GTR7-06-11

GTR head restraints
height of head restraints
discussion of new measuremt method

Task force OICA, RDW, BaSt
Peter Horn, Mercedes-Benz
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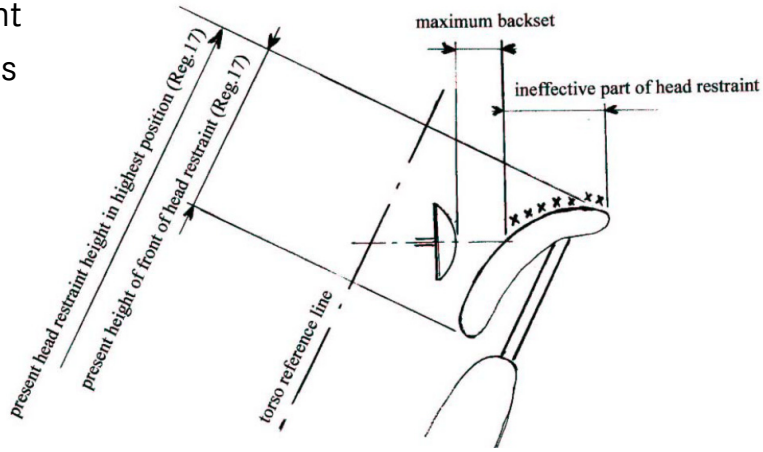
Background

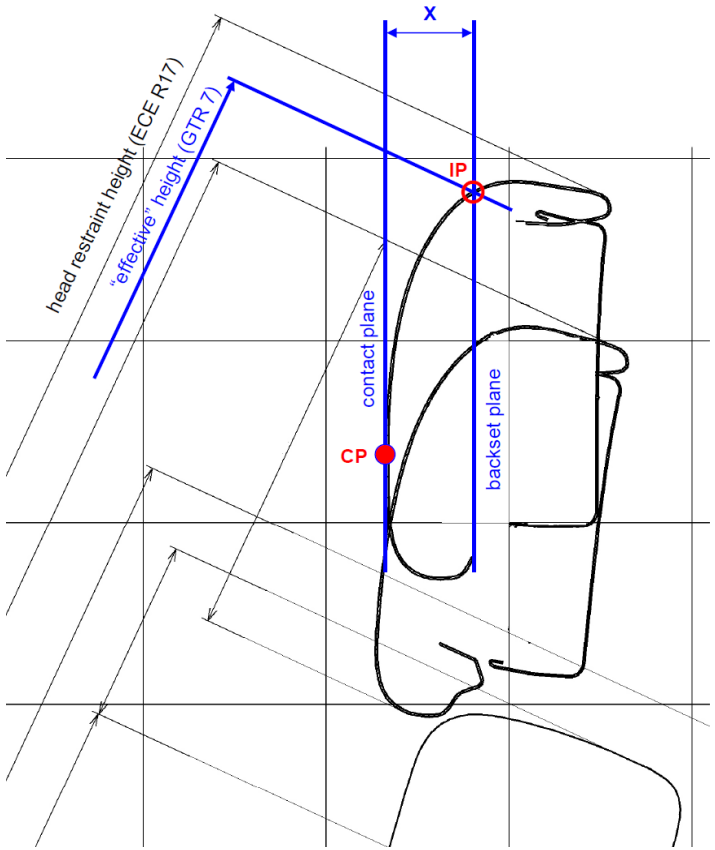
- The Netherlands proposed a new head restraint height measuring method for GTR 7, which includes backset measurements for different occupant sizes
- In a task force with the Netherlands, BaSt and OICA possible solutions were discussed
- For the definition of the backset for different occupant sizes, a correlation between backset and occupant size was investigated, to adjust the HRMD-head
- According to an OICA data collection no clear correlation between head position and occupant size was found
- A new, more simple measuring method was developed and discussed, with regard to:
  - backset for midsize (50%) and larger (95%) occupants
  - prevention of head restraint designs with „ineffective“ height
  - prevention of overlapping / intersection with child restraints on rear seats

example of criticized
“ineffective” head restraint design



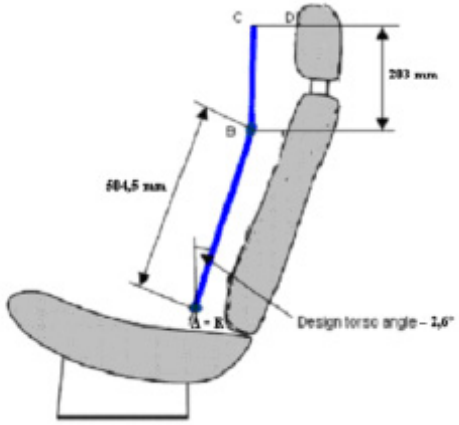
Proposal for height measuring method

- “contact plane”: take a perpendicular plane and move it in X-direction till it first contacts the front surface of the head restraint (contact point “CP”)
- “backset plane”: take a perpendicular plane, parallel to the first contact plane with a distance of X (to be defined) in a horizontal rearward direction
- determine the upper intersection of the backset plane with the head restraint front surface contour (intersection point IP)
- measure the effective head restraint height as distance to the R-point, parallel to the torso line and limited by a line perpendicular to the torso line which is intersecting the intersection point IP



Backset for taller occupants

- define “distance X” of two perpendicular planes as backset for taller occupants by:
  - defining contact point CP as contact point of HRMD head (includes static backset criteria of current GTR 7)
  - defining distance X as backset difference between 50% and 95% male, based on backset measuring apparatus for 50% (GTR 7, annex 5) and upscaled 95% apparatus
  - according to the definition of the backset measuring apparatus, the backset is depending on the torso angle
  - variable value / limit for distance X in dependance of design torso angle



backset measuring apparatus
(GTR 7, annex 5)

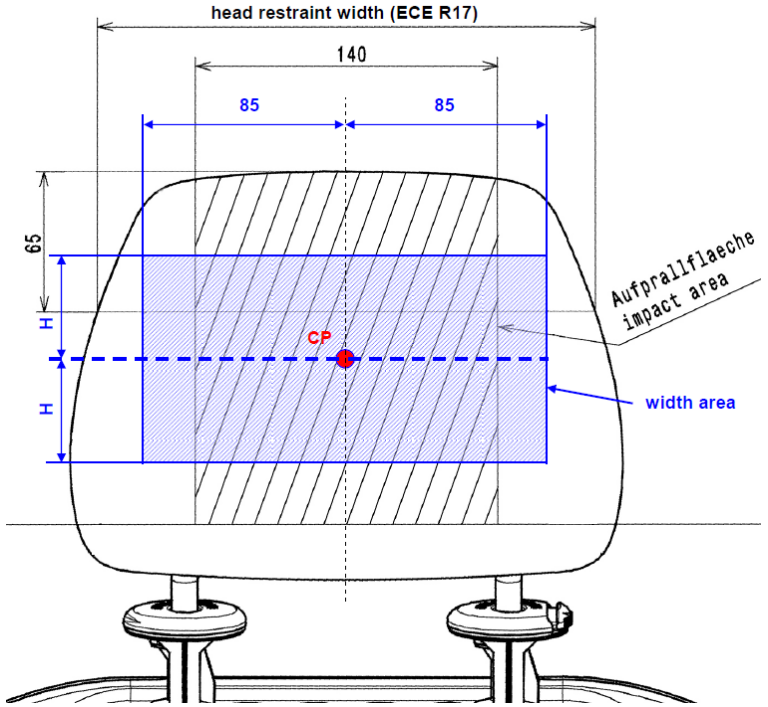
- definition of „distance X“ in GTR 7 by formulas or by a table (distance X in dependance of torso angle):
  - X position of 50% head: $X-coordinate = 504.5 * \left|SIN\ (torso\ design\ angle - 2.6°)\right| + 71$
  - X position of 95% head: $X-coordinate = 593 * \left|SIN\ (torso\ design\ angle - 2.6°)\right| + 76$

torso angle [°]	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
backset 50% [mm]	222	230	239	247	255	263	271	279	287	295	303
backset 95% [mm]	253	263	273	283	292	302	312	321	330	340	349
distance X [mm]*	**31**	**33**	**34**	**36**	**37**	**39**	**40**	**42**	**43**	**44**	**46**

* values to be discussed

Proposal head restraint width

- Proposal from the Netherlands to change the definition of the head restraint width:
  - width is currently defined at on single height (65 mm below the top of the head restraint)
  - new definition to prevent ineffective designs (e.g. head restraint in form of a small cross beam)
- Proposed definition for width:
  - take 50% HRMD contact point (CP) as basis
  - meet the width requirement (±85 mm) in a specified area (measure H, to be defined) above and below point CP



Head restraints - child restraints

- From the informal group on child restraints (ECE R44) there are known problems with the interference of child restraints and (rear) head restraints:
  - interference with child restraint fixtures (CRFs) from ECE R16
  - interference with child‘s head for taller children on booster seats (boosters with/without backrest)
- Prevention of interference with child restaints in head restraint GTR by:
  - defining contact point (CP) as HRMD contact point for front seats (this includes backset criteria)
  - defining contact point (CP) as first contact point for rear seats (this excludes the backset criteria for rear seats)

Further proceeding

- Investigation of proposed measuring methods
  - find out consequences for different head restraint designs (OICA)
  - find out consequences on head restraint height and width as basis for value / limit discussion (OICA)
- Further development and improvement of proposal (in another task force meeting, May 2011)
  - development / improvement of method based on investigations
  - first discussions on possible minimum limits for head restraint height and width
- Discussion and decisions in next informal working group meeting (GTR 7):
  - discussion of necessity of new measuring methods (height and width)
  - discussion of necessity of higher head restraints (based on accident data, ...)
  - decision for possible new minimum head restraint height value (to keep in mind: new method will lead to other head restraint height values, which can not be compared with current values of 800 mm / 850 mm)