46th GRSP Session
Status report of
Informal Group on CRS

Pierre CASTAING
Chairman
The informal group shall consider the development of a new regulation for “Restraining devices for child occupants of power-driven vehicles” for consideration by GRSP.

The basis of the discussion will be informal documents N° GRSP-42-2 and GRSP-42-27.

A step by step approach shall be implemented
– Phase1: Develop definitions, performance criteria and test methods for ISOFIX Integral “Universal” CRS

In its work, the informal group will take into consideration amongst others the technical expertise of EEVC WG18, EEVC WG12, ISO TC22/SC12, and NPACS as well as the results of the discussions held in the informal group and at GRSP.

If necessary, the informal group shall develop complementary test methods and propose alternative judgement criteria.

The target completion date for the informal group shall be the forty-sixth session of GRSP (December 2009) for this first phase.
14 meetings from January 2008 till November 2009

First draft regulation covering phase 1 presented as informal document:
  – GRSP-46-28 (Still an incomplete working document)
Principles of this new regulation

- Independent regulation. The ECE R44 remains valid
  - Multi steps approach

- The scope of this new regulation cover only “ISOFIX – Universal – Integral” CRS in first step

- New philosophy of classification
  - No groups
  - Classification based on standing height, maximum permissible weight (Child + CRS) and age limit for forward facing use.

- Use of measurement device for CRS size control

- Use of the Q dummies for frontal, rear and lateral dynamic impact on a new test bench

- Use support leg as well as top tether as universal anti rotation device
Independent regulation

- ECE R44 remains valid
- Multi steps approach
  - Integral CRS + ISOFIX
  - Non integral CRS + ISOFIX
  - Adult safety belt dependent CRS
- Transitional provisions for “soft landing” between ECE R44 and the different phases of this new regulation
Scope of this regulation for the first step

ISOFIX “universal” integral CRS

- ISOFIX
  - 2 lower anchorages + 1 anti rotation device
  - No use of the adult safety belt for the restraint of the child seat

- Universal
  - <F3 ISO fixture for FF & <R2 ISO fixture for RF
  - With top tether or support leg (to be confirmed)

- Integral
  - Child is restraint only by the CRS restraint system (harness)
  - No use of the adult safety belt for the restraint of the child
New philosophy of classification

No group approach
Classification on standing height

Total height as a function of body mass

- 5th
- 50th
- 95th
- 18 months
- 1Y
- 18M
- 3Y
- 6Y
- 10Y

Mass (kg)

Total height (cm)
Limitations of use

- Maximum weight of acceptable children
  = [32] kg – CRS weight. *(info to consumer)*

- Maximum stature of acceptable children
  = declared by EM and controlled by TAA. *(info to consumer)*

- Minimum age of acceptable children
  [12/15/18 months] for FF. *(Mandatory marking)*
Examples of information to the user

- This FF CRS is suitable for a child **older than [18th]** with a mass **not exceeding [22]kg** and a stature comprised **between 75 and 125 cms**
- This RF CRS is suitable for a child with a mass **not exceeding [18]kg** and a stature comprised **between 40 cms and 95 cms**

- Age limit
- Weight limit
- Size limits
Use of measurement device

- The blue part – lower body segment from P3
- The yellow part – rod including scale
- The red part – reading of measurement
The measurement device inside a CRS

Based on the range of size declared by the CRS manufacturer
Use of the Q dummies

For dynamic behaviour in:

- Frontal impact
- Rear impact
- Lateral impact

Q-dummy family well equipped ...

Q6 23.0 kg
Q3 14.5 kg
Q0 3.4 kg
Q1 9.6 kg
Q1.5 11.0 kg

... to contribute to child safety
Frontal Impact configuration

- Same as ECE R44 for input pulse.

- New criteria and requirements for dummies readings

- Same as ECE R44 for head displacement requirement

Injury assessment criteria per dummy

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Abbreviation</th>
</tr>
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<tbody>
<tr>
<td>Head Impact Criterion (only in case of hard contact during in-vehicle testing)</td>
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<td>Head Acceleration 3 ms</td>
<td>A head 3ms</td>
</tr>
<tr>
<td>Lower Neck Tension Force</td>
<td>Fz</td>
</tr>
<tr>
<td>Lower Neck Flexion Moment</td>
<td>My</td>
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<tr>
<td>Thorax Chest Deflection</td>
<td>D chest</td>
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<tr>
<td>Chest Acceleration 3 ms</td>
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Rear Impact configuration

- Same as ECE R44 for input pulse.
- New criteria and requirements for dummies readings
- Same as ECE R44 for head displacement requirement

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Test bench according NPACS proposal

Backrest cushion NPACS proposal with a 50 mm cut

Seat cushion NPACS proposal but without gaps

90° rotation of the test bench for lateral impact
This impactor is fixed on the reaction mass, and the R44 bench is on the sled.
Support device for the door

Door

Bench

Backrest Cushion

Seat Cushion

PU Tubes

Sliding Isofix Anchorage Points
NPACS Door dimension
35 mm rubber foam
Polychloropren CR4271
20 mm Styrodur C2500
## Test Parameters

<table>
<thead>
<tr>
<th>ISO/PDPAS N623E</th>
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<tr>
<td>Intrusion velocity</td>
<td>7-10 m/s</td>
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<tr>
<td>Intrusion depth</td>
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<tr>
<td>Sled deceleration</td>
<td>10-14 g</td>
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<tr>
<td>Intrusion surface height</td>
<td>500 mm</td>
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</table>

### Sled v/s

![Sled v/s graph](image1)

### Sled deceleration

![Sled deceleration graph](image2)

- **Intrusion velocity**: 7-10 m/s
- **Intrusion depth**: 200-300 mm
- **Sled deceleration**: 10-14 g
- **Intrusion surface height**: 500 mm
Forward Facing with TT - Dummy Q3
Some open questions to GRSP

- How to qualify “universal” CRS with support leg
  - ISO group on floor/support leg interface
  - ECE R14 & R16 modification?
  - Support leg definition

- How to encourage use of RF CRS for older children
  - Age limit [18, 15 or 12 month]
  - Available space in car
Future work

Next meetings
- 19th January 2010 (Paris)
- February before Dead Line for GRSP?

Upgrade informal document GRSP 46-28 until February dead line for GRSP May session formal document.

Propose to GRSP in May a proposal to start implementation of Phase 1 and new ToR to continue with Phase 2