

Informal document: **GRSP-58-18**  
(58th GRSP, 8 - 11 December 2015,  
agenda item 3)

# **Introduction to Revision of GTR 7**

## **Formal Document ECE/TRANS/WP.29/GRSP/2015/34**

**December 2015**



# Background

- At its 143<sup>rd</sup> session in November 2007, based upon a proposal from Japan, the World Forum for Harmonization of Vehicle Regulations (WP.29) agreed to provide guidance to GRSP for the development of an amendment to GTR number 7 – Head Restraints.
- They directed that GRSP should consider the following issues:
  - a. The head restraint height of 850 mm;
  - b. The appropriate dynamic test, including the test procedure, injury criteria and the associated corridors for the biofidelic rear impact dummy II (BioRID II).



# Background

- Further advice was given **at the 148<sup>th</sup> session, in June 2009**, based upon proposals from the representative of the United Kingdom of Great Britain and Northern Ireland and of the United States of America.
- **It was agreed that GRSP should address injuries occurring in low speed rear impact crashes** with consideration of injuries in higher speed rear impact crashes being considered in a later step.



# Background

- On this basis GRSP established an Informal Working Group (IWG). In developing this work the informal group considered that the changes were so substantial that a revision of the GTR would be most appropriate.



# Background

November 2009: WP.29/AC.3 agreed a joint proposal from Japan, the United Kingdom and the United States of America to develop an amendment to GTR7 – Head Restraints.

## The Terms of Reference were to consider:

- a. The head restraint height of 850 mm;
- b. The appropriate dynamic test, including the test procedure, injury criteria and associated corridors for the Biofidelic Rear Impact Dummy II (BioRID II).

(low speed rear impact crashes only - injuries in higher speed rear impact crashes to be considered as a further step.)



# Draft GTR 7 Phase 2

- Formal Document number  
ECE/TRANS/WP.29/GRSP/2015/34 represents the progress to date
- **There remain a number of detailed issues to resolve, the most significant being the injury criteria to be used with BioRID UN. Document 2015/34 therefore contains a number of square brackets.**



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- In principle **5 parts** of the GTR have been mainly affected:
  - the **main text of the GTR** and the content of
  - **Annex 1** (Height measurement test procedure)
  - **Annex 4 deleted** (Backset measurement test procedure using the HRMD method)
  - **Annex 5** (Backset measurement test procedure using the R-point method)
  - **Annex 9** (Dynamic performance test procedure)



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## Head Restraint Height

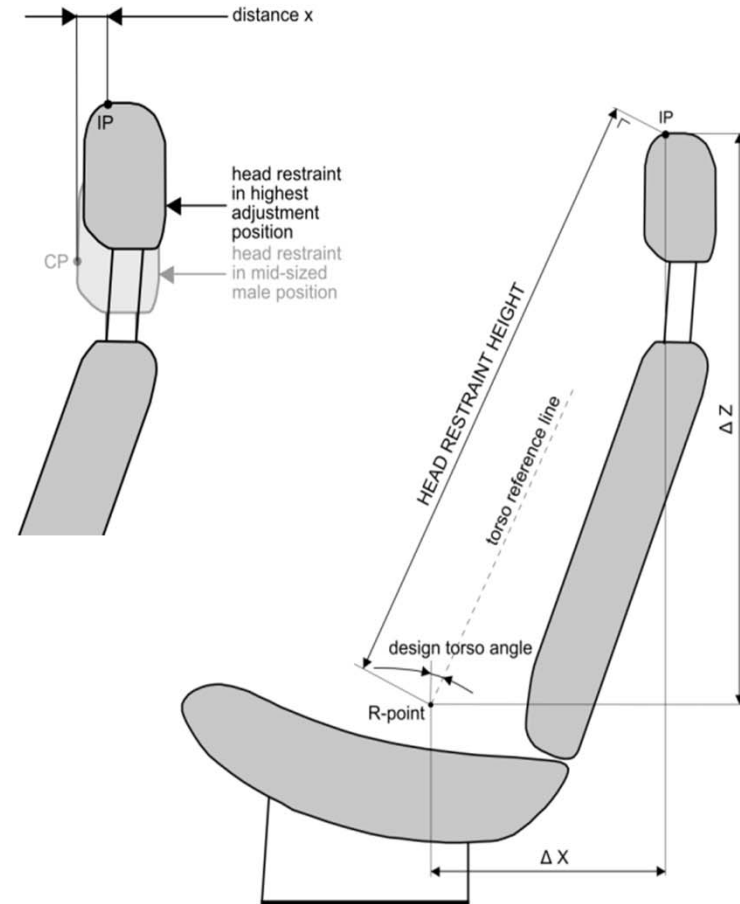
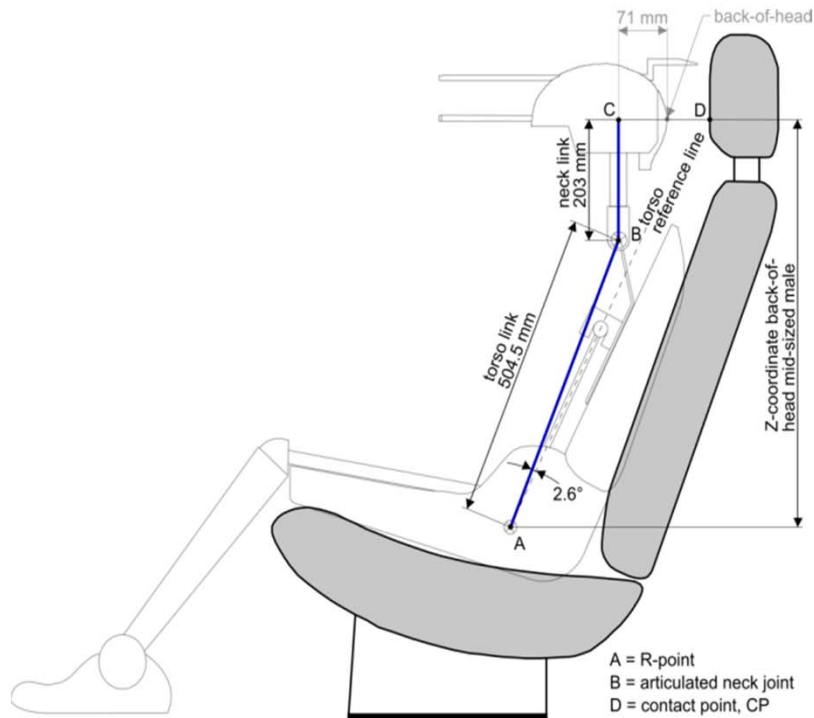
- Changes to the procedure for establishing the height of the head restraint are proposed. These changes ensure that the height is measured at a position where the restraint can be effective upon head contact rather than at its absolute height.
- The procedure is detailed in **Annex 1** but, significantly, **it removes the requirement to use the H-point machine and the HRMD.**





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## Concept of measuring effective HR height (Annex 1)



CP: contact point

IP: intersection point

Distance x: function of design torso angle



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## Head Restraint Height

- This change in procedure has resulted in the value for the head restraint height to be reduced to reflect the lower position of measurement.
- Nevertheless, the question of the maximum height requirement remains open and has previously been returned to GRSP for consideration (see also ECE/TRANS/WP.29/GRSP/2013/17).



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## **Annex 9** (Dynamic performance test procedure)

- Annex 9 contains the proposal for the introduction of BioRID UN. It has been introduced in parallel with the current Hybrid III device but could easily be shown as a single tool of choice if Contracting Parties agree.
- There has been significant effort to address initial concerns about reproducibility of the BioRID tool.
- Both NHTSA and the European Commission funded extensive testing by VRTC in the US and by TRL/BASSt in Germany. The manufacturer has also invested heavily to ensure that the tool is suitable for regulatory tests.



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## Annex 9 (Dynamic performance test procedure)

- The IWG is now content that the tool is as good as or better than the Hybrid III.

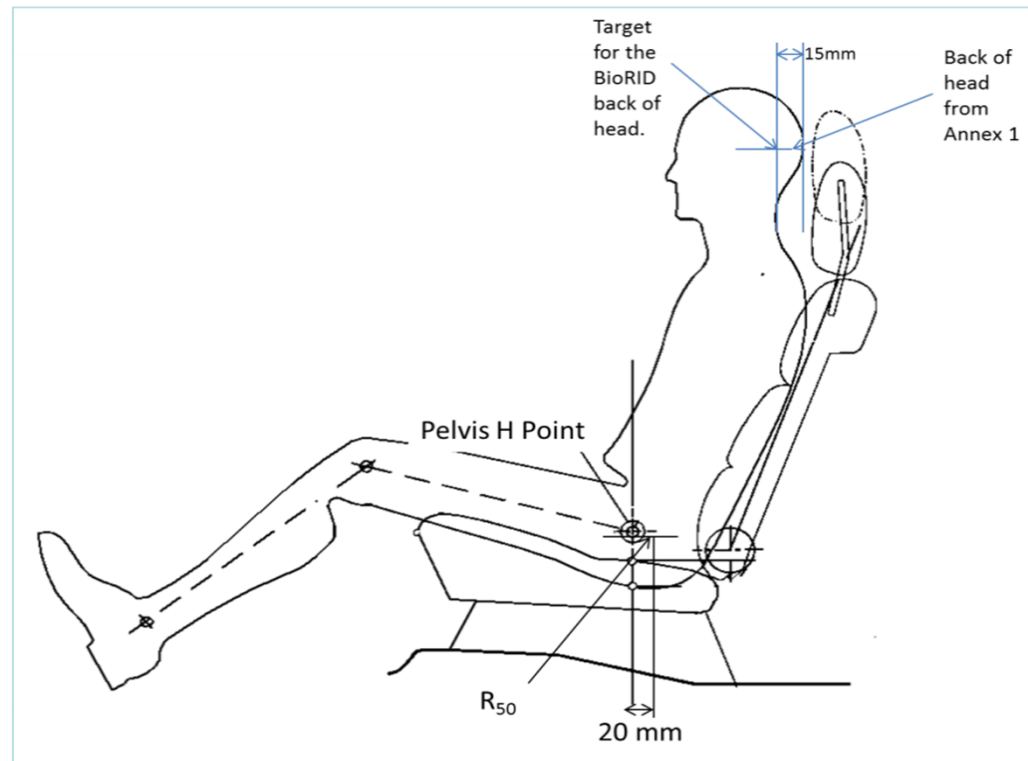




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## Annex 9 (Dynamic performance test procedure)

### Introduction of the „R<sub>50</sub> point“



- Introduction of a new “designated H-point” for mid-size male seating position “R<sub>50</sub>”.
- This data is provided by the manufacturer, allowing the seat to be adjusted to this point.
- Note: static measurement is made in a different seat set-up than for the dynamic test.
- “R<sub>50</sub>” tolerance is checked by the H-point machine. If it lies within the 50 mm box it is this is the designated design point.



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## Annex 9 (Dynamic performance test procedure)

- The IWG recognises limitations in BioRID's use and recommends that it is only used for seats having a torso angle not less than 20° and not greater than 30°.
- The IWG recognises that the design of BioRID is such that its spine can be set to represent a more upright seating position but notes that before it could recommend its use in this setting more evaluation would be required.
- This could be considered for a further amendment to the GTR but, in the meantime, the IWG recommends that, at the manufacturer's request, seats with a torso angle between [15°] and 20° may be tested as if the torso angle is 20°.





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## Injury / Seat Performance Criteria

- The IWG recognised the absence of an absolute medical definition for whiplash associated disorder and had the ambition to develop this understanding as part of its work.
- Innovative cadaver based studies were undertaken by VRTC guided by an extensive work of simulation studies by Japan and this programme of work has been significant in the timeline for the delivery of a proposal.
- However, while the work has helped to evaluate the repeatability and reproducibility of the tool it has not been successful in producing correlation between the tool and the cadaver performance. It has become clear that more cadaver studies are required in order to deliver a sufficiently large statistical sample.





# Draft GTR 7 Phase 2

## Injury / Seat Performance Criteria

- **The IWG believes that it is now necessary to proceed with a more empirical approach and to recommend that the cadaver work be reported in a later amendment.**
- The BioRID tool is already used extensively in consumer information programmes where empirical criteria are in use.
- The IWG is recommending to GRSP that it continues to review this approach and make proposals for injury criteria in a further document that will be delivered to the May 2016 session of GRSP for adoption.





# Draft GTR 7 Phase 2

## Outlook / Recommendation

- In the meantime, the IWG would welcome comments on the content of document ECE/TRANS/WP.29/GRSP/2015/34 so that it may consider them while preparing the final proposal.
- The final proposal will be accompanied by a proposal for an entry in Mutual Resolution 1 that will detail the BioRID UN test tool.
- [A parallel proposal to amend UN ECE Regulation 17 to reflect the new content of GTR7 is under preparation by Japan]

Thank you for your attention!

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