

## **Draft Agenda for the Workshop on UN Regulation No. 14**

Dates: Thursday 25 April 2024 and  
Friday 26 April 2024

Time: 10:00 - 14:00 CET

Venue: Bundesanstalt für Straßenwesen (BASt), Brüderstraße 53, 51427  
Bergisch Gladbach

Task Force leader: Mr. Bernd Lorenz, [lorenz@bast.de](mailto:lorenz@bast.de) (BASt)

Confirmation: Please send your registration to the Secretary of the group: Andreas Perl  
([andreas.perl@vda.de](mailto:andreas.perl@vda.de)) by **16 April**.

### **Agenda**

#### **25.04.2024 10:00 CET Start of Day 1**

##### **1. Welcome and Roll Call**

Mr. Lorenz welcomed the participants in the room and online. A roll call of the attendees was conducted.

##### **2. Introduction and Aim of the Workshop**

Some CPs raised concerns about OICA's proposal during the last GRSP session. Mr. Lorenz reminded the group on the outcome of GRSP-74. To further discuss the proposal and the related comments GRSP asked Germany and OICA to organize a workshop on this issue. The workshop is aiming for an amendment of the proposal to be introduced to GRSP in its 75<sup>th</sup> session.

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##### **3. Adoption of the Agenda**

Agenda was adopted w/o any changes.

##### **4. Brief Introduction of the OICA Proposal ([GRSP/2023/28](#))**

The proposal on alternative anchorage positions for “extended use positions” was introduced to the experts. It defines new permitted areas for the anchorage points in order to allow higher seatback inclinations. The area for the upper area is harmonized with FMVSS, the lower area can be tilted but the range remains the same as in current UN Regulation No. 14. Provisions for the test were also added. GRSP-74-20 was introduced to explain the background of the latest amendments on the lower permitted area to the proposal by OICA. The area might stay in its current position, can be tilted in relation to the seatback inclination completely or for a smaller margin (1/3).

The group was reminded that the concerns raised by CPs are not focussing on the proposal itself. Concerns are related to the impact on occupant safety. Hence the impact to other regulations need to be evaluated as well.

A question regarding the 1/3 dependency of the lower area's tilt was raised. The value is based on a study – the study considers comfort aspects rather than occupant safety. This aspect and also other questions related to possible injury mechanisms shall be reviewed during this workshop.

The proposal is the first step to take for allowing extended use positions during driving. Currently, there is still a reference to a normal or upright position during driving in the owner's manual. Outcome of the workshop can also be the definition of the next steps.

## **5. State of the Art: Overview on Relevant Studies**

### **- Usability of ATDs in Extended Use Positions** (Dr. Hanna Paul, Mercedes-Benz)

The presentation was introduced to the group. The first part of the presentation explains how dummy development is made. A good biofidelity is the basis for injury prediction to humans. All current dummies are based on data in an upright seating position. For injury prediction, the measured physical loads are transferred via injury risk curves, which differ based on the related human (e.g., size, weight).

This means for evaluating new seating positions, the positionability needs to be checked in the first place. Following this, the usability regarding the biofidelity (p. ex. Kinematics and submarining) needs to be checked and finally the development on injury prediction.

An overview of available studies on the positionability was introduced. This is mostly depending on the opening angle (angle between thighs and torso) of the dummy and not only on the seatback inclination. For different frontal impact dummies an opening angle of 110° was still feasible, 120° was only possible for the THOR-50M. A similar situation was observed also for side impact dummies.

Prototype dummies based on the THOR-50M for even higher opening angles were then introduced. Consequently, an overview of biofidelity and injury prediction of these dummies was shown in comparison to the THOR-50M. There is still some work to be done on these new dummies before they can be used. It was suggested to start with moderate opening angles to gather more experience.

A normal/upright position (~25° torso angle) has an opening angle of around 100°.

FORVIA referring to an investigation on the maximum inclination angle of the 3D-H-point machine. It needs to be clarified, which angles are mentioned when talking about inclination as they differ from each other.

### **- Status of the ENOP Project (Enable New Occupant Seating Positions)** (Dr. Andre Eggers, BAST Matthias Schießler, BAST)

The presentation was introduced. PHMS tests are/will be conducted in the lab MOBIOs at Comillas University in Madrid, Spain, within the project to gather information on new injury risks for non-traditional seating positions. Tests are conducted with different seatback inclinations either in combination or without changes to the inclination of the seat cushion. Matching dummy tests will be conducted in the lab of BAST using three types of dummies (Hybrid III 50%, THOR-50M, THOR-50RS).

Most PMHS test will be conducted by summer 2024. Tests with a Hybrid III dummy were already conducted in both labs to assess reproducibility of the test setups Data will be published probably at IRCOBI 2024 - at least a brief summary. In 2025 several publications are expected.

No measurements with the 3D-H-point machine were taken. The mentioned “opening angles” in the presentation might not be the same as referred to in the first presentation.

- **OSCCAR**  
(Dr. Andre Eggers, BAST  
Matthias Schießler, BAST)

One main objective of OSCCAR was to take into account virtual methods to address new seating positions. For evaluation, the different HBM are used. Some improvements were implemented in the models. However, the current versions still need improvements before they can be used to assess injuries in reclined seating positions. A validation procedure for the sled model based on sled tests with THOR-50M and HIII-50% was developed and evaluated. Before virtual testing based safety assessment of reclined seating position is possible further work on the validation procedure is needed. Finally, HBMs still need improvements (especially validation on the basis of PMHS data) for evaluating new seating positions and further research is needed.

- **Relation of the topic to the TF Virtual Testing in the EqOP IWG**  
(Dr. Corina Klug, TU Graz)

The IWG on Equitable Occupant Protection was introduced. The use of alternative test tools (physical or virtual) are under discussion to close two possibly discovered gaps in occupant safety. There are two TF under the IWG, which might be of interest for the workshop: TF3 on Virtual Crash-Testing and TF4 on Restraint System Requirements.

The usage of HBM should add a more detailed view on occupant safety to regulations. On contrary there is no qualification requirement available, which needs to be provided especially when no physical test can be conducted. These requirements and a first protocol for testing are currently developed at Euro NCAP.

NL pointing at the need to also cover COP, when type-approval was done via simulation. This link needs to be considered.

During the amendments of GTR 9, M.R.1 was amended. HBM could not be added as intellectual property must be respected. Nevertheless, this was the first time to introduce virtual testing (as a prerequisite), where no physical testing is possible.

The current geometric design requirements on restraint systems seem to limit the optimization for a wide range of occupant sizes, weights, etc. This IWG EqOP TF might think of performance based requirements.

- **Status of the Validation of HBM for Extended Use Positions**  
(Dr. Corina Klug, TU Graz)

Several studies have been reviewed for the presentation. Based on the kinematics the general outcome is that there is a good relation between HBM and PMHS in extended use positions. Nevertheless, some studies pointing also at limitations when it comes to pelvis rotation and the lumbar spine. Referring to the tests conducted at ENOP some are showing submarining and higher loads to the lumbar spine, but others don't. Currently there is no clear mechanism discovered and further research is needed. First ideas how to address the injury to the lumbar spine are currently discussed among experts.

To judge on a safe or unsafe design, several aspects have to be considered and not only the kinematics.

ESV23-0288 was mentioned regarding a comparison between THOR-AV, HBM and THUMS with PMHS tests regarding submarining. The outcome should also be considered.

HBM is validated to frontal and side impacts. Coming from traditional seating positions HBM might be used also for slightly modified positions. New injury mechanisms might not be addressed so far and new validation on component level is probably required. It might be not sufficient to evaluate only the overall biofidelity.

Question was raised if there is a link to the work on DCAS. Discussion regarding DCAS is related to the time to take over the dynamic driving task. This workshop is more related to the seating position / anchorage points of the seatbelt.

#### **5. Visit to the Test Site: Dummy Positioning in an Extended Use Position**

Different seating positions with different dummies were investigated. A presentation with the outcome will be provided.

**17:00 End of Day 1**

## **26.04.2024 09:30 CET Start of Day 2**

### **6. Summary of Findings of the First Day**

Currently available tools are usable to some extent, especially for positioning procedures. Kinematics and biofidelity yet needs to be evaluated, injury criteria/new injury mechanics need to be considered in the future.

ENOP is still ongoing and results will be available by the end of 2024 (a summary is expected during IRCOBI in 09/24).

Injury criteria / process of using HBM is currently stillnot completely solved and need further consideration. On component level, validation might be better than physical dummies. But there is also the need to validate the process/procedure.

Crash tests / simulations are not meaningful with the current dummies and HBM, although positioning might be possible to some extent. Injury mechanisms and criteria need further research as it is done in ENOP.

Proposal of 1/3 of the angle was not touched in detail.

The presentation on the results of physical static testing was introduced. During the first positioning test where the seatback was set to a higher inclination and the cushion stayed in its original position the HIII dummy family was not able to follow the seatback completely. As a result, the contact between the seatback and the upper torso was lost. The THOR dummy was able to follow the seatback some more (about an opening angle of 120°). This is in particular valid for the THOR-RS. The proposed permitted area for the upper anchorage points seem to follow the inclination of the seatback reasonably.

Examples were introduced with a higher seat cushion angle to reduce the opening angle to 110°. Dummy positioning of the HIII family was possible. The upper area for the anchorage point would be slightly above and behind the shoulder. For bigger occupants there might be the need to have some height adjustment of the upper anchorage point. For smaller occupants the new proposed area could even be lowered.

### **7. Enable UN Regulation No. 14 for “Extended Use Positions”**

Based on the findings of the first day, a discussion shall be started. The aim is to identify available means to ensure occupant safety while allowing extended use positions. Current limitations and the link to other relevant UN Regulations should also be considered.

The conclusion will be used for drafting an amendment to the OICA proposal.

Discussion started how the “care points” can be defined and maybe the link between UN Regulation No. 14 and other regulations can be established. During the last session of GRSP some CP raised concerns to amend UN R14 without amending other regulations. A first proposal was introduced during GRSP to connect the regulations via an amendment to the scope. For this proposal it needs to be defined, what information shall be contained in the mentioned report.

First question to the group was, if the new geometry of the permitted areas can be allowed for a normal use position as a first step.

Based on the findings of the first day of the workshop, it was suggested to allow only moderate adjustments to the seatback inclination in a first step.

It was then proposed to add some explanation in the introduction section of UN R14 to define the aim of the provisions. If a manufacturer would then decide to allow extended use positions during driving, this might be done according to schedule 7 of 1958 agreement.

The proposal by Germany to modify the scope of UN R14 was introduced. This was already introduced during the last GRSP session.

OICA proposing to adopt the proposal including an introduction as a first step. Introduction shall point out that the position taken during driving shall not be altered to the normal use position. Second step should be then started to amend also other UN Regulations and include provisions to enable extended use positions also in these regulations. Manufacturer shall then provide a report how the adaption to extended use positions was considered.

A first wording was then introduced by OICA to be added to other regulations. NL expressing some concerns. The wording seems to be not sufficient from their point of view. It might work for some regulations, but for UN R17 as an example there need to be specific requirements for extended use positions.

AT supporting to further specify requirements in the next step.

NL stressing that mutual recognition shall also be achieved by any approval for extended use positions. Hence requirements need to be developed not only by one Technical Service.

NL introducing an alternative wording to amend UN R14. The wording was further modified during the meeting.

Question was raised, how to deal with extended use positions in a rear seat. Currently there is no provision within the crash regulations, meaning they are not considered in this case.

The proposal by OICA was then amended by the proposed wording of the NL and reviewed completely by the experts. Some comments were given and added to the proposal.

## **8. AOB**

No further issue was raised.

## **9. Next steps**

An online meeting will be conducted to finalize the proposal. Meeting is scheduled for 24 April 10-11 CET.

**14:00 End of the Workshop**