

A Summary of Some of the Highlights of the NPRM issued on December 7, 2015 by the

**DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
49 CFR Part 571
Docket No. NHTSA-2015-0118
RIN 2127-AL58**

Rear Impact Guards, Rear Impact Protection

Highlights:

pp. 20-21

“CMVSS No. 223 **permits an option that a rear impact guard does not have to meet energy absorption requirements if it is able to resist 700,000 N of force** using the distributed load application device without deflecting more than 125 mm. For guards that can withstand 700,000 N in the uniform distributed load test, the guard is required to have a ground clearance of 560 mm after the uniform distributed load test. Transport Canada states that it permitted this option 30 Canada believes that the energy absorption requirement helps ensure that the guard will not sever from the trailer chassis when an equivalent load is applied. Canada Gazette Part II, Vol. 138, No. 20, 2004-10-06, p. 1335. 21 based on rigid barrier crash test results suggesting that a resistance to a uniform load of at least 700,000 N would help ensure that the rear impact guard will stay in place in an impact with a passenger car at impact speeds of 56 km/h (35 mph) or more.³¹ Canada’s view is that, given that modern day passenger vehicles are able to protect occupants in rigid barrier tests of up to 56 km/h (35 mph), **a rear impact guard that is strong enough to resist loads greater than 700,000 N would not pose any additional injury to occupants at crash speeds of up to 56 km/h (35mph)**. NHTSA is proposing to include this optional test in FMVSS No. 223, but the agency does not believe guards are or will likely be manufactured to this test. **We seek comment on the need for including the test in FMVSS No. 223.** “

p. 24 **“NHTSA concurs with Transport Canada’s position on maintaining the maximum allowable ground clearance of rear impact guards at 560 mm (22 inches)**. Because the upgrades to FMVSS Nos. 223 and 224 will require substantially increased strength of rear impact guards and require 560 mm (22 inches) maximum ground clearance of the guards before and after the energy absorption test, the agency believes reducing the ground clearance of trailer rear impact guards from 560 mm (22 inches) to a lower level is not needed. “

p. 30 **“While 20 percent of fatal light vehicle impacts into the rear of trailers are wheels back trailers, they only represent 8 percent of those fatal crashes with PCI into the rear of trucks and 30 trailers. Additionally, only 16 percent of fatal light vehicle impacts into wheels back trailers resulted in PCI, while 54 percent of fatal light vehicle impacts into trailers with guards resulted in PCI. Excluded trailers (equipment in rear, pole, pulpwood, and low chassis trailers) only represent 4 percent of fatal light vehicle crashes into the rear of trailers with PCI. These statistics suggest that the exclusion of pole, logging, low chassis, and wheels back trailers and trailers with equipment in rear from FMVSS No. 224 requirements may not have significant safety consequence.** “

“The data shows that there were 6 light vehicle fatal crashes into the rear of wheels back trailers resulting in PCI in 2009. Of these, 4 impacts were at crash speeds greater than 80 km/h (50 mph), which are exceedingly severe. The relative crash speeds were not known in the other two crashes. One was an impact of a Ford pickup which, with its high ride height construction, was not likely to underwrite the trailer. A review of this crash suggests that high crash speeds may have been the cause of PCI (defined by UMTRI as the deformation of the vehicle’s front end extending up to and beyond the

windshield) in the Ford pickup rather than underide of the pickup into the rear of a trailer. The other crash was a 1990 Buick Electra, a large sedan, impacting the rear of a wheels back van trailer. The Electra was traveling in a 55 mph speed zone and so may have also been in a high speed crash. “

p. 31 “This analysis suggests that the available data support the exclusion of **wheels back trailers** in FMVSS No. 224. The analysis of the 2009 TIFA data for light vehicle crashes into the rear of wheels back trailers indicates that the crashes were generally at very high impact speeds that are considered unsurvivable. In all these crashes, it is unlikely that a rear impact guard designed to CMVSS No. 223 would have prevented PCI into these vehicles. Therefore, we do not believe that a rear impact guard would have prevented these fatalities. **The agency is not proposing to extend the applicability of FMVSS No. 224 to wheels back trailers.** “

p. 35”Agency Decision **NHTSA sees merit in IIHS’s request for requiring the attachment hardware to remain intact in the quasi-static load tests, and is thus granting the request.** The agency tentatively concludes that the IIHS data indicate that a requirement that ensures the integrity of the guard attachments would reduce the likelihood of failure of the anchorages or attachments in real world crashes in crashes up to 56 km/h (35 mph). “

p. 36 “We are interpreting “any portion of the guard and the guard attachment completely separating from it mounting structure” to mean the condition where any member of the guard becomes detached from any other member of the guard or from the trailer such that the joint is no longer mechanically bound together. We would not consider a partial separation of the members at a joint where there is still some degree of mechanical connection between the members as a “complete separation.” **We seek comment on this proposed performance criterion and whether its objectivity can be improved by, e.g., specifying the percentage of fasteners or welds that remain intact during the test.** “

p. 36 “IIHS states that, to ensure the compliance tests correspond to on-road underide protection, rear impact guards should not be certified separately from the trailers to which they will be attached. IIHS states that several of its crash tests of a 2010 Chevrolet Malibu into the rear of trailers produced deformation to various portions of the trailer, and that this suggests that the total resistance of the guard-attachment-trailer system is lower than that of a guard alone when tested on a rigid fixture. IIHS states that ideally, FMVSS No. 223 should require guards to be certified while attached to complete trailers, and that at a minimum, guards should be tested while attached to sections of the trailer rear that include all the major structural components and that are constrained such that the load paths near the guard are not changed. Agency Decision: **NHTSA is denying the request to remove the option of testing guards on a rigid test fixture.** “

p. 37 “Both FMVSS No. 223 and CMVSS No. 223 provide the option of testing the rear impact 37 guard when attached to a rigid test fixture or when attached to a complete trailer. **NHTSA believes the rigid test fixture and complete trailer tests are essentially equivalent.** In NHTSA rigid test fixture compliance tests, the rear impact guards contain part of the trailer frame rails and/or cross beams to which the rear impact guard is attached. When testing on a trailer, the trailer chassis is secured so it behaves essentially as a fixed object during the test. “

p. 37 “**We do not agree with IIHS’s conclusion that, when tested on a trailer, the total resistance of the guard-attachment-trailer system is lower than that of the guard alone on a rigid fixture due to deformation of the trailer structure.** We believe that in the crash tests, the trailer structure along with the guard offered resistance to the dynamic loads and that is why the trailer structure also deformed. We believe that testing a rear impact guard when attached to the rigid structure could be

more stringent than when testing the guard while attached to the trailer. If the trailer structure is resisting a portion of the load as noted by IIHS, testing a guard on a rigid fixture may result in a more stringent test than testing it when attached to the trailer. When the guard is attached to a rigid fixture, it has to resist all the loads and absorb all the energy, whereas when it is installed on a trailer, the designs could be such that the trailer structure could resist a portion of the load. **NHTSA is also denying the request because requiring that the guard be tested when attached to the trailer would be a significant cost burden to trailer manufacturers. “**

p. 38 **“Requiring that the guard be tested when attached to the trailer would be an unnecessary and significant cost burden for the manufacturers, especially for small trailer manufacturers with low sales volumes.** If those manufacturers were to test the guard on the trailer, this testing would entail sacrificing what could be a large part of their overall trailer production for such testing. Additionally, NHTSA also acknowledges there are a few rear impact guard manufacturers who are not trailer manufacturers (some of which are small businesses), and a requirement that the guard be tested when installed on the trailer could substantially and unnecessarily impact these entities. “

p. 43 **“Second, we are concerned that moving the P1 location would not benefit safety overall.** A comparison of the rear impact guard performance of the Manac trailer and the Wabash trailer in the IIHS crash tests of the Malibu indicate that moving the vertical supports towards the lateral edges of the trailer, as with the Manac guard, does show improved performance in the 30 percent overlap crash in the IIHS test. However, moving the supports may reduce the performance of rear impact guards in preventing PCI in the more common 50 and 100 percent overlap crashes at higher speeds. “

p.44 “The Manac rear impact guard prevented PCI in 56 km/h (35 mph) crash tests with full overlap, 50 percent and 30 percent overlap of the Malibu. However, the full overlap crash test results indicate 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 for crash speeds greater than 56 km/h (35 mph). Since full and 50 percent overlap crashes are more frequent than low overlap (30 percent or less) crashes, and since most fatal light vehicle impacts into the rear of trailers are at speeds greater than 56 km/h (35 mph), such guard designs may reduce protection against PCI in higher speed full and 50 percent overlap crashes. It has not been shown that protection in the 30 percent overlap crashes can be provided without degrading protection in the 50 and 100 percent overlap crashes. **NHTSA is not convinced that improved protection in the less frequent 30 percent overlap crashes should come at the cost of adequate protection in the more common 50 and 100 percent overlap crashes “**

p.44-45 **“In addition, the suggested amendment to move the vertical supports more outboard may not be practical for different trailer types.** Typically, the vertical supports of rear impact guards are attached to the longitudinal members of the trailer frame that have sufficient strength to withstand loads transferred from the guard in the event of a rear impact. Moving the vertical supports further outboard would require changes to trailer designs so that in a rear impact, the loads from the guard can be transferred to substantially strong structural members of the trailer. Such changes in trailer design may add weight to the trailer, reduce payload, and may not be practicable for all trailer types. IIHS suggested moving the P1 test location further outboard or increasing the load in the quasi-static test at P1. However, IIHS did not provide specifics on this request. As shown in Figure 2, the P1 test location is about 300 mm (12 inches) from the edge of a typical trailer rear impact guard. It is not clear how moving the P1 location further outboard or increasing the load in the quasi-static test would improve guard performance in 56 km/h 30 percent overlap crashes and what impact that would have on crashes with a full or 50 percent overlap. : ”

p. 50 **“NHTSA is proposing to revise the definition of rear extremity in FMVSS No. 224 to adopt that of Transport Canada, so as to define a zone in which aerodynamic devices (boat tails) may be placed** where, in a collision, they would not reduce the safety of occupants of vehicles striking the rear of a trailer. The agency expects that there will be an increased use of aerodynamic devices in the rear of trailers in the coming years for fuel efficiency purposes. NHTSA intends this proposal to address the installation of aerodynamic devices on trailers and to harmonize with the requirements of Transport Canada. **Comments are requested on the proposed amendment.** “

pp. 50-51 “NHTSA only considered fatal crashes with PCI for the target population because the IIHS test data presented in Appendix A of this preamble show that when PCI was prevented, the dummy injury measures were significantly below the injury assessment reference values of NHTSA’s occupant crash protection standard, and are likely similar to values in crashes into the rear of passenger vehicles. In non-PCI crashes into the rear of trailers, the IIHS test data indicate that the passenger vehicle’s restraint system, when used, would mitigate injury. Therefore, **non-PCI crashes were not considered as part of the target population for estimating benefits.** “

pp. 51-52 “The target population of fatalities considered is representative of fatalities occurring in light vehicle crashes into the rear of trailers that result in PCI. As noted above, in estimating 52 benefits, the agency assumed that the upgraded rear impact guards would mitigate fatalities and injuries in light vehicle impacts with PCI into the rear of trailers at impact speeds up to 56 km/h (35 mph), since the requirements of CMVSS No. 223 are intended to prevent PCI in impacts with speeds up to 56 km/h (35 mph). **We recognize, however, that benefits may accrue from underride crashes at speeds higher than 56 km/h (35 mph),** if, e.g., a vehicle’s guard exceeded the minimum performance requirements of the FMVSS. **NHTSA requests information that would assist the agency in quantifying the possible benefits of CMVSS No. 223 rear impact guards in crashes with speeds higher than 56 km/h (35 mph).** “

p. 52 “We note also that, while CMVSS No. 223 requirements are intended for mitigating PCI in light vehicle rear impacts **at speeds less than or equal to 56 km/h (35 mph),**⁵⁹ CMVSS No. 223 certified rear impact guards may not be able to mitigate all fatalities in such crashes because some of the crashes may be low overlap (30 percent or less)⁶⁰ and because some fatalities are not as a result of PCI but are due to other circumstances (e.g. unrestrained status of occupants, “

pp. 52-53 “The agency estimates that 93 percent of new trailers are already equipped with CMVSS No. 223 compliant guards. Assuming 13 percent effectiveness of these guards in fatal crashes with PCI into the rear of trailers, the agency estimates that about 0.66 ($= 72 \times (1-0.93) \times 0.13$) lives would be saved annually by requiring all applicable trailers to be equipped with CMVSS No. 223 compliant guards. The agency also estimated that a total of 2.7 serious injuries would ⁵⁹ Transport Canada testing of minimally compliant CMVSS No. 223 rear impact guards indicated that such guards could prevent PCI in light vehicle impacts with full overlap with the guard at crash speeds up to 56 km/h (35 mph). See Boucher D., Davis D., “Trailer Underride Protection – A Canadian Perspective,” SAE Paper No. 2000-01-3522, Truck and Bus Meeting and Exposition, December 2000, Society of Automotive Engineers. ⁶⁰ Table 13 shows that 8 of the 9 rear impact guards tested by IIHS could not prevent PCI in a 56 km/h (35 mph) crash with 30 percent overlap of the Chevrolet Malibu. ⁵³ be prevented annually with the proposed underride guard rule. **The equivalent lives saved were estimated to be 1.1 and 1 lives discounted at 3 percent and 7 percent, respectively.** “

p. 55 **“The agency estimates that the net cost per equivalent lives saved is \$9.1 million and \$9.5 million discounted at 3 percent and 7 percent, respectively.** A summary of the regulatory cost and net benefit of the proposed rule at the 3 percent and 7 percent discount rates are presented in Table 12. At 3 percent discount rate, the net benefit of the proposed rule is \$0.59 million. At 7 percent discount rate, the net benefit of the proposed rule is \$0.13 million. “

p. 55 **“We have tentatively decided not to require used trailers be retrofitted** with CMVSS No. 223 compliant rear impact guards. Our analysis indicates such a retrofitting requirement would be very costly without sufficient safety benefits. The net benefit for a retrofitting requirement was estimated to be -\$402 million at 3 percent discount rate and -\$414 million at 7 percent discount rate. Details of the analysis for a retrofitting requirement are provided in the PRE “

pp. 55-56 **“Proposed Lead Time NHTSA proposes a lead time of two years following date of publication of a final rule.** NHTSA provided a two year lead time when FMVSS Nos. 223 and 224 were adopted. We note 63 The PRE discusses issues relating to the potential costs, benefits, and other impacts of this regulatory action. The PRE is available in the docket for this NPRM and may be obtained by downloading it or by contacting Docket Management at the address or telephone number provided at the beginning of this document. 56 that 93 percent of trailers already meet the requirements of CMVSS No. 223, so we tentatively conclude that two years will provide sufficient time for guard and trailer manufacturers to meet the requirements proposed today. Comments are requested on whether the lead time is appropriate “

p. 56 **“Regulatory Notices and Analyses Executive Order (E.O.) 12866 (Regulatory Planning and Review), E.O. 13563, and DOT Regulatory Policies and Procedures** The agency has considered the impact of this rulemaking action under E.O. 12866, E.O. 13563, and the Department of Transportation's regulatory policies and procedures. This rulemaking was not reviewed by the Office of Management and Budget under E.O. 12866, “Regulatory Planning and Review.” The rulemaking action has also been determined to be not significant under the Department’s regulatory policies and procedures. NHTSA’s Preliminary Regulatory Evaluation fully discusses the estimated costs, benefits and other impacts of this NPRM. “

pp. 56-57 “As discussed in the PRE and summarized in the section above, **the annual incremental fleet cost of equipping all applicable trailers with CMVSS No. 223 rear impact guards is estimated to be approximately \$2.5 million** ($=243,873 \times 0.65 \times (1.0-0.93) \times \229). The agency estimates that 93 percent of new trailers in the U.S. are already equipped with CMVSS No. 223 compliant guards. The agency estimates that the incremental effectiveness of CMVSS No. 223 guards over FMVSS No. 223 guards is 13 percent in preventing fatalities in light vehicle crashes with PCI into the rear of trailers. The agency estimates that about 0.66 life ($= 72 \times (1-0.93) \times 0.13$) would be saved annually by requiring all applicable trailers to be equipped with CMVSS 57 No. 223 compliant guards.⁶⁴ The agency also estimated that a total of 2.7 serious injuries would be prevented annually with the proposed override guard rule. **The equivalent lives saved were estimated to be 1.1 and 1 lives discounted at 3 percent and 7 percent, respectively.** The agency estimates that the net cost per equivalent lives saved is \$9.1 million and \$9.5 million discounted at 3 percent and 7 percent, respectively.”

p. 57 “Consistent with E.O. 13563, **“Improving Regulation and Regulatory Review,”** NHTSA is proposing to amend FMVSS Nos. 223 and 224 as a result of retrospectively analyzing the effectiveness of the standards. NHTSA realized the merits of CMVSS No. 223 in addressing the same safety need that is the subject of FMVSS Nos. 223 and 224, and has undertaken rulemaking to adopt upgraded

strength and other requirements of CMVSS No. 223. “

pp. 57-58 “**Regulatory Flexibility Act Pursuant to the Regulatory Flexibility Act (5 U.S.C. 601 et seq., as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996)** whenever an agency is required to publish a notice of proposed rulemaking or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small governmental jurisdictions), unless the head of an agency certifies the rule will not have a significant economic impact on a substantial number of small entities. Agencies must also provide a statement of the factual basis for this certification. I certify that this proposed rule would not have a significant economic impact on a substantial number of small entities. NHTSA estimates there to be 354 manufacturers of trailers in the U.S., 331 of which are small businesses. The impacts of this proposed rule on small trailer manufacturers would not be significant. This NPRM proposes changes to the strength requirements applying to underride guards, but would not be amending the method by which small trailer manufacturers can certify compliance with FMVSS Nos. 223 and 224. FMVSS No. 223, an equipment standard, specifies strength and energy absorption requirements in quasi-static force tests of rear impact guards sold for installation on new trailers and semitrailers. FMVSS No. 224, a vehicle standard, requires new trailers and semitrailers with a GVWR of 4,536 kg (10,000 lb) or more to be equipped with a rear impact guard meeting FMVSS No. 223. NHTSA established the two-standard approach to provide underride protection in a manner that imposes reasonable compliance burdens on small trailer manufacturers. “

p. 58 “**Under FMVSS No. 223, the guard may be tested for compliance while mounted to a test fixture or to a complete trailer.** FMVSS No. 224 requires that the guard be mounted on the trailer or semitrailer in accordance with the instructions provided with the guard by the guard manufacturer. Under this approach, a small manufacturer that produces relatively few trailers can certify its trailers to FMVSS No. 224 without feeling compelled to undertake destructive testing of what could be a substantial portion of its production. The two-standard approach was devised to provide small manufacturers a practicable and reasonable means of meeting the safety need served by an underride guard requirement. This NPRM does not propose changing the method of certifying compliance to the underride guard requirements of FMVSS Nos. 223 and 224. “

p. 59 “NHTSA has analyzed this proposed rule for the purposes of the **National Environmental Policy Act** and determined that it would not have any significant impact on the quality of the human environment. “

p. 60 “**Pursuant to Executive Order 13132 and 12988, NHTSA has considered whether this proposed rule could or should preempt State common law causes of action.** The agency’s ability to announce its conclusion regarding the preemptive effect of one of its rules reduces the likelihood that preemption will be an issue in any subsequent tort litigation. To this end, the agency has examined the nature (e.g., the language and structure of the regulatory text) and objectives of today’s proposed rule and finds that this proposed rule, like many NHTSA rules, would prescribe only a minimum safety standard. As such, NHTSA does not intend that this proposed rule would preempt state tort law that would effectively impose a higher standard on motor vehicle manufacturers than that established by today’s proposed rule. Establishment of a higher standard by means of State tort law would not conflict with the minimum standard “

p. 62 “**National Technology Transfer and Advancement Act Under the National Technology Transfer and Advancement Act of 1995 (NTTAA)**(Public Law 104-113), all Federal agencies and

departments shall use technical standards that are developed or adopted by voluntary consensus standards bodies, using such technical standards as a means to carry out policy objectives or activities determined by the agencies and departments. Voluntary consensus standards are technical standards (e.g., material specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies, such as the International Organization for Standardization (ISO) and the Society of Automotive Engineers (SAE). The NTTAA directs us to provide Congress, through OMB, explanations when we decide not to use available and applicable voluntary consensus standards. This NPRM proposes to adopt requirements of CMVSS No. 223, as discussed later in this section. NHTSA's consideration of CMVSS No. 223 accords with the principles of NTTAA, in that NHTSA is considering an established, proven standard, and has not had to expend significant agency resources on the same safety need addressed by CMVSS No. 223 “

pp. 65-66 **“NHTSA has decided to propose the strength requirements of CMVSS No. 223 rather than ECE R.58 because the rear impact protection requirements for trailers in Canada are more stringent than that in Europe, and more appropriate for the underride crashes experienced in the U.S.** Passenger vehicles in the U.S. are required by FMVSS No. 208 to have frontal air bag protection and comply with a full frontal 56 km/h (35 mph) rigid barrier crash test by ensuring that the injury measures of crash test dummies restrained in front seating positions are within the 66 allowable limits. CMVSS No. 223 is designed to prevent PCI in full frontal 56 km/h (35 mph) crashes. Together, FMVSS No. 208 and FMVSS Nos. 223 and 224 would significantly reduce the harm resulting to occupants of passenger vehicles impacting the rear of trailers in crashes of up to 56 km/h (35 mph) “

p. 67 **“In accordance with 5 U.S.C. 553(c), DOT solicits comments from the public to better inform its rulemaking process.** DOT posts these comments, without edit, including any personal information the commenter provides, to www.regulations.gov, as described in the system of records notice (DOT/ALL-14 FDMS), which can be reviewed at www.dot.gov/privacy. “

p. 67 **“Public Participation** In developing this proposal, we tried to address the concerns of all our stakeholders. Your comments will help us improve this proposed rule. We welcome your views on all aspects of this proposed rule, but request comments on specific issues throughout this document. Your comments will be most effective if you follow the suggestions below: x Explain your views and reasoning as clearly as possible. x Provide solid technical and cost data to support your views. x If you estimate potential costs, explain how you arrived at the estimate. x Tell us which parts of the proposal you support, as well as those with which you disagree. x Provide specific examples to illustrate your concerns. x Offer specific alternatives. x Refer your comments to specific sections of the proposal, such as the units or page numbers of the preamble, or the regulatory sections. x Be sure to include the name, date, and docket number with your comments. Your comments must be written and in English. To ensure that your comments are correctly filed in the docket, please include the docket number of this document in your comments. Your comments must not be more than 15 pages long (49 CFR §553.21) We established this limit to encourage you to write your primary comments in a concise fashion. However, you may attach necessary additional documents to your comments. There is no limit on the length of the attachments. Please submit your comments to the docket electronically by logging onto <http://www.regulations.gov> “

p. 68 **“Please note that pursuant to the Data Quality Act, in order for substantive data to be relied upon and used by the agency, it must meet the information quality standards set forth in the OMB and DOT Data Quality Act guidelines. Accordingly, we encourage you to consult the guidelines in preparing your comments. OMB's guidelines may be accessed at** <http://www.whitehouse.gov/omb/fedreg/reproducible.html>. **How Do I Submit Confidential Business**

Information? If you wish to submit any information under a claim of confidentiality, you should submit three copies of your complete submission, including the information you claim to be confidential business information, to the Chief Counsel, NHTSA, at the address given above under FOR FURTHER INFORMATION CONTACT. In addition, you should submit a copy from which you have deleted the claimed confidential business information to the docket. When you send a comment containing information claimed to be confidential business information, you should include a cover letter setting forth the information specified in our confidential business information regulation. (49 CFR Part 512.) “

pp. 68-69 “**Will the Agency Consider Late Comments?** We will consider all comments that the docket receives before the close of business on the comment closing date indicated above under DATES. To the extent possible, we will also consider comments that the docket receives after that date. If the docket receives a comment too 69 late for us to consider it in developing a final rule (assuming that one is issued), we will consider that comment as an informal suggestion for future rulemaking action. “

p. 90 “**Relative Speed of Light Vehicle Fatal Crashes into the Rear of Trailers and SUTs** Using information derived by reviewing police crash reports,⁷⁷ UMTRI estimated the relative speed of fatal light vehicle crashes into the rear of SUTs and trailers. Relative velocity was computed as the resultant of the difference in the trailer (truck) velocity and the striking vehicle velocity and could only be estimated for about 30 percent of light vehicle fatal crashes into the rear of trailers and SUTs. Most of the crashes (with known relative velocity) were at a very high relative velocity and many were not survivable. The mean relative velocity at impact into the rear of trailers and SUTs was estimated at 44 mph. Among fatal light vehicle impacts into the rear of trailers that resulted in PCI, 74 percent were with relative velocity greater than 56 km/h (35 mph) (Figure A-4). Among the remaining 26 percent fatal light vehicle impacts into the rear of trailers, 21 percent were trailers with guards and 5 percent were trailers excluded from FMVSS No. 224 requirements. Among fatal light vehicle impacts into the rear of SUTs that resulted in PCI, 70 percent were with relative velocity greater than 56 km/h (35 mph). Among the remaining 30 percent fatal light vehicle impacts into the rear of SUTs, 3 percent of the SUTs had rear impact guards, 10 percent of the SUTs could be required to have a guard based on rear geometry but did not have a guard, 3 percent were excluded from requiring a guard (wheels back, low chassis vehicles), and 14 percent had equipment in the rear precluding rear impact guards. ⁷⁷ Information included police estimates of travel speed, crash narrative, crash diagram, and witness statements. The impact speed was estimated from the travel speed, skid distance, and an estimate of the coefficient of friction. “

pp. 91-92 “**Fatalities Associated with Light Vehicle Crashes into the Rear of Trailers and SUTs** There are about 362 light vehicle occupant fatalities annually due to impacts into the rear of trailers and SUTs. Of these fatalities, 191 (53 percent) are in impacts with trailers, 104 (29 percent) are in impacts with SUTs, and 67 (18 percent) are impacts with an unknown truck type (Figure 5). Among the 191 light vehicle occupant fatalities resulting from impacts with the rear of trailers, 125 occurred in impacts with trailers with rear impact guards while the remaining 66 were in impacts to trailers without guards (trailers excluded from a requirement to have a rear impact guard). PCI was associated with 86 annual light vehicle occupant fatalities resulting from impacts into the rear of trailers; 72 of these fatalities were in impacts with trailers with rear impact guards and 14 with trailers without guards (see Figure A-5). Among the 104 light vehicle occupant fatalities resulting from impacts with the rear of SUTs, 80 occurred in impacts with SUTs without rear impact guards while the remaining 24 were in impacts to SUTs with guards. PCI was associated with 33 annual light vehicle occupant 92 fatalities resulting from impacts into the rear of SUTs; 25 of these fatalities were in impacts with SUTs without rear impact

guards and 8 with SUTs with guards (see Figure A-5). “

pp. 92-93 “**Among light vehicle occupant fatalities in impacts into the rear of trailers and SUTs, approximately 60 percent were in vehicles with no underride, underride less than halfway or 93 underride up to the hood without PCI.** The agency found that in a number of TIFA cases reviewed, fatalities in non-PCI crashes into the rear of trailers and SUTs occurred due to occupants being unrestrained, other occupant characteristics (e.g. age), and other crash circumstances. Additionally, as shown in Figure A-4, 26 percent and 30 percent of light vehicle impacts with PCI into the rear of trailers and SUTs, respectively, had a relative velocity less than or equal to 56 km/h (35 mph). Since currently manufactured light vehicles are subject to FMVSS No. 208 requirements that ensure adequate occupant crash protection to restrained occupants in a 56 km/h (35 mph) rigid barrier frontal crash test, some light vehicle occupant fatalities in impacts into the rear of SUTs and trailers at speeds less than or equal to 56 km/h (35 mph) that resulted in PCI may be preventable if intrusion into the passenger compartment were mitigated.⁷⁸ “

Raymond R. Posten Associate Administrator For Rulemaking

Summary provided by Marianne Karth, December 8, 2015