

Improvement in the checking apparatuses for measuring backset of a head restraint using H point method.

Introduction :

Global technical regulation (GTR) 7 has been prepared by UNECE to address the concerns of whiplash injuries in slow speed rear impacts. The GTR has identified backset as one of the important parameters to assess the effectiveness of the head restraints for controlling the whiplash related injuries.

“Backset” is defined as the horizontal distance between the head & front surface of the head restraint.

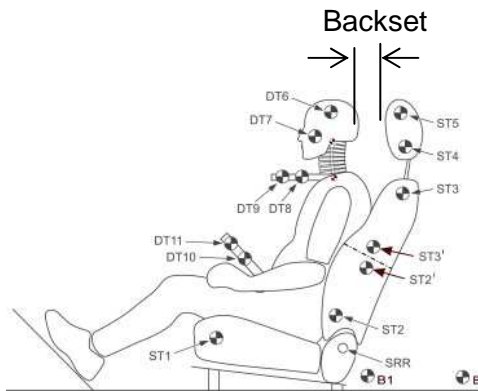


Fig 1

The backset can be measured either by H point method or R point method.

This article is focused on the backset measurement using H point method.

Backset measurement by H point method involves use of a head restraint

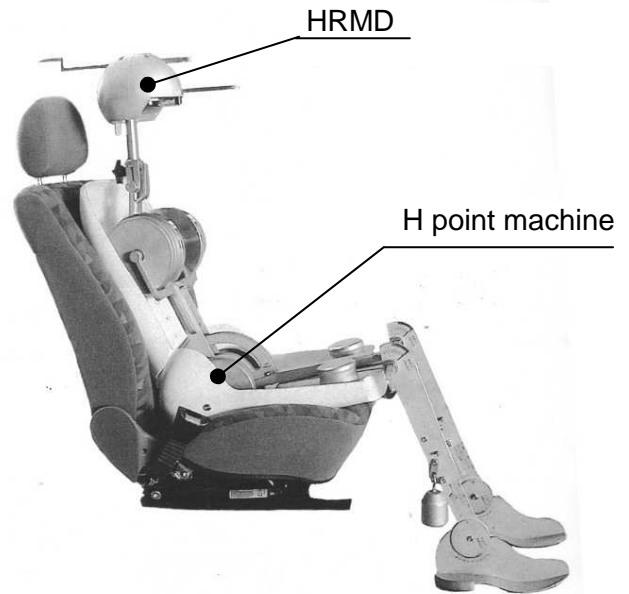


Fig 1 – HRMD installed on an H point machine

measurement device (HRMD) installed on a standards H point machine. (Refer fig 1).

However during these measurements following difficulties are experienced -

- while installing the HRMD on an H point machine, certain changes are required to be carried out on the H point machine assembly. These changes are time consuming & results in the loss of accuracy.

- When an H point machine with HRMD is installed on seats in a vehicle, the backset scale in HRMD is difficult to observe due to surrounding vehicle structure.

The article discusses changes made to the H point machine & HRMD to improve the backset measurement.

Installation of HRMD

In order to install HRMD, the H point machine requires following changes –

- removal of head room probe. The head room probe is attached to the H point machine through pivot pin at the hip sector. After removal, washers of adequate thickness need to be inserted, in the place of the head room probe lower part, to maintain the assembly dimension of

the pivot pin.

- removal of 4 nos of torso weights. 4 torso weights of the H point machine are replaced by 2 nos of heavier torso weights supplied with the HRMD.

With these changes the H point machine is now ready for installation of the HRMD.

The HRMD is then installed with the specified supports at the back pan & torso hanger brackets.

These changes are illustrated in the fig 2 & 3 below.

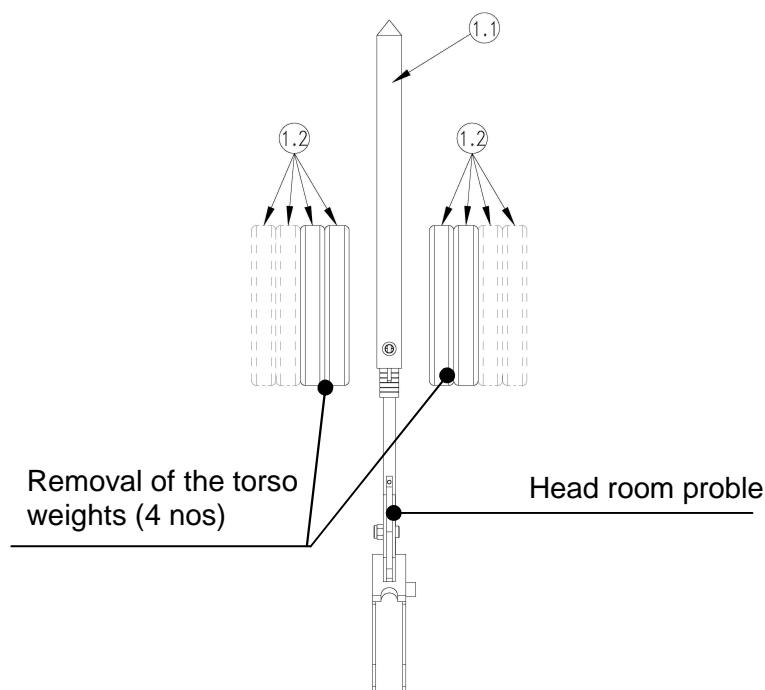


Fig 02

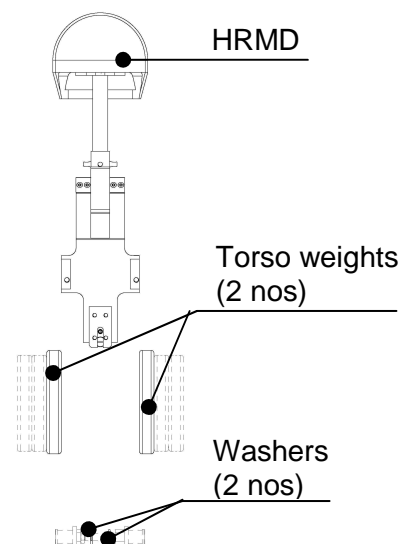


Fig 3

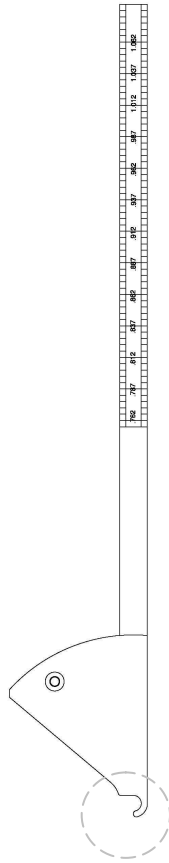


Fig 4

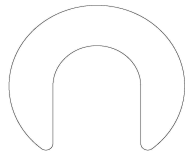


Fig 5

Difficulties in removal of head room probe

The pivot pin at the hip sector assembles the head room probe, the lower end of the torso hanger brackets & hip sector. Therefore in order to remove the head room probe, the complete pivot pin assembly

needs to be disturbed. The head room probe lower end is replaced by washers of equal thickness & the pivot pin assembly is repeated. This exercise is quite time consuming & cumbersome. Also frequent assembly & disassembly of the hip pivot pin reduces the assembly accuracies.

Modifications to the H point machine

The head room probe of the H point machine was modified to suit easy assembly & disassembly of the pivot pin. The mounting holes provided at the lower end of the head room probe were changed to a slot. (see Fig 4). Similarly the replacement washers were also provided with slots. (see fig 5).

With these changes installation of the HRMD was simplified as follows -

Simplified installation sequence of HRMD

- set the H point machine,
- loosen the pivot pin at the hip pivot,
- remove the head room probe by rotating it forward till it is dislodged from the hip pivot pin,
- insert slotted washers on the hip pivot pin in the place of the lower end of the head room probe,
- Tighten the hip pivot pin,
- Insert torso weights,
- Install HRMD

The h point machine is now ready for measurement of the backset & height of the head restraint.

Deinstallation of the HRMD

The simplified deinstallation procedure of the HRMD is –

- Remove HRMD,
- Remove the torso weights,
- Loosen the hip pivot pin,
- Remove the slotted washers from the hip pivot pin,
- Insert the head room probe on the hip pivot pin by tilting it adequately to engage the slot with the pivot pin,
- Tighten the hip pivot pin,
- Install the torso weights

The H point machine is now ready for H point measurements.

Difficulty in observing the backset reading

Refer fig 6 which shows the H point machine, with HRMD, installed on a front seat of a vehicle. Due to vehicle structural obstructions, such as structural pillars, it is not convenient to observe the backset reading on the scale provided on the HRMD since it is located behind the headform.

Therefore the scale was relocated to the front side of the headform such that the reading can be read conveniently from front of the HRMD. See fig 7 for details.

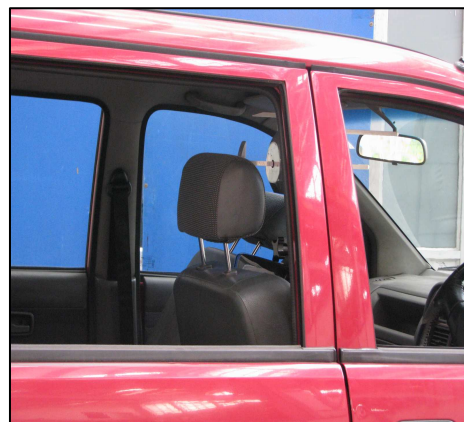
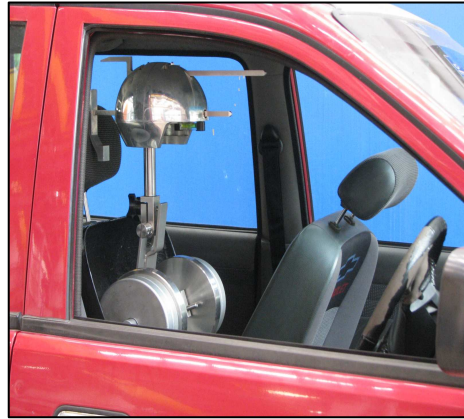


Fig 6

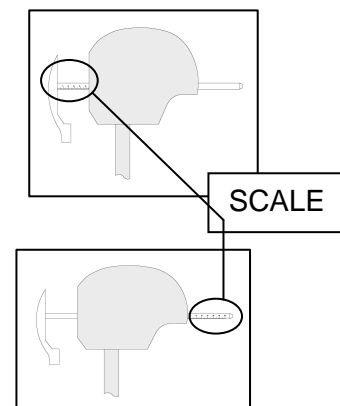


Fig 7

Further the scale has been provided on both faces of the sliding probe to suit its viewing while inspecting LH or RH seats.

Modification to the HRMD probe for measurement of height for a head restraint

The HRMD has been provided with an additional probe to measure the height of the top edge of the head restraint in relation to the top of the HRMD head.

With the current probe, the inspector has to measure the height by scale or tape manually. Such manual measurement is erroneous as

- it can not ensure the perpendicularity of the measuring scale with the probe,
- the visual parallax can vary the reading.



Therefore the height probe is revised such that a standard height cage can be placed on it to measure the required height. This will improve the accuracy of the measurement.

