



**RDW**

# **New measuring method for effective head restraint height**

**update of the method as a result of**

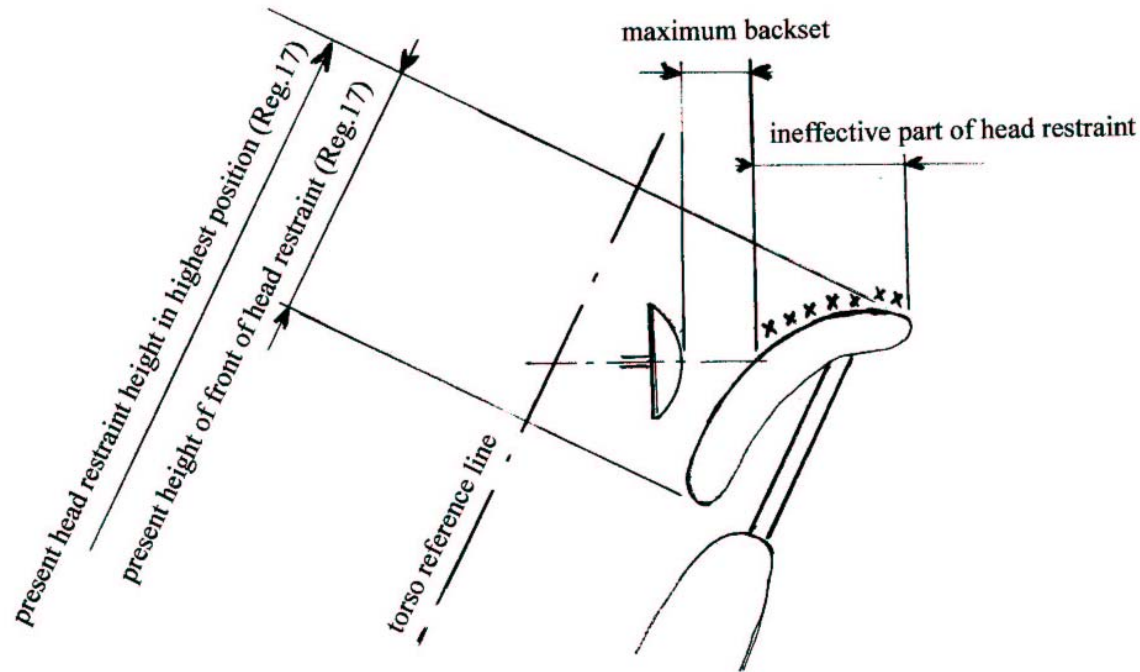
**the IWG on gtr No.7 in Dec. 2011**

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# Concerns expressed in the rationale of gtr No.7



- The measurement of the head restraint height taken as shown above does not address the effective height of the head restraint.
- In the case of extremely contoured head restraints, the height of the surface that the head would contact is less than the measured height.

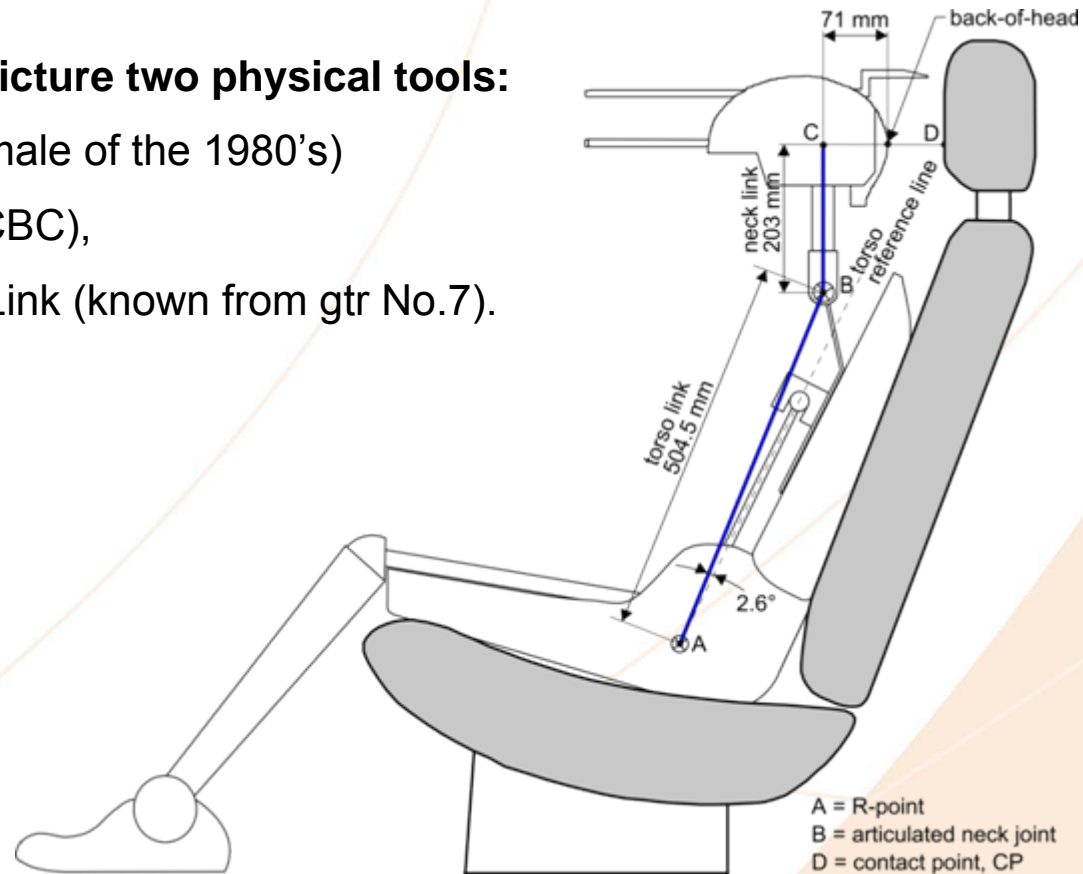


# Physical tools for positioning of back-of-head

**Combined in one picture two physical tools:**

(both for mid-sized male of the 1980's)

- the HRMD (from ICBC),
- the Torso & Neck Link (known from gtr No.7).



# Tools for positioning of back-of-head of people nowadays I

- The TNO study (GTR7-04-03) presented in Berlin made use of the posture from UMTRI-83-53-1 (= the study used to create the HRMD) and combined this with the anthropometric database of CAESAR (**C**ivilian **A**merican and **E**uropean **S**urface **A**nthropometry **R**esource).
- The back-of-head of the 2004 NL large male is found to be 39 mm more rearwards than an mid-sized occupant (HRMD).
- Based on this the Torso & Neck Link is supplemented with an upscaled version as follows:

	Torso & Neck Link, based on HRMD	Torso & Neck Link, based on large male (CAESAR NL 2004)
Torso link	504,5	593
Neck link	203	215
Head-overhang	71	76



# Tools for positioning of back-of-head of people nowadays II

- The original Torso & Neck Link together with the upscaled Torso & Neck Link can be used in goniometric formulas to calculate the difference in back-of-head position between the mid-sized male (HRMD) and the large male.
- This difference (later called “*Distance x*”) depends of the design torso angle and can be expressed also in a table for all relevant angles.
- Doing so, the measuring method for effective head restraint height as presented in Geneva December 2011 does not need tools that are questionable.
- This measuring method comprises the following 5 steps.



# Test procedure for effective head restraint height I

the Torso & Neck Link concept expressed in goniometric formulas

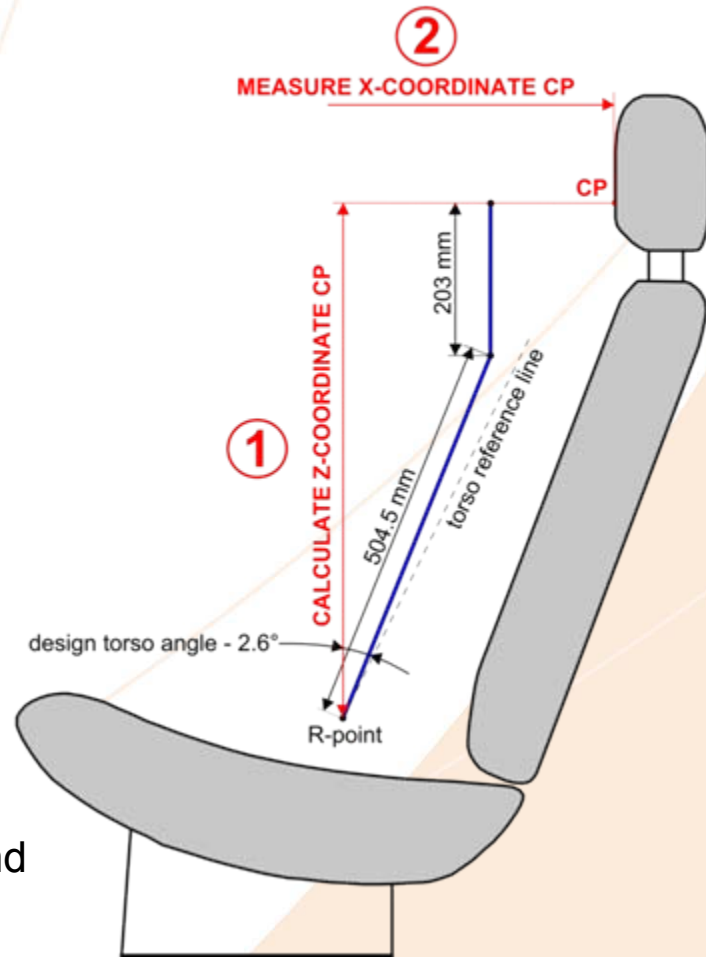
With head restraint set in mid-sized position,  
the measuring of Contact Point CP:

Available are:

- the coordinates of the R-point,
- A design torso angle, and
- dimensions of a mid-sized Torso & Neck Link.

Needed actions:

- 1) calculate Z-coordinate CP =  
 $504.5 * \text{COS}(\text{design torso angle} - 2.6^\circ) + 203$   
(instead of calculation, a table will be provided),
- 2) mark this point on the head restraint surface and  
measure X-coordinate CP.



# Test procedure for effective head restraint height II

the Torso & Neck Link concept expressed in goniometric formulas

With head restraint set in its highest position,  
the measuring of Intersection Point IP:

Available are:

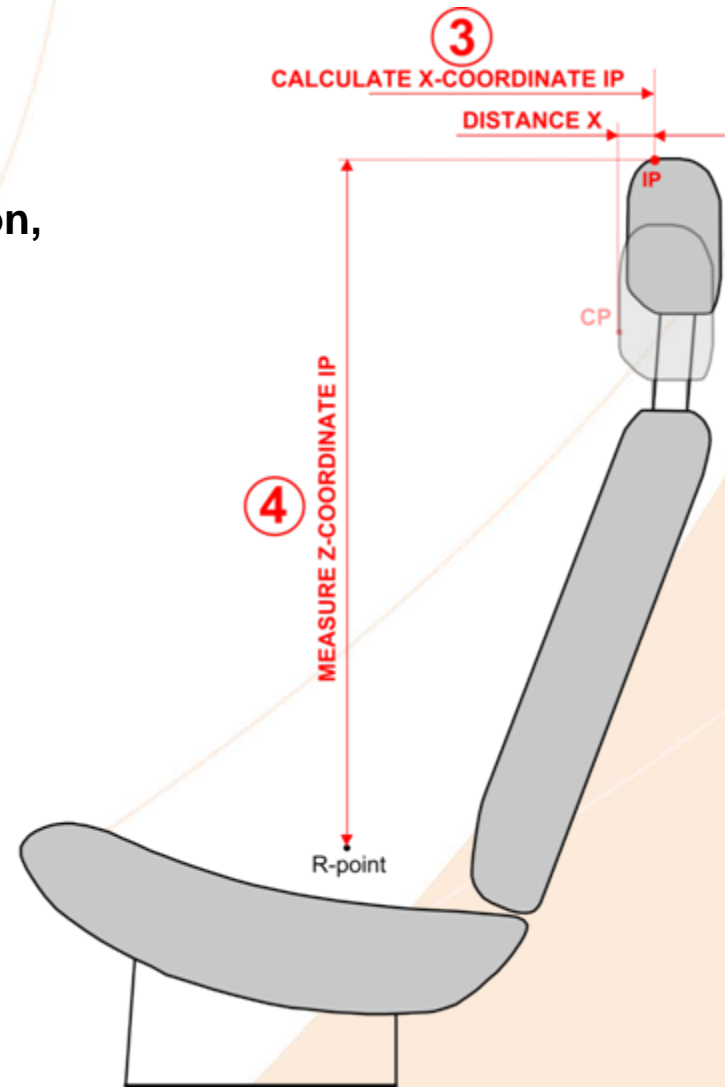
➤ The table providing also “distance X”

Needed actions:

**3)** calculate X-coordinate IP =

Measured X-coordinate CP + “distance x”,

**4)** mark this point on the HR and measure Z-coordinate IP.





# Test procedure for effective head restraint height

## III

the Torso & Neck Link concept expressed in goniometric formulas

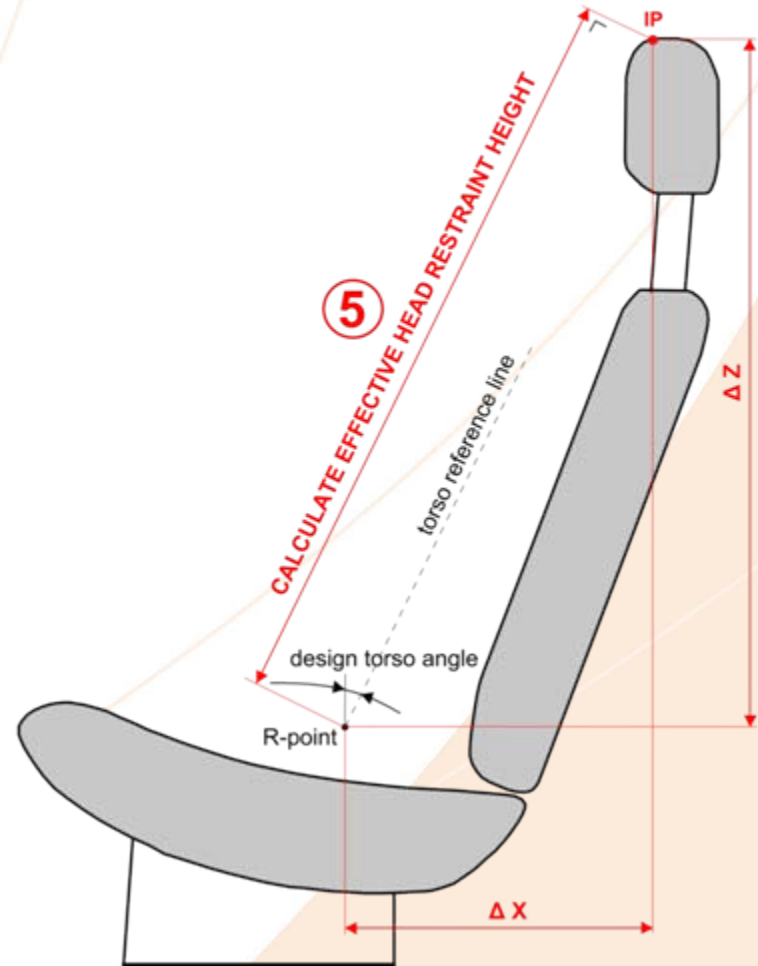
**Calculation highest effective head restraint height:**

Needed final action:

5) Calculate HR height =

$\Delta X * \text{SIN}(\text{design torso angle}) +$

$\Delta Z * \text{COS}(\text{design torso angle})$



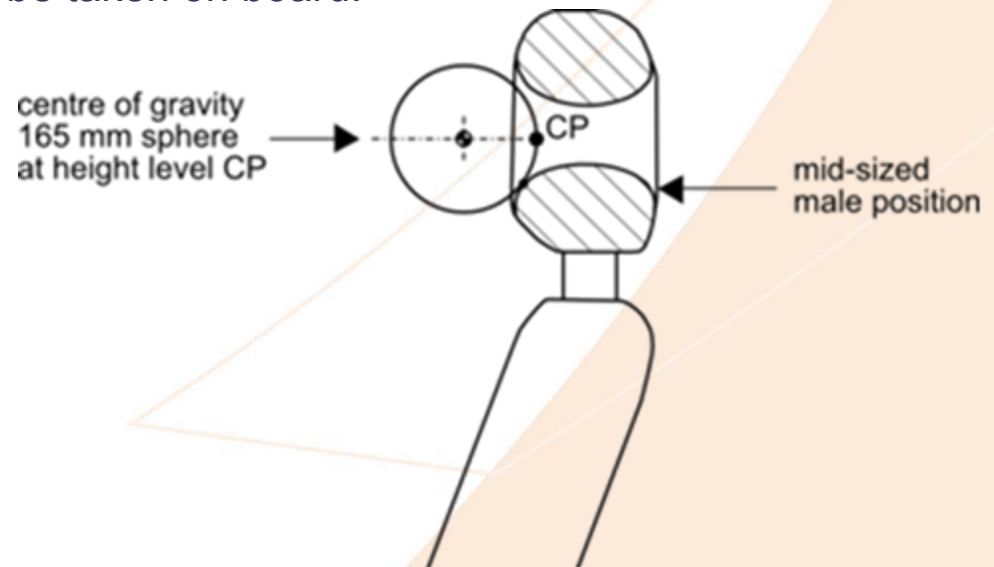
# Update of method since previous meeting in Dec. 2011

I

**Question:** how to do the measurement in case of gaps in the head restraint?

**Answer:** already in the task force this item has been discussed and in its report (May, 11th 2011) one alinea including a figure was dedicated to a solution. If this gap case is thought to give problems this solution can be taken on board.

To solve this item a figure (as given hereby) and an accompanying tekst have been introduced in Annex 1 and will be shown this London meeting  
(see resp. figure 1-5 and last alinea of paragraph 2.3.1.)



# Update of method since previous meeting in Dec. 2011

## II

**Question:** why do you fully prescribe a paragraph 2.1. “Relationship between the H-point and the R-point”, in fact the same tekst is already given in Annex 5, paragraph 2.2.

**Answer:** (after a short discusion) as more people support this question a further simplification can be done by making a clear reference to the relevant paragraph in Annex 5.

In the meantime this has been done and will be shown this London meeting.

Finally some editorial remarks have been forwarded which have been taken on board too.



**Thank you for your attendance**

