

*2010 Government/Industry Meetings
January 26 – 29, Washington DC*



Alliance **OF AUTOMOBILE**[®]
MANUFACTURERS

Pedestrian Protection Global Technical Regulation Challenges

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Alliance of Automobile Manufacturers**



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2010 Government/Industry Meetings
January 26 – 29, Washington DC

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BMW Group

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TOYOTA

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Presentation Outline

Discussion Items:

Slide

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| 1. GTR 9 Challenges for US Market: | 4 |
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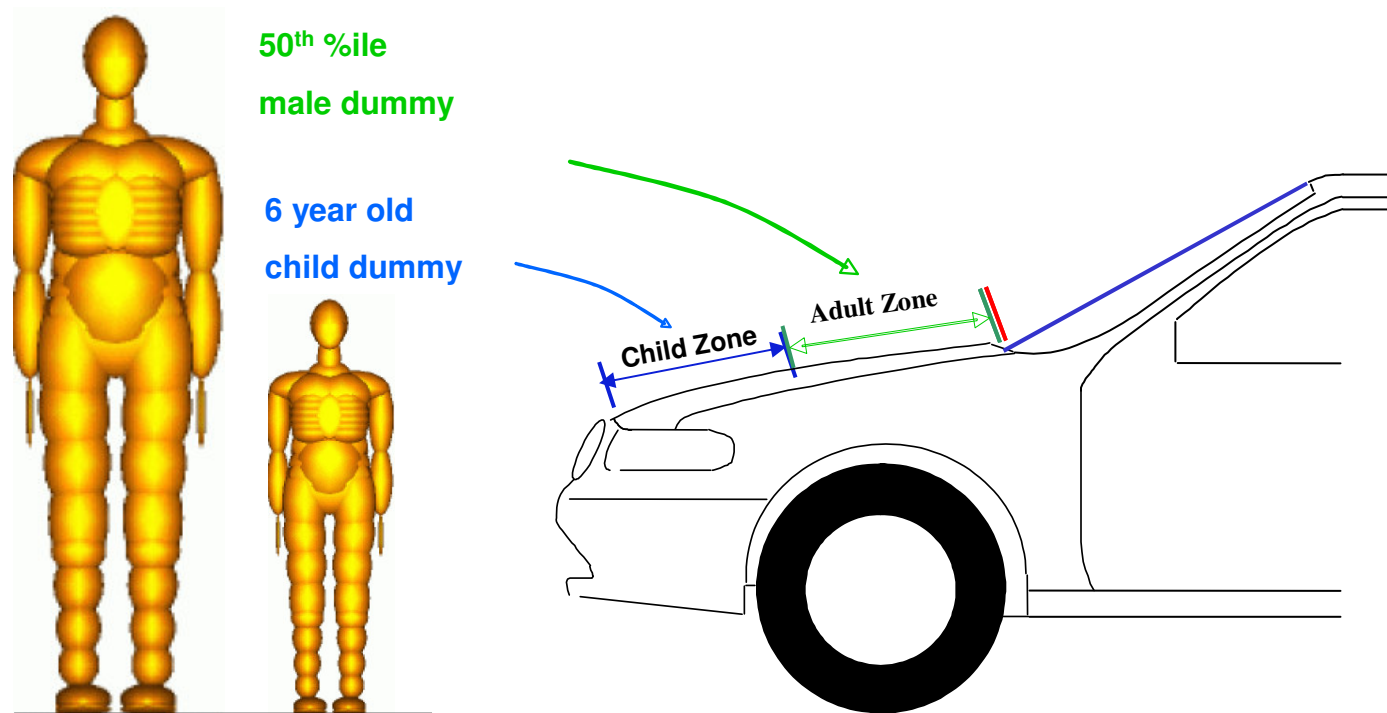
GTR 9 Challenges for US Market

Technical Challenges for Trucks / SUVs

Technical Challenges for Trucks / SUVs

GTR Pedestrian Kinematics:

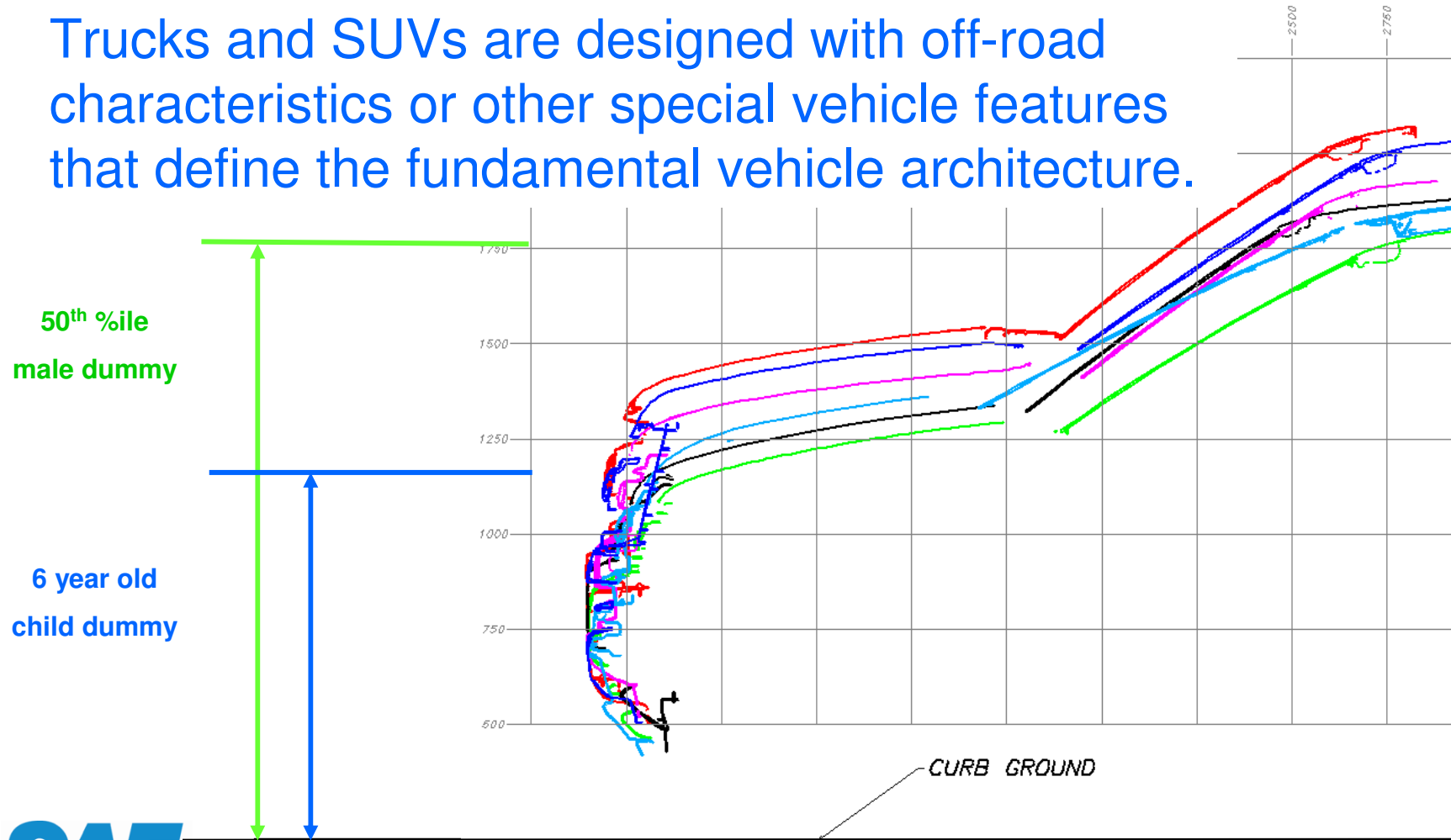
The Pedestrian Protection GTR test procedure was developed based on sedan type cars.



Technical Challenges for Trucks / SUVs

Truck / SUVs Vehicles:

Trucks and SUVs are designed with off-road characteristics or other special vehicle features that define the fundamental vehicle architecture.



Dimension Height Source:

Weber, K., Lehman, RJ- Schneider, LW (1985) Child Anthropometry for Restraint System Design. Report No. UMTRI-85-23.
UMTRI, AA, MI Snyder, RG, Schneider LW, Owings CL, Reynold HM, golomb DH, Schork MA (1977) Anthropometry of Infants, Children and Youths to Age 18 for Prodcut Design. SAE-SP 450. SAE, Warrendale Pa.

Technical Challenges for Trucks / SUVs

Truck / SUVs Functionality:

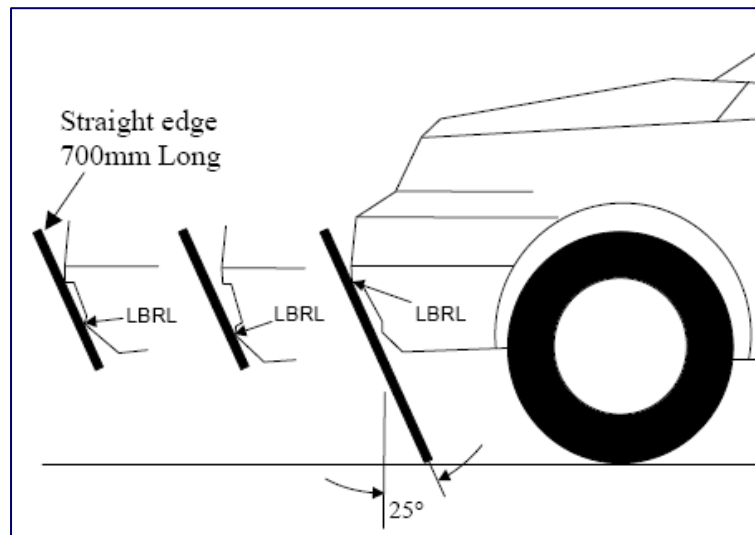
There are no known practicable solutions to meet the GTR leg requirements and satisfy truck/SUV architecture and other functionalities, such as:

- higher running clearances
- larger approach angles
- provisions for mounting equipment, e.g. snow plow
- skid plate
- tow/recovery hooks
- steel/chrome bumpers

Self Certification

Self Certification LBRL Definition

- The GTR scope application is up to 4500kg which includes the US full size trucks and SUV's. These vehicles meet a variety of US customer needs resulting in large ranges of ride heights within a single vehicle program.
- The Lower Bumper Reference Line (LBRL) could range from below 425mm to above 500mm on a single vehicle program due to ride height variations.

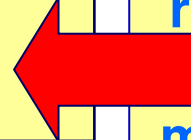


LBRL < 425 mm	lower leg test required
425 mm ≤ LBRL < 500 mm	Manufacturer's choice of lower or upper leg test
LBRL ≥ 500 mm	upper leg test required

Self Certification LBRL Definition

Pedestrian Protection Leg Testing Requirements			
Vehicle	Lower Leg LBRL < 425mm	Lower or Upper Leg 425 mm ≤ LBRL < 500 mm	Upper Leg LBRL ≥ 500 mm
High Hooded Vehicle - A	X		X
High Hooded Vehicle - B		X	
High Hooded Vehicle - C			X
High Hooded Vehicle - D		X	X

For vehicles that fall within both the upper and lower leg requirements, the manufacturers should be allowed to **meet one of the two leg requirements, but not both.**



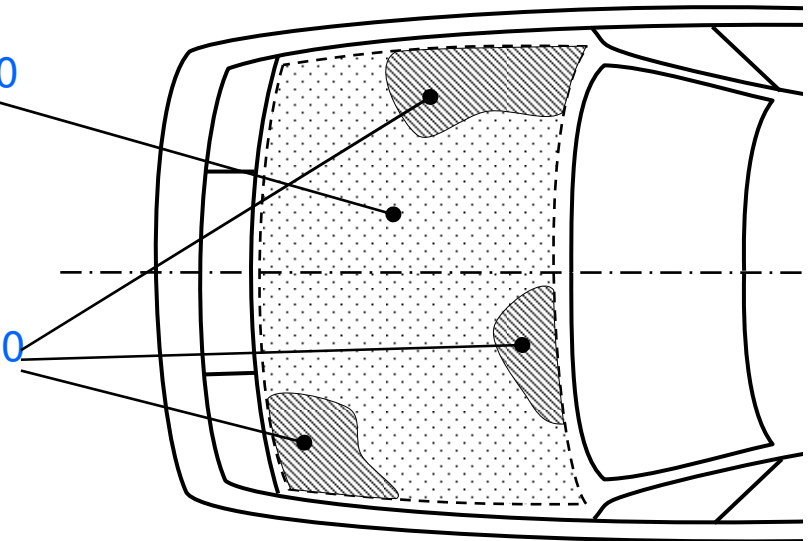
Self Certification Compliance Process Concerns

Head Impact Test Procedure:

- **Potential misinterpretation test zones mapping**
 - Need clear definition of 1/3-2/3 zones
 - Need clear reference coordinates
- **Potential conflicting points selections**
 - Need clear definition of testing points procedure
- **Test procedure needs to be clearly defined for repeatability**

HIC1000
Zone
(2/3 of
area)

HIC1700
Zone
(1/3 of
area)



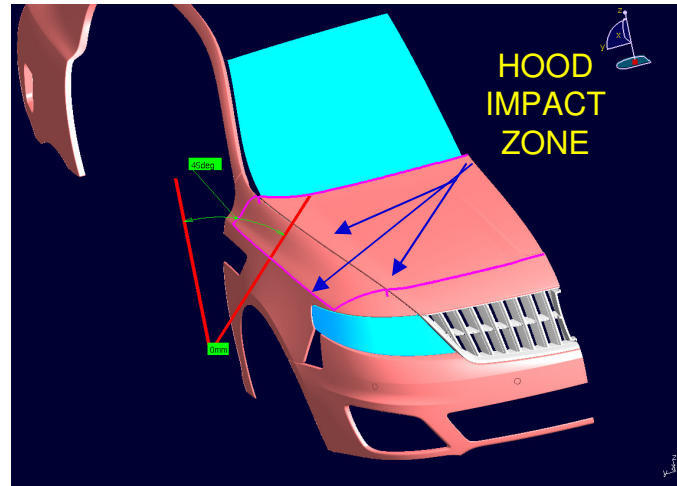
As in FMVSS 201U, the standard should define target points at safety effective locations in order to provide objective and practicable compliance requirements.

Vehicle Design, Timing & Feasibility

Vehicle Design & Timing

Vehicle Design:

- The potential solutions to meet the GTR requirements will have a significant impact on vehicle exterior design, vehicle function, package flexibility, weight and cost.



As an example in the above drawing, a simple vehicle feature line may drive a redesign based upon the resultant pedestrian impact zones.

Timing:

- The GTR 9 statement of rationale confirms that the pedestrian requirements are substantial and severe, requiring significant vehicle redesign and development. This regulation is unique and as a result, OEMs will need the longest lead times to date to redesign the entire front ends of all vehicles.

Feasibility

Feasibility:

- In the US, bumper systems are designed for the Part 581 Bumper Standard and IIHS damageability assessment. Compliance with the potential pedestrian leg requirements creates a design conflict with current damageability standards and possibly CAFÉ.
- In Europe, bumper systems are designed for Pedestrian Protection compliance and bumper design specifications such as ECE R42 / R-Car/ Thatcham / GdV.

Country	Bumper Regulation	Pedestrian Protection Reg.	Public Domain
US	Yes (Part 581, car only)	Potential	Yes (IIHS)
EU	No (ECE R42 not regulated)	Yes	Yes (R-CAR/ Thatcham/ GdV)

GTR Amendment Proposals

GTR Amendment Proposals

Flat Front Vehicle (FFV):

- At the December 2009 GRSP the UN studied a proposal to align the scope of GTR 9 Pedestrian Safety with that of the EU Regulation. The proposal extends the Flat Front exemption distance to 1100mm (currently 1000 mm).
- GRSP did not approve the proposal discussion and it will now be postponed until May 2010.
- *The Alliance supports the adoption of this amendment in order to maintain global harmonization.*

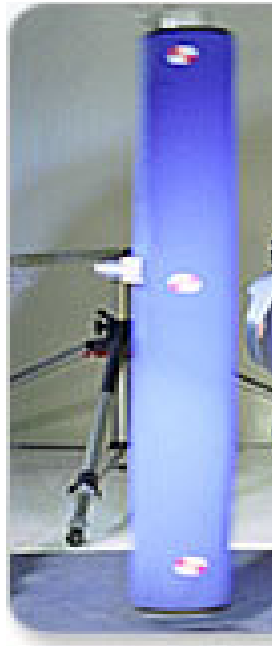
GTR Amendment Proposals

FlexPli Legform:

- Japan has proposed adding the FlexPli legform to the Pedestrian Protection GTR. This item was also discussed at the December 2009 GRSP.

GTR (TRL)
Lower Leg
 $v = 40 \text{ km/h}$

Limits
 $a \leq 170 \text{ g}$
 $\alpha \leq 19^\circ$
 $s \leq 6 \text{ mm}$



Proposed FlexPli
Lower Leg
 $v = 40 \text{ km/h}$

Limits
Tibia $\leq 340 \text{ Nm}$
ACL $\leq 13 \text{ mm}$
PCL $\leq 13 \text{ mm}$
MCL $\leq 22 \text{ mm}$



GTR Amendment Proposals

FlexPli Legform:

- Although the passenger cars tested were not developed for the FlexPli legform, results showed comparable results to the TRL leg tests.
- Large SUV/Trucks are included in the GTR's scope. The FlexPli legform has not been evaluated on this set of vehicles. As a result, there is no data showing capability to the TRL data.
- OEMs outside of Europe and Japan have had little or no opportunity to evaluate the latest version of the FlexPli legform.
- *The FlexPli amendment should not be adopted until the leg is fully certified. The Alliance supports the transition to the FlexPli legform assuming the proper transition time is provided to support the industry's product cycle timing.*



Questions?

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