ADVOCATES FOR HIGHWAY & AUTO SAFETY

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Federal Motor Vehicle Safety Standards; Occupant Crash Protection
Advanced Notice of Proposed Rulemaking
84 Federal Register 51076, September 27, 2019

Advocates for Highway and Auto Safety (Advocates) files these comments in response to the National Highway Traffic Safety Administration's (NHTSA, Agency) advanced notice of proposed rulemaking (ANPRM, Notice) seeking public comment on issues related to a requirement for a rear seat belt warning system.[1]

The Delay in Initiating this Rulemaking is Unconscionable

The Agency's delay in promulgating this rulemaking required by Congress in Section 31503 of the Moving Ahead for Progress in the 21st Century Act (MAP-21)[2] is egregious and has cost lives. The U.S. Department of Transportation (DOT) was required not only to initiate a rulemaking within two years of the date of enactment but also to issue a final rule not later than three years after enactment or submit a report explaining how the requirement for a safety belt use warning system for the rear seat would not meet the requirements of 49 USC 30111. Considering the effective date of MAP-21 was Oct. 1, 2012, the DOT is now more than four years overdue on meeting this congressional directive. During this delay, between 2013 and 2017, over 900 unbelted second row occupants of passenger cars and light trucks have died in crashes on U.S. roads annually.[3] Between 2013 and 2015 alone (years for which injury data is reported), on average 19,000 unbelted second row occupants were injured annually.[4] Considering the effectiveness of seat belts at mitigating injuries and the fact that more than half of all fatally injured rear seat occupants in passenger cars and light trucks were unbelted during

[1] Federal Motor Vehicle Safety Standards; Occupant Crash Protection, Advanced Notice of Proposed Rulemaking, NHTSA, 84 FR 51076, Sep. 27, 2019 (2019 ANPRM).
[2] Pub. L. 112-141 (MAP-21).
[3] Traffic Safety Facts 2017, NHTSA, DOT HS 812 806, Sep. 2019 (2017 Annual Report); Traffic Safety Facts 2016, NHTSA, DOT HS 812 554, May 2018 (2016 Annual Report); Traffic Safety Facts 2015, NHTSA, DOT HS 812 384 (2015 Annual Report); Traffic Safety Facts 2014, NHTSA, DOT HS 812 261 (2014 Annual Report); Traffic Safety Facts 2013, NHTSA, DOT HS 812 139 (2013 Annual Report).
[4] 2015 Annual Report, 2014 Annual Report, 2013 Annual Report.

that time,[5] rear seat belt reminders could have helped to eliminate or mitigate a large portion of these fatalities and injuries. Children and teens constitute a large proportion of rear seat occupants in crash data.[6] In 2018, 1,038 children age 14 and under were killed in motor vehicle crashes.[7]

The NHTSA has known for years that these safety systems can dramatically improve safety on public roads. In fact, Advocates petitioned the Agency in 2007 for a rulemaking requiring rear seat belt reminders.[8] The NHSTA finally published a request for comments on the petition nearly three years later in 2010.[9] In sum, the Agency is four years overdue on executing a directive in federal law and more than a decade behind Advocates' petition seeking regulatory action on these life-saving systems. Advocates urges the Agency to complete this rulemaking without any further delay.

Seat Belts Save Lives

The facts surrounding the issue of rear seat belt use are not in dispute. Seat belts save lives and prevent injuries. As the NHTSA states:

> Research has found that seat belts greatly reduce the risk of fatal and non-fatal injuries, compared to the risk faced by unrestrained occupants. Unbelted occupants are overrepresented in fatal crashes. For rear seat occupants, seat belts reduce the risk of fatality by 55 percent (for passenger cars) and 74 percent (for light trucks and vans).[10]

Seat belt use in the rear seat has lagged behind that of front seats. As the NHTSA states:

> [U]sage rates for rear belts have consistently been below those for the front seats. According to data from NHTSA's National Occupant Protection Use Survey, from 2006 to 2017, seat belt use was consistently lower in rear seats than in front seats, with the lowest difference of 6.2 percent in 2007 and the highest difference of 15.6 percent in 2006. Most recently, in 2017, front seat belt use was 89.7 percent, while rear seat belt use was only 75.4 percent, a difference of 14.3 percent.[11]

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[5] 2017 Annual Report.
[6] Durbin, D. R., Jermakian, J. S., Kallan, M. J., Mccartt, A. T., Arbogast, K. B., Zonfrillo, M. R., & Myers, R. K. (2015). Rear seat safety: Variation in protection by occupant, crash and vehicle characteristics. Accident Analysis & Prevention, 80, 185–192. doi: 10.1016/j.aap.2015.04.006
[7] Child Safety, website, NHTSA, https://www.nhtsa.gov/road-safety/child-safety, .
[8] Advocates for Highway & Auto Safety – Petition, Nov. 21, 2007, NHTSA-2010-0061-0002.
[9] Federal Motor Vehicle Safety Standards; Occupant Crash Protection, NHTSA, 75 FR 37343, Jun. 29, 2010.
[10] 2019 ANPRM, at 51077, citing Donna Glassbrenner & Marc Starnes. 2009. Lives Saved Calculations for Seat Belts and Frontal Air Bags. DOT HS 811 206. Washington, DC: U.S. Department of Transportation, National Highway Traffic Safety Administration, pp. 18–20.
[11] 2019 ANPRM, at 51077.

Seat belt reminders encourage increased belt use. The NHTSA cites its own research which showed that:

> A field observational study found that belt use rates of drivers in vehicles with most types of ESBR [enhanced seat belt reminder] systems was about 3 to 4 percentage points higher than drivers in vehicles without ESBRs, whose observed belt use rate was 85 percent. The most significant increases in belt use were found among occupant groups with the lowest belt use propensities.[12]

Given the lower belt use rate in the rear seat, there is the potential for even greater increase in belt use for systems addressing these occupants.

It is undisputed that seat belts save lives, that rear seat occupants tend to use belts less than front seat occupants, and that seat belt reminders work to increase usage. A recent study by the Governors Highway Safety Association (GHSA) has further pointed out that "[r]ear seat belt use is lower in for-hire vehicles – taxis, Lyft, Uber – than in private vehicles, and trips in for-hire vehicles are increasing."[13] Additionally, as the development and deployment of autonomous vehicles (AVs) is being aggressively sought by AV manufacturers, more passengers will effectively become rear seat passengers in for-hire type riding experiences. Given these longstanding facts about the use and effectiveness of belts and the current trends in mobility as a service and vehicle autonomy, this rulemaking must be concluded without any further delay.

Responses to Specific Requests for Comment in the Notice

The NHTSA requests comments on a number of specific questions in the Notice, which are addressed individually as follows.

1. Should the warning be visual-only or audible-only, or audio-visual?

The warnings required by the NHTSA should ensure redundancy as well capture the attention of both drivers and passengers. Therefore, the Agency should require the use of combined visual and audible signals as well as consider the use of haptic alerts to draw the attention of the driver and passengers to the unsafe condition (a belt being unbuckled) and the visual warning to indicate that the warning is for the unbuckled condition and not related to another condition within the vehicle. Under current regulations, an audio-visual warning is used for the driver's seat belt reminder system. Thus, such a warning is familiar to the public. In addition, a 2012 study published by the Society of Automotive Engineers (SAE) found that the combination of an

[12] Mark Freedman *et al.* 2009. Effectiveness and Acceptance of Enhanced Seat Belt Reminder Systems: Characteristics of Optimal Reminder Systems, Final Report. DOT HS 811 097. Washington, DC: U.S. Department of Transportation, National Highway Traffic Safety Administration, p. 1. (DOT 2009 Belt Warning Study).

[13] Rear Seat Belt Use: Little Change in Four Years, Much More to Do, GHSA, Nov. 2019.

auditory and visual warning increased the effectiveness of an experimental seat belt reminder system.[14]

2. Triggering Conditions

The seat belt warning should be provided both at the start of the trip and at any change of status during a trip. Regarding the triggering conditions and the definition of the start of the trip, the NHTSA should establish adequate requirements to discourage movement of the vehicle prior to initiation of the warning. The best and safest opportunity for a driver to ensure that all passengers are properly buckled is prior to movement of the vehicle. Likewise, Advocates concurs with the Agency's findings in the "2015 Survey of Principal Drivers of Vehicles with a Rear Seat Belt Reminder System" which found that a change of status warning is effective in getting passengers to refasten their seat belt."[15] Therefore, the NHTSA should establish effective criteria for initiating the change of status warning to minimize exposure of unbelted occupants to collisions which can result in serious injury or death. While Advocates acknowledges that the Agency is attempting to balance the warning effectiveness with consumer annoyance, the NHTSA must base its criteria for triggering conditions on crash data reflecting instances in the United States illustrating the conditions under which unbelted occupants are sustaining injuries and strive to address the largest portion of that population as possible.

3. Alternative Warning Systems

The NHTSA's specifications for the warnings (audible / visual / haptic or otherwise) should be based on an evaluation of the effectiveness of those warnings. As noted earlier, given the familiarity of the driving population with the audio-visual warnings presently used for drivers and, in many cases, right front passengers, it is likely that maintaining consistency with these warning specifications would achieve high levels of effectiveness.

4. Occupant Detection Technology

Advocates concurs with the NHTSA's statements in the Notice that:

> Rear seat warning systems that employ occupant detection have potential advantages over systems that do not utilize it. With occupant detection, a warning system can provide more informative warnings. The system can determine whether any seats are occupied by an unbelted occupant, as opposed to simply notifying the driver which or how many belts, if any, are fastened. Such systems are also better able to appropriately target audible warnings or longer-duration visual warnings (enhanced warnings).[16]

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[14] M. Akamatsu, H. Hashimoto and S. Shimaoka, "Assessment Method of Effectiveness of Passenger Seat Belt Reminder," in SAE International 2012-01-0050, 2012.

[15] 2019 ANPRM, at 51083, citing Paul Schroeder & Melanie Wilbur. 2015. Survey of Principal Drivers of Vehicles with a Rear Seat Belt Reminder System. Washington, DC: National Highway Traffic Safety Administration.

[16] 2019 ANPRM at 51084.

Occupant detection and classification systems can both improve the ability of the systems to accurately discern seat occupancy but also to minimize false positives which could increase annoyance of users. It is deeply concerning that while NHTSA has provided a short list of challenges facing rear seat occupant detection systems it has provided no literature review of available systems and their capabilities. New car assessment programs throughout the globe, representing multiple nations, have concluded that these systems are feasible and important to advancing safety. Moreover, the technology is readily available in numerous vehicle models. As the Agency notes, the Euro NCAP does not presently require occupant detection; however, Euro NCAP will be awarding additional points for systems that feature rear seat occupant detection in 2022.[17] The Australia NCAP presently awards higher scores for systems that feature rear seat occupant detection.[18] The ASEAN NCAP presently recommends rear seat occupant detection[19] and has plans to include rear seat occupant detection in future evaluations.[20] The Agency in the Notice identifies several "challenges" associated with requiring these systems in all passenger motor vehicles. Yet, some of the challenges such as discerning packages or child seats from other occupants have already been addressed in systems developed for the right front passenger seat. The existence of these "challenges" is not a justification for failing to issue this overdue regulation especially when the NHTSA has provided no estimation of how often these challenging situations occur. Furthermore, the Agency has failed to provide any information on its efforts to address these issues in the years since Congress required the use of these systems. Moreover, as mentioned earlier, developments in vehicle autonomy will likely result in the need for AVs to identify occupancy and conduct classification of those occupants to ensure that all occupants are safely seated and properly restrained prior to commencing and throughout the duration of a trip. Advocates encourages the Agency to require occupant detection systems for the benefits described above.

5. Enhanced Warning Systems

Advocates supports the specification of the most effective warnings to address the non-use of seat belts in the rear seat and the accompanying increased injury risk. As noted previously, Advocates concurs with the Agency's finding based on research "that audible warnings in conjunction with visible warnings are potentially more effective than visible warnings alone."[21] The familiarity of the audible and visual warnings provided by current driver's and right front passenger's seat belt warning will improve effectiveness. The Agency should also consider the use of a haptic warning to further enhance the alert given to drivers and passengers. In addition, the use of occupant detection systems reduce the opportunity for false activations of the warnings thus minimizing annoyance.

[17] European New Car Assessment Program Assessment Protocol – Safety Assist, Version 9.0.2, Jul. 2019.
[18] ANCAP Assessment Protocol – Safety Assist v8.0.4, Jan. 2019.
[19] ASEAN NCAP – Assessment Protocol – Safety Assist Version 1.0, Jan. 2017.
[20] ASEAN NCAP ROADMAP 2021-2025, Dec 2018.
[21] 2019 ANPRM, at 51084, citing DOT 2009 Belt Warning Study, Paul Schroeder & Melanie Wilbur. 2015. Survey of Principal Drivers of Vehicles with a Rear Seat Belt Reminder System. Washington, DC: National Highway Traffic Safety Administration, and IIHS Status Report Vol. 54, No. 3, April 25, 2019.

6. Belt Use Criteria

The Agency may need to establish criteria differing from what is presently required for the driver's seat belt considering the wider range of possible occupants, devices (car seats), and objects (luggage, etc.) compared to a driver's seat which is limited, generally, to adults of the legal driving age. The NHTSA should base the criteria defining belt use on research which would characterize use in the rear seat most appropriately.

7. Seat Occupancy Criteria

Advocates supports the use of occupant detection and classification systems to improve the performance of rear seat belt warning systems. The specifications should be based on data ensuring that the occupant population at risk from non-use of seat belts in the rear of vehicles is provided with an effective warning to increase belt use and reduce risk. Recent data from NHTSA indicates that for passenger vehicle occupants killed in 2017, restraint non-use exceeds the national average (47%) in the population of occupants starting at age 8 – 12. The unrestrained percentage for younger occupants is 36% for 4-7 year olds and 22% for occupants less than 4 years old.[22]

The Agency should evaluate the population exposed to the risk from being unbelted in the rear seats of vehicles using crash data and ensure that the proper populations are addressed by the regulation. The appropriate anthropomorphic test devices (ATDs, crash test dummies) for confirming the functionality of the systems would thus be based on the population identified by the Agency as being at risk. Likewise, the Agency should base its conclusions on data regarding limiting false activations when seats are occupied by child seats or other items. Unfortunately, the Agency has provided no explanation of how the specifications for testing suppression or low-risk deployment in federal motor vehicle safety standard number 208 would be applicable to the back seat environment particularly as it applies to belt use. This issue should be resolved as the rulemaking proceeds.

8. Making the System Resistant to Intentional and Inadvertent Defeat

The NHTSA has stated that in regard to belt use "consumer research shows that part-time non-users make up the majority of non-users (83%), while hard-core non-users make up a smaller proportion of non-users (17%)."[23] Thus, the proportion of the potential target population for seat belt reminders seeking to intentionally defeat the systems is relatively small. Nonetheless, if mitigation strategies can be built into the systems, such an advance would likely help address at

[22] National Center for Statistics and Analysis. (April 2019). Occupant protection in passenger vehicles: 2017 data (Traffic Safety Facts. Report No. DOT HS 812 691). Washington, DC: National Highway Traffic Safety Administration.

[23] 2019 ANPRM, at 51087, citing John M. Boyle & Cheryl Lampkin. 2008. 2007 Motor Vehicle Occupant Safety Survey, Volume 2, Seat Belt Report. DOT HS 810 975. Washington, DC: U.S. Department of Transportation, National Highway Traffic Safety Administration; and Buckling Up: Technologies to Increase Seat Belt Use. Special Report 278 at 18, Committee for the Safety Belt Technology Study, Transportation Research Board of The National Academies (2003).

least some portion of "hard-core non-users" as well as those exhibiting inadvertent misuse. The three potential countermeasures described by the Agency all appear to rely on system components which would be necessary for an effective rear seat belt reminder system. Thus, the cost for execution of these safeguards should be minimal as they will already be part of the system. As such, to the extent feasible, countermeasures should be required as part of these systems to prevent intentional or inadvertent defeat.

The NHTSA also requests comment on the possibility of allowing a deactivation feature (either short or long term depending on the situation) which would allow a driver to acknowledge a belt warning and disable it. Such a feature would drastically weaken the effectiveness of the technology and should not be included as part of any federal regulation.

9. Electrical Connection Requirements

Advocates acknowledges that seat designs, such as those that are removable, folding, rotating or stowable, may present challenges for designers of rear seat belt warning systems. However, the Agency has provided no evidence that in cases other than removable seats, permanent electrical connections could not be designed into the vehicle to account for the seat motion. The Agency should also evaluate the use of alternative wireless systems to address any challenges to the execution of reminder systems on removable seats. The NHTSA has also not quantified what portion of the target population is represented by occupants of these types of seats. This information would benefit the public in evaluating the questions posed by the Agency. Without additional information, it is inappropriate to consider excluding from the regulation any types of seats and particularly those in a class of vehicle (in this case, largely minivans) designed to carry multiple individuals and likely a larger proportion of children.

10. Owner's Manual / Label Requirements

As with other safety technologies, the likelihood of proper use will generally be improved by informing consumers. Descriptions of the warning system and its use should be included in the owner's manual.

11. Interaction with Other Vehicle Warnings

The Agency has failed to advance any persuasive reasoning as to why the warnings associated with these systems, which will be an extension of the current warnings required for drivers and voluntarily provided in many cases for right front passengers, would present any increased conflicts with other vehicle warnings.

12. Harmonization with Regulatory Requirements or New Car Assessment Programs in Other Markets

While harmonization of requirements is generally beneficial, the NHTSA must not seek harmonization at the cost of safety. As noted elsewhere, the requirements such as type of warning, triggering conditions, types of occupants addressed, to name just a few, should be based

on sound research and supported by evidence from crash data of the risks to be addressed on U.S roads.

13. Visual Warning Location

The intent of a warning is to encourage passengers to use restraints in order to realize the risk reduction associated with their use. In the cases of adults and younger passengers with the ability to comprehend this warning, the visual alert will be beneficial. In the case of younger passengers who may not understand the consequences of non-restraint, the current system (even without a warning) relies on the driver to ensure passengers are properly restrained. Nonetheless, as more and more of the population become passengers, rather than drivers, due to the increased use of for-hire vehicles, and, possibly at some time in the future, autonomous vehicles, the ability of the visual warning to convey to the passengers the need to buckle up will be essential.

14. What Type of Information Should the Visual Warning Convey?

As stated earlier, rear seat warning systems should be required to utilize occupant detection and classification. The use of such systems would reduce the false signals provided to the driver and reduce annoyance. Thus, in order to minimize visual clutter and annoyance, Advocates believes that the rear seat warning should only be active when the system determines that a seat is occupied by an occupant requiring the use of a belt (not an inanimate object such as a bag of groceries) and the seat belt is not being used. Advocates does not believe that "a less sophisticated warning, such as a specialized system of mirrors, [would] be sufficient to inform the driver about the status of the rear seat belts."[24]

15. Visual Telltale Characteristics

Advocates supports the establishment of standardized characteristics for the rear seat belt warning systems. Standardized warnings ensure that drivers and passenger alike are presented with consistent information at all times and in all vehicles. Therefore, they would be more likely to understand what the warning is about and ideally motivate compliance.

16. Visual Warning Minimum Duration

The visual warning duration should be based on evidence of effectiveness while maintaining a balance with annoyance, understanding that annoyance can undermine effectiveness after a certain point. The Agency should provide context in terms of the duration of visual signals currently in use in the U.S. vehicle fleet and determine if there is any variation and if there is evidence of an impact on effectiveness.

[24] 2019 ANRPM, at 51086

17. Audible Warning Minimum Duration

Similarly, the audible warning duration should be based on evidence of effectiveness while maintaining a balance with annoyance, understanding that annoyance can undermine effectiveness after a certain point. The Agency should provide context in terms of the duration of audible signals currently in use in the U.S. vehicle fleet and determine if there is any variation and if there is evidence of an impact on effectiveness.

18. Other Audible Signal

Again, the specification of the audible warning should be based on evidence of effectiveness. It is likely that maintaining consistency with other seat belt warning signals will present consistent information to the driver and passengers and should aide in understanding that warning and the action necessary to address same.

19. Applicability

The NHTSA should apply the requirements for rear seat belt reminders in all vehicles in which the data indicates that non-use of belts is occurring. At a bare minimum, the requirements should apply to all passenger vehicles.

20. Effectiveness

As noted earlier, Advocates concurs with the NHTSA's findings that the proportion of occupants who actively seek to avoid restraint use is small compared to the proportion that exhibit misuse for a variety of reasons but would likely be amenable to warnings.[25] The present lower belt use rate in the rear seat, compared to the front seat, is an indication that rear seat belt warnings have the potential to elicit increase in belt use beyond that observed in the front seat, which already enjoys a relatively high rate of compliance.

21. Potential Consumer Acceptance Concerns with a Proposed Seat Belt Warning System

The Agency has already gathered more than enough research to support the conclusion that a large proportion of the consumer population will accept rear seat belt warnings. In considering the history of ignition interlocks as cited by the NHTSA, the Agency must be reminded that at the time of the interlock issue in the 1970s, the motoring public exhibited a much lower belt use rate and a larger proportion of the population at the time likely fell into what would now be considered hard-core non-users. While considerations of annoyance should not be dismissed, in the case of seat belt warnings, a technology which has been required and in use for such a long period, and is now being encouraged, if not mandated by a number of other countries, the simple mention of the interlock occurrence should not be justification for further delay of the rulemaking.

[25] 2019 ANPRM, at 51087.

22. The Technological and Economic Feasibility of Alternative Rear Seat Belt Warning Systems

As noted previously, the adoption of requirements in international regulatory and consumer information programs is evidence of the availability of such systems.

23. Potential Benefits and Costs of Rear Seat Belt Warnings

As noted previously, approximately 900 second row unrestrained occupants are killed and another 19,000 are injured each year. According to U.S. DOT, the average cost of a life lost is $9.6 million.[26] A portion of this target population would likely have injuries mitigated or eliminated through the use of rear seat belt warning systems. The incorporation of these systems into international regulations and consumer information programs internationally appears to indicate that the technology is readily available.

24. Whether a Rear Seat belt Reminder Rule Would Meet the Requirements of 49 USC 30111

49 USC 30111 required that standards be practicable, meet the need for motor safety, and be stated in objective terms. The incorporation of rear seat belt reminder systems into international regulations and consumer information programs are evidence that these systems are feasible. Likewise, the number of unrestrained fatalities and injuries in the rear seats of vehicles evidence that a dire safety need would be met by the regulation. Lastly, given the standard for driver's seat belt warnings, the rule could be stated in objective terms.

25. Should NHTSA Consider Non-regulatory Approaches to Address the Issue

Advocates does not oppose the inclusion of rear seat belt reminders into the New Car Assessment Program. In order to be a meaningful safety advance and spur adoption by the industry, the evaluation of rear seat belt reminder systems would need to be part of the vehicle rating and not just a recommendation to the consumer to purchase a vehicle with the technology. However, inclusion in the NCAP is not a substitute for regulation which ensures that all occupants are afforded minimal safety protections the NHTSA has deemed necessary. Voluntary guidelines would in no way provide a substitute for a strong, clear and concise regulation.

26. Removing the Driver's Seat Belt Warning Audible Signal Duration Upper Limit

Advocates supports the removal of the upper limit on the duration of the driver's seat belt warning in accordance with the change instituted by MAP-21.

Conclusion

Requiring rear seat belt reminders as standard equipment in all passenger vehicles is long overdue. The technology is feasible and available, and it saves lives. Other countries have

[26] U.S. DOT, Memorandum to Secretarial Officers and Modal Administrators, Guidance on Treatment of the Economic Value of a Statistical Life (VSL) in U.S. Department of Transportation Analyses-2016 Adjustment (Aug. 8, 2016).

already adopted requirements in regulations or consumer interest programs or are planning to do so in the near future. Advocates supports the establishment of a regulation requiring rear seat belts reminders for the reasons listed above. Specifications should be based on best available evidence and research and should seek to minimize safety risks of unrestrained rear seat occupants. The NHSTA must complete this rulemaking without further delay or more lives will be needlessly lost.

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