Torso Belt Path Assessment for Non-integral ECRSs

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Aim

- To create a method and criteria to assess non-integral child restraints, to identify poor or good seat belt routing and positioning, that can be implemented into Regulation 129

- The method should be applicable for the Q3, Q6 and Q10

- To ensure non-integral child restraints can provide a seat belt path which is correctly positioned on the shoulder and across the chest of the occupant.
Method of Investigation

Method

- Measurement method based on IIHS
- Measurements taken in R129 test environment
- Different designs of child restraint were measured to determine a criterion for assessing the belt fit
- Initially a large range of measurements were taken with/without the suit
- Measurements that were difficult or not repeatable were removed
Method of Investigation - Grid Suit Measurements

Method progressed to using Q6 & Q10 grid suits, whereby measurements can be easily measured and recorded to determine the belt path for the different seats.
Method of Investigation - Child Restraints

- Various different designs of child restraint have been evaluated
- These included child restraints that are perceived to position the seat belt wide on the shoulder or too close to the neck.
- Four different types were used:

- No CRS
- Booster Seat 1
- ‘Poor’ CRS (abdomen loading)
- Booster Cushion 1
Torso Belt Path Assessment - Results

- Belt path assessment based on IIHS method
- Criteria created to avoid being A) or C)

A) Too close to neck  
B) Ok  
C) Too wide
Torso Belt Path Assessment - Criteria

Belt path assessment based on belt position relative to grid suit

Use for Q3, Q6 & Q10

Values based on R129 test bench using UMTRI installation

<table>
<thead>
<tr>
<th>Dummy</th>
<th>Suit</th>
<th>Grid A</th>
<th>Grid E</th>
<th>Grid F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q10</td>
<td></td>
<td>110&lt; x &lt;145</td>
<td>N/A</td>
<td>-190&lt; x</td>
</tr>
<tr>
<td>Q6</td>
<td>Grid Suit</td>
<td>105&lt; x &lt;130</td>
<td>-140&lt; x</td>
<td>N/A</td>
</tr>
<tr>
<td>Q3</td>
<td></td>
<td></td>
<td></td>
<td>To be defined when suit is available</td>
</tr>
</tbody>
</table>

*Measurements based on RHS B-pillar, measurements need to be inverted for LHS B-pillar

Complete assessment on Q3 once grid suit becomes available (expected early 2016)