47th 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

– Phase 1: 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.
18 meetings from January 2008 till April 2010

First draft regulation covering phase 1 presented as formal document:
- ECE/TRANS/WP.29/GRSP/2010/26

Amended by informal document:
- GRSP-47-06 - Draft amendment to ECE/TRANS/WP.29/GRSP/2010/26
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:
      - Top Tether
      - Support leg
    - No use of the adult safety belt for the restraint of the child seat

- **Universal**
  - <F2X ISO fixture for FF & <R2 ISO fixture for RF (*)
  - With top tether or support leg (**) 
  - Integral
    - Child is restraint only by the CRS restraint system (harness)
    - No use of the adult safety belt for the restraint of the child

(*)(**) others could fall into “Integral ‘specific vehicle’ ISOFIX” category
New philosophy of classification

No group approach
Classification on standing height

Geometrical dimensions of
-Size child restraint systems

<table>
<thead>
<tr>
<th>Stature mm</th>
<th>Sitting height mm</th>
<th>Shoulder breadth mm</th>
<th>Hip breadth mm</th>
<th>Shoulder height mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every 50mm</td>
<td>95%ile</td>
<td>95%ile</td>
<td>95%ile</td>
<td>5%ile</td>
</tr>
</tbody>
</table>

Standing Height  
Seating Height  
Shoulder Height
Source : IFTH – Projet 3D Child
Shoulder breadth / Stature
The measurement device inside a CRS

Based on the range of size declared by the CRS manufacturer

Front

Section
Limitations of use

- Maximum weight of acceptable children
  
  = 33 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

  15 months for FF. *(Mandatory marking)*
This FF CRS is suitable for a child older than [15th] 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 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
- 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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### Injury assessment criteria per dummy

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

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For monitoring purpose
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
  
  For monitoring purpose
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
Test Rig

Support device for the door

PU Tubes

Sliding Isofix Anchorage Points

Door

Bench

Backrest Cushion

Seat Cushion
Door Panel Definition

Relative velocity corridor to be confirmed by evaluation program

Door Panel Dimensions
### Test Parameters

<table>
<thead>
<tr>
<th>ISO/PDPAS N623E</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrusion velocity</td>
<td>7-10 m/s</td>
</tr>
<tr>
<td>Intrusion depth</td>
<td>200-300 mm</td>
</tr>
<tr>
<td>Sled deceleration</td>
<td>10-14 g</td>
</tr>
<tr>
<td>Intrusion surface height</td>
<td>500 mm</td>
</tr>
</tbody>
</table>

#### Sled v/s
![Sled v/s graph](#)

#### Sled deceleration
![Sled deceleration graph](#)
Some open issues to be validated (1)

Floor/support leg interface

− Support leg definitions:
  • “Support foot”
  • “Support leg contact surface”
  • “Support leg contact volume”
  • “Vehicle contact area”
  • “Vehicle contact volume”

− ECE R14 & R16 modification
  • Assessment of “I-Size ready” vehicles
Some open issues to be validated (2)

Age limit [18, 15 or 12 month]
– Taking into consideration ISO fixtures dimensions

Side impact procedure
– Dummy positioning
– Pulse corridor
– Criteria
  • Containment
  • HIC
  • g (3ms) level
– Requirements
Geometrical characteristics

- Seating height upper limit / Standing height
- Shoulder breadth upper limit / Standing height
- Hip breadth upper limit / Standing height
- Shoulder height upper and lower limits / Standing height
- Measurement tool and tolerances
The Group proposes to GRSP to endorse the draft and to start implementation of Phase 1 and ask for extended mandate to continue with Phase 2:

“ISOFIX universal non-Integral CRS”

Next meeting (19th) 30 June (Madrid ?)