Proposal on the requirements for the determination of the ocular points when the driver seat has fixed seat-back angle or when the design torso line cannot be set at 25°
Introduction

• This short presentation is aimed at describing the calculation process of the variation in height of the driver’s ocular points OD and OE for a seat back angle ranging from 5° to 40°.

• Driver’s ocular points OD and OE have been defined in Directive 71/127/EEC and UNECE Regulation No 46 taking into account a design seat back angle of 25°.

• Simplified corrections are proposed in accordance with the method used to check the rearward field of vision.

• Vertical coordinate corrections should be introduced in new Annex 11 to UNECE regulation No. 46.

Ref: Bosch Memento de technologie automobile
50th Percentile Male Hybrid III test Dummy

- Body dimensions have to be obtained from dummy manufacturer
- Length of the torso from the H point to the shoulder (start of neck).
- \[ Z_2 = J + I - C = 200.7 + 337.8 - 86.4 = 452.1 \text{mm} \]

**TEST PARAMETER DESIGNATION in mm**
- H-Point Height (Ref) (C) 86.4 ± 2.5
- Shoulder to Elbow Length (I) 337.8 ± 7.6
- Elbow Rest Height (J) 200.7 ± 10.2

NOTE: FIGURE IS REFERENCED TO THE ERECT SEATED POSITION.
Calculation procedure

From trigonometry
\[ \cos 25^\circ = \frac{Z_3}{Z_2}, \]
- \( Z_2 = 452.1 \text{mm} \) is found from the user’s manual for the 50\(^{th}\) male hybrid III test dummy so \( Z_3 = 409.74 \text{mm} \) for \( Z_0 = 635 \text{mm} \)
- It is assume that the head is 90\(^\circ\) vertical to the X axle
- Then \( Z_1 = Z_0 - Z_3 = 635 - 409.74 = 225.26 \text{mm} \)
- The equation which links the seat back angle with the height variation \( \Delta Z \):
  \[ \Delta Z = 225.26 + 452.1 \cos \theta \]
  \[ \Delta Z = 225.26 + 452.1 \cos \frac{635}{635} \]
  Where \( \theta \) is the variable
Results

• θ values: 5° to 40° step of 1°, in ΔZ = 225.26 + 452.1 cos θ - 635
• The table on the right hand site shows the vertical coordinates correction ΔZ (in mm) from 5° to 40° seat angle
• The graph below demonstrates the variation of ΔZ against degrees
Comparison with previous proposal

- The point of reference of the previous proposed correction for $\Delta Z$ is unclear and all $\Delta Z$’s are negative which is unrealistic if we consider the starting reference point is at 25°.
- The current proposal is presenting a realistic movement of the seat from 5° to 40° with a positive and negative variation.