi-trailers lacking side guards (Bloch and Schmutzler 1998; Bodapati 2006; Braver et al. 1997; Brumbelow 2012; Government Accountability Office (GAO) 2019; IIHS 2023; Kwan (Volpe) 2019; Mattos et al. 2021; National Transportation Safety Board 2014, 2019, 2023; Padmanaban 2013; Sievers 2020).

NHTSA's (2020) safety defect analysis policy is to objectively evaluate different levels of risk using frequency of occurrence and categories of severity of harm, based on a data-driven process to validate these parameters, whether there is sufficient evidence of a potential safety-related defect, and then open a formal investigation. Yet, when NHTSA (2022) denied the 2021 Petition to initiate a safety defect investigation of semi-trailers that lack side underride guards, there was no "data-driven" evaluation of risk. Rather, NHTSA was remiss by disregarding the undisputed facts that numerous deaths and serious injuries occur annually from passenger vehicles and VRUs colliding with semi-trailers that lack side underride guards (see Kwan (Volpe 2019); Epstein 2022; Hein 2023; Brumbelow 2023). Moreover, the possibility of a proposed and final rulemaking for side underride guards, which take years[2], cannot supplant NHTSA's legal

[2] NHTSA proposed rear impact (underride) guards in 1981 but did not finalize the rule until 1996 with an effective date of 1998 (NHTSA 1996; 61 FR 2004).

responsibility to investigate any motor vehicle or item of motor vehicle equipment for a potential defect (National Traffic and Motor Vehicle Safety Act 1966).

By ignoring the level of risk to the traveling public, NHTSA (2022) erroneously concluded in the Federal Register notice of the 2021 Petition denial that the issues raised would be best addressed through the Congressionally-directed evaluation of SUGs by a forthcoming Advisory Committee on Underride Protection (ACUP).[3] However, the ACUP does not know that NHTSA evaluated and denied a 2021 petition (ACUP 2024). The ACUP recommended rulemaking for SUGs (ACUP 2024) and did not address any issues related to recall of semi-trailers. In fact, the issue of recall was never raised by NHTSA during any of the six ACUP meetings and a final report with recommendations was submitted to Congress and the Secretary of Transportation on June 28, 2024 (ACUP 2024), indicating that the ACUP will not investigate or address a potential side underride recall.

Although NHTSA (2022) recently surveyed and obtained relevant information and data on side underride guards from all eight semi-trailer manufacturers (i.e., Great Dane, Hyundai Translead, Kentucky Trailer, Stoughton, Strick Trailers, Utility Trailer Manufacturing (UTM), Vanguard, and Wabash), it is highly doubtful that these manufacturers will agree to share CBI given opposition to side underride guards by trucking industry representatives on the ACUP. Likewise, NHTSA's (2023a; 00:04:17) recent "Operational Guidance" from an ACUP meeting was that Confidential Business Information (CBI) "…cannot be discussed during a public meeting, unless the owner of that information has agreed to the disclosure of the information". Moreover, the ACUP is not aware that side underride guard survey information was recently collected by NHTSA (Lee Jackson, ACUP Chairperson, pers. comm. March 1, 2024). As a result, the 2021 Petition was wrongly denied because a safety defect investigation will not be initiated through the ACUP. Regardless, the ACUP has no authority to make the decision of whether semi-trailers lacking SUGs contain a defect or issue a recall.[4] In fact, the ACUP has only been charged with providing *advice and recommendations* to the Secretary on safety regulations to reduce underride crashes and fatalities relating to underride crashes on ***newly*** manufactured trailers and semitrailers and contains no requirement as it relates to retrofitting existing trailers and semitrailers (Infrastructure Investment and Jobs Act 2021).

NHTSA's FARS data demonstrate that semi-trailers without SUGs contain a *defect that presents an unreasonable risk* to the public because there are "…a "significant number of failures" in "normal operation" that are "reasonably foreseeable" (*United States* v. *General Motors*

[3] The Bylaws and Charter for the ACUP indicate that the objectives and scope of the ACUP are only to "…provide advice and recommendations to the Secretary of Transportation on safety regulations to reduce underride crashes and fatalities" and the ACUP "…shall act solely in an advisory capacity" (NHTSA 2022b, 2022c). In effect, the ACUP will not use a "data-driven" evaluation of risk of semi-trailers lacking SUGs because there is no mention of a risk-based process in their Bylaws and Charter. The Bylaws and Charter for the ACUP demonstrate that the ACUP does not have any decision authority for non-advisory functions (41 CFR 102-3.75). Indeed, Advisory committees established under the Federal Advisory Committee Act (5 U.S.C. App. 1 Public Law 92-463) may only perform advisory functions, Federal functions (i.e., decision making or operations) cannot be delegated to, or assumed by, non-Federal individuals or entities; the Executive Branch retains the authority for decision-making (GSA 2024; Final Rule 89 FR 27673).

[4] The ACUP cannot investigate the issues raised in the 2021 Petition or initiate a recall of safety-related defects (49 U.S.C. 30102), because, in particular, NHTSA has not delegated their authority in making "…final decisions concerning alleged safety-related defects and noncompliances with Federal motor vehicle safety standards (49 CFR part 573). Consequently, the solely "advisory capacity" of the ACUP does not impart Secretarial authority to protect the public from unreasonable risk of accidents occurring as a result of the design, construction, or operation of automobiles (i.e., "…if through testing, inspection, investigation, or research" the Secretary "…determines that any motor vehicle or item of motor vehicle equipment contains a defect which relates to motor vehicle safety" (National Traffic and Motor Vehicle Safety Act 1966).

Corporation ("*Wheels*"), 518 F.2d 420 (D.C. Cir. 1975); Hein 2024; NHTSA 2023). As NHTSA recognizes, a "significant number of failures" is merely a "non-de minimus" quantity; it need not be a "substantial percentage of the total" (*Wheels,* 518 F.2d at 438). The undisputed facts below demonstrate that numerous deaths and serious injuries occur annually from passenger vehicles colliding with semi-trailers that lack side underride guards. These data establish a defect because there is no dispute that this hazard "…can definitely be expected to occur in the future" (*United States* v. *Gen. Motors Corp*., 565 F.2d 754, 758 (D.C. Cir. 1977)).

Facts:

- NHTSA (2023) estimated that annually there are 89 light passenger vehicle occupant fatalities in two-vehicle crashes with tractor-trailers;
- NHTSA (2023) estimated that annually 409 serious injuries to light passenger vehicle occupants in underride crashes into the side of trailers annually;
- IIHS (2023) reported that NHTSA (2023) erroneously omitted substantial data, severely biasing the fatality and serious injury estimates and demonstrated that 159-217 fatalities could be addressed by a side underride guard standard;
- Hein (2024) reported that from 2007 to 2020, there were at least 1,238 side underride crashes with 1,415 fatalities cataloged in FARS with an estimated 2,191 side underride crashes, which resulted in 2,505 fatalities;
- NHTSA (2023) estimated a 97 percent effectiveness of side underride guards in mitigating fatalities in underride crashes into the side of trailers at impact speeds 64 km/h (40 mph) or less; and
- NHTSA (2023) estimated 85 percent effectiveness of side underride guards in mitigating serious injuries in underride crashes.

It is noteworthy that a defect "is systematic and prevalent in a particular class [of motor vehicles or equipment], . . . this is prima facie an unreasonable risk" (*United States* v. *General Motors Corp*., 561 F.2d 923, 928–29 (D.C. Cir. 1977) ("*Pitman Arms*"). In the context of the National Traffic and Motor Vehicle Safety Act of 1966, (Safety Act), "motor vehicle safety" refers to an "unreasonable risk of accidents" and an "unreasonable risk of death or injury in an accident" (49 U.S.C. § 30102(a)(8)). Thus, while defect analysis has generally entailed a retrospective look at how many failures have occurred (see, e.g., *Wheels*), the safety-relatedness question is forward-looking, and concerns hazards that may arise in the future from, for example, side underride collisions resulting in death and serious injury to the traveling public (e.g., see *United States* v. *Gen. Motors Corp*., 565 F.2d at 758).

Although currently there is no applicable Federal Motor Vehicle Safety Standard (FMVSS) for side underride guards on semi-trailers (or single unit trucks), NHTSA has the authority to recall vehicles or equipment that pose an "unreasonable risk" to safety even when there is no FMVSS (NHTSA 2017). Under the Safety Act, a safety "defect" includes "any defect in performance, construction, a component, or material of a motor vehicle or motor vehicle equipment" 49 U.S.C. § 30102(a)(2). Importantly, this includes a defect in design of a safety part missing from the vehicle (i.e., lacking side underride guards; see *Wheels*, 518 F.2d at 436; see for example Safety Research and Strategies 2021).

NHTSA has determined that SUGs are an extremely effective countermeasure intended to mitigate the unreasonable risk of side underride deaths and serious injuries (NHTSA 2023), yet has failed to investigate or act. Many semi-trailer manufacturers have been developing and patenting side underride guards, as evidenced by numerous patents, including but not limited to Wabash (2012, 2020, 2021), Vanguard (2019), Great Dane (2021), UTM (2022, 2023a), Fortier (2019), and Fontaine (2021). Wabash[5] (2012, 2020) and Vanguard[6] (2019) patents clearly acknowledge the known unreasonable risk posed by the geometric mismatch of semi-trailers and passenger vehicles. Indeed, for over 2 years, UTM, the largest semi-trailer company in the United States, has offered a patented SUG (Side Impact Guard) for all its refrigerated and dry van trailers, which has undergone extensive third-party testing and can be installed as safety option at the factory during semi-trailer manufacturing (UTM 2022, 2023).

UTM semi-trailers have frequently been involved in side underride crashes and fatalities (e.g., *Beane* vs. *Utility Trailer Manufacturing Company* 2013*;* Times Record News 2016; Ludington Daily News 2017; National Transportation Safety Board 2017; *Valenzuela* vs. *Abarca et al*. 2019; WNDU 2019; KOTA 2020; Sievers 2020; see also Hein 2023a) and, while all dry van and box trailers should be investigated, UTM semi-trailers in particular should also be investigated for a potential recall requiring retrofitting with their Side Impact Guard. Although Bennett (2023) has stated that UTM cannot even "give away" their Side Impact Guards, this statement is inaccurate because UTM has already sold over 75 percent of their manufactured guards with many semi-trailers currently operating in the U.S. with the UTM SUG installed (UTM 2022, 2024; Bennett 2023).

Wabash (2021) even indicated that its side underride system may provide dual aerodynamic efficiency and protection to road users without operational limitations such as "costly installation, access to the underside of the trailer, or adding considerable weight". Likewise, starting in 2010, the AngelWing has been installed on semi-trailers that have already logged over 1 million miles delivering loads with no issues of road clearance, structural deficiencies (e.g., stress cracks on welds), loading/unloading at docks, or serviceability (Berry 2021; Heres 2021; Camden 2021; Airflow 2024).

The AngelWing, SafetySkirt, UTM, and Wabash SUGs have been successfully crash-tested by stopping a passenger vehicle from underriding a semi-trailer (IIHS 2017; Wilson 2017; Ponder 2020; Kiefer 2023; Safetyskirt 2020; Seven Hills Engineering 2023; CBS News 2022; UTM

[5] Wabash (2012, 2020) reported that "Truck trailers typically have a higher elevation than passenger vehicles. This presents a risk that a passenger vehicle will underride the trailer in an accident, potentially resulting in damage to the underriding vehicle and injury to occupants therein. Accordingly, some trailers may include a side protection device, or underride guard, to reduce the risk of such passenger vehicles underriding the trailer. The side protection device is intended to reduce the extent to which a "passenger vehicle" (as defined in 49 C.F.R. Part 571S) can intrude under the side of a trailer, diminishing passenger compartment intrusion." Wabash found that the "side underride system may reduce the risk of passenger vehicle underride in the event of a side impact collision, as well as reduce the risk of pedestrians, bicyclists, or motorcyclists from falling or sliding under the trailer, for example, between the landing gear and rear wheel assembly."

[6] Vanguard (2019) indicated that "Truck trailers typically have a higher elevation than passenger vehicles. This presents a risk that a passenger vehicle will underride the trailer in an accident, potentially resulting in damage to the underriding vehicle and injury to occupants therein. Accordingly, the United States Federal Motor Vehicle Safety Standards require the installation of underride guards or bumpers on certain trailers. The underride guards must comply with certain deflection and energy absorption requirements. Underride guards are common on the rear of trailers; however, underride guards between the landing gear and wheel assembly of the trailer are less common. A device positioned between the landing gear and wheel assembly of the trailer can function to prevent an impacting vehicle from underriding the trailer.

2023). In addition to crash tests[7], computer-based simulations are often used by researchers investigating crash attenuation of side underride guards up to 50 mph (Bodapati 2006; Moradi *et al*. 2011; Moradi 2012; Galipeau-Belair *et al*. 2013; Galipeau-Belair 2014; NHTSA 2018; Mattos *et al*. 2021). Notably, NHTSA (2018) concluded that "…the vehicle was successfully prevented from wedging under the tractor-trailer vehicle."

Congress intended the Safety Act to represent a "commonsense" approach to safety and Courts have followed that approach in determining what constitutes a "defect" (*Wheels*, 518 F.2d at 436). For this reason, a defect determination for semi-trailers lacking side underride guards does not require an engineering explanation or root cause, but instead "may be based exclusively on the performance record of the component" (*Wheels*, 518 F.2d at 432). The substantial amount of research and data on the number of deaths and serious injuries from collisions with semi-trailers without side underride guards is clear; failure to include a side underride guard amounts to a defect in the semi-trailer's design, construction, and performance.

Without a government recall in the United States, truck and trailer manufacturers and operators will not voluntarily stop the known unreasonable risk to public safety by designing and implementing safer trucks and trailers with effective side underride prevention guards (Bloch and Schmutzler 1998; GAO 2019). While the trucking industry frequently refers to SUG falsehoods (see Appendix), crash tests and side underride guard research demonstrate that side underride guard technology is available, has been well-studied, and would be an easy and inexpensive and cost-beneficial solution to the known hazard of side underride collisions to the traveling public (see also Hein 2023; Kwan 2024, Kwan (Volpe) 2019; Vargas 2024).

For the reasons discussed above, the Institute for Safer Trucking urges NHTSA to grant this Petition for a Defect Investigation into van-type or box semi-trailers due to a lack of side underride guards. Deaths and serious injuries continue to occur every day across our Country. The DOT and NHTSA can no longer feign ignorance to the danger of underride collisions. NHTSA must grant the petition and conduct an investigation, in which you will certainly find that this known defect poses an unreasonable risk to motor vehicle and VRU safety and is therefore a "safety defect," and subsequently order manufacturers to conduct a recall to mitigate the dangers of death and serious injury from semi-trailers lacking side underride guards (49

[7] Side underride guard crash tests (e.g., Kumar *et al*. 2009; IIHS 2017; Wilson 2017 (Wabash); Ponder 2018; Jenkins 2023 (Fortier); Kiefer 2023; UTM 2022, 2023) confirm NHTSA's determination that SUGs are highly effective in mitigating fatalities and serious injuries. Moreover, computer-based simulations also crash attenuation of side underride guards at collision speeds up to 50 mph (Bodapati 2006; Moradi 2012; Galipeau-Belair 2014; NHTSA 2018; Mattos *et al*. 2021). While side underride guards are specifically intended to prevent a vehicle from underriding a semi-trailer, they would also be effective in mitigating pedestrian, bicyclists, and motorcyclists fatalities, particularly if an aerodynamic side skirt is attached (e.g., Volpe 2021; Epstein 2022; Brumbelow 2023; IIHS 2023).

U.S.C. § 30118(b)). Pursuant to 49 U.S.C. § 30162(d), we formally request you respond to this petition within 120 days.

Respectfully,

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Appendix

Trucking Industry Falsehoods of Side Underride Guards

The trucking industry has lobbied against side underride guards since 1971 and continues to inaccurately claim that side underride guards are infeasible from lack of testing, cost, weight, and operational issues, even though Utility Trailer Manufacturing Company and private businesses sell side underride guards and many other semi-trailer manufacturers hold patents. The facts regarding side underride guards are addressed below.

Testing Has Validated Side Underride Guards: The AngelWing, SafetySkirt, Utility Trailer's Side Impact Guard, and Wabash side underride guards and have all been successfully crash tested using passenger vehicles (IIHS 2017; Wilson 2017; SafetySkirt 2020; CBS News 2022; UTM 2022, 2023b). These crash tests demonstrate that side underride guards would prevent almost all underride collisions at a speed ***differential*** of 35 to 40 mph (note: on a highway, the difference in speed of the vehicle and semi-trailer is usually less than 40 mph). In addition to crash tests, computer-based simulations have often been used by researchers to demonstrate crash attenuation of side underride guards up to 50 mph (Bodapati 2006; Moradi *et al*. 2011; Moradi 2012; Galipeau-Belair *et al*. 2013; Galipeau-Belair 2014; NHTSA 2018; Mattos *et al*. 2021).

Testing the Ends of Side Underride Guards NHTSA (2018) concluded that "…the SUPD [side underride protection device] designs are expected to perform acceptably for impacts near the ends of the SUPD" and at 50 mph, "…the vehicle was successfully prevented from wedging under the tractor-trailer vehicle." Mattos et al. (2021) tested impacts centered on the underride guard ('Center') as well as those with the driver side tires aligned with the rear of the underride guard ('Rear'). A 'Gap' test was also conducted in which the front set of tires in the rear tandem were removed (Figure 10-bottom) to generate a 1686 mm gap between the aft end of the underride guard and the forward most part of the rear tires. The results demonstrate that an side underride guard provides a sufficient reaction surface to allow for the vehicle's passive and active safety systems to protect the occupant. The side underride guard also causes the location of PCI to move from near the occupant's head and torso to the lower extremities which reduces the likelihood of serious or fatal injury. As tested, there is an 80 percent or greater reduction in PCI for impacts with an side underride guard compared to the baseline condition. No adverse effects were observed because of the side underride guard.

Angular Crash Testing: Moradi et al. (2011) researched two different angular crash tests: a 90-degree impact and a 45-degree impact. The impact angle between the underriding vehicle and the truck affects the pattern of the damage and the way the impact energy is dissipated. If the angle of impact is relatively small, the vehicle will be in contact with the trailer over a larger distance and slide along the side of the trailer. This will expose the underriding vehicle to a greater opportunity to contact the underbelly structures. Also, a significant amount of energy may be dissipated as the vehicle moves and slides along the side guard. For a small car, the addition of the side guard reduces the probability of severe injury of occupants by about 250 percent compared to no guard configuration. Further it prevents the under-riding probability of the car which increases the injury potential catastrophically.

Less Than 90 Degrees Crash Testing: Galipeau-Belair (2014) also conducted research to determine how side underride guards would react during angle crashes compared to a perpendicular crash. Each of the three side underride guards were tested at angles of 15, 30, 45 and 60 degrees. When comparing these results to the perpendicular (90 degree) crashes, the side underride guards experienced much smaller deformations, and were still rigid enough to stop the car. As the angle increases, the deformation becomes larger, showing that the perpendicular (90 degree) crash was the worst condition for maximum deformation of the side underride guard. In all angular impact tests, the side underride guard remained rigid and proved to be effective at preventing the passenger vehicle from underriding the trailer.

Cost: Wabash National (2023) estimated the cost of a side underride guard would be about $1,100. The AngelWing, an aftermarket retrofit side guard, is estimated to cost $2,990. NHTSA (2023) reported that the adoption of side underride guards would likely lead to reduced costs due to scale and competition (e.g., the difference between an aftermarket retrofit side underride guard such as the AngelWing and side guards that would be mass produced and installed as original safety equipment during the manufacturing of semi-trailers).

Cost Beneficial: Although only relevant in analysis during rulemaking and not a recall, Volpe analyzed side underride guards and determined adding guards to semi-trailers would be significantly cost beneficial, saving both lives and fuel (Kwan 2024, 2024a). However, after pressure from the American Trucking Associations, NHTSA stripped the cost-benefit analysis and conclusions from the final published report, which is now the subject of a whistleblower investigation (Vargas 2024). Similarly, Hein (2023) reported the estimated annual economic benefit of side underride guards of between $540 million to $1.4 billion, which is based upon the annual mitigation of between 50 to 150 fatalities and the annual mitigation of between 50 to 150 serious injuries. The mitigation of these fatalities and serious injuries would be easily achievable with an average of 279 passenger vehicle and Vulnerable Road User fatalities that occur annually.

Baseline Cost to Society: In the absence of side underride guards on semi-trailers, side underride crashes and fatalities result in a minimum annual baseline of between $4.0 to $5.9 billion. This calculation multiplied the U.S. Department of Transportation's (2023) monetized values of $313,000 by an estimated 200 serious injuries and $14 million by the estimated 179 fatalities per year from side underride crashes. The baseline also includes an estimated 100 vulnerable road user deaths per year from these crashes.

Light Weight: A side underride guard's weight (which is approximately 400 to 500 pounds) will rarely be an issue. In 2019, the average tractor-trailer operating weight was 63,000 lbs, indicating the average tractor-trailer usually fills all the footage of space before it ever gets close to reaching the 80,000-pound weight limit (Williams and Murray 2020).

Cube Out is Common: Most tractor-trailers' cargo never reaches its 80,000-pound weight limit because the cargo's size and bulk usually fill the semi-trailer before the weight limit is even close to being topped. which is referred to in the industry as "cubing out before weighing out". In other words, a semi-trailer usually fills all the footage of space before it ever gets close to reaching weight limit. In fact, dry van semi-trailers rarely (approximately 2 percent of the time) travel at

maximum weight, either because the goods fill the trailer volume (cube out) before they gross out, or simply because their routes and cargo patterns are not conducive to traveling full (North American Council for Freight Efficiency 2021).

No Operational Issues: Wabash (2021) indicated that its side underride system may provide dual aerodynamic efficiency and protection to road users without costly installation, access to the underside of the trailer, or adding considerable weight. Utility Trailer (2023b) describes that their Side Impact Guard is "fully compatible with Utility's Aerodynamic Side Skirt to improve safety without sacrificing performance".

Ground Clearance: Utility Trailer Manufacturing (2022, 2023b) maintains that their side underride guard did not high center in the same ground-clearance performance test used on its aerodynamic skirts and the high ground clearance of their side underride guard eliminates trailer and guard damage in both loaded and unloaded trailers. Additionally, their patent clearly and repeatedly indicates the design achieves "effective ground clearance" (UTM 2023a). As such, side underride guards do not obstruct semi-trailer hauling due to low ground clearance of curbs or railroad crossings. A side underride guard that fully protects all road users is also fully compatible with railroad crossing and curb grades – and still leaves at least 22 to 27 inches of clearance between the bottom of the underride guard and the ground. In fact, many types of semi-trailers currently on the road, like auto transporters, have only 3 inches of ground clearance and are not an impediment to commerce. Moreover, side underride guards with 22 inches of ground clearance would not be a hinderance on the maximum 6 percent dock slope as set forth in Society of Automotive Engineers' SAE J699 (cited in Ponder 2020; Kelly 2013; SAE International 2011).

Ice and snow resistance: Aerodynamic skirts resist snow and ice buildup (TrailerBlade 2024) indicating that skirts installed on side underride guards would not only save fuel, but would also reduce the potential for snow and ice to accumulate.

Unintended Consequences: The trucking industry frequently mentions possible "unintended consequences" of side underride guards (e.g., the remote chance of a side guard falling off a semi-trailer or a passenger vehicle ricocheting and causing a crash with multiple fatalities; see Thompson et al. 2023). These have no basis other than scare tactics, particularly when compared to the facts: hundreds of fatalities and serious injuries occur annually from side underride crashes (Brumbelow 2023, IIHS 2023, NHTSA 2023).

Legal Cost Savings: Side underride guards would also limit the very real financial liability to trucking companies from lawsuits, plus lower trucking insurance premiums by saving lives and preventing serious injuries. For example, in August 2019, a jury reached a $42 million verdict from a 2015 underride death against the Barkandi Express Trucking Company and Utility Trailer Manufacturing Company (Sievers 2020). The jury found that Utility Trailer Manufacturing Company was negligent because their newly manufactured semi-trailer lacked side underride guards (Sievers 2020). Utility Trailer has since developed and now sells side underride guards (UTM 2022, 2024; Bennett 2023). Similarly, in 2024, a $32.5 million settlement was reached with Tyson Foods after fatal side underride crash killed an Army veteran (Manins 2024).

Insurance Premium Reductions: Volpe (2019; see Kwan 2024a) found that the annual cost savings for side guard equipped trucks would be a $665 ($815 adjusted to 2024) reduction in insurance premiums by saving lives and preventing serious injuries.

For more information see: Unguarded and Unsafe: Death by Underride

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