



July 7, 2022

Dr. Steven Cliff
Administrator
National Highway Traffic Safety Administration
1200 New Jersey Avenue SE
Washington, D.C. 20590

Dear Deputy Administrator Cliff,

The Alliance of Automotive Innovation (Auto Innovators) is writing to provide comments and policy recommendations to NHTSA in advance of the agency's anticipated pedestrian protection rulemaking proposal that is expected to be published in the coming months.¹ These comments focus on several key issues identified in August 2018 National Highway Traffic Safety Administration ("NHTSA") GTR report entitled *"Vehicle Hood Testing to Evaluate Pedestrian Head Form Reproducibility, GTR No. 9 Test Procedural Issues, And U.S. Fleet Performance,"* and emphasize the importance of ensuring international harmonization.² Included is discussion on the impact of NHTSA's potential interpretation of unresolved issues within Global Technical Regulation (GTR) No. 9 that may result in inconsistent requirements between the United States and other parts of the world where similar requirements have already been adopted as part of regulatory or consumer information program evaluations.³ This will likely require U.S.-specific vehicle designs due to the lack of harmonization. Given the potential for regulatory misalignment, and the likelihood that proposed changes will have a significant impact on motor vehicle design, this rulemaking has been incorrectly classified as "nonsignificant," and should instead be considered a "major" rulemaking, which requires additional review by OMB. To address these concerns, we have provided several recommendations for the agency's consideration as it works to finalize its proposed rulemaking based on the Pedestrian Safety GTR.

Introduction

Auto Innovators shares the Department of Transportation's (DOT) safety priority and supports DOT's emphasis on the need for a safe systems approach for improving roadway safety. Our members are investing in the development of innovative technologies including Pedestrian Automatic Emergency Braking (PAEB) systems and advanced lighting features to help enhance roadway visibility in low light conditions. However, recognizing the lead time for new technologies to become widespread within the vehicle fleet, we underscore the importance of continued focus on driver and pedestrian education, the need for appropriate laws and enforcement, and investment in infrastructure improvements designed to enhance pedestrian safety. Safer roads, safer speeds, and safer people are all core components of the safe systems approach. As the automotive industry continues to make advances in vehicle safety, regulatory certainty, and clarity with respect to any potential NCAP requirements become increasingly important as these policies can have a significant impact on vehicle design.

¹ *Auto Innovators is the singular, authoritative, and respected voice of the automotive industry, representing motor vehicle manufacturers responsible for nearly 99 percent of cars and light trucks sold in the U.S., original equipment suppliers, technology companies, and others within the automotive ecosystem.*

² See docket NHTSA-2018-0026

³ GTR No. 9: ECE/TRAN/2005/124/9

Based on the *Spring 2022 Unified Agenda of Regulatory and Deregulatory Actions* that was recently published by the Office of Information and Regulatory Affairs (OIRA), we understand the agency is currently in the process of developing a Notice of Proposed Rulemaking (NPRM) based on the Pedestrian Safety Global Technical Regulation (GTR) – also referred to as GTR No. 9. Specifically, that NPRM would propose requirements to protect pedestrian heads impacting vehicle hoods.⁴

It remains critical that the agency work to ensure its regulations are closely harmonized with GTR No. 9, particularly with respect to how the requirements are being implemented by those that have adopted them through their respective regulatory and consumer information programs. This *implementation focused* approach is essential, particularly as stakeholders work to provide clarification on aspects of the GTR that are currently open to interpretation. Such an approach is consistent with the intent of the GTR process for ensuring “globally harmonized performance-related requirements and test procedures”.⁵

Just recently, the importance of international harmonization was reinforced in the Bipartisan Infrastructure Investment and Jobs Act (IIJA). If NHTSA is to take a divergent approach on this issue, it would likely require U.S-specific hood designs to meet future regulation and related NCAP test procedures. This would add unnecessary complexity and require additional research on development of new vehicle hood designs instead of those that already meet the pedestrian protection requirements of GTR No. 9 that have been adopted and implemented in other global markets and could be more readily integrated for vehicles sold in the United States. Such action would conflict with the IIJA which indicates a desire for increased harmonization.

NHTSA Interpretation of the GTR

In the aforementioned NHTSA GTR No. 9 report, it is stated that “[t]he first objective was to evaluate the GTR language defining the head impact point.” It is also noted that “The current language could be interpreted in more than one way, and a proposed amendment to the GTR supported by the European industry consortium OICA has been introduced to revise the GTR language to reflect one interpretation.” Auto Innovators supports this proposed amendment and urges the agency to further consider support for its adoption as part of the GTR process.

It is important to note that the NHTSA report (as quoted in the previous paragraph) incorrectly refers to OICA as a “European Industry Association.” In fact, the organization’s membership comprises 36 trade associations around the world, including all major automobile manufacturing countries and covers virtually the entire motor vehicle industry worldwide.⁶ This is a crucial distinction to make because the OICA recommendations represent an *international consensus* recommendation for improving the robustness of existing test procedures to evaluate pedestrian safety.

Unfortunately, the issue of potential multiple interpretations remains unresolved, despite strong international support for a clear path forward. Auto Innovators has significant concerns that this lack of resolution, coupled with a potentially unique NHTSA interpretation, could lead to an indefinite state of regulatory misalignment between regions.⁷ In other words, there may be no clear path forward for resolving this issue through a clarifying amendment.

⁴ *Spring Regulatory Agenda: Pedestrian Safety Global Technical Regulation* ([RIN: 2127 AK98](#))

⁵ <https://unece.org/wp29-introduction>

⁶ <https://www.oica.net/category/about-us/>.

⁷ [TWSG-03-05](#): *Final Minutes of the Technical Working Subgroup on Amendment 3 to GTR9* (December 03, 2021)

NHTSA has additionally noted a diverging interpretation for the “definition of area calculation.” Notably, the proposed amendment 3 to GTR No. 9 does not intend to revise the GTR requirements themselves for the definition of area calculation but rather intends to clarify the language to be consistent with the homologation procedures that have been in practice in Japan and the EU since 2004, and subsequently in UN R127 since 2012.

These issues, which are discussed in more detail below, include: (1) the process for defining the test areas (and corresponding HIC zones); (2) the method for defining the head impact point; and (3) Consideration for Impacts Outside the Defined HIC 1000/1700 Test Zones.

1. Defining the Test Area and Corresponding Test Zones (HIC 1000 and 1700 Areas)

It is important that test procedures are harmonized and aligned. Inconsistency can have a significant, adverse impact on vehicle design. When conducting head impactor tests consistent with GTR No. 9, it is important to first mark up the vehicle to identify valid test areas. We recognize that the current requirements *as written* in GTR No. 9 are potentially open to interpretation with respect to the methodology (or mark-up procedure) for defining the corresponding HIC 1000 and HIC 1700 zones. However, despite this, there is clear alignment *in practice* for how the regulation is being applied through the test procedures that have been implemented in regions that have adopted the GTR. An example of this would be the Republic of Korea where KMVSS 102-2 was crafted per GTR No. 9 but in practice aligns with GTR No. 9 with the adoption of Amendment 3. In an attempt to resolve possible differences between the regulatory text and the corresponding test procedure, a proposed *clarifying amendment* was introduced (referred to as Amendment 3) to update GTR No. 9.⁸ These issues are summarized and described in Figure 1 and 2 below.

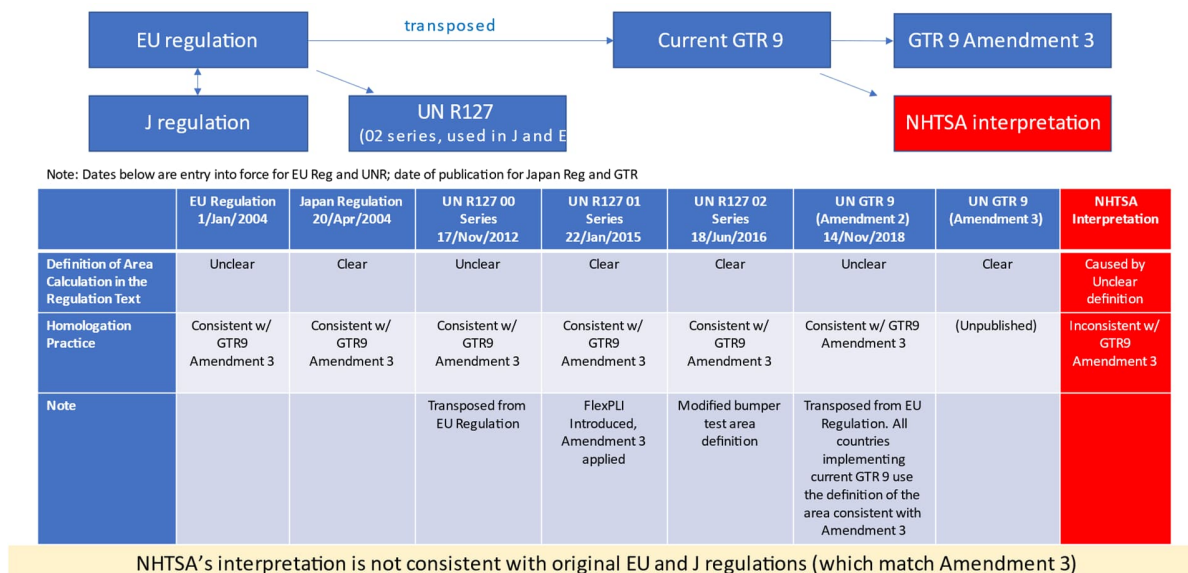


Figure 1: Regulation history for the definition of area calculation for HIC 1000 and 1700 zones (and resulting inconsistencies)

⁸ Amendment 3: ECE/TRANS/WP.29/2021/53

	Current GTR9 (NHTSA Interpretation)	Amendment 3
Side Reference Line(SRL)	 First contact point of 45deg line	 First contact point of 45deg line
Area in which Impact Points (Current GTR9) / Measuring Points (Amendment 3) are positioned	Side Boundary : SRL -82.5 Inconsistent	Side Boundary : SRL -82.5mm Consistent
Definition of Bonnet Top (current GTR9) / Bonnet Top Test Area (Amendment 3)	Side Boundary : SRL	Side Boundary : SRL -82.5mm
Definition of HIC 1000 and 1700 areas	HIC 1000 : 2/3 of Bonnet Top HIC 1700 : 1/3 of Bonnet Top	HIC 1000 : 2/3 of Bonnet Top Test Area HIC 1700 : 1/3 of Bonnet Top Test Area

Figure 2: Comparison of HIC 1000 and HIC 1700 zones between GTR No. 9 (expected NHTSA Interpretation) and Amendment 3.

Auto Innovators recommends that the “mark-up” approach discussed in the agency’s 2018 report should not be pursued.⁹ If the mark-up procedure approach adopted in NHTSA regulation is inconsistent with the current GTR No. 9 test procedure, in practice this could potentially result in undefined HIC 1000 and HIC 1700 zones, or circumstances where the ratio of HIC 1000 zones exceed 2/3 of the testable area. This is illustrated in Figure 3, below, using a simplified 2D representation of the width of a vehicle hood. Miswording in the current GTR No. 9 leads to interpretation of the area requirement that is different from the original concept of GTR No. 9 to prescribe 2/3 and 1/3 area ratios for HIC 1000 and HIC 1700 zones, respectively. Similar issues would also likely arise if the agency were to adopt a hybrid approach that blends requirements from the GTR No. 9 and UN Regulation 127 test procedure.

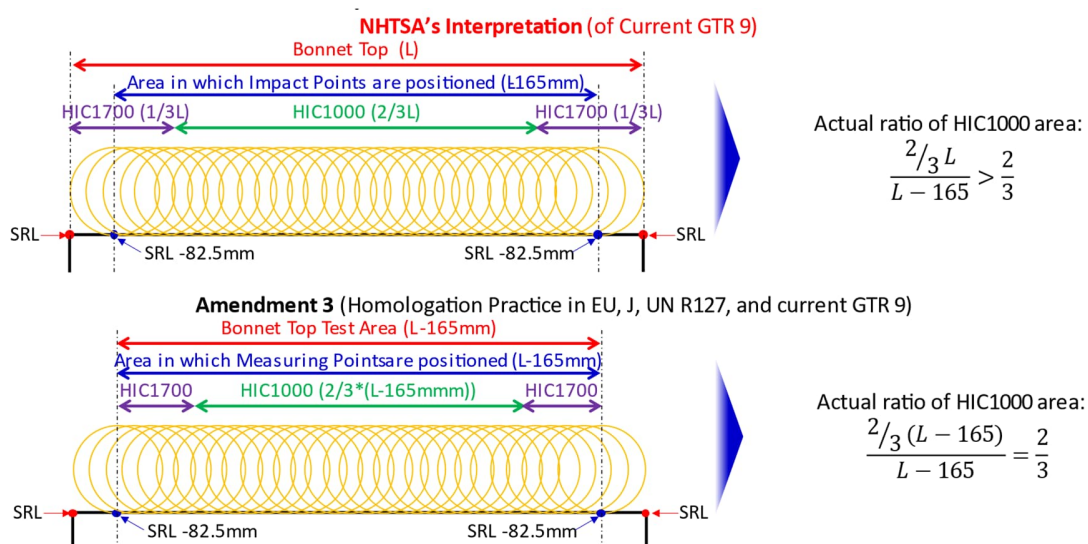


Figure 3: Comparison of the HIC 1000 area ratios when applying markup procedures from Amendment 3 and the expected NHTSA interpretation of current GTR No. 9

⁹ Vehicle Hood Testing to Evaluate Pedestrian Head Form Reproducibility, GTR No. 9 Test Procedural Issues, And U.S. Fleet Performance (Page 50-51)

Figure 4, below, further demonstrates that for vehicles with smaller, narrower front ends, the actual ratio of the HIC 1000 area can become substantially larger than the fundamental 2/3 requirement in GTR 9. This inappropriately drives more stringent requirements for smaller vehicles and would have the counterintuitive effect of encouraging larger vehicles because of the comparatively lower ratio of HIC 1000 to 1700 zones in relation to the overall size of the vehicle front end. Above all, this creates significant concerns for objectivity and departs from the fundamental concept of defining 1/3 and 2/3 ratio zones for HIC 1700 and 1000 areas.

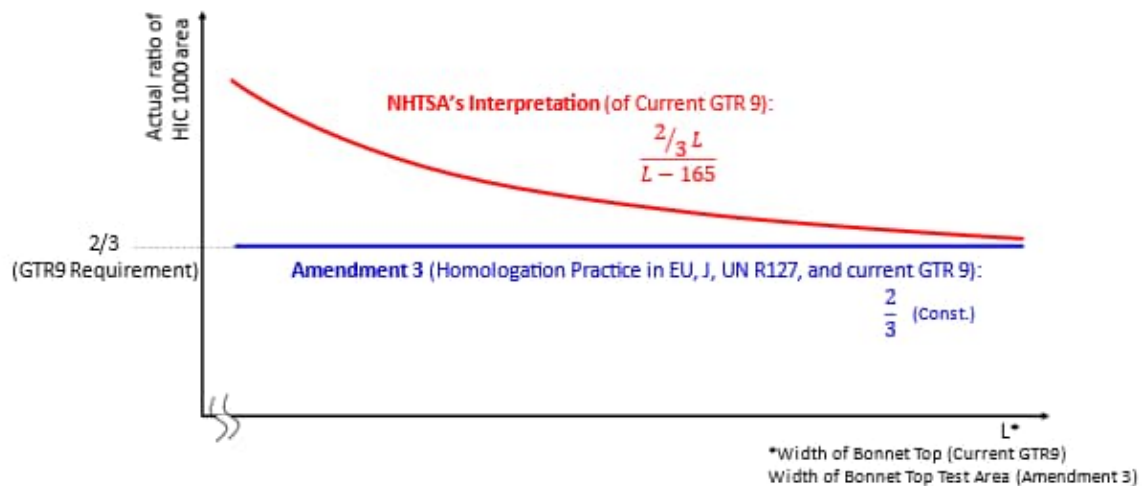


Figure 4: Sensitivity of the actual ratio of the HIC 1000 area to the width of a vehicle, when comparing markup procedures from Amendment 3 and the expected NHTSA interpretation of current GTR No. 9

To ensure greater harmonization, NHTSA should align with how GTR No. 9 is being implemented in other markets in terms of mark-up procedure. We encourage the agency to base its proposal on the GTR 9 with consideration for proposed clarifying Amendment 3, and to work with its international partners to ensure favorable resolution within the UNECE process.

2. Defining the Head Impact Point – Concerns with the NHTSA Targeting Protocol

Auto Innovators has concerns related to the NHTSA targeting protocol and methodology for aligning the head impactor used to evaluate pedestrian injury risk. As noted in the agency's GTR No. 9 report:

With the current GTR language, three different impact point definitions have been put to use by different laboratories: (1) the 3D point of first contact (POFC) (current NHTSA protocol); (2) the aiming point (EuroNCAP protocol); and (3) the point of first contact on the vertical-longitudinal plane containing the center of the headform impactor, which is known as "2D measuring point" (OICA protocol)... clear definition would provide lab- to-lab consistency, ensure that the test zones are not decreased to limit the GTR's benefit, and would provide clear wording for test procedures.¹⁰

The NHTSA report states, "Different interpretations of the head impact point could affect HIC outcome in a test, depending on the geometry/contour and under hood structures in the vehicle."¹¹ This statement is particularly relevant with respect to the proposed use and application of the 3D POFC method, where the interpretation by the agency introduces unnecessary complexity as well as several other issues as described below.

¹⁰ See docket NHTSA-2018-0026

¹¹ See docket NHTSA-2018-0026

Figure 5 illustrates the difference between the definition of “Impact Point” (based on the 3D POFC) and the “Measuring Point” (using the 2D method) ^{12,13}

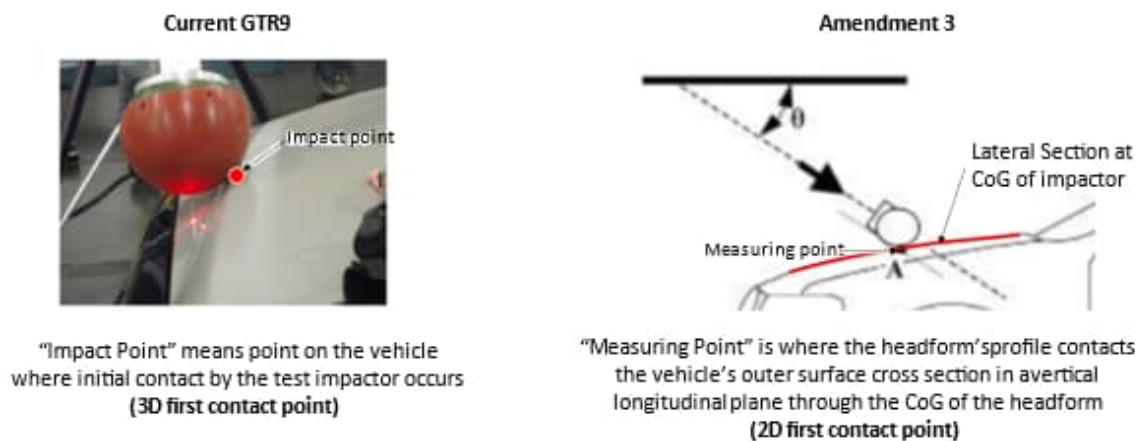


Figure 5: Definition of Impact Point (Current GTR9)¹⁴ and Measuring Point (Amendment 3)¹⁵

In addition to challenges outlined in the previous section, the 3D POFC method also introduces repeatability and reproducibility concerns whereby a “Point of First Contact” could be associated with multiple impactor positions as outlined in Figure 6, below. In some cases, depending upon the structural profile of the hood, areas where multiple POFCs may exist results in zones that cannot be reliably assigned to a single point. Areas where a test cannot be assigned to one single point may need to be considered as “unassignable,” particularly where they overlap HIC 1000 and HIC 1700 zones.

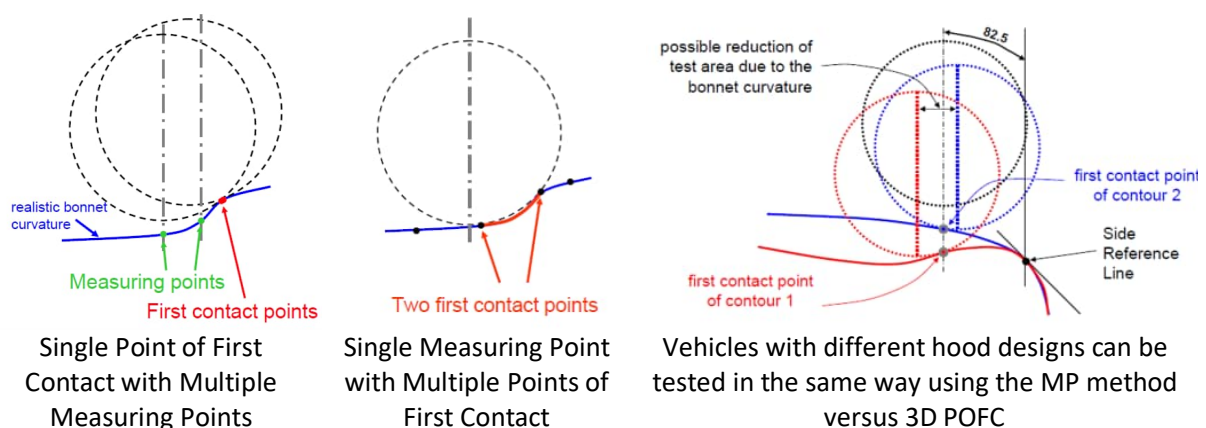


Figure 6: Challenges with 3D POFC Method [Source TFPP3-1-03]

¹² TFPP3-1-06: First session of the GRSP Task Force on Pedestrian Protection GTR Amendment 3” held in 14th and 15th June 2021 (June 14-15, 2021)

¹³ UN-R127 01 series (R127r1e)

¹⁴ Source: “First session of the GRSP Task Force on Pedestrian Protection GTR Amendment 3” held in 14th and 15th June 2021 (please see page 8 of TFPP3-1-06).

¹⁵ Source: UN-R127 01 series (Figure 8B in page 11 of R127r1e)

The aforementioned issues with the 3D POFC do not exist for the 2D method. We therefore strongly urge the agency to adopt the 2D approach as it is significantly more straightforward, limits unnecessary test burden, ensures repeatability and reproducibility, better guarantees that impacts occur within defined testable areas, and is more closely aligned with the intent of GTR No. 9.

3. Consideration for Impacts Outside the Defined "Child and Adult Test Areas"

Diagram illustrating the difference between Po1C and SRL impact tests:

- Po1C (Point of Impact):** The impact point is often located in the lateral offset zone, leading to a test result compared with the wrong area.
- SRL (Standard Reference Line):** The impact point is located in the longitudinal centreplane (velocity vector).
- Velocity Vector:** The velocity vector is often in the offset zone or even outside the bonnet top area.
- Impact Area:** Great portions of the impactor are allowed to be outside the bonnet top area.

¹⁶ Minutes of 2nd Meeting of Technical Working Subgroup on Amendment 3 to GTR9, December 13, 2021.

As noted in the agency's report, the first objective was to "investigate how the front, side, and rear borders of the GTR "launch area" would change if various targeting protocols are used." The report further states that the agency has

*[I]nterpreted the language of the original GTR to mean that as long as any point of the headform touches inside the 82.5 mm bounded test zone as specified in the GTR, it would be considered a valid test point as long as the target point (headform centerline projection) is within the initially drawn front/side/rear boundaries of the test zone.*¹⁷

This interpretation inappropriately expands the testable area beyond the intended scope of GTR No. 9. Based on our assessment, the 3D POFC method further calls into question what is considered a valid test/impact based on defined test zones.

While the agency's rationale is that "this method engages more structural members along the extreme periphery of the prescribed zone and therefore could provide more benefit to pedestrians in harder vehicle areas," it is not reasonable or practicable to adopt such a requirement given that these structures are necessary to support the position of the hood system during normal operation, provide access during maintenance and repair, or maintain reasonable integrity during vehicle crash testing. As such, any cost-benefit analysis should include a comprehensive assessment of the impact of regulation on existing vehicle designs, compared to if the agency were to simply adopt the requirements of GTR No. 9 as implemented in other regions.

Rulemaking Significance

Based on the aforementioned concerns, and the potential for NHTSA to propose rulemaking that is inconsistent with the spirit, intent, and implementation of GTR No. 9, Auto Innovators is concerned that this could result in a situation where regulation may require U.S.-specific hood and front-end designs. Given that the hood is an integral component of the vehicle, this could have downstream impacts on the design of other systems that may be closely integrated with the hood (e.g., fender, bumper system), adding substantial burden to manufacturers, notwithstanding any fuel economy related impacts that need to be considered based on redesign of the vehicle body shape.

Any cost-benefit analysis by the agency should include an assessment of the impact of rulemaking on vehicle hood design in the United States and factor in any U.S.-specific requirements that may alter the cost-benefit analysis. Should the agency proceed in a direction inconsistent with our technical recommendations, we request that the agency provide a comparison of the cost-benefit if it was to simply align with the GTR No. 9 as accepted and implemented in other parts of the world.

Given the potential for regulatory misalignment, and the likelihood that proposed changes will have a significant impact on motor vehicle design, this rulemaking has been incorrectly classified as "nonsignificant." It should instead be considered a "major" rulemaking, which requires additional review by OMB.

Conclusion

We remain supportive of efforts to address pedestrian safety; however, we have significant concerns should the agency seek to implement performance requirements inconsistent with GTR No. 9. While we recognize that the exact language used in the GTR is open to interpretation by the agency, the application and implementation of the standard globally, is not. Adopting an approach that is

¹⁷ See docket NHTSA-2018-0026

inconsistent or based on a unique interpretation of the GTR No. 9 requirements creates the potential for long-term international regulatory misalignment, which is counter to the intent of the GTR process, and the spirit of the directive issued by Congress in the recently passed Bipartisan Infrastructure Law.¹⁸ We therefore strongly urge the agency to harmonize any proposed pedestrian protection standard with those already being implemented in other regions.

Please let me know if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read 'Scott Schmidt', with a stylized, flowing script.

Scott Schmidt
Vice President, Safety Policy
Alliance for Automotive Innovation

¹⁸ Sec. 24211 -- Infrastructure Investment and Jobs Act