



November 3, 2023

USG 5940-2

Ms. Ann Carlson
Acting Administrator
National Highway Traffic Safety Administration
1200 New Jersey Avenue, SE
Washington, D.C. 20590

Subject: National Highway Traffic Safety Administration's Request for Comment on Automatic Emergency Braking Systems for Light Vehicles (Docket No. NHTSA-2023-0021)

Dear Ms. Carlson,

General Motors LLC ("GM") appreciates the opportunity to provide supplemental comments in response to the Request for Comments ("RFC") referenced above addressing NHTSA's ("the Agency") Notice of Proposed Rulemaking ("NPRM") on Automatic Emergency Braking Systems for Light Vehicles.

Since submitting our initial response to the NPRM dated August 14, 2023, GM has undertaken a more detailed review of the supporting Preliminary Regulatory Impact Analysis ("PRIA") titled "Federal Motor Vehicle Safety Standard No. 127; Light Vehicle Automatic Emergency Braking (AEB); AEB Test Devices" that provided the costs and benefits for the NPRM. In addition, GM has conducted analysis of supplemental field data from real world crashes involving recent model year passenger vehicles in AEB-relevant rear end collisions. Based on this work, GM is providing the following additional feedback for consideration.

If you have any questions, please feel free to contact me or Hoang Ngo from GM Safety Standards & Regulatory Integration (huy-hoang.d.ngo@gm.com).

Sincerely,

A handwritten signature in black ink that reads "John Capp".

John Capp,
Director, Vehicle Safety Technology,
Strategy & Regulations
Global Product Safety & Systems
General Motors LLC, North America

Attachment

general motors

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cc: Raymond R. Posten

ATTACHMENT

While the NPRM leverages NHTSA fatality, injury, and crash data to motivate the need for continued improvement in AEB and PAEB systems, the PRIA lacks grounding in field data. The PRIA documents a substantial amount of analysis conducted to estimate the costs and benefits of new AEB performance requirements but does so without consideration of real-world performance. For example, the Agency selected test speeds and no-impact criteria based on test target object, real estate, and equipment constraints rather than field-relevant performance needs. If implemented, GM believes such tests could push OEMs toward standards that are not optimized for public safety.

Using NHTSA CISS data from crash years 2017-2021, GM examined two-vehicle rear end collisions with reported total delta-velocity (DV) and found that 95% of collisions reported a total DV below 37KPH. To validate the CISS sample, we also examined telemetry-reported DVs for rear end AACN events involving recent model year vehicles and found a similar distribution of real world crash severities.¹ Comparing these results to the DV values experienced in current NCAP test procedures by a variety of model year 2022 and 2023 GM vehicles, we found current test configurations effectively cover the range of severities experienced in the field. Increasing test conditions beyond field relevance has important potential negative consequences, as requirements may drive significant increases in potential false braking events which, in turn, risks creating other vehicle safety hazards including an increase in some crash types. The AFAI response to the NPRM notes these concerns in various sections but specifically addresses these risks in Section 1.3.1²:

- ***False activations*** - *While we recognize that the agency has proposed a series of alternatives for evaluating false positives, this does not negate the complexity of designing systems to meet the proposed requirements and reduce the likelihood of false positives occurring... This becomes increasingly more complex at higher speeds and in low light conditions where it becomes more challenging to discern the expected movements of objects in and around the roadway environment. Establishing a no contact requirement essentially requires a more conservative approach where manufactures need to refine the sensitivity of their systems to require more aggressive braking or potentially update hardware systems to provide greater redundancy in terms of object detection and classification at higher speeds. In both scenarios, this may result in increased warnings and brake activations beyond those that may actually warrant intervention and may cause unintended consequences.*
- ***Change in profile of rear end crashes*** – *In the PRIA, NHTSA indicates that “sudden braking as a result of an AEB intervention is not expected to cause additional crashes.” While it is the agency’s assumption that when an “AEB intervenes, the vehicle behind would also be equipped with AEB that would also engage in response to the sudden braking,” it is unlikely that this*

¹ Research with University of Michigan International Center for Automotive Medicine matched AACN signals with Michigan UD-10 police reports to identify two-vehicle rear-end collisions in Michigan for model year 2013-22 vehicles with active OnStar subscriptions.

² <https://www.regulations.gov/comment/NHTSA-2023-0021-0844>

assumption is reasonable in that it assumes significant distance between vehicles, a one dimensional travel condition and no lane change maneuvers. In addition, since not all vehicles on the roadway today are so equipped, it will take time for FMVSS compliant systems to achieve sufficient levels of fleet penetration. Even then, this presents potential challenges for the following vehicle. As a result, we anticipate that the rule will likely result in a shift in the profile of rear impact crashes whereby modern vehicles subject to the new requirements may be involved in fewer high severity front-rear crashes but may encounter higher instances of rear impact collisions due to limitation with the avoidance capabilities of the following vehicle. We request that the agency update its cost-benefit analysis to further evaluate these potential scenarios to understand potential limitations in the suggested hypothesis and more accurately account for anticipated changes in crash outcomes.

GM also finds several assumptions in the PRIA minimize the projected impact of current voluntary industry initiatives. For example, the PRIA weights the projected status quo population by 65.4% based on “current NCAP compliant market penetration;” this does not take into account the large investments being made to measure and improve system performance. Further, the PRIA assumes that the current population of AEB-addressable fatalities is representative of future years and does not adjust for voluntary AEB improvements. In particular, the PRIA does not filter fatal crashes based on vehicle model year, which obscures that many are not representative of the latest occupant protection or crashworthiness levels.

GM has been a member of the NHTSA-sponsored Partnership for Analytics Research in Traffic Safety (PARTS) since its beginning. As stated in the report “Market Penetration of Advanced Driver Assistance Systems (ADAS)³”, the goal of the PARTS initiative is to “...gain real-world insights into the safety benefits and opportunities of emerging advanced driver assistance systems...” The report shows that between model year 2015 and 2020, the penetration of AEB increased from 5% to 74% of the study fleet, while PAEB increased from 2% to 66%. The analysis included data on 47 million US passenger vehicles, including 93 different models from model years 2015-2020. The dramatic penetration increases were driven by voluntary OEM and industry commitments⁴, but delays in crash reporting and increases in the age of the US fleet⁵ mean the consequences of this proliferation will not be apparent in NHTSA crash data sets for some time.

The PARTS study on AEB effectiveness⁶ found early AEB systems to be 49% effective at eliminating front-to-rear collisions, and 53% effective at eliminating front-to-rear crashes with injury. In addition to providing a real-world industry baseline for ADAS effectiveness, the PARTS initiative provides member OEMs with effectiveness benchmarks. The voluntary PARTS initiative has thus provided GM real-world, data-driven assessments of how AEB systems on specific vehicle models and segments are performing

³ Available from <https://www.nhtsa.gov/parts-partnership-for-analytics-research-in-traffic-safety>

⁴ <https://www.regulations.gov/document/NHTSA-2015-0101-0005>

⁵ <https://www.spglobal.com/mobility/en/research-analysis/average-age-of-vehicles-in-the-us-increases-to-122-years.html>

⁶ <https://www.mitre.org/news-insights/publication/real-world-effectiveness-model-year-2015-2020-advanced-driver-assistance>

relative to the industry. GM believes continued NHTSA funding of these efforts can drive voluntary ADAS performance improvements that more effectively target high impact field relevant opportunities.

With respect to PAEB, the PRIA highlights a lack of data on PAEB-relevant vulnerable road user (VRU) collisions. The exclusion of VRU crashes from the detailed NHTSA CISS data set results in a limited understanding of crash dynamics such as vehicle braking, vehicle speed at collision, pedestrian behavior, pedestrian injury risk, and other external factors. Without such data, the PRIA must rely on assumptions based on correlations, imputation of large sets of missing data, and high-level adjustments for unmeasured factors (e.g., a 20-percent reduction to account for pedestrian behavior). GM fully supports NHTSA's focus on addressing the increase in VRU fatalities but believes the industry should take a data-driven system safety approach to this important issue. Improved PAEB system perception and reaction is one element of such an approach. Driving improvements in these systems requires a more detailed understanding of the full spectrum of crashes and VRU outcomes. To that end, GM supports the University of Michigan Hospital International Center of Automotive Medicine's VIPA initiative⁷, which works with Michigan law enforcement agencies and medical centers to collect and analyze detailed data on Michigan VRU crashes. We would further support additional efforts to develop a national data set with representative VRU data.

Along with the other AFAI members, GM recognizes the agency's objectives in establishing a FMVSS for light vehicle AEB and PAEB systems and is supportive of NHTSA rulemaking to establish a new baseline level of performance that builds upon the industry's commitment to improve safety. To that end, GM welcomes the opportunity to review these data comparisons with NHTSA to help align proposed AEB performance requirements with field relevant safety benefits.

⁷ https://www.med.umich.edu/surgery/icam/pedestrian_consortium.html