

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°

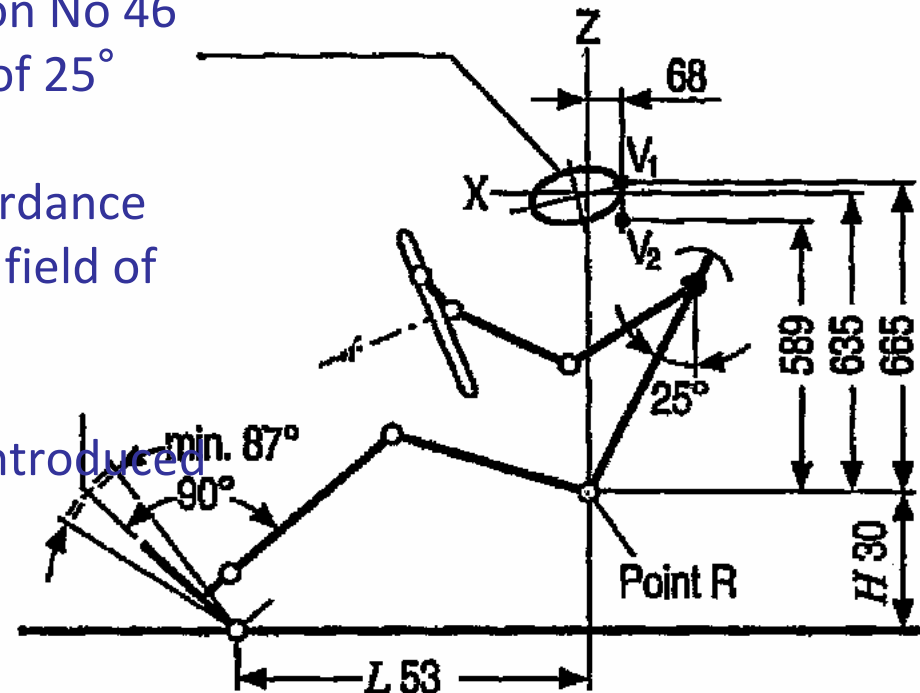


European Commission
Enterprise and Industry



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



50th Percentile Male Hybrid III test Dummy

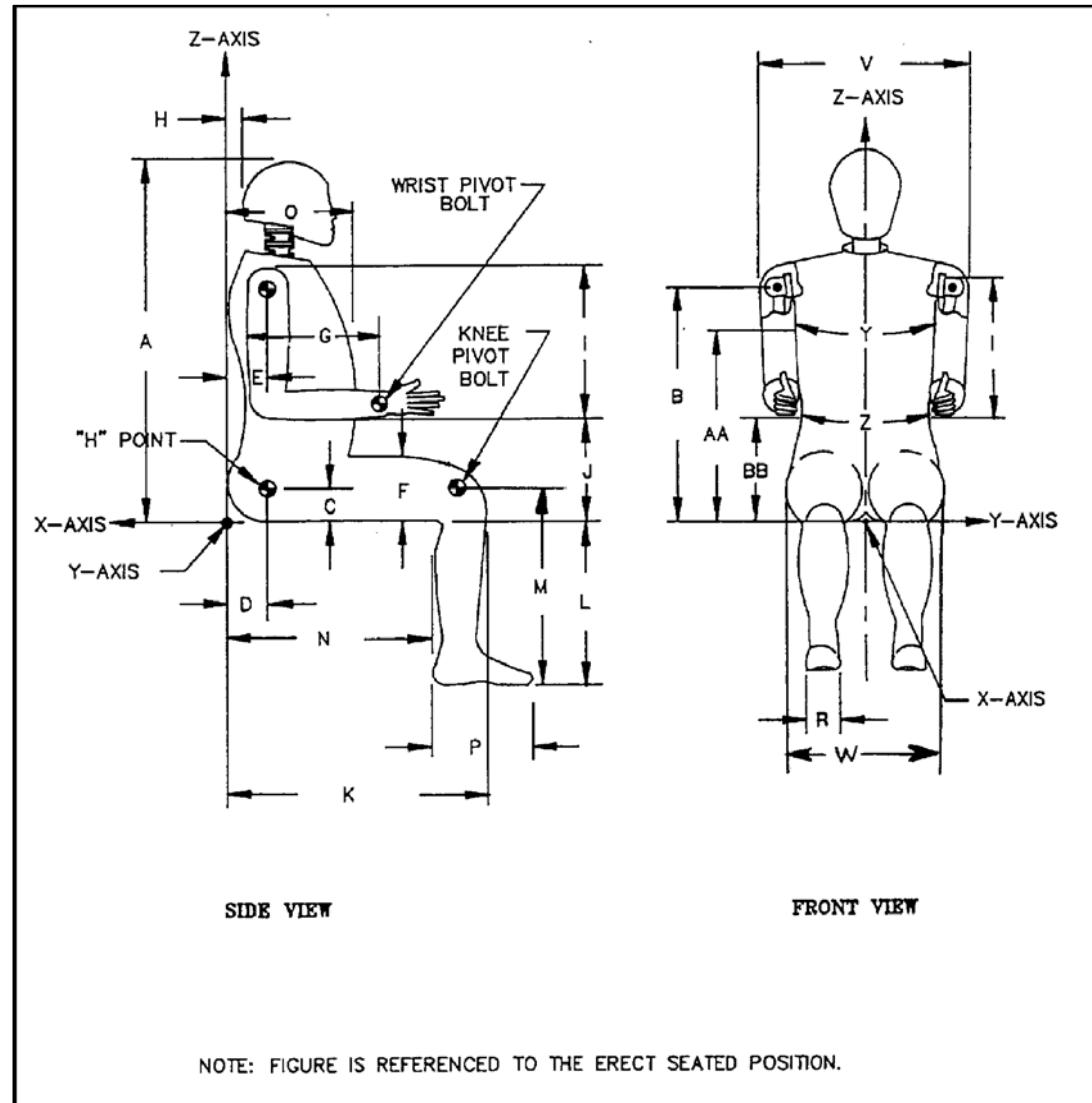
- Body dimensions have to be obtained from dummy manufacturer
- Length of the torso from the H point to the shoulder (start of neck).
- $Z_2 = J + I - C = 200.7 + 337.8 - 86.4 = 452.1\text{mm}$

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



Calculation procedure

From *trigonometry*

$$\cos 25^\circ = Z_3 / Z_2,$$

- $Z_2 = 452.1\text{mm}$ is found from the user's manual for the 50th male hybrid III test dummy so $Z_3 = 409.74\text{mm}$ for $Z_0 = 635\text{mm}$

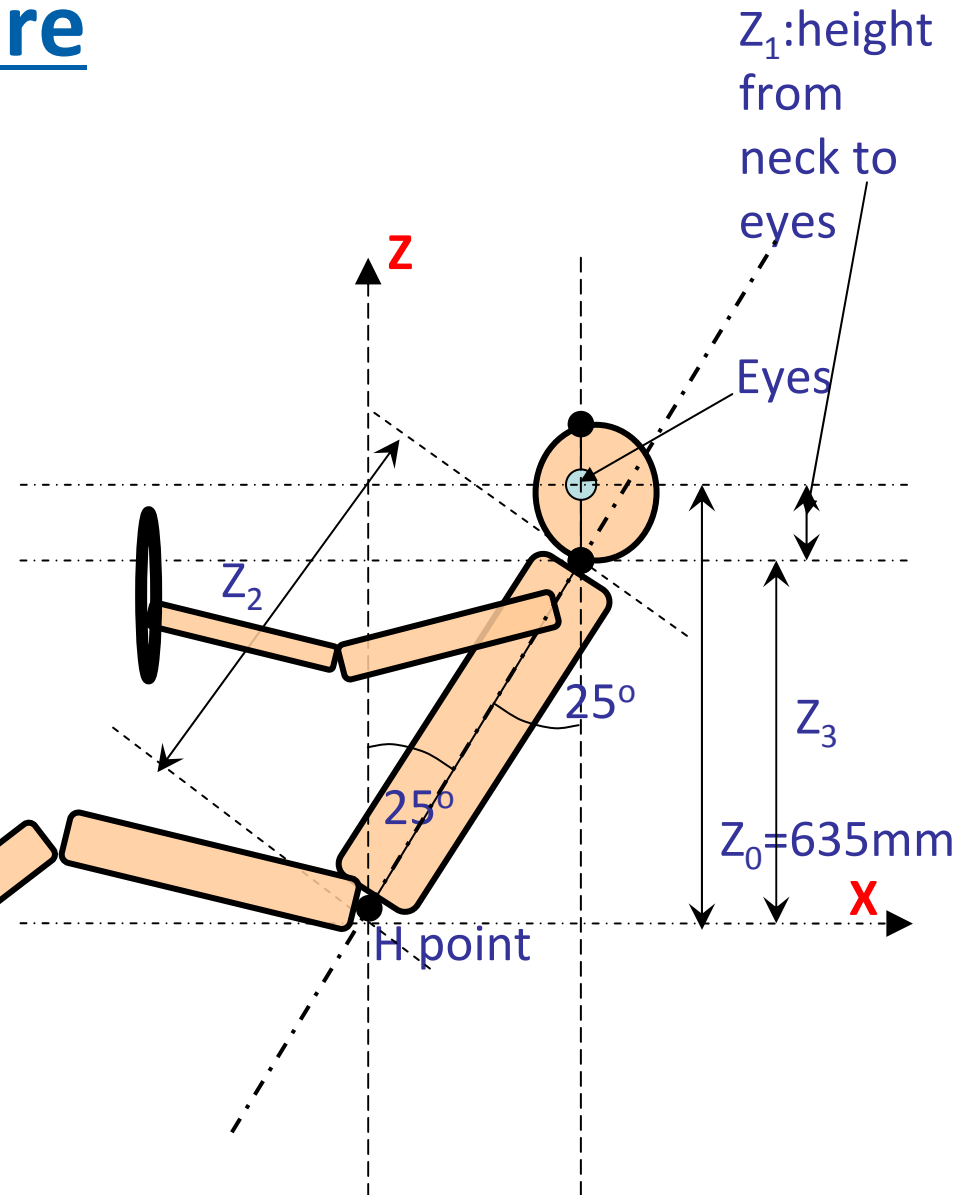
- It is assumed that the head is 90° vertical to the X axis

- 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 ΔZ

- $\Delta Z = 225.26 + 452.1 \cos \theta - 635$

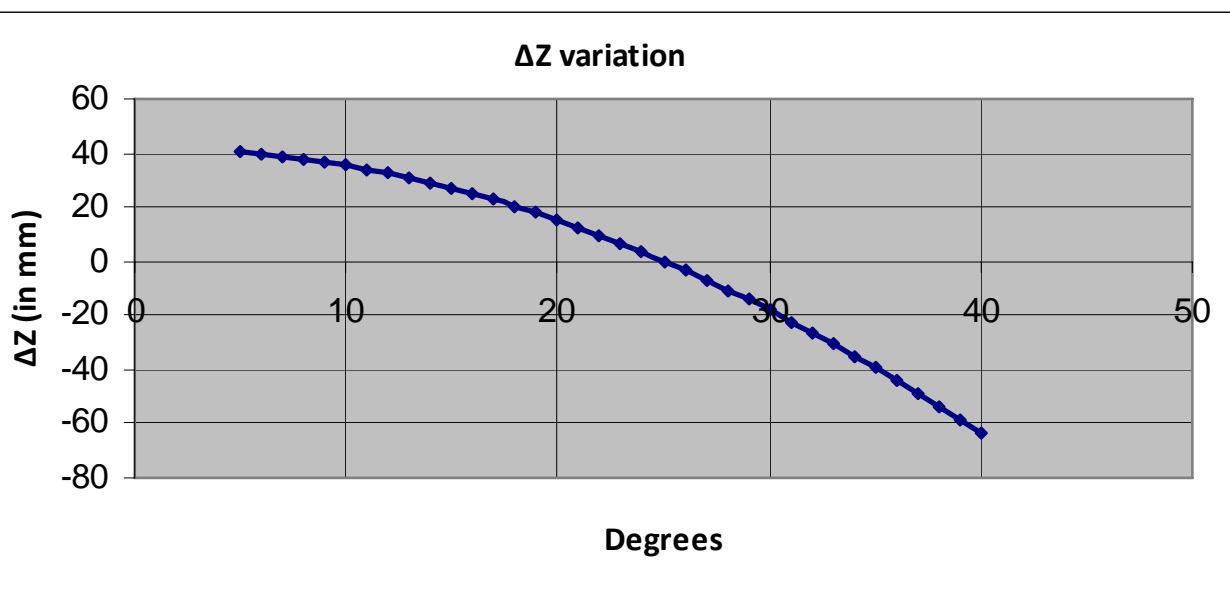
Where θ is the variable



Results

- θ values: 5° to 40° step of 1° , in $\Delta Z = 225.26 + 452.1 \cos \theta - 635$
- The table on the right hand side shows the vertical coordinates correction ΔZ (in mm) from 5° to 40° seat angle
- The graph below demonstrates the variation of ΔZ against degrees

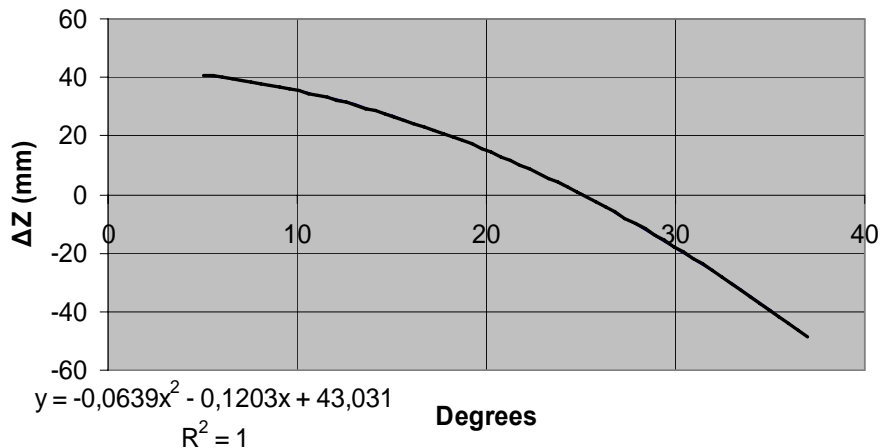
Seat Back Angle θ (in Degrees)	Vertical coordinates ΔZ (in mm)
5	40,6
6	39,9
7	39,0
8	38,0
9	36,8
10	35,5
11	34,1
12	32,5
13	30,8
14	28,9
15	27,0
16	24,8
17	22,6
18	20,2
19	17,7
20	15,1
21	12,3
22	9,4
23	6,4
24	3,3
25	0,0
26	-3,4
27	-6,9
28	-10,6
29	-14,3
30	-18,2
31	-22,2
32	-26,3
33	-30,6
34	-34,9
35	-39,4
36	-44,0
37	-48,7
38	-53,5
39	-58,4
40	-63,4



Comparison with previous proposal

- The point of reference of the previous proposed correction for ΔZ is unclear and all ΔZ '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.

Current proposed correction



Previous proposed correction

