Priorities for the protection of children in cars: available data from the field

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Priorities for children in cars

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- **Fatal accident analysis**
  - Casimir project
- **Representative real world data**
  - GIDAS
- **Observation data campaign**
  - CEDRE
  - CASPER
- **Synthesis**
Children in cars - context

• 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

• **On-going 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
Context – Europe and others

• **New regulation** – initiated in Jan08 - on going work
  – Objectives:
    • The informal group shall consider the development of a new regulation for “Restraining devices for child occupants of power-driven vehicles” for consideration by GRSP.
    • A step by step approach shall be implemented
      – Phase1: Develop definitions, performance criteria and test methods for ISOFIX Integral “Universal” CRS status: to be validated by GRSP.
      – Phase2 – ISOFIX CRS non integral (Child is restraint by the adult safety belt) status: TOR to be agreed
      – Phase3 – during phase2, discussions will take place in order to see if an additional phase is necessary to cover the other types of CRS.
Fatal accident analysis

- **CASIMIR**: (Child Accident Study Investigating Mortal Incident on the 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:

<table>
<thead>
<tr>
<th>Impact type</th>
<th>Frontal</th>
<th>Side</th>
<th>Roll over</th>
<th>Rear</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>children</strong></td>
<td>34%</td>
<td>28%</td>
<td>18%</td>
<td>4%</td>
<td>15%</td>
</tr>
<tr>
<td><strong>All occupants</strong></td>
<td>45%</td>
<td>32%</td>
<td>13%</td>
<td>2%</td>
<td>7%</td>
</tr>
</tbody>
</table>
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

![Pie chart](chart.png)

- **killed children per quality of restraint use**
  - not restrained: 5%
  - inappropriate: 31%
  - appropriate (misuse = yes + unknown): 31%
  - correctly restrained: 17%
  - unknown: 16%

**Total ejection rate (all types of impact)**

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>average</td>
<td>23%</td>
</tr>
<tr>
<td>not restrained</td>
<td>49%</td>
</tr>
<tr>
<td>misuse (appropriate or not)</td>
<td>35%</td>
</tr>
<tr>
<td>no misuse (inappropriate)</td>
<td>10%</td>
</tr>
<tr>
<td>correctly restrained</td>
<td>3%</td>
</tr>
</tbody>
</table>

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
Fatal accident analysis
CASIMIR

**Main results per type of crash**

- **FRONTAL**
  - Not correctly restrained = 55% (including 32% not restrained at all)
  - Crash severity over physiologic limits (EES>=75kph) = 25%

- **SIDE IMPACT**
  - with intrusion (72% of side impact)
    - 57 % level of intrusion >=450mm at seating position
    - 19% not restrained
  - Child not in the area of intrusion
    - 38% not restrained

- **ROLL OVER**
  - 76% not restrained – ejection is the main reason of death
Representative real world data

- **GIDAS** (German In Depth Accident Study)
  - Data collection:
    - Hannover, Dresden (and surrounding areas)
    - 2 shifts every day
    - Minimum severity level guaranteed (at least one person injured)
    - Representative of German accidents
    - Approx. 1% of German accidents
  - Sample
    - Accidents between 1999 and 2008 (multiple impacts included)
    - Children up to 12 YO as car occupants,
    - accident against cars, objects or lorries
Representative real world data
GIDAS

Injury level per impact direction

- Front: 224 (uninjured), 188 (MAIS 1-2), 5 (MAIS 3+)
- Rear: 129 (uninjured), 97 (MAIS 1-2), 2 (MAIS 3+)
- Near side: 52 (uninjured), 50 (MAIS 1-2), 2 (MAIS 3+)
- Far side: 65 (uninjured), 80 (MAIS 1-2), 0 (MAIS 3+)
Representative real world data
GIDAS

Injury level per delta-v in frontal impacts

Note: The safety level guaranteed by the current regulation seems satisfying for most of the accidents in frontal impacts (which represents more than 80% of the accidents in frontal impact)
Observation data campaign

• **CEDRE** *(Controle et Etude de Dispositifs de Retenue Enfant):*
  – **Aim:** getting a better understanding of
    – the global situation of transportation of children in cars
    – the main reasons of incorrect use (profiles of “mis-users”)
  – 419 children in France (177 vehicles - August 08 - July 09).
  – **Collaborative project:**
    • Insurances, industry, police, administration, hospital
Observation data campaign CEDRE

- **Main results:**

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

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

- **CASPER:** Child Advanced Safety Project for European Roads
  - 36 months duration project co-funded by EC
    - (FP7-SST-2007-RTD-1 - GA no.: 218564)
  - 15 partners (industry, research, universities) from 7 countries (D, E, F, I, NL, S, UK)
  - Budget 5.5 M€

- Analysis of sociological aspects child safety in cars
- Questionnaires filled by parents (232 F, 176 E, 113 I)
- Aim to
  - understand the reality of child environment as car passenger
  - determine what are the social barriers, for drivers in charge of children transportation, to a correct use of CRS?
  - Cultural comparison using the same methodology and questionnaire
Observation data campaign

• **CASPER:** *First sociological results*

  – France, Italy, and Spain:
    • children are travelling almost everyday in cars
    • According to parents:
      • the main source of accident is other drivers: this is contradictory to CASIMIR results (*a large majority drivers of the cars in which children were killed is responsible of the accident*).

  – France:
    • 29% of parents do not use an appropriate restraint system to transport their children.
    • more than 40% of children with a weight lower than 9 kg are already using a FWD FC system
Synthesis

- **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 – sensibilisation**
  - 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
Synthesis

• Frontal impacts, rear impacts and roll overs seem to be correctly covered by current regulation and do not seem do 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
Thanks for your attention

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