

Fig. 3. Example of Euro NCAP HPD Zone on Rear Seat [4].

III. INITIAL FINDINGS

There were no design constraints on the thickness of a booster cushion Type Approved to R44. However, testing of existing R44 booster cushions with the Q10 has shown that the head position is already at 840 mm [5].

Adalian et al. [4] assessed the head centre of gravity (CoG) positions and measured HPD zones from forty-six vehicles tested by Euro NCAP between 2016 and 2020. The Q10 head position in front and side impact tests was compared to the Hybrid III 5th and the HPD zone (Figure 4). This showed that the Q10 head (red, yellow) was always positioned above the head of the Hybrid III 5th (blue). The average difference was 36 mm. But importantly the Q10 was always at least 120 mm lower than the Hybrid 95th percentile HPD reference zone (green dots).

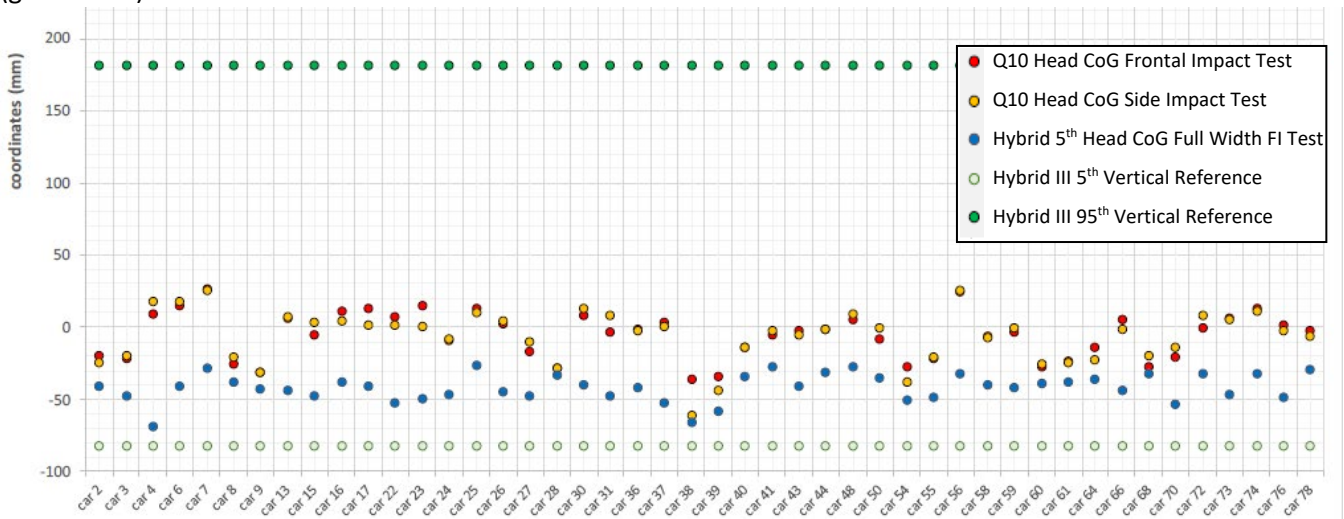


Fig. 4. Q10 & Hybrid III 5th Head CoG Vertical Position [4].

IV. DISCUSSION

R129 has created conflicting requirements for booster cushions that are challenging to achieve. It is likely that R129 booster cushions will need to be thicker than most R44 booster cushions in order to meet the static head position assessment (Figure 1). The consequence being that the vertical head excursion plane will be exceeded even before the dynamic test starts. However, the Euro NCAP head position measurements presented by [4] show that the R129 vertical head excursion plane could be increased and still be below the head position of the Hybrid 95th percentile HPD reference zone. The next stage of this work will be to gather vehicle measurement information to confirm the space is available and to propose a new suitable vertical head excursion limit for testing booster cushions in R129.

V. REFERENCES

[1] UN website, <https://unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/2020/R129r4am3e.pdf>
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 [3] UN website, <https://unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/2020/R129r4e.pdf>
 [4] Adalian C et al., Protection of Children in Cars, 2020.
 [5] Pitcher M et al., Protection of Children in Cars, 2019.