

Minutes of 2 nd Meeting of Technical Working Subgroup on Amendment 3 to GTR9	
Title	3 rd Meeting of Technical Working Subgroup on Amendment 3 to GTR9
Place	Teams
Status	Final
Meeting Date	03 December 2021, 6am-9am EDT / 12pm-3pm CET / 8pm-11pm JST
Prepared By	Benjamin Buenger (Audi), Oliver Zander (BAST)
Purpose of Meeting / Agenda	Discussion on Markup Methods and Test Point Methods for Headform Test Procedure in GTR9 Amendment 3
Issue date	13 December 2021
Next meeting	Not planned
Invited	Interested Experts from Contracting Parties to the 58 and the 98 Agreements, OEMs and Suppliers

Attendees	
Peter Broertjes (PB)	European Commission
Benjamin Buenger (BB)	Audi
Irina Dausse (ID)	Renault
Anders Fredriksson (AF)	Volvocars
Dirk-Uwe Gehring (DG)	BGS
Oliver Klöckner (OK)	German Ministry of Transport and Digital Infrastructure
Shashi Kuppa (SK)	NHTSA
Hans Lammers (HL)	RDW
Mr. Lee (ML)	KATRI
Peter Martin (PM)	NHTSA
Gerhard Maurer (GM)	BMW
Kenneth McCabe (KM)	PSA
Louis Molino (LM)	NHTSA
Y Nozaki (YN)	Japanese Ministry of Land, Infrastructure and Transport
Jin Seop Park (JP)	KATRI
Ansgar Pott (AP)	Hyundai
Stefan Schinke (StS)	Volkswagen
Paul Scullion (PS)	Alliance for Automotive Innovation
Jason Stammen (JS)	NHTSA
Yoshinori Tanaka (YT)	NTSEL
Corelis Thielen (CT)	Volkswagen
Mary Versailles (MV)	NHTSA
Vincent Wu (VW)	NHTSA
Toshiyuki Yanaoka (TY)	Honda
Oliver Zander (OZ)	BAST

Meeting Minutes

1. Welcome and Overview

OZ welcomed the participants. Due to a number of new attendees to this meeting, a short roll call was made. The group was reminded of the main working items for a possible alignment of Draft Amendment 3 with the needs of all contracting parties of the 98 agreement that would ideally enable WP.29 to adopt the proposal, but at least to create a mutual understanding on the technical discrepancies and remaining points of discussion with respect to the headform test procedure. Main topics to be covered during this last meeting were:

- 1) Description of the markup sequence / procedure and zone assignment as interpreted by the US (in comparison to TWSG-02-02)
- 2) Potential safety benefit, technical feasibility and possible side effects of testing in the offset zones (CoG aiming at points therein)

OZ informed the group members that a short meeting of the Task Force on Amendment 3 which will be chaired by MV was to be held on 6 December 2021 prior to the start of the 70th session of GRSP.

All meeting documents were available on the ftp server:

(<https://files.bast.de/index.php/s/pk4WdyfgyRk5A9H>)

2. Adoption of the Agenda

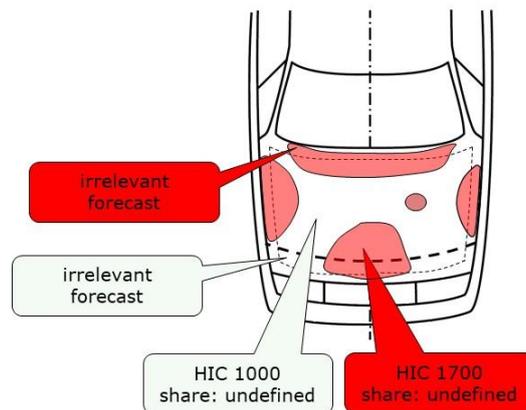
The Agenda (TWSG-03-01) was agreed without any modifications.

3. Review and Approval of the Meeting Minutes

The group went through the draft minutes of the last meeting (TWSG-02-04). OZ mentioned that NHTSA handed in extensive comments on the discussion. Since they felt their point of view not sufficiently reflected in the meeting minutes, it was decided to submit a separate document with a more detailed summary of the discussions as perceived by NHTSA (TWSG-02-05). A remark was included under agenda item 6 and the minutes were then approved as drafted.

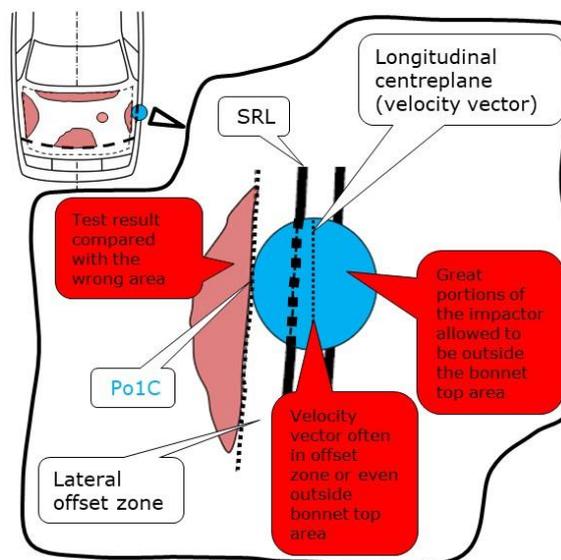
4. Current Status of Work

OZ presented a summary of the remaining discussions (TWSG-03-02) which were the common interpretation of the markup sequence and the permission to perform tests in the offset zones. He pointed out that marking the HIC 1,000 and HIC 1,700 zones prior to marking the WAD and 82.5mm offset lines would result in undefined shares of HIC 1,000 and 1,700 in the impact area with unnecessary forecasts in the offset zones:



He added that this would be significantly different to what has been always done in type approval testing. Both approaches however would be possible according to GTR9; a combination of both approaches however could not be interpreted from the wording of GTR9.

In terms of tests to the offset zones, he mentioned this, according to the current wording of GTR9, being a question of either marking test points with the global first point of contact or with the first point of contact on the longitudinal vertical centerplane of the headform. Regardless of which alignment method being used, OZ presented several possible shortcomings of testing the offset zones, often comparing the test results with the wrong area, permit great portions of the impactor, including the velocity vector, outside the bonnet top area and, as far as the alignment method is concerned, a compromised repeatability and reproducibility with unpredictable test results:



OZ concluded his presentation with the recommendation to resubmit Draft Amendment 3 in its unchanged version to WP.29 and AC.3 for adoption.

MV expressed her disagreement to GTR9 not allowing a combination of both markup methods, as depicted by OZ. It was her understanding to markup the vehicle as done in UN-R 127.01 (Option B of the presentation), but as a key difference to Option B to ask the OEM for a prediction of the entire bonnet top, requiring that a portion of at least 2/3 has to meet HIC 1,000 and to be located in the impact area. All remaining areas which were sometimes less than 1/3 must meet HIC 1,700.

In terms of impactor alignment and offset zones, MV explained NHTSA's understanding that the two areas (HIC 1,000 and HIC 1,700) are complete areas that are not related to performance per test point but by the

zone. MV confirmed it was not foreseen to align a headform with its very edge on the offset zone. She also confirmed the zone separation to be not applied to the offset zone and that using the 3D method would lead to multiple possible impact points at a certain surface. PM also confirmed Option B but the computation of the areas was seen differently, i.e. relating the ratios to the whole bonnet top. This was the main difference in area determination and calculation where the US have a unique interpretation of the GTR No.9 wording. OZ asked for a clear reference on the statement “2/3 of the bonnet top area need to be in the impact area and below HIC1000”.

DG asked how NHTSA allocates a test point to a particular test zone. MV answered that there wouldn't be marked any test points on the bonnet top. PM added that it was the launching position and the HIC score NHTSA would rather be interested in. Upon request of BB what is meant by launching position PM answered that the US rulemaking proposal has not yet been fully worked out but it was supposed to correspond with the projection on the xy plane, not following the contour. DG wondered how to test a point and allocate its HIC result without determination of its location on the bonnet. PM answered that it was difficult to nail down the procedure that is still under development. OZ wondered whether the US could ever agree upon any amendment until initiation of their rulemaking process.

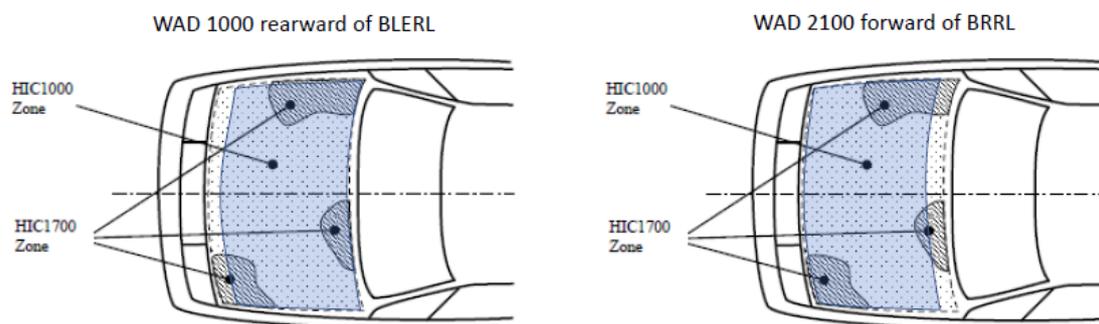
More questions were raised, and NHTSA stated to have no more answers prepared for now but would come back with a clearer statement. OZ replied that his summary was designed to reflect the current and approved practice in global pedestrian regulations and asked to have a clear statement on how NHTSA would practically conduct testing with this understanding. MV replied all tests so far have been research tests and since US rulemaking has not started the language may be a little vague intentionally.

JP and ML raised several questions based on the US procedure in the report. It was not solved how to deal with double contact point. He also reiterated on the purpose of the 82.5mm which was foreseen to avoid impacts too far outwards. 3D positioning was stated to be more ambiguous, raising more questions for self-certification under KMVSS. ML clarified that Korea uses the 2D method for pedestrian headform testing.

BB stated that an agreement on ignoring a test result in case of the head impactor touching the vehicle outside the reference lines during the impact would solve most of the differences in understanding and ambiguities in positioning (2D/3D).

DG tried to clarify based on GTR No.9 text, showing where the lack of clarity may come from (TWSG-03-04). The combined test area and the bonnet top were not separated clear enough in the text:

GTR9 – Examples of the „combined test area“



The HIC recorded shall not exceed 1,000 over a minimum of one half of the child headform test area and 1,000 over two thirds of the combined child and adult headform test areas. The HIC for the remaining areas shall not exceed 1,700 for both headforms.

In every case there are parts of the HIC 1000 zone up to the test area borders!

Amendment 3 intended to clarify this aspect. There was no way of applying the whole area related to requirements in the offset area only. DG concluded that GTR 9 must be amended to ensure that the 1/3-2/3 requirement could be verified, i.e. that it was only related to the testable part of the impact area.

PB suggested that the proposed **amendment to paragraph 5.2.4.1** should solve the main problems the US were facing:

5.2.4.1. The manufacturer shall identify the zones of the bonnet top **test area** where the HIC must not exceed 1,000 (HIC1000 Zone) or 1,700 (HIC1700 Zone) (see Figure 11).

MV answered that according to her understanding there were other sections or how they all work together causing their concern.

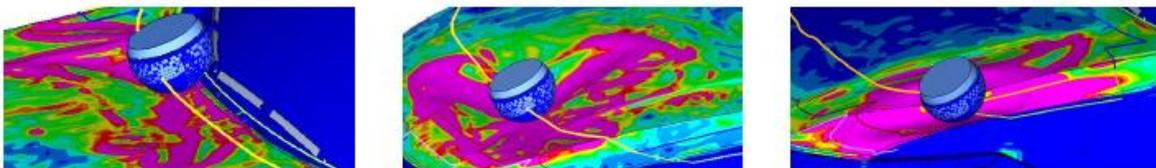
OZ reiterated that Draft Amendment 3 was to clarify there was no issue in safety but clarity and asked to provide a clear view on how NHTSA interprets GTR No. 9 and would enforce it in US. MV stated that NPRM would only be out by March 2022 and NHTSA could not commit to any further details so far. JP asked for feedback from US manufacturers and to provide their feedback on procedural understanding.

5. Markup Sequence / Procedure and Zone Assignments

No further information was provided by NHTSA regarding the US interpretation of GTR9.

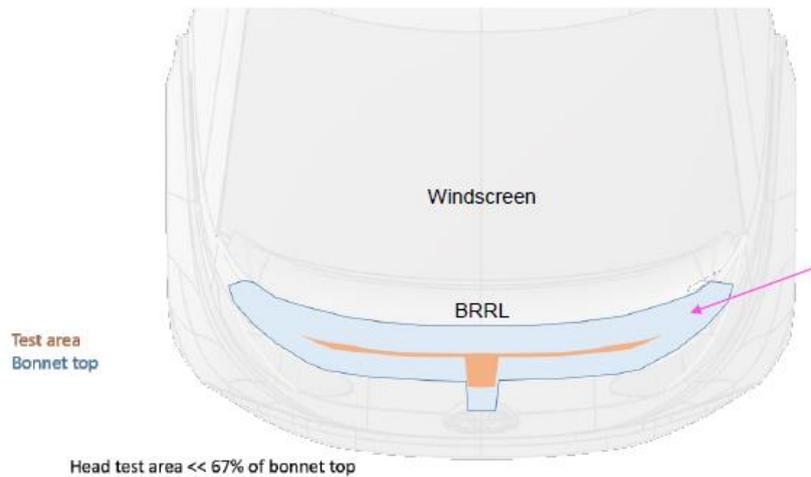
6. Testing in Offset Zones: Potential Safety Benefit, Technical Feasibility, Possible Side Effects

BB presented a study on how the offset areas are assessed in regulations today (TWSG-03-03). The data indicated that the offset area is interacting with the head impactor and is required to deform for the desired values of HIC for meeting the thresholds. Three examples for a clear deformation of the bonnet top in the offset zones - close to the side reference lines, the bonnet rear reference line and the WAD 1,000 line – while aligning the impactor according to the 2D method as described in Draft Amendment 3 were illustrated:



It was concluded that HIC values were directly related to deformation, i.e. that a reduction in safety by application of Draft Amendment 3 to GTR9 was not intended, nor happening, as the entire bonnet top area up to the borders was assessed. The formal assignment of performance to a single target was required for documentation, as well as validity of the performance claim. A target close to another impact point would show a different outcome in terms of HIC values, despite being in the same zone. So formally, if direct HIC values were documented, these could only be true for the very impact point. If just pass or fail was documented, then all the zones could be documented in a simplified way.

On a backup slide BB depicted another shortcoming of the US interpretation of zone assignment, presenting a vehicle whose impact area contains far less than 2/3 of the entire bonnet top area:



PB gave an example of these kinds of vehicles not only being hypothetical cases, but already existing.

[Please note that in order to avoid potential issues with any copyright, a photo is not reproduced in this report. It can be found under https://www.daihatsu.co.jp/lineup/move_canbus/05_driving.htm]

BB added that such actual vehicles would not allow compliance testing according to NHTSA interpretation of GTR9.

HL indicated supporting the given presentation as a further example for the need for Draft Amendment 3. He added that it would clarify what is being done for a long time.

JP asked about what to do in case of the absence of any existing testable area. HL answered that this would already be the case nowadays with e.g. a missing adult headform area on the bonnet. In that case, the child headform area would be taken into account, only.

7. Discussion

The group went on with discussing possible ways forward. It was found that without a clear and complete proposal from the US containing alternative changes to GTR9 different to Draft Amendment 3 it would be difficult to anonymously agree upon anything else.

8. Next Steps & AOB

It was concluded that despite the progress made during the three meetings of the Technical Working Subgroup, due to the absence of a full technical understanding of NHTSA's concerns and any alternative proposal, no modifications to Draft Amendment 3 could be proposed for the time being.

A Status Report of the work of this group (TWSG-03-06) will be submitted to the Task Force.

9. Closure

OZ thanked all attendees and closed the meeting, concluding the work of TWSG.