

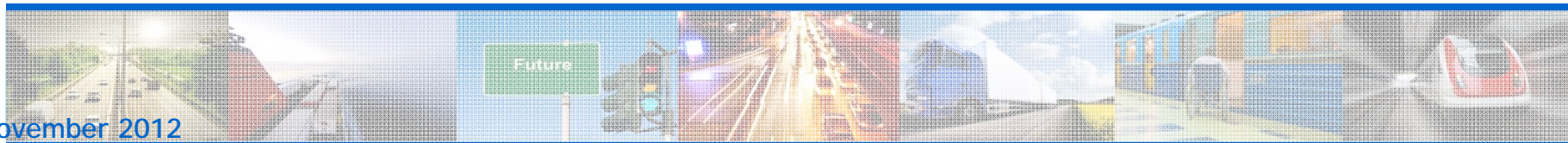


United Nations Economic Commission for Europe  
Transport Division

# Child Restraints Systems (CRS) Endeavours of United Nations to secure children on cars

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UNECE TRANSPORT DIVISION

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# New UN Regulation on CRS - Foundation stones

- Fatal accident analysis
  - Casimir project
- Representative real world data
  - GIDAS
- Observation data campaign
  - CEDRE
  - CASPER
- Synthesys



- **CARE database 2008 :**
  - Data for EU27 ( except Cyprus, Bulgaria, Lithuania)
  - Children (0-11y) , car passengers
  - 340 killed, 2790 severely injured
- **The United Nations General Assembly:**
  - proclaimed "the period from 2011 to 2020 as the Decade of Action for Road Safety "
- **European Commission:**
  - proposed "to continue with the target of halving the overall number of road deaths in the European Union by 2020 starting from 2010 "



# Context - Europe

- Research works

- EPOCH (Enabling Protection for Older Children)

- Objectives:

- Produce a 10/12 year old prototype dummy
- Extend the NPACS testing and rating protocols for older children
- Make proposals for Q10/12 dummy use in UN-ECE Regulation



- CASPER (Child Advanced Safety Project for European Roads)

- Objectives:

- Analysis of the reasons and consequences of the conditions of transportation of children both on scientific and sociological aspects.
- Improvement of the efficiency of child protection





# Fatal accident analysis

- **CASIMIR:** (Child Accident Study Investigating Fatal Incident on Road)
  - French project, results published May 2010
  - Analysis of police reports:
    - child fatalities (<12 years) (all car accidents) in France in the period oct 2001 to sept 2003.
    - sample size: 206 killed children out of 210
    - France: In 2003, 2/3 of total number of children killed on the road were car occupants
  - Distribution of fatalities per types of impact:

Impact type	Frontal	Side	Roll over	Rear	Others
<b>children</b>	<b>34%</b>	<b>28%</b>	<b>18%</b>	<b>4%</b>	<b>15%</b>
<i>All occupants</i>	<i>45%</i>	<i>32%</i>	<i>13%</i>	<i>2%</i>	<i>7%</i>





# Incorrectly restrained children

- Explanations

- Incorrectly restraining situation can be

- Inappropriate restraint system (e.g., adult belt only for children that should use a CRS)
- Wrong installation of CRS (e.g., wrong routing of vehicle belt) (called misuse) or not authorized seating position (active frontal airbag, floor resistance,...)
- Mistakes by restraining the child in the CRS (e.g., slack in harness system, seatbelt under the arm,...) (called misuse)



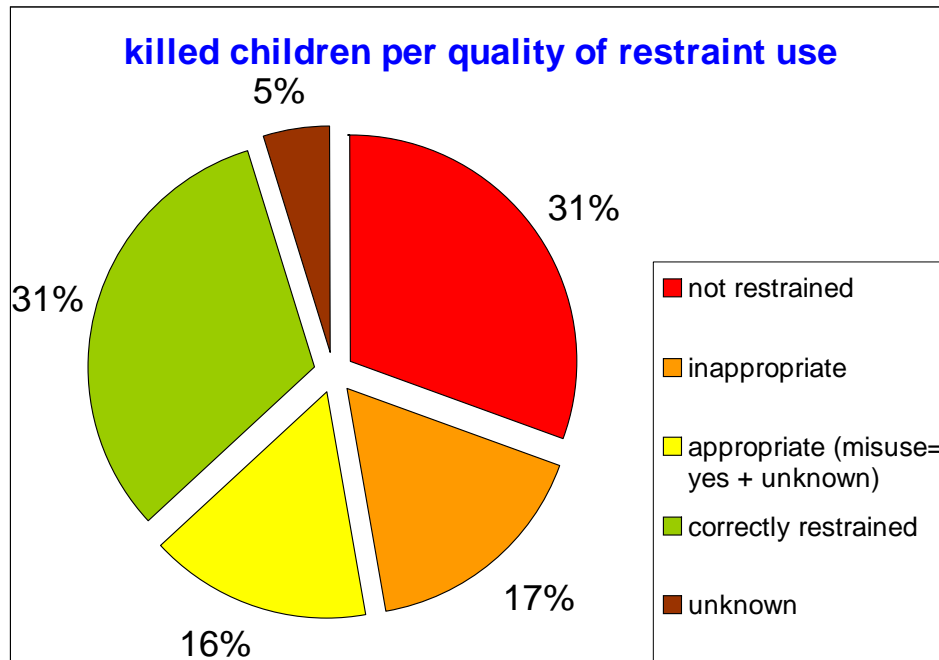


# Fatal accident analysis

## CASIMIR

### • Analysis

- Drivers: 80% are parents, 11% are close family



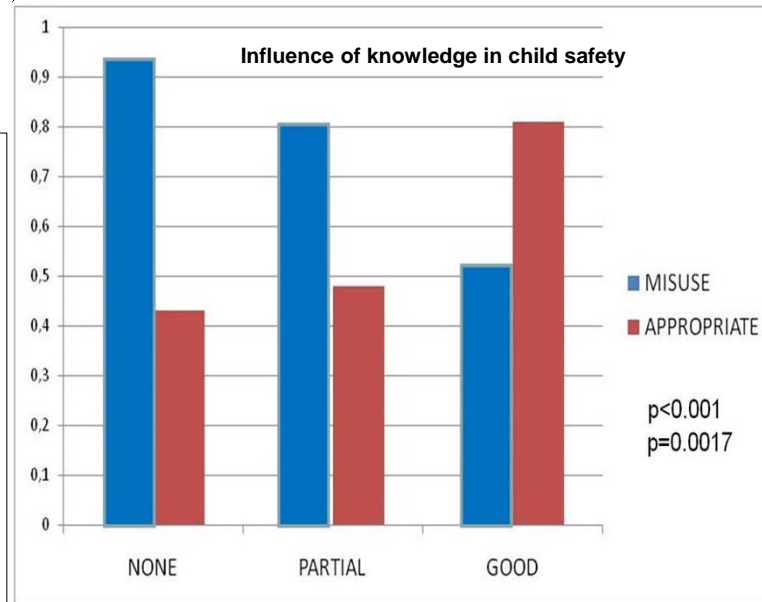
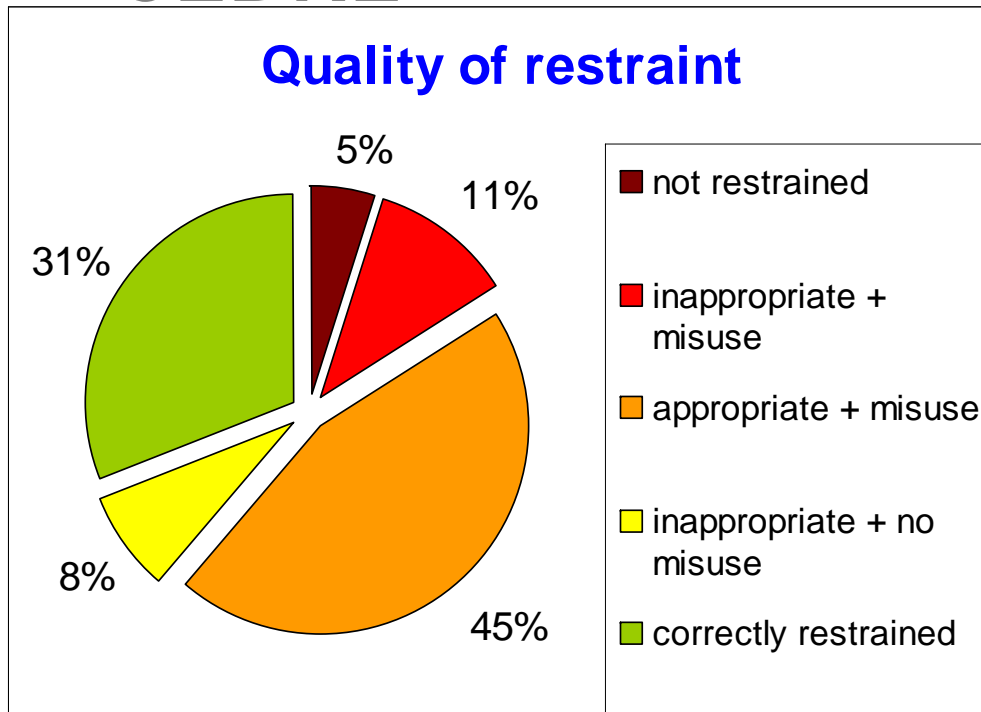
average:	23%
not restrained	49%
misuse (appropriate or not)	35%
no misuse (inappropriate)	10%
correctly restrained	3%

Maximum rate of correctly restrained children = 31% (misuse is underestimated when based on accident reports analysis)

Restraint use and misuse have a high influence killed children that have been ejected



# Observation data campaign CEDRE



From interviews, it clearly appears that parents do not measure correctly the level of safety for their children (especially parents from new borns)





## Synthesis

- Frontal impacts, rear impacts and roll overs seem to be correctly covered by current regulation and do not seem to be an issue for most of the correctly restrained children.
  - CASIMIR, GIDAS
- Reduction of the impact severity in order to be in range where the car protects its occupants mainly for frontal and side impacts (*mainly on near side*)
  - CASIMIR



- Very few ISOFIX CRS (1%) although more than 45% cars are equipped with rigid anchorages (France)
- Approximately 20% of drivers knew what ISOFIX is (France)
- Combination car equipped with rigid anchorages and drivers knowing what it means : 7% of the total sample!(France)



- Improve use and the quality of use is the priority
  - CASIMIR, CEDRE, CASPER
- Children are mostly safe
  - GIDAS
- Information campaigns and practice clinics dedicated to parents - sensibilization
  - CEDRE: Information is a useful and necessary step to limit misuse but not sufficient: misuse rate is still > 50% influencing parameter studied
  - CEDRE and CASPER: About inappropriate use : reason is the switch of one system to another too early including the use of the seatbelt only
- ISOFIX to be promoted
  - CEDRE - low use of ISOFIX, very low knowledge of parents
  - CASPER - To fix the CRS to the car, many parents feel/admit that they are not doing it correctly but are not able to tell what is wrong in their installation



# The New UN Regulation





- **New regulation** - initiated in Jan08 - on going work on validation of dummies and next phases
  - Objectives:
    - The informal group developed a new regulation for “Restraining devices for child occupants of power-driven vehicles” under the responsibility of GRSP.
    - A step by step approach was implemented
      - Phase1: Develop definitions, performance criteria and test methods for ISOFIX Integral “Universal” CRS **status : adopted by WP.29 (November 2012)**
      - Phase2 - ISOFIX CRS non integral (Child restrained by adult safety belts) Develop transitional provision to withdraw ISOFIX application from Regulation No. 44 after **status : in progress**
      - Phase3 - will develop the necessary amendments to upgrade Regulation No. 44 for the Seatbelt mounted CRS and Regulation Nos. 14 and 16 in order to introduce for this category of CRS the outcome of Phase 1 and 2.



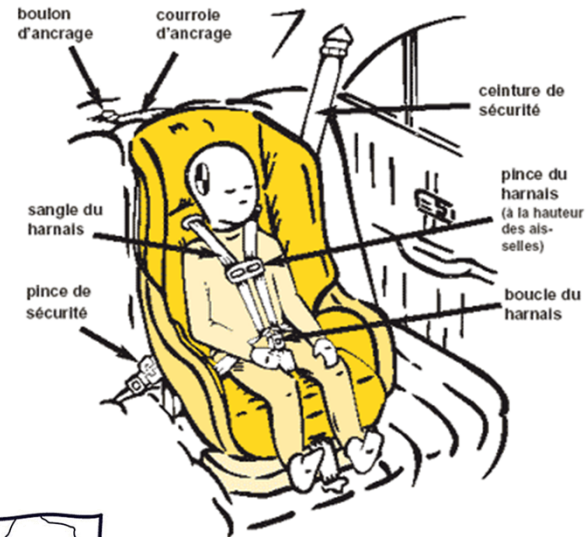
- **Independent regulation.** UN Regulation No. 44 remains valid
  - Multi steps approach
- **The scope of this new regulation cover only “ISOFIX - Universal - Integral” CRS in first step**
- **New philosophy of classification**
  - No groups
  - Classification based on standing height, maximum permissible weight (Child + CRS) and age limit for forward facing use.
- **Use of measurement device for CRS size control**
- **Use of the Q dummies for frontal, rear and lateral dynamic impact on a new test bench**
- **Use support leg as well as top tether as universal anti rotation device**



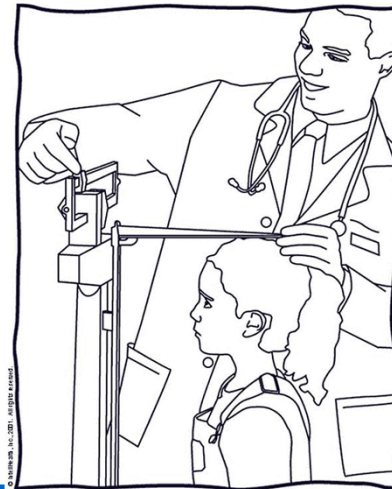
- **ISOFIX “universal” integral CRS**
  - ISOFIX
    - 2 lower anchorages + 1 anti rotation device:
      - Top Tether
      - Support leg
    - No use of the adult safety belt for the restraint of the child seat
  - **Universal**
    - <F2X ISO fixture for FF & <R2 ISO fixture for RF
    - With top tether or support leg
    - Integral
      - Child is restraint only by the CRS restraint system (harness)
      - No use of the adult safety belt for the restraint of the child



- No group approach



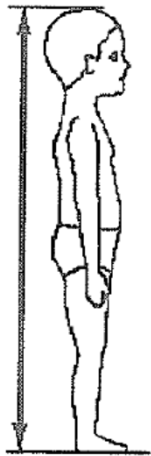
siège d'enfant/de bébé utilisé face à l'avant



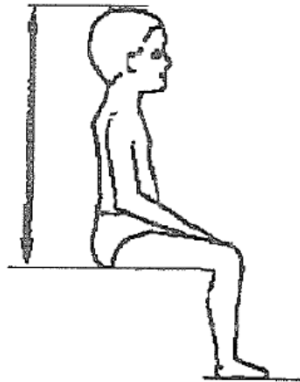




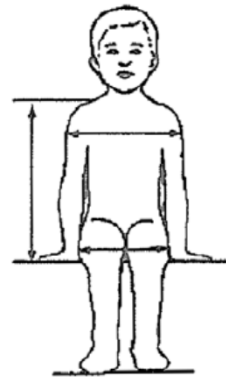
# Classification on standing height



Standing Height



Seating Height



Shoulder Height

Shoulder Breadth

Hip Breadth

Geometrical dimensions of  
①-Size child restraint systems

<i>Stature</i> <i>mm</i>	<i>Sitting height</i> <i>mm</i>	<i>Shoulder breadth</i> <i>mm</i>	<i>Hip breadth</i> <i>mm</i>	<i>Shoulder height</i> <i>mm</i>	
Every 50mm	95%ile	95%ile	95%ile	5%ile	95%ile



- Maximum weight of acceptable children  
= 33 kg (CRS + child weight).

*(info to consumer: i.e. if CRS weighs 1 kg it can be used by children with 32 Kgs )*

- Maximum stature of acceptable children  
= declared by EM and controlled by TAA.  
*(info to consumer)*

- Minimum age of acceptable children

*15 months for FF. (Mandatory marking)*



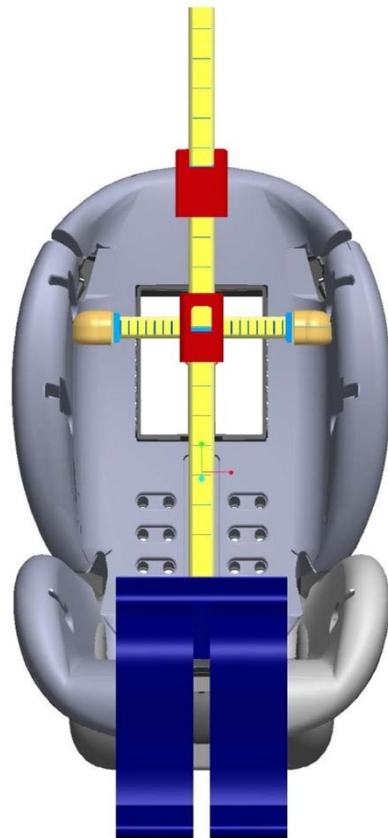
- Forward Facing CRS is suitable for a child **older than 15 months** with a mass **not exceeding 33 kg altogether the CRS**
- Rearward Facing CRS is suitable for a child until 15 months **not exceeding 33 kg altogether the CRS**



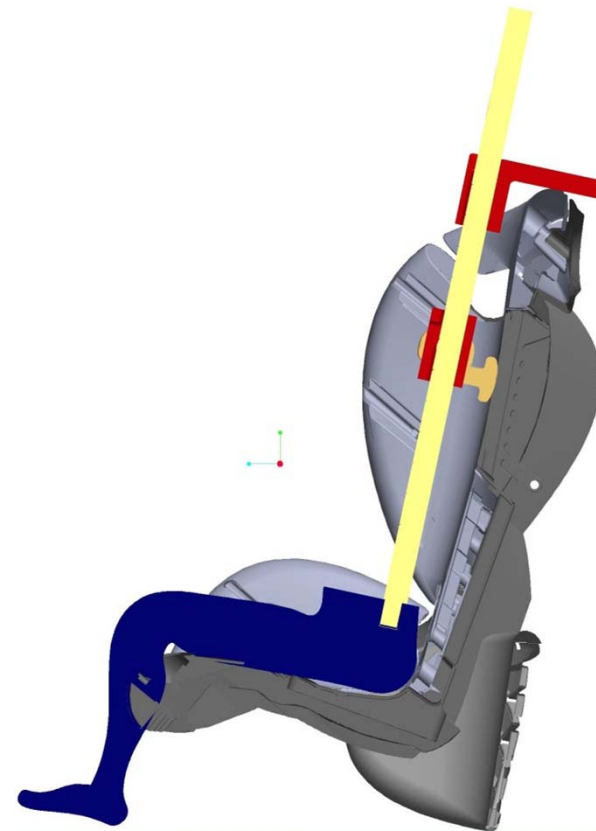
# The measurement device inside a CRS

Based on the range of size declared by the CRS manufacturer

- Front



- Section







## Use of the Q dummies

For dynamic behaviour in:

- Frontal impact
- Rear impact
- Lateral impact

Q-dummy family well equipped ...

<b>Q6</b>	23.0 kg
<b>Q3</b>	14.5 kg
<b>Q0</b>	3.4 kg
<b>Q1</b>	9.6 kg
<b>Q1.5</b>	11.0 kg

... to contribute to child safety

GRSP adhoc Group CRS testing – London May 13, 2008

33

First Technology<sup>33</sup>  
Innovative Solutions



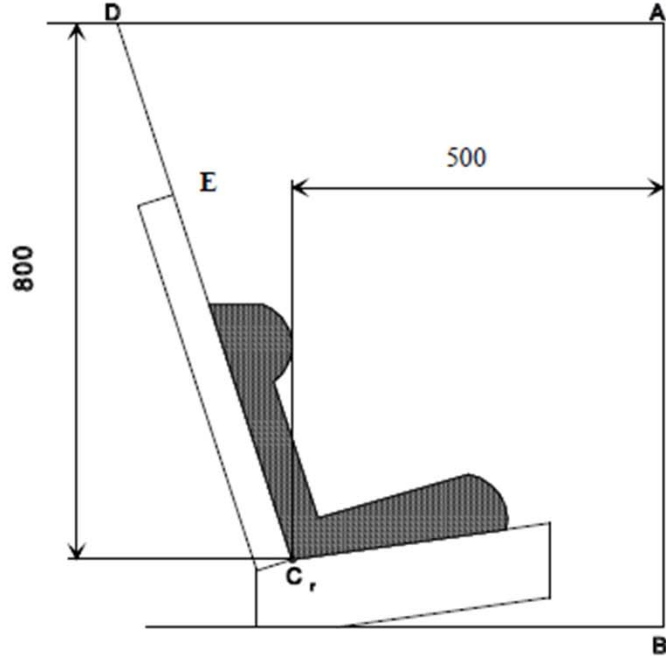
# Summary of provisions

## Frontal/Rear/Lateral impacts

- Injury assessment criteria
  - Biomechanical performance criteria recorded through dummies
- Head excursion limits
  - no part of the head of the dummy shall pass beyond defined planes on the test sled (verified by cameras)

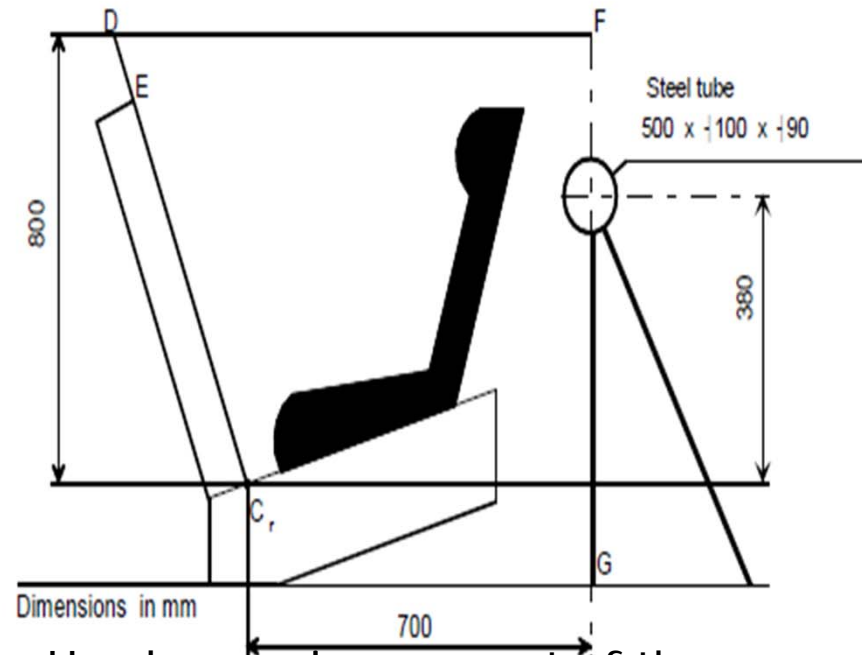


Arrangement for testing a forward-facing device



- Head excursion: no part of the head of the dummy shall pass beyond the planes BA, DA and DE as defined in figure above

Arrangement for testing a rearward-facing device, not supported by the dashboard



- Head excursion: no part of the head of the dummy shall pass beyond the planes FD, FG and DE as defined in figure above



## Arrangements for the lateral impact test

Figure 1  
Door panel geometry and position at T0 – Top View

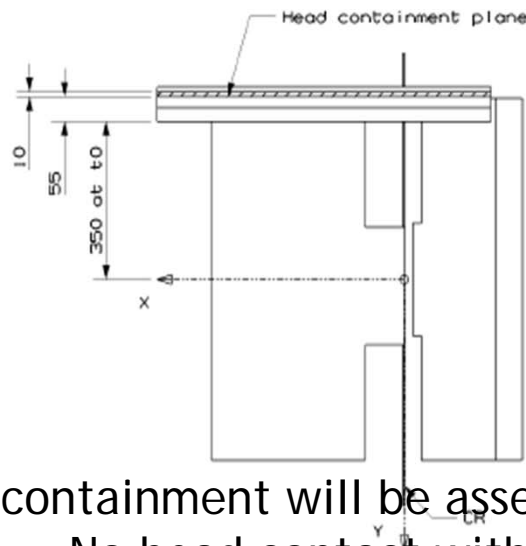
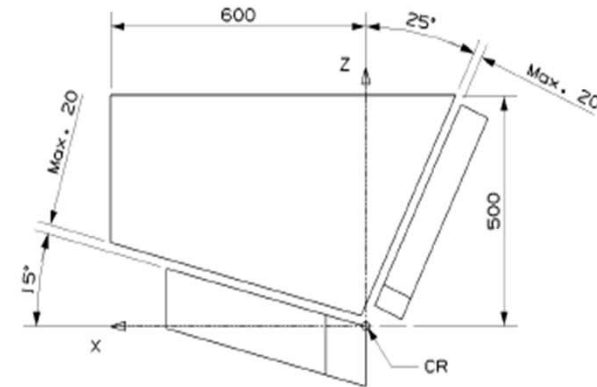


Figure 2  
Door panel Geometry – Side View



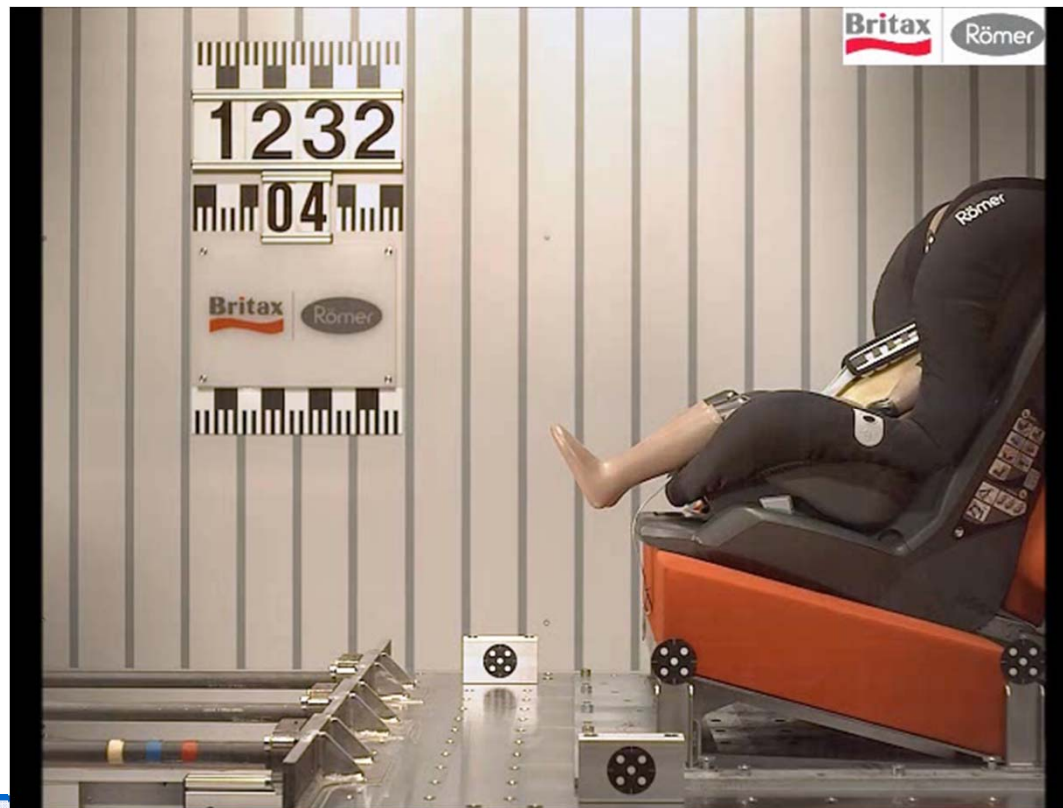
Head containment will be assessed by the following criteria:

- (a) No head contact with the door panel (simulated on the sled by a trapezoidal foam sheet);
- (b) Head shall not exceed a vertical plane identified by a red line on top of the door (top view camera). This vertical plane is identified by a line on the impacted door





# The UN Regulation is promoting Rearward Facing Child Restraint Systems.....



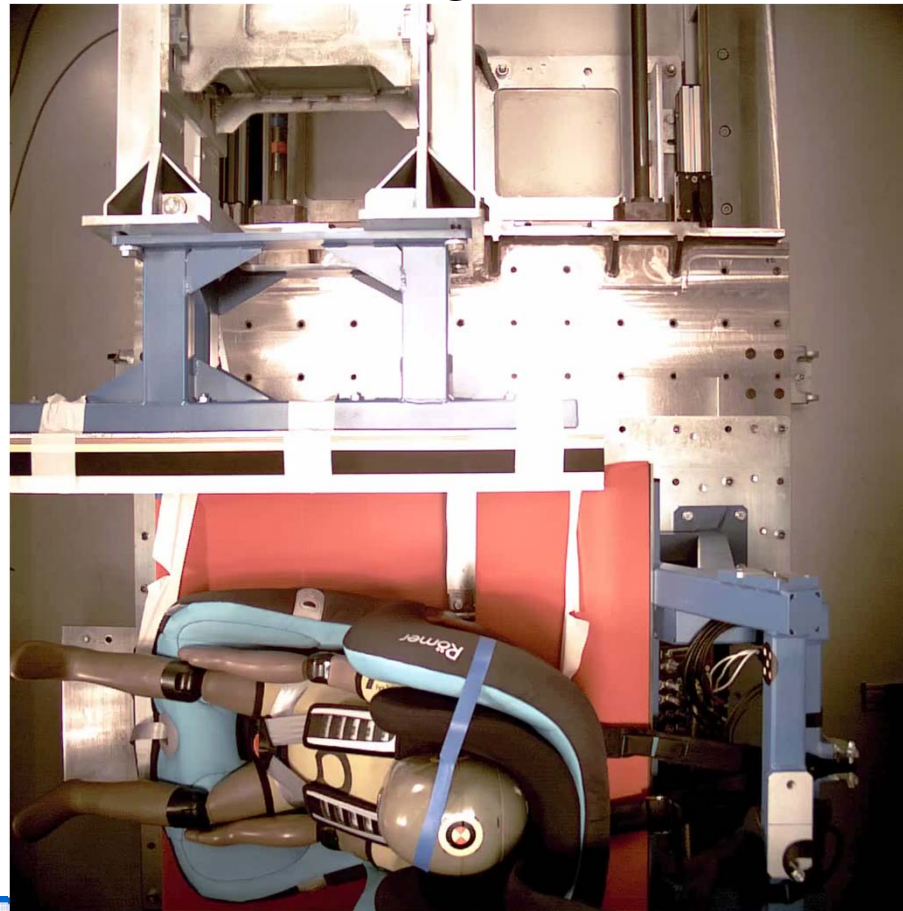


Rearward facing is safer than forward.





# The lateral containment of the head is the new requirement to limit injuries in side impacts





**ISOFIX is the unique solution to prevent misuse.  
The new UN Regulation is promoting just ISOFIX!**











- WP.29 has adopted in November this year new requirements preventing users, or siblings from unintentionally disengaging ISOFIX child restraint systems from their anchor points.