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[Docket No. NHTSA–2020-0014]
RIN 2127–AM06
Occupant Protection for Automated Driving Systems

Subject: NPRM Regarding Occupant Protection for Automated Driving Systems

The Automotive Safety Council (ASC) is an industry trade association of 45 of the world's leading suppliers of Autonomous, Crash Avoidance and Occupant Protection automotive safety systems to the automobile industry. The mission of the Automotive Safety Council is to improve the safety of people through-out the world through the development, production and implementation of the latest automotive safety equipment by preventing accidents, protecting occupants and pedestrians when in a collision and to notify emergency responders after the collision when necessary.

The ASC is providing comments to the recently published NPRM regarding Occupant Protection for Automated Driving Systems (Docket No. NHTSA-2020-0014). The ASC appreciates the opportunity to comment on this topic

General Comments:

The Automotive Safety Council fully supports the need to provide at minimum the same level of crash protection to occupants of vehicles with automated driving systems as assured occupants of human operated vehicles. Removal of regulatory barriers that prevent automated vehicles from being sold is a necessary step, but of course will not address certain challenges that may be unique to these vehicles. The ASC fully supports the need to address these challenges and further update the FMVSS's but appreciates the need for additional research before these updates can be fully defined.

Specific Comments:

- We believe that further research is definitively necessary to ensure the protection of occupants in some of the automated vehicles expected, including (but not limited to):
    - New seating configurations:
        - potential injury causations due to novel seating positions (reclined seating, rotated seating, reclined and rotated seating, etc.).
        - increased seat track adjustment range – where mid-point position for testing per FMVSS may no longer be appropriate.
        - provide countermeasures to mitigate injuries related to occupant-to-occupant interactions in crashes.
        - potential interaction with portable hand-held devices such as lap top computers, coffee mugs and other items.
    - Availability, prognosis capability & reliability of test tools (ATD's) in reclined and rotated seating.
    - Injury criteria (IRC's) for potential new injury risks associated with novel seating.
    - Consideration of virtual testing for compliance demonstration to provide for broad scope of evaluation.

- Fully automated vehicles without driver controls, or those with stowable driver controls, will need consideration for novel seat belt and airbag designs/configurations (including implications related to OOP/LRD testing). Non-traditional concepts (roof mounted air bags, seat-centric restraints, etc.) may be necessary for occupant protection within new vehicle interiors that may include:
    - Novel seating arrangements (campfire, living room, etc.)
    - Novel instrument panel designs (larger space for leg room, designated workspace, large video screens, etc.)
    - Changes in occupant activity/usage/posture that may be prevalent during travel.

- **NHTSA: Seeks comment on proposed changes in definitions**.

  We support necessary changes to definitions while maintaining continuity of definitions where possible. We do not find the proposed changes confusing or misleading.

- Within the defined scope of this NPRM we do not see a need to modify additional FMVSS's related to crash protection beyond those proposed. Additional FMVSS's will likely need changes in the future (following NHTSA's additional research) to accommodate future interior scenarios (e.g., lay flat seating), and occupant seat use patterns. Based on our experience, it can be expected that these new scenarios will produce different loading conditions during crashes. To assure an equivalent level of occupant protection more advanced ATD's, criteria and thresholds may need to be established. We anticipate the opportunity for a separate review of proposed FMVSS updates following the necessary research.

- **FMVSS 208 Comments**
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  - We support limiting the crash protection requirements of FMVSS 208 to vehicles with at least one designated seating position. Measures are still needed to ensure adequate crash compatibility with the fleet. It has been stated previously by the NHTSA (Automated Driving Systems: A Vision for Safety 2.0) that "unoccupied vehicles equipped with ADSs should provide geometric and energy absorption crash compatibility with existing vehicles on the road". Such a policy/regulation would prevent unoccupied vehicles from being developed with overly aggressive structures – which is currently controlled to some degree by the crash requirements of FMVSS 208. Energy absorption in the crash by the unoccupied vehicle structure is a necessary factor in helping to protect the occupied vehicle passengers.
  - Occupant restraints for front seating positions are currently optimized for adult occupants, with certain known risks associated with airbag deployment. For vehicles without driver controls, and with all front seating positions designated as passenger seats – it is reasonable to apply the advance airbag requirements (suppression or low risk deployment) for all front designated seating positions. We also urge (assuming the presence of airbag systems) that children continue to occupy only the rear seat(s) unless additionally protected using technologies such as advanced occupant classification systems with suppression or adaptive deployment strategies.
  - We agree that a seating position without driver controls shall be considered as a passenger seat under the FMVSS but have concern regarding such designation for vehicles with stowable controls. Where it may be possible (or necessary) for stowed driver controls to be activated (such as departure from ODD), such vehicles should not allow children to occupy that seat – even when driver controls are stowed. Such a seating position shall be considered as a passenger seat in all aspects of FMVSS except requirements specific to accommodating children or child safety.

- Dual mode vehicles shall be equipped with an appropriate occupant monitoring system to disallow vehicle motion with children on the seat behind the steering controls. The discrimination between (allowed) small adult and (not allowed) adolescent may be challenging, but necessary for such vehicles.
- We believe that dis-allowing vehicle motion in ADS-equipped dual-mode vehicles when a child is seated behind driving controls is definitively the most appropriate option. We fully support this approach even if advanced, and potentially costly, sensor technology will become mandatory.
- For dual-mode vehicles which have the capability of stowing driving controls, it will be necessary to certify compliance in both states (e.g., human-operated driving controls "available" and "stowed"). The state with manually operated controls "available" should continue to be tested with the ATD's hands on these controls according S10.2.1 and S10.3.1.
- The new advanced air bag suppression telltale shall provide information about the status of any suppression on front outboard seats. A seat specific display of this information should be required rather than a general information. The location of the telltale should be chosen carefully to provide this information to the adults independent where they are sitting in the vehicle. Seatbelt reminder should be available for all seating positions.
- We agree that future automated vehicles may have increased usage/presence of a center seating position, possibly without accompanying outboard seating positions. For such vehicles (those with a stand-alone center designated seating position) we believe additional test requirements and occupant protection devices are necessary and considered by FMVSS's as the other passenger seating positions.
- Occupants of highly automated vehicles are more often likely to engage in tasks that may take place using non-standard sitting positions (reclined, legs crossed, etc.). Advanced occupant and object detection/classification systems may be required for suppression or deployment adaptation.
- NHTSA has recently issued a request for comments on revising FVMSS 208 to include Rear Seat Belt monitoring. As seating positions will continue to be more dynamic as AVs develop - we strongly feel that occupant detection/classification and seat belt monitoring is essential to ensure safety.

- **Buses**:
  - **NHTSA: Seeks comment on how best the agency can ensure that occupants receive the same level of protect as today.**

    Seat belts are the primary restraint and should be used for all occupants with seatbelt reminders available for all seating positions. The fitment of busses with Type 1 seat belt should not be supported anymore. Type 2 should be required.

- **NHTSA: Seeks comment on requiring front seats to have seat belts.**

  All front occupants remain at risk of serious injuries during an accident and shall be protected independently of the vehicle control type (Non-ADS / ADS). Seat belts have been proven to be the primary restraint in accidents and are necessary to provide occupants with a minimum level of protection. We support requiring that all front seats have seat belts as the correct way forward.
- **NHTSA: Seeks comment on compartmentalization:**

  Compartmentalization has been shown to be effective in frontal crashes but contributes little in lateral impact and rollover crashes. An appropriate seat belt reduces the risk of ejection and its related injury risks. We also appreciate the difficulty in ensure all occupants in a school bus are properly seated and wearing seat belts – especially if there is no driver or adult overseeing the situation.

- **NHTSA: Seeks comment on whether it would be more appropriate to require seat belts at only one DSP rather than at all front seating positions.**

  We support requirement for (Type 2) seat belts in all front DSP's. Occupants who desire protection from seat belts should not be confronted with the choice to ride in a DSP without seat belts – or get off the bus.

In conclusion, the ASC welcomes this opportunity to comment on Occupant Protection for Automated Driving Systems. We welcome any invitation to visit the NHTSA office for a detailed discussion of these comments should the need arise.

Sincerely,

Douglas P. Campbell
President
Automotive Safety Council