CAD – Investigation on R2-ISOFIX Envelope for GRSP Informal Group

18.11.2009
Objectives

• Evaluation of the available space, defined by R1 and R2 ISOFIX envelopes using CANDAT occupant dimensions.

• Proposal of balance between occupant maximum size/CRS size and R2 ISOFIX envelope capacity.

Methodology

• R1 and R2 envelope applied to the CAD system

• Current ISOFIX RF seat group 0+

• Dummy definition by CANDAT data

• Adjustment of CRS size and position to determine maximum occupant size, while staying within R2.
Child Restraint Systems Envelope

ISO/R1 Envelope

ISO/R2 Envelope
9 months, 95 percentile – Initial Position

Changes to original BabySafe-Position:

- X-travel: -
- Torso-A: -
- Hip-A: -
- Knee-A: +10°

95-percentile 9months
Sitting height: 503
Standing height: 774
1 year, 95percentile Limits of R1 envelope

95-percentile 12months
Sitting height: 515
Standing height: 801

Changes to original BabySafe-Position:

- X-travel: +10mm
- Torso-A: -
- Hip-A: -
- Knee-A: +10°

Maximum Baby-size for BabySafe shell!
Baby-Safe reaches R1 borderline!
15 months, 95 percentile
Limits of R2 envelope

95-percentile
15 months
Sitting height: 528
Standing height: 832

Changes to original BabySafe-Position:

- X-travel: +30mm
- Torso-A: -1°
- Hip-A: -1°
- Knee-A: +10°
Installation Check – 18 month Handling Dummy/Infant Carrier RF

- Sitting height: 503 (50%)
- Hits limits of R2 box

• Legs are already in a more upright position and do not have contact to the shell → comfort issues
Summary

• R1 ISOFIX envelope is going to be exceeded by adjusted CRS size to dimensions of the dummy stature of an age above 12 months/95%, based on the CANDAT data.

• R2 ISOFIX envelope is going to be exceeded by adjusted CRS size to dimensions of the dummy stature of an age above 15 months/95%, based on the CANDAT data.

• Above 15 month/95% RF position is obtainable, but will compromise occupant comfort
  • More upright position of the occupant
  • Decreased angle between torso and legs of the occupant
  • Risk for the parents to switch earlier to FF position due to comfort
Conclusion

- Recommendation to Informal Group to define switch from RF to FF at an age of 15 months to ensure, we stay within R2 ISOFIX envelope.
- Need for confirmation by OEM’s if R2 ISOFIX envelope is accepted.