

# Minutes of 4<sup>th</sup> meeting of the Informal Group on Child Restraint System

Held at CCFA, Paris  
18<sup>th</sup> June 2008

## 1 Welcome and Introductions

Pierre Castaing opened the meeting, welcomed the delegates and presented the meeting arrangements.

## 2 Roll call

Due to new participants' attendance to the group, a roll call of all participants was done.

**Attendees and Apologies for Absence:** See Annex 1

## 3 Approval of Agenda

**Doc. INF GR / CRS-4-1**

Heiko Johannsen, from TUB, proposed to present two documents he addressed to the group following the second meeting. The first presentation concerns Side Impact Protocol and the second deals with comparison tests involving Isofix and belted seats.

Nojiri Keiichiro, from Takata, announced a presentation on accidentology in Japan.

The draft agenda was approved with those additions.

## 4 Approval of the Minutes of last meeting

The Minutes were reviewed.

**Doc. INF GR / CRS-3-18**

- Point 5.2.1: on first sentence, investigations were done on front bench and not rear bench.
- Point 5.2.1: on third sentence, anchorage positions of the bench correspond to **average** and not to the "**worst** case position".
- Point 5.2.2: Last sentence, "studies **seem to show** ..."
- Point 5.4.1: add comment regarding the fact that conclusions are based on HIC criteria analysis.
- Point 5.4.2: modification of ISO document number ISO 14 646.
- Point 6: 6<sup>th</sup> meeting will be held the 7 and not the 10.

Minutes were approved without other comments.

## 5 Report of the last GRSP session

Pierre Castaing updated the group on the last GRSP meeting.

The Terms of Reference were presented to GRSP members and were accepted. The Informal Group must work while keeping in minds the target of December 2009 to deliver a draft document.

In addition GRSP agreed to mandate ISO to propose/develop a side impact test procedure for Child Restraint Systems. GRSP members asked Pierre Castaing to contact ISO for this subject.

During the GRSP meeting presentations on US activities on side impact test procedures, "Ease of Use" Rating System and test dummies were made by Marie Versailles (NHTSA).

See Documents GRSP 43-13, 43-14 and 43-17 on website address:

<http://www.unece.org/trans/main/wp29/wp29wgs/wp29grsp/grspinf43.html>

Child Safety in Buses/Coaches - GRSP supported the initiative from Spain to work on this topic. Pierre Castaing estimates that it is too early for the Informal Group to deal with this item, but is interested to follow advances in this domain. It was reported that EEVC WG18 introduced this item in their new TORs.

## 6 Actions from the Minutes of last meeting

The action list was reviewed. Presentations and discussions followed each item.

Pierre Castaing informed members that Luis Martinez, chairman of EEVC Working Group 18 will propose to next EEVC SC new ToRs for the group, in order to support our informal group. Main items described in these new TorS are:

- To collect and assess existing side impact test protocols,
- To assess frontal test protocol that our group will define
- To work on Child Safety in buses/coaches.

### 6.1 Test bench

#### 6.1.1 Comparison between ECE.R44 and NPACS benches

This presentation is postponed next meeting (September).

**Action TRL**

### 6.2 Classification – Load level in Isofix anchorages

#### 6.2.1 CLEPA presentation (continue)

François Renaudin informed the group that tests are scheduled in August to validate previous results. Presentation will be made at next meeting.

**Action CLEPA**

Pierre Castaing reminded to members the importance to obtain data regarding forces in anchorages during dynamic tests, on ECE.R44 test bench as well as on vehicles. Data are needed to establish maximum forces experienced by these anchorages. Future CRS should not load these anchorages beyond limits defined by manufacturers.

Request was made to OICA members too who have no more results for the moment.

**Action OICA**

VW is planning to run overload tests. Data are expected to be available for next meeting

**Action VW**

Pierre Castaing indicated he would like to finalize this target during next meeting in September.

## 6.3 Dummies

### 6.3.1 Q Dummies experience by other participants

Pierre Castaing informed the group that during the last GRSP meeting Marie Versailles, from NHTSA, presented a study with comparison between Q3s and Hybrid III 3YO, including the development of a new neck for the Q3s. Following conclusion, future work could be the improvement of durability on Q dummies (thorax durability and neck biofidelity).

See Document GRSP 43-17 on website address:

<http://www.unece.org/trans/main/wp29/wp29wgs/wp29grsp/grspinf43.html>

Pierre Castaing requested if more information on Q dummies are available among members of the group and which can be presented during next meetings.

It was reported that Q-series dummies could show reproducibility problems (differences in repeatable tests with 2 Q-series dummies used).

For FTSS, these problems are probably durability troubles and not reproducibility due to the fact that calibration procedure is established to avoid this type of problem.

Chairman highlighted the importance of test reproducibility. It will be unthinkable to support introduction of dummies having this type of problem. The group needs data on the following:

- The number of tests that a dummy could perform before a new calibration,
- Who or which institutions are able to calibrate the dummies?
- Are there calibration procedures available and is the necessary material to calibrate the dummies available?

It was reported that in order to assess reproducibility of calibration protocol it will be necessary to circulate a Q-dummy in all the laboratories in a position to calibrate Q-dummies,

Chairman requested the members to bring data on this subject to assess the real risks in associated with Q dummies' reproducibility for the next meeting.

#### **Action All**

Mister Waagmeester, from FTSS, emphasizes it could be interesting to correlate calibration and futures tests.

Pierre Castaing will contact Luis Martinez to request if WG18 could provide data or if they could work on reproducibility item.

#### **Action Chairman**

Regarding variant of Q-family for side impact, Michele Maître informed the group that ISO should assess Q3s in a near future. This assessment will allow to judge reproducibility among others. It was reported that only two Q3s dummies are available currently (Canada and US).

Mr Waagmeester requested the group on anthropometry item and point of view of the group regarding pertinence to develop a Q10 dummy (stature/weight). Indeed, Sweden, due to evolution of child anthropometry, requests higher dummy, equivalent to Q12. Mr Waagmeester takes advantage of this meeting to consult members about future and dummy needed.

Farid Bendjellal mentioned directive 2003/20/EC where prescriptions on child stature are given. Limit in the Directive is 1.50 meter but for some countries, 1.35 meter is tolerated. It was added that in Directive limits on weight are found, and in countries limit on age is tolerable too.

Chairman concludes that the group must define applicable limits to avoid problems with so many restrictions. He requested automotive manufacturers regarding limit of age above which they guarantee that children without CRS are in safety in their vehicles.

Mister Horn mentioned that sled tests are conducted with different dummy sizes, including the P10 with booster. Submarining is one of the key issues that are considered.

#### **Action Daimler**

It was reported that Q1 is not sufficient to develop new products for infant carriers. Manufacturers develop CRS which are used also for a younger population than that of Q1 YO. As P3/4 dummy is not being replaced it appears that a "tool" is missing for studies and developments. The Chairman stated that this will be kept in mind but we should concentrate our efforts on Group 1 population.

Pierre Castaing summarizes dummy situation:

To conclude dummy item members need to clearly define a work field, and limits that our group imposes. Exact limits in stature/weight and acceptable loadings in vehicle seat anchorages will be key parameters for the new regulation.

In a first step the chairman will contact commission to know why and how limits, in Directive 2003/20/EC are defined.

#### **Action Chairman**

In a second time, chairman hopes to receive information from each country represented in the group regarding the usage or local regulation regarding child seats, as far as age limit, weight limit and/or stature limit are concerned.

#### **Action All**

A discussion took place on rear facing seats and classification. Clepa members raised the issue of the burden supported by child seat manufacturers caused by the semi universal approval system in EU. Clepa is of the opinion that the universal Isofix target of the Informal Group should cover also the rear facing seats using support leg. The Chairman commented that this subject will be taken into consideration and that the informal group could envisage, if possible, a universal Isofix rear facing seat having a top tether or a support leg.

### 6.3.2 Q Dummies update (2004-2006)

#### **Doc. INF GR / CRS-4-2**

Mister Waagmeester presented to the group an overview of Q-series family evolutions. Update program has started in 2003 to improve anthropometry, biofidelity and durability of the family.

Improvements are concerned

- New segmented neck (lighter as previous),
- New rubber shoulder (heavier),
- Modification of clavicle (scapula part)
- Modification of thoracic spine with a higher version and introduction of IR-TRACC pack (chest deflection sensor).

Members received information as before 2004, tests were performed with old version of Q series family and since 2004 the upgraded version must be used.

To conclude, it was requested to FTSS a synthesis document regrouping all updated parts, definition of the new parts and date of the replacement (upgrade). This information is fundamental to validate that Q-series family is finalized and is in a position to be introduced in regulations as reliable tool.

#### **Action FTSS**

## 6.4 Dynamic tests

### 6.4.1 NPACS study on rear impact

This presentation is postponed next meeting (September).

**Action IDIADA**

### 6.4.2 UTAC presentation on pulses

**Doc. INF GR / CRS-4-3**

Pierre Castaing presented a synthesis of vehicles tests according to ECE.R94, EuroNCAP and PDB including A-pillar deceleration measurements. EuroNCAP curves show level of deceleration higher than ECE.R94 curves; timing is not really different for both; velocity is not really relevant. It was noted that loading time and level of decelerations are different (between curves and current ECE.R44 corridors).

It was reported that this item was studied by EEVCE WG18. Finally this group decided pulses and corridors did not necessitate a modification. Severity of pulse had been considered as sufficiently severe, but without data to work on this subject, this item had been only brought in mind.

Pierre Castaing requests participants on their points of view regarding the pulse. He asks NPACS representative regarding choice of pulse used in the protocol. Marianne Le Claire answers that loading time of the pulse is different, i.e. shorter, because they used data from accidentology. They estimated accident velocities and used it to define a pulse.

Considering pulses generated from EuroNCAP and ECE.R94 tests, Pierre Castaing says that target of the group is not to use EuroNCAP pulse (average presented), because deceleration level is higher, but to follow a pulse similar to ECE.R94 average presented previously. Pulses from ECE.R44 corridors (average) and ECE.R94 average presented seem to be similar in terms of level of maximum deceleration, even if time and slope are a little bit different.

Chairman requests members on their feeling regarding differences on results, generated by the both types of pulses.

UTAC proposed to perform a series of tests to assess the differences of results in using both pulses on a R44 rig. Moreover these tests will help to assess reproducibility and repeatability of Q-series dummies (only with Q3 in a first time) as discussed previously. UTAC have a Q3 but need collaborations of partners to have a second dummy. Both dummies should be calibrated before tests. Results and presentation should be available for the next meeting, in September.

**Action UTAC + Partners to lend second Q3**

Heiko Johannsen, from TUB, gives information to the group on TUB work regarding side impact.

**Doc. INF GR / CRS-4-9**

First document is a technical report on selection of side impact test procedures that was issued to European project CHILD (Child Injury Led Design). The document gives information on capability of current side test protocols to differentiate CRS. Proposal of a side test protocol (for CHILD project) is included. The study is based on 7 CRS tested. Conclusion of the report is that the best way to have a representative test is to use a modified version of NPACS protocol, and that version is presented in the report.

**Doc. INF GR / CRS-4-6**

Mister Johannsen presented full-scale test results with and without Isofix. Tests were performed on Megane with side airbag deactivated. Two types of CRS are tested, firstly a

Bebe Confort in Forward facing configuration, with Q3, secondly a Maxi Cosi Cabrio in Rearward Facing configuration with Q1,5. Both CRS are tested with and without Isofix. Results of these Full-Scale tests are compared to Sled tests (tests performed following ISO and ADAC fixed procedures).

Conclusions are shown that ISO and TUB side test protocols give minor differences between the both types of seat attachment (with and without Isofix). ADAC procedure seems to be sensitive and give lower values criteria in case of CRS is used with Isofix fixation.

Following last presentation Pierre Castaing emphasizes that the main problem to reproduce correctly side impact in a procedure is intrusion in the car. Therefore question for us is what do we want to do in the future regulation? Do we want to reproduce a car to car configuration on a test bench? Or is it possible to consider a simple configuration?

Next step of reflection will be what do we want to measure? Do we want to validate head containment and biomechanical criteria in a first test and energy absorption of CRS in a second step? We can imagine a pendulum test as for pedestrian assessment. In that case, group needs to define level of energy expected, type of impactor, number and localization of application points on CRS. But another solution to assess efficiency of CRS could be to define a global solution as in EuroNCAP test for example?

Pierre Castaing will contact Luis Martinez to give him orientations/decisions of the group regarding side impact tests and to request that WG18 supports and works on this topic. This item will be discussed in the meeting of October.

**Action Chairman**

## **6.5 Interoperability with vehicles**

### **6.5.1 APROSYS presentation by UPM**

This presentation is postponed next meeting due to absence of Luis Martinez (apologized)

### **6.5.2 CI study of the performance of restraints used by children aged three years and under, with recommendations for the development of the new Regulation**

Ronald Vroman presented a study based on real world accidents from USA, Sweden and UK involving forward facing and rear facing seats. The aim of the study was to determine the potential of protection offered by a large rear facing seat. In most of the cases investigated there was no intrusion, no evidence of head contact, but severe injury or death were observed. The authors of the study concluded that outcomes of accidents would have been different in 13 cases out of 17 cases, had rear facing seats been used. The injuries reported with rear facing seats in Sweden were associated with luggage loading during the accident.

### **6.5.3 USA final rules – Ease of use**

Due to lack of time, Pierre Castaing gives briefly some indications regarding US data presented in GRSP meeting, documents on US final rules and Ease of use.

See Document GRSP 43-14, 43-31 and 43-32 on website address:

<http://www.unece.org/trans/main/wp29/wp29wgs/wp29grsp/grspinf43.html>

## **6.6 Japan accident data**

**Doc. INF GR / CRS-4-8**

Mister Nojiri from Takata presented data about Fatalities and Injuries among Children in Motor Vehicle Crashes in Japan (source JASIC). He mentioned that Japan adopted ECE.R44 regulation and authorities are interested by work in progress in our group.

As in Europe, Japanese survey shows a lot of misuses on CRS including unrestrained children in cars, a situation involving deaths and serious injuries in frontal and side impact accidents.

Moreover results of the survey show that the body region the more injured is the head in both types of accidents (frontal and side). However there are no details in the survey regarding head loading (contact, no contact, surface impacted)

Conclusions highlight the importance to find solutions that reduce misuses of CRS.

## **7 Definition of a Frame Work for drafting a regulation**

Action is postponed next meeting for lack of time.

**Action Chairman**

## **8 Date and Venue of Next Meetings**

Dates of next meetings were planned:

- September, 2<sup>nd</sup> – Ministry (Vienna)
- October, 7<sup>th</sup> – CLEPA (Brussels)
- November, 25<sup>th</sup> – BNA (Suresnes)

## **9 AOB**

No other business.

## **10 Actions**

To conclude the 4<sup>th</sup> meeting, Pierre Castaing mentions that priority will be given during next meeting to:

- Load level anchorages – CLEPA presentation expected.
- Load level anchorages – OICA or car manufacturer presentation expected.
- Data from NPACS regarding test benches comparisons and NPACS rear impact study – TRL presentations expected.
- Data from APROSYS – UMP presentation expected.
- Interoperability on vehicle/CRS.
- Issues on classification and pulses expected.

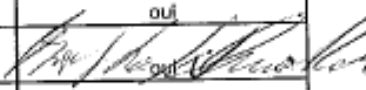

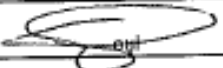

See Action list in Annex 2.

## 11 Attachments and Working Documents

<b>Annex No.</b>	<b>Presented by / on behalf of</b>	<b>Title</b>
1	PC	Attendance list
2	PC	Actions list
3	PC	Documents list

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25 June 2008



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Action Number	Action	Target Date	Action By	Comp Date
1.1	Terms of reference	01/04/08	Chairman	01/04/08
1.2	Test Bench definition – Information/Presentation following NPACS protocol	13/05/08	OICA / CI	13/05/08
1.3	R point / Cr point correlation	Postponed 13/05/08	MPA	13/05/08
1.4	Floor positioning versus R (H) point	Postponed 13/05/08	OICA	13/05/08
1.5	Classification – Anthropometry data	01/04/08	CLEPA	01/04/08
1.6	Classification – Load level in Isofix anchorages	Postponed 13/05/08	OICA / CLEPA	13/05/08
1.7	Dummies – FTSS presentation	13/05/08	RDW / EEVC WG12	13/05/08
1.8	Dummies – Results from test labs	13/05/08	All	
1.9	Dummies – NPACS experience	13/05/08	CI	13/05/08
1.10	Dummies – DFT Validation	13/05/08	DFT	13/05/08
1.11	Side Test protocols in the world	13/05/08	CLEPA	13/05/08
1.12	Validation of door velocity in side impact procedure	Postponed	OICA	
1.13	APROSYS study on vehicle's interior arrangement	Postponed	UPM	
1.14	Misuses – Marking of Isofix anchorages	ASAP	TUV Rheinland	
1.15	Information to GRSP concerning CRS regulation for Buses and Coaches	???	IDIADA	
1.16	Pulses – Presentations/Analysis	Postponed	UTAC	18/06/08
1.17	ISO data on accidentology and accident scenario	Postponed 13/05/08	ISO	13/05/08
1.18	EEVC WG18 final report	01/04/08	EEVC WG18	01/04/08
1.19	Invitation of EEVC WG12, WG18 and TUB	01/04/08	Secretary	01/04/08
2.01	EEVC WG18 final report (version of February 07)	18/06/08	Netherlands	

<b>Action Number</b>	<b>Action</b>	<b>Target Date</b>	<b>Action By</b>	<b>Comp Date</b>
2.02	NPACS study on rear impact	18/06/08	TRL	Postponed
2.03	US situation on rear impact	18/06/08	Chairman	Postponed
2.04	Side impact data upgraded	18/06/08	LAB	Postponed
2.05	Dummy family comparisons by NPACS	13/05/08	TRL	13/05/08
3.01	Comparison between ECE.R44 and NPCAS test bench	18/06/08	TRL	Postponed
3.02	Information on acceptable limits of vehicle floor	18/06/08	All	
4.01	Classification – Load level in Isofix anchorages	02/09/08	OICA	
4.02	Dummies – Repeatability and reproducibility in Q-family	02/09/08	All	
4.03	EEVC WG18 Chairman to discuss for future collaborations	02/09/08	Chairman	
4.04	Information on safety level for A P10 dummy with and without CRS in case of accidents (tests)	02/09/08	Daimler	
4.05	Background on Directive 2003/20/EC	02/09/08	Chairman	
4.06	Synthesis document on Q-series family upgrades	02/09/08	FTSS	
4.07	Tests to assess differences between ECE.R44 and R94 pulses	02/09/08	UTAC	

Document Number	Title	Origin
INF GR / CRS-4-9	Minutes of 4 <sup>th</sup> meeting of the Informal Group on Child Restraint System	Secretary
INF GR / CRS-4-8	Japanese accidentology presentation	JASIC
INF GR / CRS-4-7	Study of the performance of restraints used by children aged three years and under, with recommendations for the development of the new Regulation	Consumer International
INF GR / CRS-4-6	Full-scale Tests with and without ISOFIX	TUB
INF GR / CRS-4-5	Short report on Forward Component in ISO Side Impact Test Procedure for CRS	TUB
INF GR / CRS-4-4	Short report on Side Impact Testing with Big Rear-Facing Scandinavian Child Restraints	TUB
INF GR / CRS-4-3	ECE.R94 / EuroNCAP / PDB pulses comparison	UTAC
INF GR / CRS-4-2	Q-dummies Update (2004-2006) Presentation	FTSS
INF GR / CRS-4-1	Provisional Agenda for 4 <sup>th</sup> meeting of the Informal Group on Child Restraint System	Chairman
INF GR / CRS-3-18	Minutes of 3 <sup>rd</sup> meeting of the Informal Group on Child Restraint System	Secretary
INF GR / CRS-3-17	Load level in Isofix Anchorages	CLEPA
INF GR / CRS-3-16	Side Impact Test Methods for Evaluating Child Restraint Systems. A Summary for GRSP Informal Group on Child Restraints Systems	CLEPA
INF GR / CRS-3-15	Dummies NPACS comparison	TRL
INF GR / CRS-3-14	Q-dummies ready to enter regulations	FTSS
INF GR / CRS-3-13	Child Occupant Protection Research & Considerations for Future Regulations	Canada
INF GR / CRS-3-12	JPMA/Vehicle Manufacturer LATCH WG	US
INF GR / CRS-3-11	Classification - Anthropometry	CLEPA
INF GR / CRS-3-10	Data from child anthropometry data base CANDAT	Netherlands
INF GR / CRS-3-9	Selection of Size of Child Restraints	Australia

INF GR / CRS-3-8	Indicative Anthropometric Data	Australia
INF GR / CRS-3-7	Data on floor position	OICA
INF GR / CRS-3-6	Location of ISOFIX Top-tether anchorages Location of Cr-Point	OICA
INF GR / CRS-3-5	NPACS presentation	TRL
INF GR / CRS-3-4	ISO information on CRS International Standards	ISO
INF GR / CRS-3-3	SMMT directions	SMMT
INF GR / CRS-3-2	ISO/TR 14646 - Road vehicles - Side impact testing of child restraints systems	ISO
INF GR / CRS-3-1	Provisional Agenda for 3rd meeting of the Informal Group on Child Restraint System	Chairman
INF GR / CRS-2-8	Minutes of 2nd meeting of the Informal Group on Child Restraint System	Secretary
INF GR / CRS-2-7	NPACS Final Report_Project Report Version2.pdf	TRL
INF GR / CRS-2-6	WHO_Growth.ppt – Anthropometric data	UPM
INF GR / CRS-2-5	05-0157-O.pdf – ESV presentation	EEVC WG18
INF GR / CRS-2-4	CANDAT_data.pdf – Anthropometric data	Netherlands
INF GR / CRS-2-3	EEVC WG18 report	Netherlands
INF GR / CRS-2-2	Proposal for Terms of Reference and Rules of Procedure	Chairman
INF GR / CRS-2-1	Provisional Agenda for 2 <sup>nd</sup> meeting of the Informal Group on Child Restraint System	Chairman
INF GR / CRS-1-8	Minutes of 1st meeting of the Informal Group on Child Restraint System	Secretary
INF GR / CRS-1-7	Informal document No.GRSP-42-27	GRSP
INF GR / CRS-1-6	Informal document No.GRSP-42-02	GRSP
INF GR / CRS-1-5	Proposed Schedule for a Review of ECE Regulation 44.03	EEVC WG18
INF GR / CRS-1-4	Effect of Q-dummies and Criteria on the EEVC Test Database Results	EEVC WG12&18

INF GR / CRS-1-3	Injury Criteria for Q Dummies	EEVC WG12&18
INF GR / CRS-1-2	DRAFT OF Q-DUMMIES INJURY CRITERIA	EEVC WG12
INF GR / CRS-1-1	Provisional Agenda for 1st meeting of the Informal Group on Child Restraint System	Chairman