

November 8, 2023

James Myers, Designated Federal Officer  
U.S. Department of Transportation  
NHTSA  
Special Vehicles and Systems Division  
1200 New Jersey Avenue SE  
Washington, DC 20590

Dear Mr. Myers:

As recommended in the [Federal Register](#) notice, I am submitting the following written materials, questions, and comments to you and the Advisory Committee on Underride Protection (ACUP) in advance of the November 15, 2023 public meeting ([88 FR 73940; Docket No. NHTSA-2023-0045](#)).

1. Please consider revising the agenda item entitled, “Implementation and Operation Hurdles” to “Implementation and Operations”. NHTSA should strive to word agenda items as neutral as possible. Including the word “Hurdles” suggests obstacles or difficulties with side underride guards (SUG), rather than following the ACUP’s duties that include:
  - a. Gathering information as necessary to discuss issues presented by the Designated Federal Officer (DFO).
  - b. Deliberating on issues relevant to safety regulations related to underride crashes and fatalities from underride crashes.
  - c. Providing written consensus advice to the Secretary on underride protection to reduce underride crashes and fatalities relating to underride crashes.
2. When deliberating on issues, NHTSA and the ACUP should require data or research (gathering information) to confirm any statements or observations (deliberating on issues). Otherwise, statements or observations based solely on an opinion should be dismissed and certainly not included in any written consensus advice to the Secretary. For example, any discussion of “unintended consequences” such as the remote chance of a SUG falling off a semitrailer or a passenger vehicle ricocheting off a SUG and causing a crash with multiple fatalities (Bennett 2023; see Enclosure for all citations) are extremely unlikely to occur and have no basis other than scare tactics, particularly when these remote possibilities are compared to the facts: hundreds of fatalities and serious injuries occur annually from side underride crashes (IIHS 2023).
3. Many semitrailer manufacturers have been investigating and patenting side underride guards, as evidenced by numerous patents, including but not limited to Wabash ([2012](#), [2020](#), [2021](#)), Vanguard ([2019](#)), Great Dane ([2021](#)), Utility Trailer ([2023](#), [2022](#)), Fortier ([2019](#)), and Fontaine ([2021](#)). 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”. This information should be made available and reviewed by the ACUP.

4. There is a wealth of data and research on side underride guards, which should also be made available and reviewed by the ACUP (e.g., see Enclosure 1). In fact, starting in 2010, the AngelWing has been installed on a small number of semitrailers that have already logged over 1 million miles delivering loads with no issues of road clearance, structural deficiencies (e.g., stress cracks on welds), or loading/unloading at docks (Berry 2021, Heres 2021, Camden 2021, P. Ponder pers. comm.). UTM has 60 trailers currently operating in the U.S. with the UTM SUG installed (UTM 2022; Bennett 2023). Moreover, computer-based simulations are often used by researchers investigating crash attenuation of side underride guards up to 50 mph (Bodapati 2004; Moradi et al. 2011; Moradi 2012; Galipeau-Belair et al. 2013; Galipeau-Belair 2014; Mattos et al. 2021). Notably, even NHTSA (2018) concluded that “The successful testing and simulations at speeds up to 50 [mph] and angles from 90 to 15 degrees further speaks to the wide range of accident scenarios and severities for which side underride protection is proven effective.” Clearly, significant protection of occupants in passenger vehicles (e.g., reductions in compartment intrusion reductions) have been demonstrated for speeds up to 50 mph.
5. Side underride guards will not impede semitrailer hauling due to low ground clearance of curbs or railroad crossings. Guards on semitrailers would still leave 22-27 inches of clearance from the bottom of the guard to the ground. From 2014-2018 there were no fatalities from semitrucks and semitrailers on railroad grade crossings that were coded “semi-trailer stuck on tracks”, which would include the population of trailers far lower to the ground than is required by a SUG (Ponder 2020a; 2020b). SafetySkirt (2019) has also demonstrated adequate clearance of a SUG over a raised median. Many semitrailers currently on the road, like low boys, auto transporters or double-drop trailers, have only 3 inches of ground clearance and are not an impediment to commerce. Low chassis trailers have minimal ground clearing and are not a side underride hazard. Moreover, existing equipment on trucks and semitrailers has much less clearance: landing gear-8 inches; differential-10 inches; brake chambers-12 inches; and truck cab-8 inches. Finally, the Federal Railroad Administration (FRA) offers a Rail Crossing Locator App that allows the public to access the highway-rail grade crossing database and a variety of map features for route planning to avoid problematic grade crossings for any semi-trailer (FRA 2023), suggesting any trucks and semitrailers that become stuck on a railroad track crossing may be a the result of human error and a failure to drive safely. Using any of these as examples as possible evidence that SUGs would have difficulties crossing railroads would be inappropriate.
6. Although the Virginia Port Authority (2023) is concerned that ground clearance on SUGs may be inadequate for loading and unloading of long trailers in trains or ships, they provided no specific data to support their opinion. Like rear underride guards, a SUG

with 22 inches of ground clearance would not interfere with trains, ships, or intermodal loading and unloading (e.g., vessel loading ramps or on any 20 percent grade; NHTSA 1996). The American Trucking Associations (ATA) supported a 22 in proposed ground clearance for rear underride guards because 53-foot semi-trailers are rarely used on vessels, and because 20 percent grades are rare (cited in NHTSA 1996). Moreover, the Truck Maintenance Council of the ATA recommended a rear guard clearance of 22 in for general freight equipment (cited in NHTSA 1996). Furthermore, the TTMA (2019) has a final recommended practice trailer ground clearance that "...provides a uniform method for calculating the location of the minimum vertical ground clearance for rigid auxiliary equipment – such as fuel tanks, storage boxes, side-door steps, tire carriers, lift gates – that may be affixed underneath the semi-trailer without contacting the ground when the trailer goes over a change in grade, including grade changes attributable to loading docks, railroad crossings, steep driveways." According to a trailer designer and manufacturer, the 22 in height for rear underride guards was acceptable because, although many trailers are still driven into ships rather than being crane loaded, vessel owners can adjust their ramps, and because it is compatible with the dimensions established by the trucking industry and loading dock restraint device manufacturers (NHTSA 1996). This rationale would also hold true for SUGs.

7. Virginia Port Authority (2023) also indicated that Side guards would impede the need for intermodal chassis trailers to stack. However, side guards have already been designed and installed on intermodal chassis trailers without issue (Alibaba 2023, 2023b). Moreover, Strick (2000) already has a proposed design for equipping intermodal chassis with a side guard.
8. The Virginia Port Authority (2023) also indicated that "...there have been no fatalities identified over the last five years from side underride incidents involving intermodal marine chassis indicating limited if any safety benefits from imposing new regulations." This statement is inaccurate. Please note this fatal side underride crash in Indiana in 2018 from an intermodal chassis fatal side underride crash (News Now Warsaw 2018).



9. A SUG with 22 inches of ground clearance would not be a hinderance on the maximum 6% dock slope as set forth in Society of Automotive Engineers' SAE J699 (cited in Ponder 2020a). Notably, the max SAE recommended dock slope is 6 percent (Kelly 2013; SAE International 2011). The analysis below was conducted by Christopher Bonanti, formerly NHTSA's Associate Administrator for Rulemaking, demonstrates that ground clearance is maintained with up to 10 percent dock slope, even with the semitrailer axles are set at the full rearward position (cited in Ponder 2020a). In fact, this analysis demonstrates that the AngelWing would clear a dock by nearly 6 inches, even when the dock slope is 10 percent, and the wheels are full rearward (which means the trailer is most likely to bottom out due to the extended wheelbase). Additionally, Utility Trailer's (2022) SIG did not high center in the same ground-clearance tests Utility uses to test the performance of its aerodynamic skirts.

Figure 10 Clearance of a 53' Semitrailer loading/unloading cargo on 6% recessed ramps.

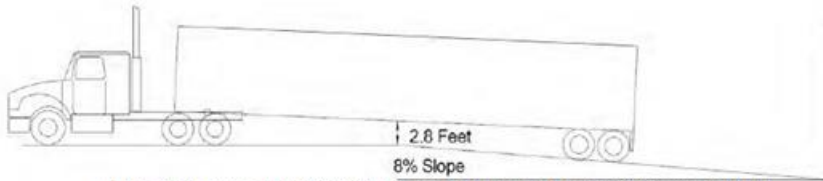


Figure 11 Clearance of a 53' Semitrailer loading/unloading cargo on 8% recessed ramps.

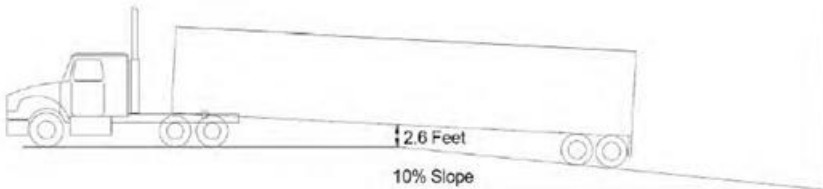


Figure 12 - Clearance of a 53' Semitrailer loading/unloading cargo on 10% recessed ramps.

Table 1 - 53' Semitrailer Clearance

19.69" Clearance with Side Underride	6 % Slope Clearance	8 % Slope Clearance	10 % Slope Clearance
<b>Tire Location Forward</b>	$39.6" - 25.31" = 14.29"$	$37.2" - 25.31" = 11.89"$	$36" - 25.31" = 10.69"$
<b>Tire Location at Maximum Aft</b>	$36" - 25.31" = 10.69"$	$33.6" - 25.31" = 8.29"$	$31.2" - 25.31" = 5.89"$

10. Side underride guards would not materially add weight to a semitrailer. A side underride guard's weight (which is approximately 200 to 500 pounds compared to a tractor-trailer's 80,000-pound weight limit; NHTSA 2018) will in most cases not be an issue because the majority of tractor-trailers never reach their weight limit. Dry vans rarely (approximately 2 percent of the time) or never travel at maximum weight, either because the goods fill the trailer volume before they gross out, or simply because their routes and cargo patterns are not conducive to traveling full. For semi-trailers, the majority of freight hauled in semi-trailers cubes-out (is volume-limited) before it grosses-out (is weight-limited) (EPA 2016). Federal Highway Administration (2000) estimated that about 80 to 90 percent of semi-trailers "cubes out before it weighs out". Indeed, Williams and Murray (2020) reported that the average operating weight of a tractor and semi-trailer in 2019 was 63,000 pounds, leaving 17,000 pounds on average before reaching the weight limit. Moreover, 27 states already have exemptions to this weight standard (Federal Highway Administration 2015; [Appendix B](#)). The current Federal vehicle weight limits strive to strike a balance among the preservation of the road and bridge infrastructure on the highway network, safety, and vehicle productivity. Today, trucks can achieve about 2,000 lbs. of weight reduction by investing in a limited degree of lightweight technologies while more aggressive investment can yield around 4,000 lbs. of savings (Fleetowner 2021; NAFCE 2021). If the profit margin of truckers hauling freight is small, why would trucks carry excess weight (e.g., sleeper cabs of 15,000 lbs; brush guards of 500 to 800 lbs)? Nevertheless, is it possible to provide a maximum weight exemption (i.e., 300 lbs) to the 80,000 lbs GVW standard to encourage innovation and lightweighting for side underride guards?

11. In 2022, NHTSA surveyed all eight of the *relevant* semitrailer manufacturers, which represented nearly 100% of the current in-service subject semitrailer population (i.e., semitrailers that could be outfitted with side underride guards). Based on the manufacturer's responses, NHTSA estimated the **total** semitrailer population relevant to SUGs to be 2.45 million semitrailers (NHTSA 2022a). NHTSA (2022a) research demonstrated that 245,000 semitrailers would be subject to side underride guards, which was even higher than the 3-year (2020-2022) average semitrailer output of 211,472 from these eight manufacturers was (Trailer Body Builders 2022, 2023). Inexplicably, in the Advanced Notice for Proposed Rulemaking documents, NCSA (2023) and NHTSA (2023), did not use either of these estimates and incorrectly used inflated numbers of 260,000 semitrailers as a percentage of the commercial semitrailer fleet, which was based on outdated 2010 information provided by the trucking industry to calculate the "current" subject semitrailer population. These overestimates are not only significantly higher than NHTSA's (2022a) estimate, but also are not based on the best reasonably available information. Please use the correct estimates of 211,472 semitrailers, with the total semitrailer population of 2.45 million that would be subject to side underride guards.
  
12. The ACUP should review the readily available information from multiple semitrailer manufacturers and private individuals that have conducted crash testing of side underride guards in the United States. For example, Utility Trailer Manufacturing Company, the largest semi-trailer company in the United States, sells 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 patented (UTM 2022, 2023). The AngelWing, Safetyskirt, and Wabash SUGs have similarly been successfully crash-tested by stopping a passenger vehicle from underriding a semi-trailer (IIHS 2017; Wilson 2017, Ponder 2020; Kiefer 2018; Safetyskirt 2021; Airflow 2022; CBS News 2022), while Fortier (Truck News 2022; Jenkins 2022) has also recently been successfully tested with computer simulations and crash tests.

Thank you for the opportunity to submit information for the ACUP to review.

Sincerely,

*Eric Hein*

Enclosure: Underride Literature