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Date	November 26, 2019

Docket Management Facility
U.S. Department of Transportation,
1200 New Jersey Avenue SE, West Building
Ground Floor, Room W12-140
Washington, DC 20590-0001

Attention: The Honorable James C. Owens
Acting Administrator
National Highway Traffic Safety Administration

RE: Docket No. NHTSA-2019-0093

Dear Administrator Owens:

ZF North America (ZF) appreciates the opportunity to provide its perspective in response to NHTSA's Advanced Notice of Proposed Rulemaking (ANPRM) to amend Federal Motor Vehicle Safety Standard No. 208, "Occupant crash protection," to require a seat belt use warning system for rear seats.

ZF North America is headquartered in Livonia, Michigan, and is a primary developer and producer of active and passive safety systems, including seat belts, serving all major vehicle manufacturers. We proudly manufacture many of these products in the United States.

ZF is committed to Vision Zero: a future with zero accidents and zero emissions. As we work toward that goal, there are a number of safety precautions that can be taken to reduce the consequences of crashes. Seat belt usage is at the top of this list.

According to NHTSA's own data, seat belt use in passenger vehicles on American roads saved an estimated 14,955 lives in 2017. Tragically, it is estimated that an additional 2,549 lives could have been saved if belt usage was 100 percent. Seat belt usage is now near 90 percent for front seat occupants, but remains at only around 75 percent for those in the rear of the vehicle. Those rear seats, when occupied, often carry the most precious occupants: our children. This safety challenge merits urgent attention.

ZF applauds NHTSA's longstanding focus on increasing seat belt usage, and we are pleased to have the opportunity to share our perspective regarding seat belt warnings for rear occupants. The following comments lean on our experience developing seat belts, sensors, and monitoring systems, and we hope they are informative and useful as NHTSA pursues this important rulemaking.

Highlights of ZF's Response:

- Generally, conformity with FMVSS 208 in rear seat locations is recommended.
- Occupant detection technology is the preferred means of monitoring rear seat occupancy for purposes of determining seat belt use.
- To confront the challenge raised regarding child restraint systems, it is recommended that NHTSA consider the feasibility of systems that would recognize and detect whether those systems are appropriately latched.
- A visual alert indicating an unbuckled passenger's specific seating position would assist drivers in ensuring all passengers are using seat belts.
- This rulemaking should accommodate all body types and child restraint systems that could be present in rear seats.
- A "negative-only" system with occupant detection and seat-specific display is the recommended means of driver notification of unbelted occupants.

ZF's full response is provided on the following pages.

Again, ZF appreciates the opportunity to provide input on this important matter and looks forward to further engagement with NHTSA regarding future implementation of a rear seat belt warning system. We stand ready to provide further clarification or information regarding the following response, as needed.

Best regards,



Sarah Kirkwood
Senior Vice President
Head of Legal NA and Secretary,
ZF North America, Inc.

ZF Response to ANPRM – NHTSA FMVSS 208

ZF is pleased to offer its perspective on NHTSA's ANPRM regarding rear seat belt warning systems. In general, ZF suggests that conformity with the standard established by 49 CFR § 571.208 - Standard No. 208, S7.3 be sought for rear seat belt warnings. Conformity to this existing standard would help to limit confusion or discordant messaging when indicating that a seat belt is not fastened. Below, please find feedback to each enumerated topic.

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

In order to reduce the risk of confusion and maintain consistency with existing warnings for front seat occupants, conformity with the alternatives currently posed under FMVSS 208 is recommended. Further, the option selected for rear seat passengers should be the same option used for those in front seating positions. Both audio and visual warnings are recommended to gain the highest level of attention, but visual-only (with a location indicator showing which seat is unbuckled) would be preferred to audio-only.

2. Triggering conditions.

As with existing standards under FMVSS 208, the engine start should trigger the warning as an "intention to be driven" signal. Delaying the warning until the vehicle is in drive mode could leave drivers unable to ensure all passenger belts are fastened. Delaying the warning might warrant additional study, but if the study suggests changing the warning timing, it should do so for all vehicle occupants.

The warning should be deactivated or disallowed if all occupants are properly buckled. Occupant detection would help more accurately determine whether occupants are properly belted, while also reducing false positives and nuisance warnings, likely affording the warnings greater attention.

Just as is currently the case under FMVSS 208, if rear seats are unbuckled while the vehicle is in gear, a warning should be issued and continue until the vehicle is parked or the seat belts are re-fastened. This warning should occur at any speed.

3. Alternative warning systems.

The rear seat belt warning should conform to the warnings for front occupants under FMVSS 208 to the greatest extent possible in order to reduce the risk of confusion. Where changes are warranted to improve efficacy, those changes should likewise apply to FMVSS 208 for front occupants.

4. Occupant detection technology.

Occupant detection technology is the preferred means of monitoring rear seat occupancy for purposes of determining seat belt use. This helps reduce the risk of false positive warnings that

could, over time, lead to reduced efficacy of warnings. Many of NHTSA's very valid concerns about improper use of seat belts can be addressed with adequate occupant detection technology. To confront the challenge raised regarding child restraint systems (CRS), it is recommended that NHTSA consider the feasibility of systems that would recognize CRS and detect whether they are appropriately latched. It is recommended that an occupant detection system that can recognize a CRS and sense whether it is properly latched provide a warning if the CRS is improperly latched.

5. Enhanced warning systems.

The system should align with the standard for front occupants, but occupant detection is recommended for both front and rear passengers. A visual alert indicating an unbuckled passenger's specific seating position could assist drivers in ensuring all passengers are using seat belts. Such a warning could function similarly to a tire-specific pressure sensor dashboard monitor.

6. Belt use criteria.

In order to reduce the potential for fooling the system, NHTSA could investigate the possibility of eliminating the "false comply" condition of buckling behind the back or extracting and "pinning" the belt without buckling. One potential option is to replicate current systems used to identify use for front seated occupants, but occupant detection systems can also assist with identifying misuse.

7. Seat occupancy criteria.

In order to maximize safety, it is recommended that NHTSA's testing reflect the full range of body types as well as child restraint systems that could be present in rear seats. This may require a unique solution set, but occupant detection systems can assist in addressing this array of demands.

8. Making the system resistant to intentional and inadvertent defeat

Occupant detection technology is recommended, and sensor technology that identifies belt pullout, occupant location, and buckle switches can add redundancy and reduce the risk of intentional and inadvertent defeat. A manual override or deactivation feature is not recommended, especially with occupant detection technology that can reduce the risk of false positives.

9. Electrical connection requirements.

Rear seat electrical connections pose a significant challenge in developing this regulation, especially as it relates to foldable or removable seats. It is recommended that those seating types be exempted for a period of time as part of an escalating strategy to maximize safety for rear passengers in conventional vehicles as soon as possible while promoting innovation and technological progress to address foldable or removable seats. This would align with the approach taken by the UNECE.

10. Owner's manual/label requirements.

It is recommended that the seat belt warning features associated with this rulemaking be disclosed in the owner's manual in line with existing FMVSS 208 standards. This information should also be displayed in the vehicle for sake of redundancy, and to increase the likelihood that one-time vehicle users (renters, friends, family) are aware of the vehicle features. NHTSA should study and require displays that maximize comprehension of seat belt warnings. Information about the disconnection and reconnection of electrical components for any removable/stowable seats should be placed in close proximity to the seat's electrical connection, with graphical information to clearly show how to disconnect and reconnect the sensor wiring.

11. Interaction with other vehicle warnings.

Warnings for rear passengers should function in the same manner as those for front occupants. As mentioned previously, a visual indicator demonstrating the location of the unbuckled occupant could help improve efficacy.

12. Harmonization with regulatory requirements or new car assessment programs in other markets.

From both a safety and economic standpoint, harmonization is helpful, so long as that harmonization is in the direction of improving automotive safety.

13. Visual warning location.

Consistent with front occupant warnings, the driver should receive the visual warning, while an audio warning would notify all able-hearing occupants. Consideration should be given to location other than the dashboard, including perhaps an overhead console to provide visibility to all vehicle occupants. The highest notification priority is the driver, and any change in display should keep that perspective in mind.

14. What type of information should the warning convey?

A "negative-only" system with occupant detection would be able to notify the driver in the event that there is an unbelted passenger in the vehicle. At minimum, the display should indicate that an occupied seat is unbelted, as is the current requirement for front driver side occupants. As mentioned previously, a more sophisticated display that can visually indicate which specific seating position is unbelted is recommended.

15. Telltale characteristics.

At minimum, the telltale should align with existing FMVSS 208 for front occupants, but a more sophisticated system that indicates which position is

occupied but unbelted, as described above, could prove more effective and should also be considered.

16. Minimum duration (visual).

ZF recommends consistency with existing FMVSS 208 visual warning systems for front occupants.

17. Minimum duration (audible).

ZF recommends consistency with existing FMVSS 208 audible warning systems for front occupants.

18. Other audible signal characteristics.

ZF recommends consistency with existing FMVSS 208 audible warning systems for front occupants.

19. Applicability.

While applicability to commercial vehicles and buses could be beneficial, it may also pose considerable challenges from an implementation standpoint. It is recommended that this rulemaking apply to all vehicles below 10,000 pounds gross vehicle weight rating equipped with rear seats, and that requirements for larger vehicles be considered separate and apart from this process.

20. Effectiveness.

While ZF has not conducted research into the effectiveness of rear seat belt warning systems, it is plausible and even likely that such systems would increase seat belt use among “part-time” non-users.

21. Consumer acceptance.

Likewise, ZF has not conducted analysis of consumer acceptance of these technologies, but believes that keeping warnings as consistent as possible with existing warnings for front occupants could reduce the risk of consumer confusion or frustration. As mentioned previously, occupant detection can also reduce the risks of false positive warnings.

22. Technological and economic feasibility.

Seat-based, direct occupant detection technology is mature and available today.

23. Benefits and costs.

No comment.

24. Safety Act criteria.

No comment.

25. Non-regulatory alternatives.

Considering rear seat belt warning within NCAP could motivate greater introduction of these systems, but not at the same rate as a regulatory requirement.

26. Removing the driver's seat belt warning audible signal duration upper limit.

ZF recommends consistency with existing FMVSS 208 for front passengers to reduce confusion. If consideration is given to removing the upper limit, it should apply to both front and rear occupant positions.