



Head restraints: GTR 7 ph2

Static backset measurement

GTR7-10-XX

June, 18th 2012

- In the actual GTR 7, the static backset is measured using HRMD in combination with HPM
 - original HPM based on specification on SAE J826 and developed to measure H-points (seat adjustment and dummy positioning)
 - HRMD headform tool developed by ICBC to measure the backset

- In the previous IG meetings: R&R problem when using these tools to measure the static backset

- A solution has to be found to solve this problem in GTR7.

HRMD – Head Restraint Measuring Device

HPM – Hip Point Manikin based on SAE J826

ICBC - The Insurance Corporation of British Columbia , Canada

- Define more accurate tolerances on the actual tools
 - in previous meetings, seemed to be a difficult and long term solution

- Define another method to measure the static backset without using neither HPM nor HRMD.
 - first proposal would be to use CAD data for static backset measurement
 - another practical proposal is developed in the next slides
 - alternatively a combination of this practical proposal and CAD data could be defined

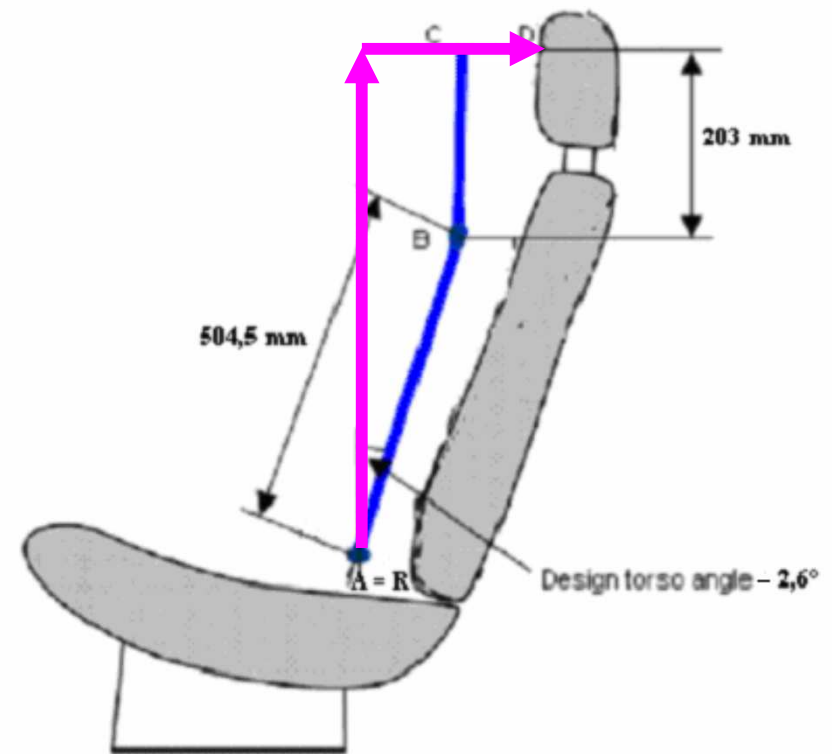
Torso
angle

$X_{\text{back of head_mid size male}}$

Z_{CP}

25	263	669	302	39
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HEAD POSITION TABLE Location of the back-of-head of two designated males in automotive posture with respect to the R-point at several design torso angles, and their in-between "distance x"				
Design torso angle	X-coordinate of back-of-head calculated for the mid-sized male	Z-coordinate of back-of-head calculated for the mid-sized male	X-coordinate of back-of-head calculated for large male ²	"Distance x": distance between X-coordinates of back-of-head of both males
	$504.5 * \sin(\text{design torso angle} - 2.6) + 71$	$504.5 * \cos(\text{design torso angle} - 2.6) + 203$	$593 * \sin(\text{design torso angle} - 2.6) + 76$	
5	92	707	101	9
6	101	707	111	10
7	110	706	121	12
8	118	705	132	13
9	127	704	142	15
10	136	703	152	16
11	145	702	163	18
12	153	701	173	19
13	162	699	183	21
14	171	698	193	22
15	179	696	203	24
16	188	694	213	26
17	196	692	223	27
18	205	689	233	29
19	213	687	243	30
20	222	684	253	31
21	230	682	263	33
22	239	679	273	34
23	247	676	283	36
24	255	673	292	37
25	263	669	302	39
26	271	666	312	40
27	279	662	321	42
28	287	659	330	43
29	295	655	340	44
30	303	651	349	46



Annex 5 – GTR7 ph1 - current text

BACKSET MEASUREMENT TEST PROCEDURE USING THE R-POINT METHOD

2.3. Adjust the seat back to its design angle.

2.4. Adjust the front head restraint so that its top is at any height between and inclusive of 750 mm and 800 mm.

If the lowest position of adjustment is above 800mm, adjust the head restraint to that lowest position of adjustment.

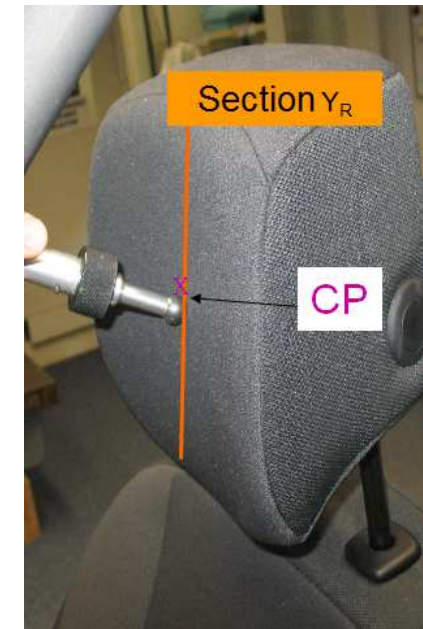
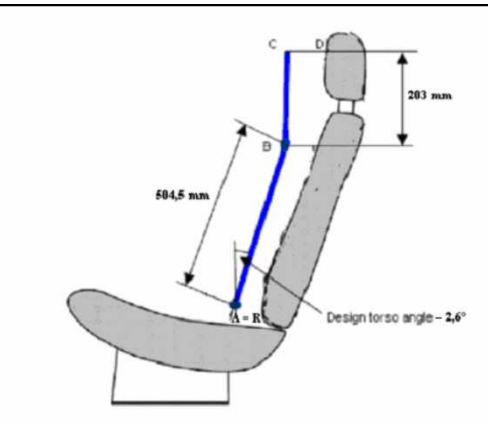
2.5. In the case of head restraint with adjustable backset, adjust the head restraint at the most rearward position, such that the backset is in the maximum position.

2.6. Establish point D on the head restraint, point D being the intersection of a line drawn from point C horizontally in the x-direction, with the front surface of the head restraint.

2.7. Measure the distance CD. The backset is the measured distance CD minus 71 mm.

Determine CP point with 3D arm:

- $Z_{CP} = Z_{CP1} = Z_{CP2} = f(\text{torso angle})$
provided in a table
- In order to define X_{CP} & Y_{CP}
 - 1/ define section at Y_R
 - 2/ determine intersection between Y_R & horizontal plane at Z_{CP}



1/ Head-restraint set in lowest backset position

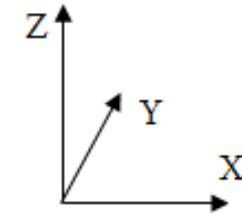
$$\text{Backset CP1} = X_{CP1} - X_{\text{mid-sized male}}$$

2/ Adjust the HR up to the highest backset position

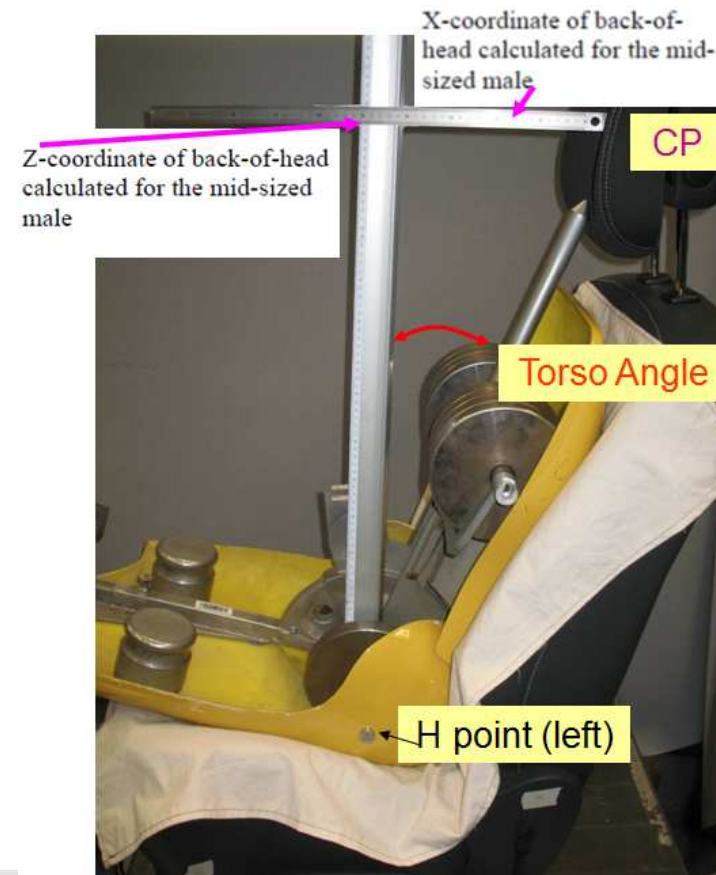
$$\text{Backset CP2} = X_{CP2} - X_{\text{mid-sized male}}$$

The shape of the contact part will have to be defined.

1/ measure H point with 3D arm
(e.g. Romer or Faro)

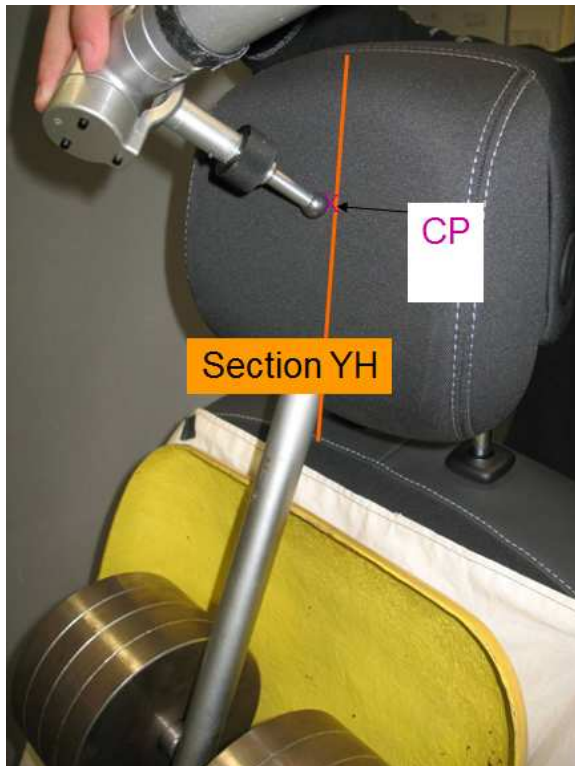


2/ measure CP point (X, Z) of
mid-sized male at Y_H section



Determine CP point with 3D arm:

- $Z_{CP} = Z_{CP1} = Z_{CP2} = f(\text{torso angle})$ provided in a table
- In order to define X_{CP} & Y_{CP}
 - 1/ define section at Y_H
 - 2/ determine intersection between Y_H & horizontal plane at Z_{CP}



1/ Head-restraint set in lowest backset position

$$\text{Backset CP1} = X_{CP1} - X_{\text{mid-sized male}}$$

2/ Adjust the HR up to the highest backset position

$$\text{Backset CP2} = X_{CP2} - X_{\text{mid-sized male}}$$

Torso angle

$X_{\text{back of head_mid size male}}$

Z_{CP}

25	263	669	302	39
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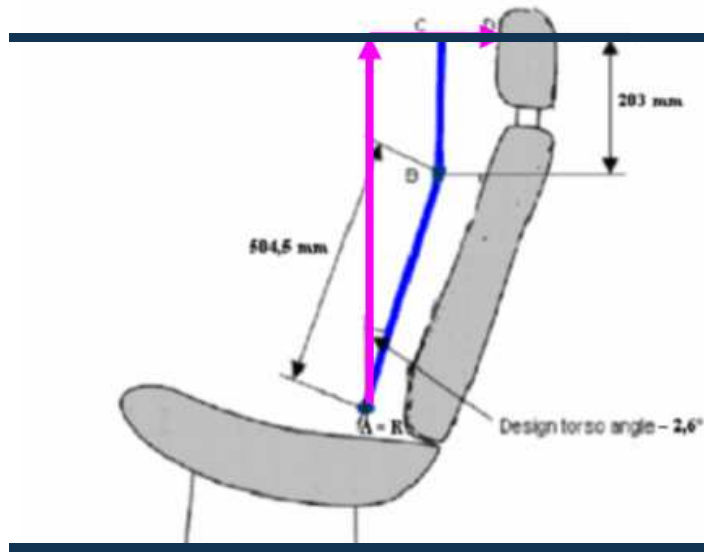
- A proposal in order to solve a R&R matter for static backset measurement in GTR7

- A practical method to measure the static backset
 - same approach as the new method for head restraint height
 - using the R point (without HRMD, without HPM) or the H point (without HRMD, with HPM)

- Alternatively a combination of this practical proposal and CAD data could be defined

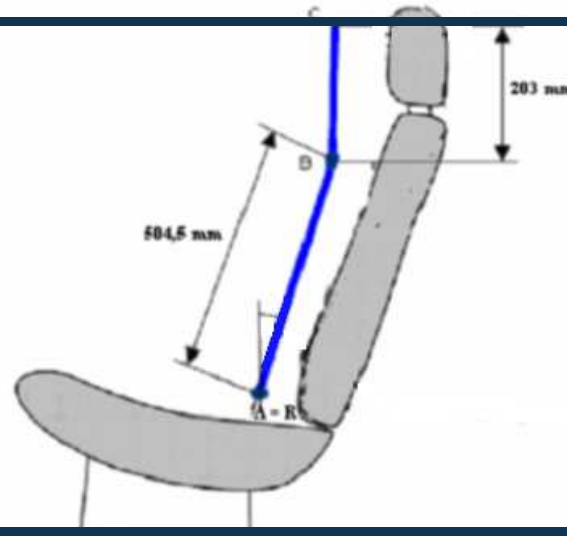
Thanks for your attention.

Contact point = CP



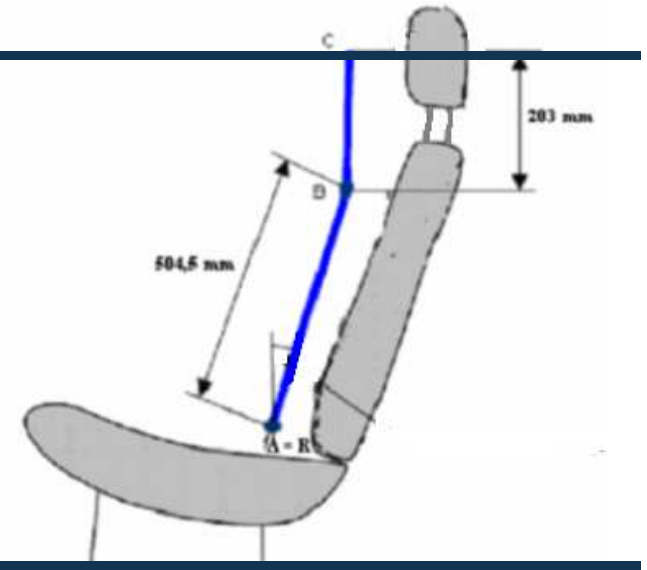
HR in the position intended for use by the mid-sized male as specified by the manufacturer.

Contact point = CP1



HR in lowest backset position

Contact point = CP2



HR in highest backset position