

Informal document **GRSP-55-39**  
(55<sup>th</sup> GRSP, 19 - 23 May 2013,  
agenda items 15 & 18)

# A STUDY ON SHIELD SYSTEMS

Presented by the expert of France  
55th Session of the UN ECE Working Party on  
Passive Safety GRSP 19–23 May 2014  
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...

(...(manufacturer) has achieved a perfect safety concept for a forward faced child restraint system.....)

Quelle: StiWa Test Magazin 2012

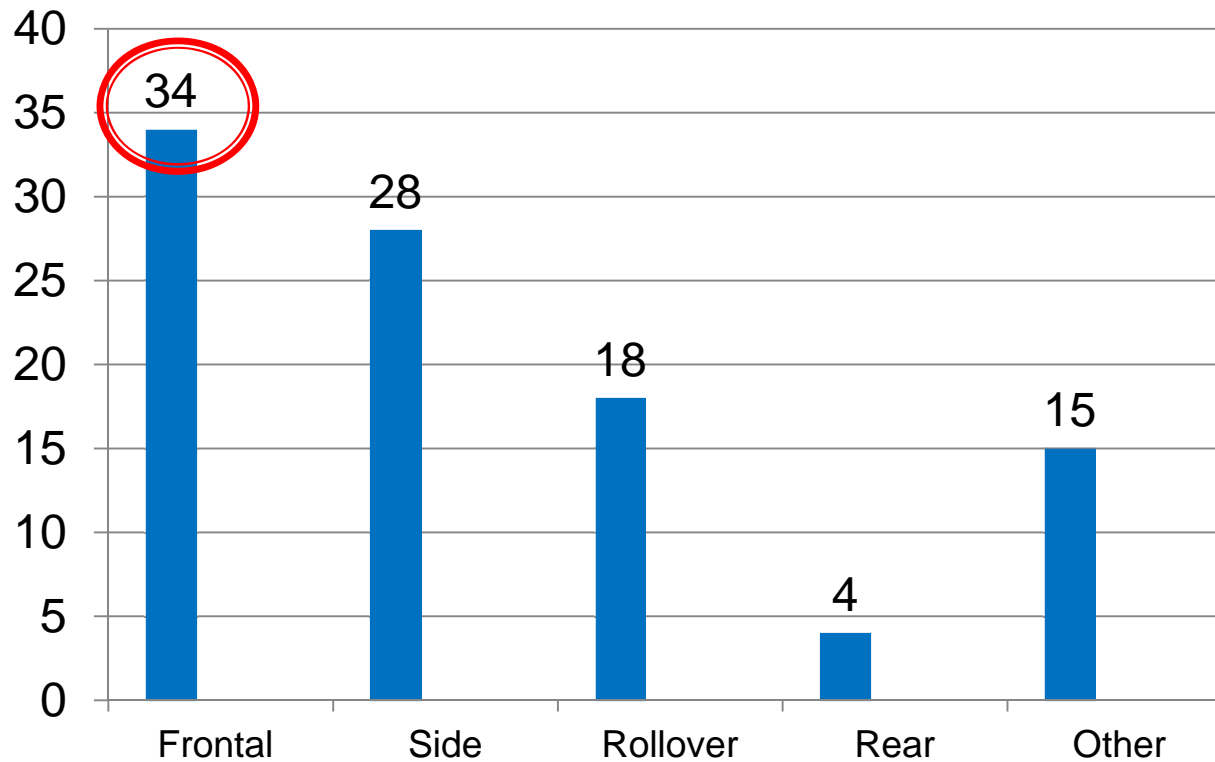
....Der Crashtest zeigt: Kindersitze mit Fangtisch sind besonders sicher...

(...The crash test proves: Child restraint systems with shield technology are safe in particular....)

Quelle: StiWa Test Magazin 2013

# Child Accident Study Investigating Mortal Incident on the Road – CASIMIR Programme – France

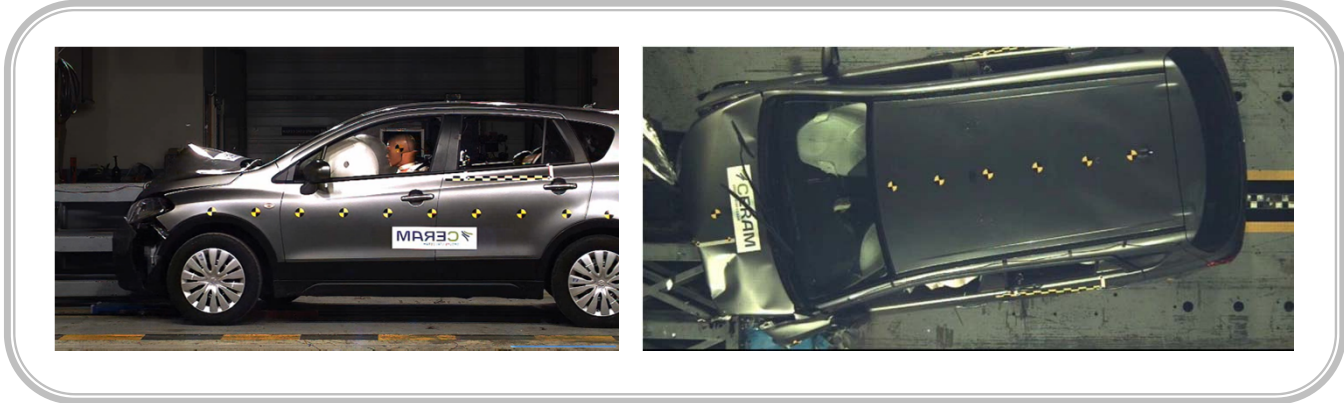
- Analysis of police reports 2001–2003: 206 Child fatalities (age < 12 y)



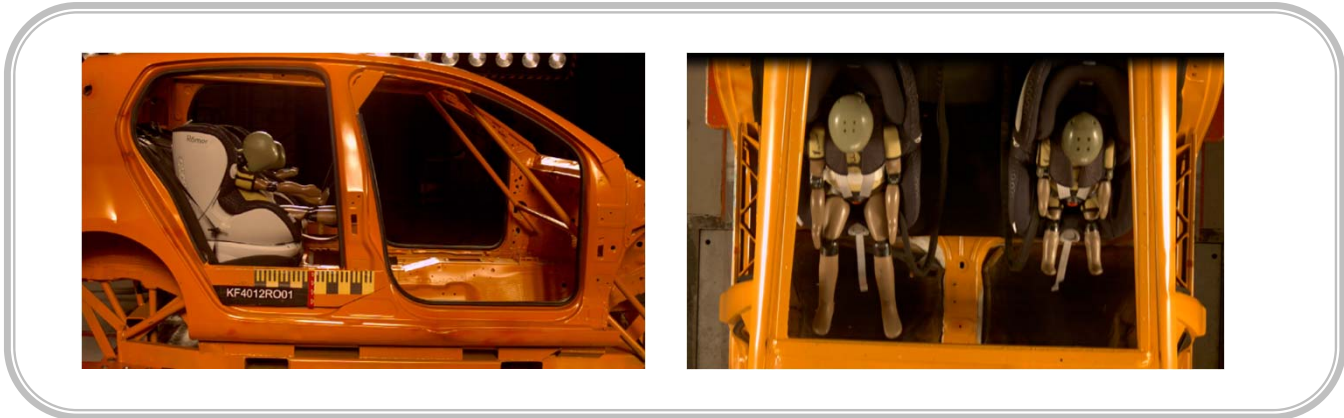
# Current EuroNCAP & Consumer test conditions in frontal impact

	Stiftung Warentest Consumer Test (current status)	EuroNCAP Protocol 2013
Frontal impact	64 km/h & 33 – 37 G Golf 6 Body in white	64 km/h , <b>40% "offset"</b> <b><u>Wider range of cars</u></b>
Dummies	Q Dummies Q1 ; Q3	Q Dummies <b><u>Q1.5</u></b> ; Q3
Performance criteria	Parameter	
• Head	Excursion + Acceleration , HIC	Excursion + Acceleration , HIC
• Neck	Loads	Loads
• Chest	Accelerations	Accelerations
• Abdomen	Not measured	Not measured
• Ejection	Measured	Measured + <b><u>Head Contact</u></b>

# Offset Deformable Barrier test & Sled Test



EuroNCAP  
ODB Test



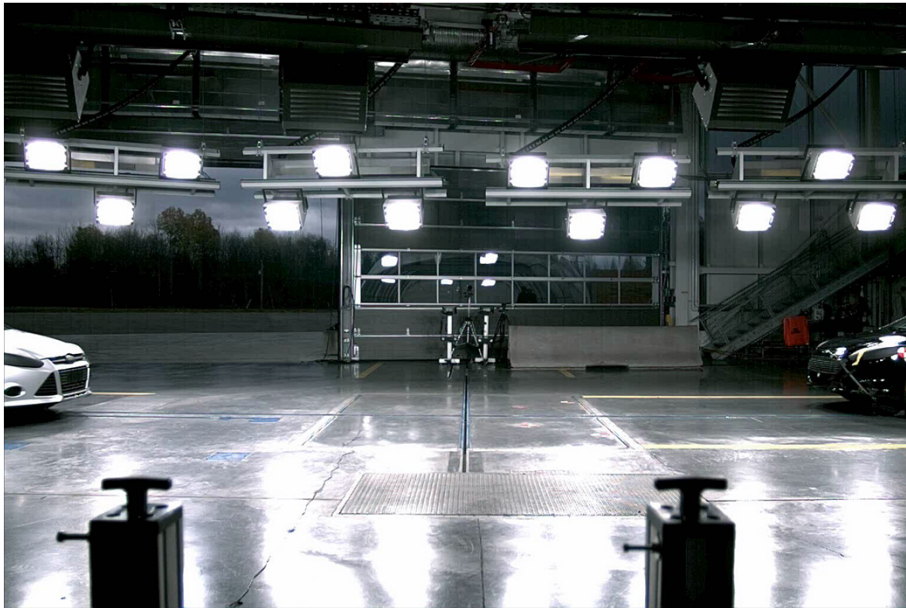
ETC Sled test

# Car to car Tests & Offset Deformable Barrier Tests according to EuroNCAP



# Frontal Offset car to car Tests

## Transport Canada – November 2013

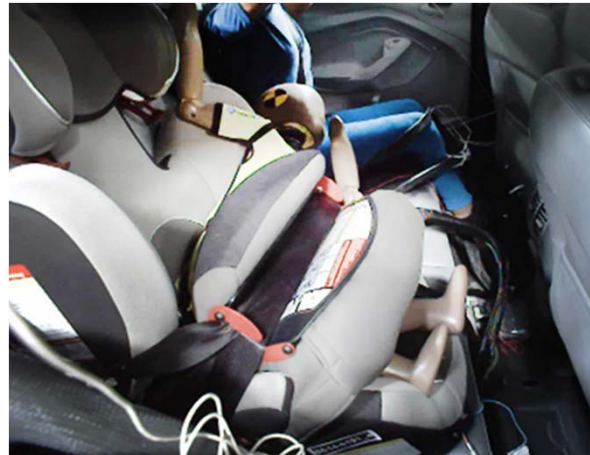


# Frontal Offset car to car Tests Transport Canada – March 2014



# 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; BAST–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

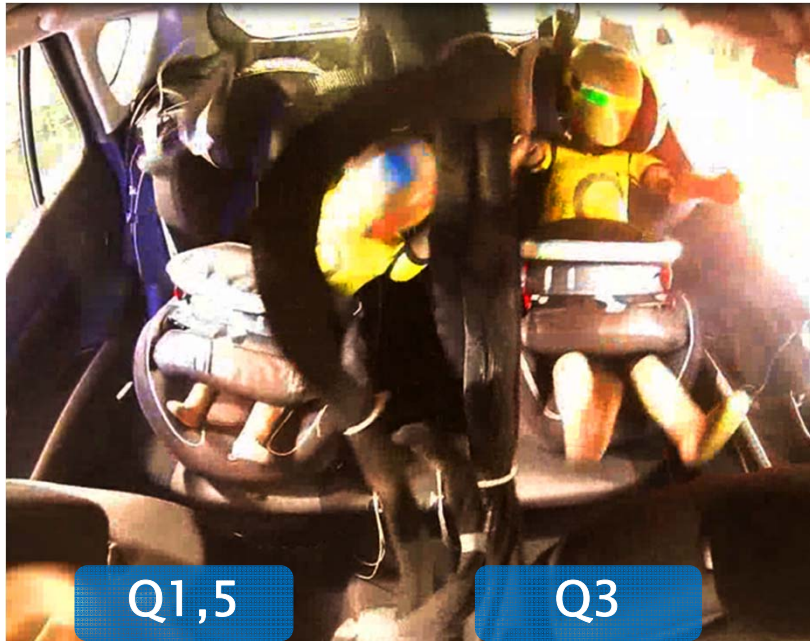


# ODB Test No. 1 – Shield A Vehicle 1 – February 2014 – UTAC

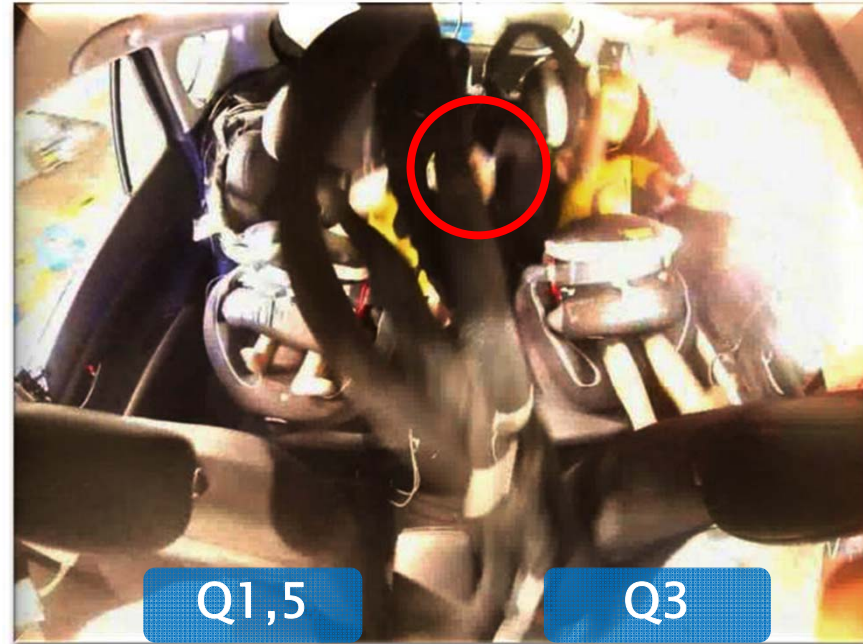


# ODB Test – UTAC Continued

3



4



- 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](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

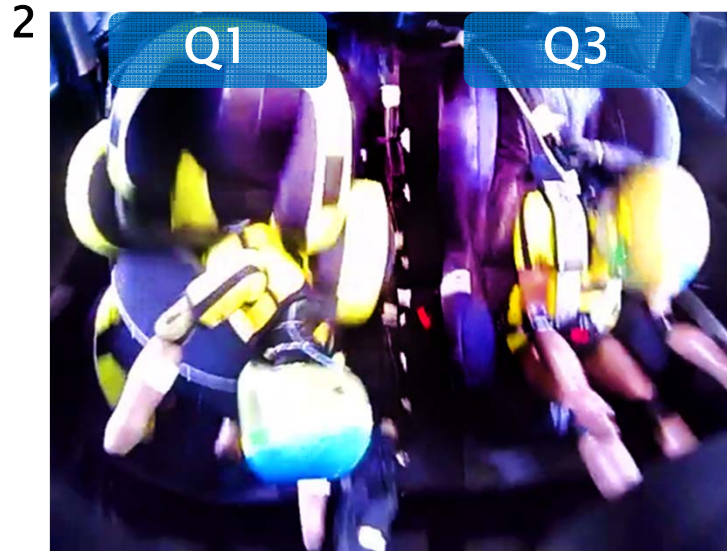




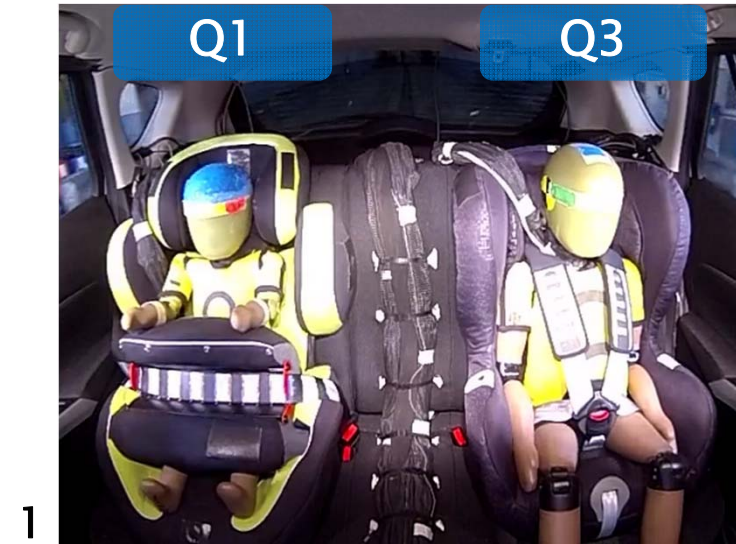
# ODB Test No. 4

## Vehicle 1 – March 2014 – UTAC

**Q1** = Shield system  
**Q3** = Harnessed system



Q1: Non containment  
Q3: Containment



# ODB Test No. 2 - Shield B Vehicle 2 - February 2014 - CSI



Q1

Q3



Working Party on F

# ODB Test No. 2 – Shield B Vehicle 2 – February 2014 – CSI

1

Q1

2

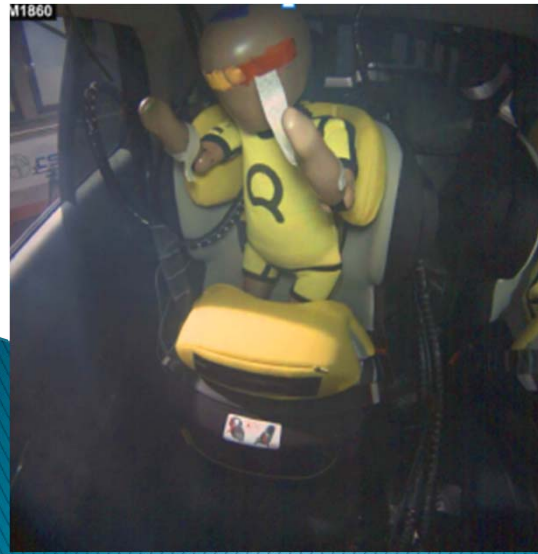
Q3



3



4



Q1: Ejection  
Q3: Non Containment + Head Impact

# ODB Test - Shield B Vehicle 2 - March 2014 - BAST



Working Part  
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# ODB Test - Shield B - Chevrolet Trax March 2014 - BAST - Q1 & Q3 kinematics

1

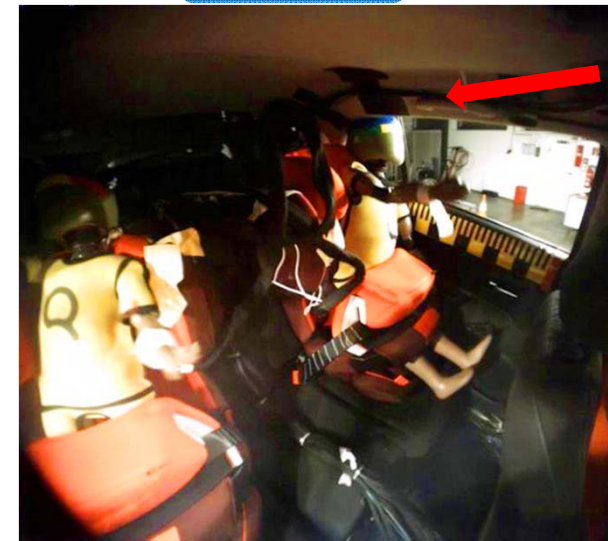
Q1



2



Q3



3



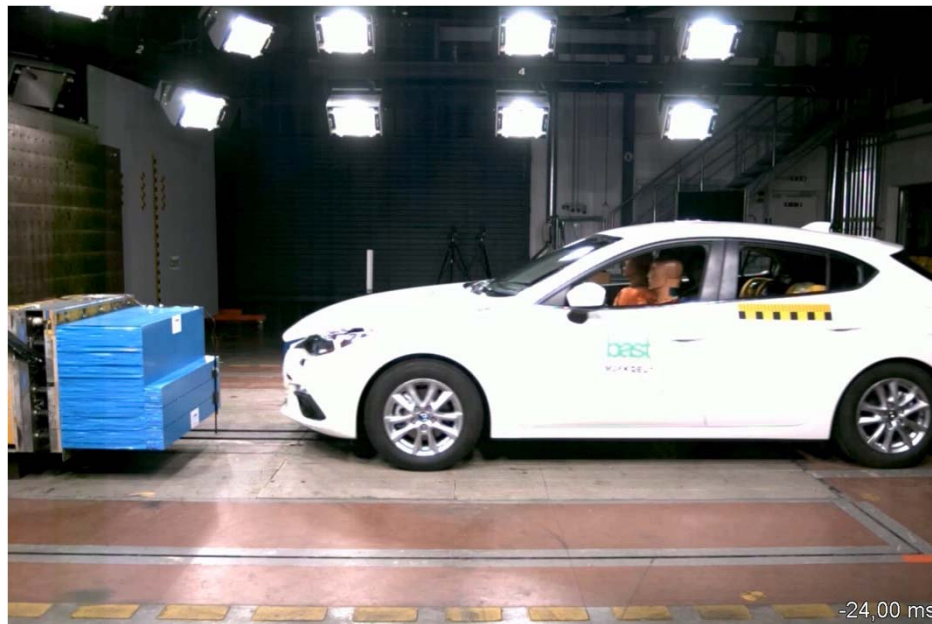
4



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

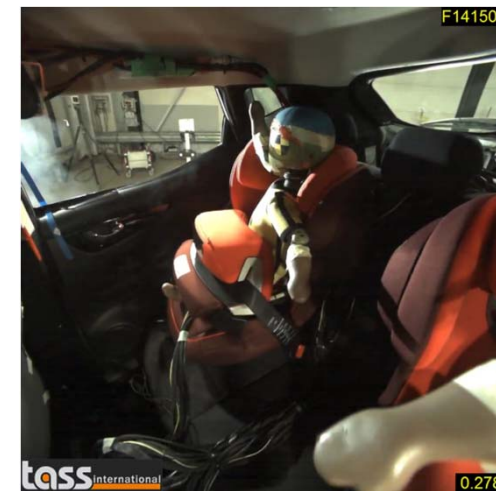
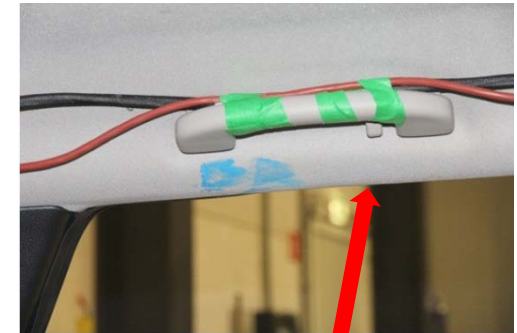


Party on F



# ODB Test TASS International April 2014

Q3 – head contact with roof of vehicle



Q1 – non-containment

Working Party on Passive Safety – GRSP 55th  
Session



# »» Summary

# 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)