EPOCh-COVER-CASPER workshop

Q10 Anthropometry

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Erik Salters
Dorel Europe

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Introduction

1. Preparation study
2. Considerations & CANDAT
3. Mass. Target, realization and check
4. Stature. Target, realization and check
5. Place within Q dummy family
1. Preparation study

- EEVC [2008] and Johannsen [2004] show that protection in front and side impact for children >8 years should still be a main focus for improvement.

- Potential improvements of child seats, vehicles and their combinations are hard to check, as the current P10 does not allow in-depth research.

- So for this reason, the project of the Q”BIG” was started in the beginning of 2009.

- Research at the University of Surrey, UK [dissemination meeting Paris, June 2009], [Mertz, 2008] showed the differences in children around the age of 8-12, giving guidance to the design and size/mass selection.
### 2. Considerations & CANDAT

#### Mass.
- 32.0 kg = P10
- 35.5 kg = 10.5 [50 percentile CANDAT]
- 36.5 kg = 10.75 [50 percentile CANDAT]
- 40.0 Kg = 11.6 year & 1500 mm [50 percentile CANDAT]

#### Stature.
- 1376 mm = P10
- 1442.5 mm = 10.5 years [50 percentile CANDAT]
- 1447 mm = mass of 36.0 kg [50 percentile CANDAT]
- 1500 mm = 11.6 years [50 percentile CANDAT]
- 1519 mm = 12 years [50 percentile CANDAT]
3. Mass
Realization and check to targets

At the Stakeholders meeting in Paris, June 2009 it was decided that the anthropometry of a 10.5 year old “CANDAT-child” would be the bases for the Q10 dummy.

**Mass selection arguments**

- Smaller gap between Q6 and “Q10.5” then Q6 and “Q150” cm
- To raise the bar for enhanced protection of children towards 35.5 kg. (P10=32 kg)
- 40 kg is not required, as a “range” of real children is assumed to be assessed sufficiently with a 35.5 kg dummy.

### Result

<table>
<thead>
<tr>
<th>Design</th>
<th>kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>3.59</td>
</tr>
<tr>
<td>Neck</td>
<td>0.60</td>
</tr>
<tr>
<td>Upper torso</td>
<td>5.15</td>
</tr>
<tr>
<td>Lower torso</td>
<td>9.70</td>
</tr>
<tr>
<td>Arm + hand (each)</td>
<td>1.99</td>
</tr>
<tr>
<td>Leg + foot (each)</td>
<td>6.24</td>
</tr>
<tr>
<td><strong>Designed total mass</strong></td>
<td><strong>35.5</strong></td>
</tr>
</tbody>
</table>
4. Stature
Realization and check to targets

Size selection arguments

- Smaller gap between Q6 and “Q10,5” then Q6 and “Q150” cm
- To raise the bar for enhanced protection of children towards 150 cm. (P10 = 1376mm)
- 150 cm is not required, as a “range” of real children is assumed to be assessed sufficiently with a 1442.5 mm dummy.

<table>
<thead>
<tr>
<th>Design</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitting height [mm]</td>
<td>748</td>
</tr>
<tr>
<td>Shoulder height @sitting mm</td>
<td>473</td>
</tr>
<tr>
<td>Shoulder breadth</td>
<td>270</td>
</tr>
<tr>
<td><strong>Stature [mm]</strong></td>
<td><strong>1441</strong></td>
</tr>
</tbody>
</table>
5. Place within the Q family

- 50%ile CANDAT
- Q dummies
- Hybrid III dummies
- CANDAT 5 to 95%ile envelops

Body mass [kg]

Stature [mm]

- 5 yo
- 10.5 yo
- 6 yo
- 11.6 yo

0 5 10 15 20 25 30 35 40 45 50 55

400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600
For more information
Email: EPOCh@trl.co.uk
www.epochfp7.org