A STUDY ON SHIELD SYSTEMS

Presented by the expert of France
Agenda Items 15
Objectives
Presentation Objectives

- This work is a follow up of the study presented at the 52nd session of the GRSP in Dec 2012 (Informal document GRSP 52–12).

- Presentation of new information which shows a potential safety risk for children.

- Provide you with content to determine the appropriate next steps to take.
Recent background

- Safety questions raised in relation to frontal impacts during a presentation at the „Protection of Children in Cars“ conference in Munich, Germany, 5th–6th December, 2013 Munich.

- Good performance in consumer tests and strong public perception across Europe of the safety of shield systems compared to child restraint systems with harnessed seats, with the biggest impact in Germany.

- No shield systems are used by OEMs in EuroNCAP.

….((Hersteller) gelingt es, das Schutzkonzept für einen vorwärtsgerichteten Sitz zu perfektionieren…

….Der Crashtest zeigt: Kindersitze mit Fangtisch sind besonders sicher…

Quelle: StiWa Test Magazin 2012
Quelle: StiWa Test Magazin 2013
Child Accident Study Investigating Mortal Incident on the Road – CASIMIR Programme – France

## Current EuroNCAP & Consumer test conditions in frontal impact

<table>
<thead>
<tr>
<th></th>
<th>Stiftung Warentest Consumer Test (current status)</th>
<th>EuroNCAP Protocol 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frontal impact</td>
<td>64 km/h &amp; 33 – 37 G Golf 6 Body in white</td>
<td>64 km/h, <strong>40% &quot;offset&quot;</strong> <em>Wider range of cars</em></td>
</tr>
<tr>
<td>Dummies</td>
<td>Q Dummies Q1 ; Q3</td>
<td>Q Dummies Q1.5 ; Q3</td>
</tr>
<tr>
<td>Performance criteria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Head</td>
<td>Excursion + Acceleration , HIC</td>
<td>Excursion + Acceleration , HIC</td>
</tr>
<tr>
<td>• Neck</td>
<td>Loads</td>
<td>Loads</td>
</tr>
<tr>
<td>• Chest</td>
<td>Accelerations</td>
<td>Accelerations</td>
</tr>
<tr>
<td>• Abdomen</td>
<td>Not measured</td>
<td>Not measured</td>
</tr>
<tr>
<td>• Ejection</td>
<td>Measured</td>
<td>Measured <strong>+ Head Contact</strong></td>
</tr>
</tbody>
</table>
Offset Deformable Barrier test & Sled Test

EuroNCAP ODB Test

ETC Sled test
Car to car Tests & Offset Deformable Barrier Tests according to EuroNCAP
Frontal Offset car to car Tests
Transport Canada – November 2013
Frontal Offset car to car Tests
Transport Canada – March 2014

Dummy in a shield system car 1

Dummy in a harnessed system car 2
Frontal Offset car to car Tests Transport Canada – Summary Dummy Kinematics

Test 1: November 2013
Test 2: 18 March 2014

Partial ejection of the Q1,5 Dummy Left and US Crabi 18m Dummy Right
Investigation of Shield CRS technology in Frontal Offset Deformable Barrier (ODB) Tests

Procedure:

- EuroNCAP Protocol

- In a test lab certified for EuroNCAP: UTAC CERAM–France; CSI Italy; BASF–Germany; Tass–The Netherlands.

- Cars already tested in 2013 with harnessed seats and achieved top safety ratings

- Focus: Child Occupant Protection with shield systems that were rated “Very Good” in Consumer Tests in May and Nov 2013
An Example of a EuroNCAP ODB test
ODB Test No. 1 – Shield A
Vehicle 1 – February 2014 – UTAC
Q1.5: No containment

Q3: abdominal pressure, 2 times the provisional threshold (limit proposed by Dr. H. Johannsen et al., 2012 [http://www.ircobi.org/downloads/irc12/pdf_files/66.pdf])

The next tests – replace Q1.5 by Q1

Reasons:
Group 1 seats approved to cover Q1 occupant weight. ETC uses Q1 as the dummy for the lower limit in this child seat category.
ODB Test No. 4
Vehicle 1 – March 2014 – UTAC

AFFSAS1400647
N2
Frontal type Euro NCAP
1000 images/s

AFFSAS1400647
N2
Frontal type Euro NCAP
240 images/s
Q1: Non containment  
Q3: Containment

Q1: Shield system  
Q3: Harnessed system
ODB Test No. 2 – Shield B
Vehicle 2 – February 2014 – CSI
Q1: Ejection
Q3: Non Containment + Head Impact
ODB Test – Shield B Vehicle 2 – March 2014 – BASt
ODB Test – Shield B – Chevrolet Trax
March 2014 – BASt – Q1 & Q3 kinematics

1  Q1
2  Q3
3
4

Q1 no longer restrained – Head impact against the roof of vehicle
Q3 no longer restrained – Head impact against the roof
Q3 Abdominal pressure Q3 approximately 3 times higher than the provisional threshold
ODB Test – Shield B
Car 2 Mazda 3 – February 2014 – BAST

- Increased chest deflection of 42mm of the Q3
ODB Test TASS International
Nissan Qashqai – April 2014
Q3 – head contact with roof of vehicle

Q1 – non-containment
Car to Car & ODB Tests – Summary

- Car-to-car Transport Canada tests show that this technology could have substantial safety issues in the most representative accident situation (frontal impact) with no containment of the occupant, which is the primary role of a child restraint system.
- Offset Deformable Barrier crash tests, according to Euro NCAP protocol, has confirmed this finding with:

**Q1 or 1.5 years old dummies:**

- Q1.5: non-containment
- Q1: Full ejection in one test
- Q1: Partial ejection in 2 tests with occupant no longer restrained, including head impact in rebound phase with roof or with adjacent child seat

**3 year old dummy:**

- Large dummy excursion
- Head impact on the roof in the "rebound phase"
- Higher abdominal pressure than the provisional threshold

- It is assumed that the use of shield technology will increase due to the positive assessment given today.

- Some shield CRS have demonstrated injury risk in rollover and in frontal ODB impact configurations.
Follow up

• Is there any other studies (present or past) on this subject in other contracting parties?

• Are similar products available in or entering your country or market?

• If not, is it due to your national rules? (specific requirements banning such product)