Transmitted by the expert from France

Informal document **GRSP-49-25**
(49th GRSP, 16-20 May 2011,
agenda items 20)

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

Philippe LESIRE
Heiko JOHANNSEN

Priorities for children in cars

- **Introduction**
- **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 (**E**nabling **P**rotection for **O**lder **Ch**ildren)
    - 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 (**C**hild **A**dvanced **S**afety **P**roject for **E**uropean **R**oads)
    - 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:** (**C**hild **A**ccident **S**tudy **I**nvestigating **M**ortal **I**ncident on the **R**oad)
  - 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
children	**34%**	**28%**	**18%**	**4%**	**15%**
All occupants	*45%*	*32%*	*13%*	*2%*	*7%*

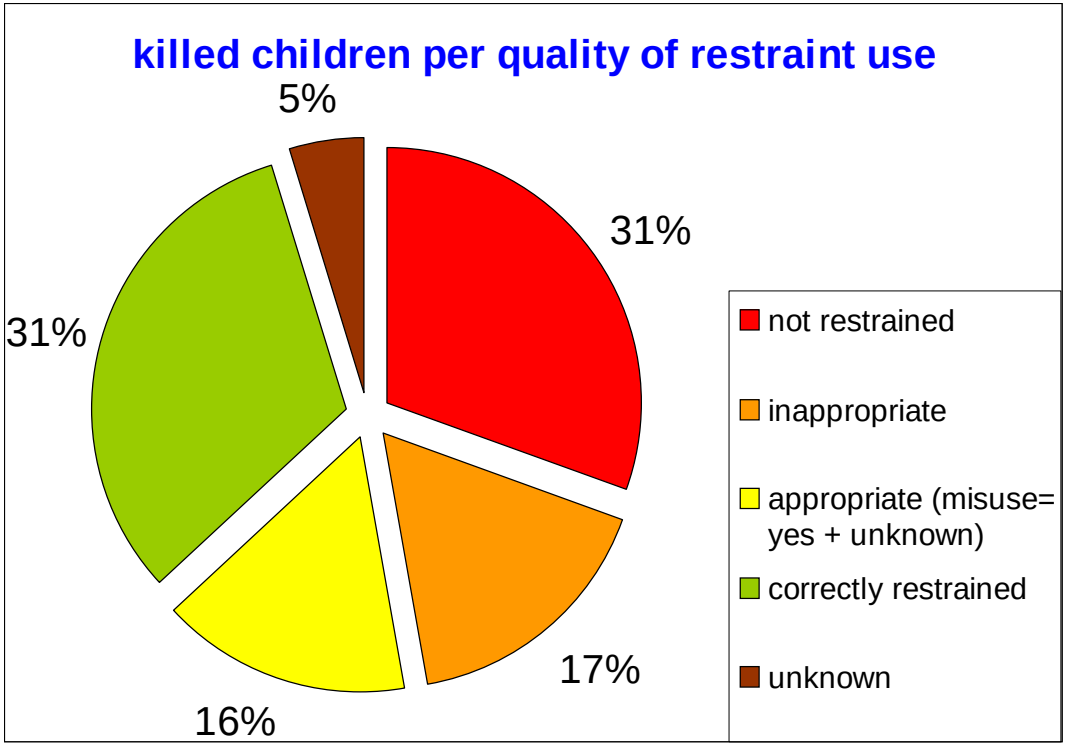
Incorrectly restained children

- **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



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

Total ejection rate (all types of impact)

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

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

Fatal accident analysis CASIMIR

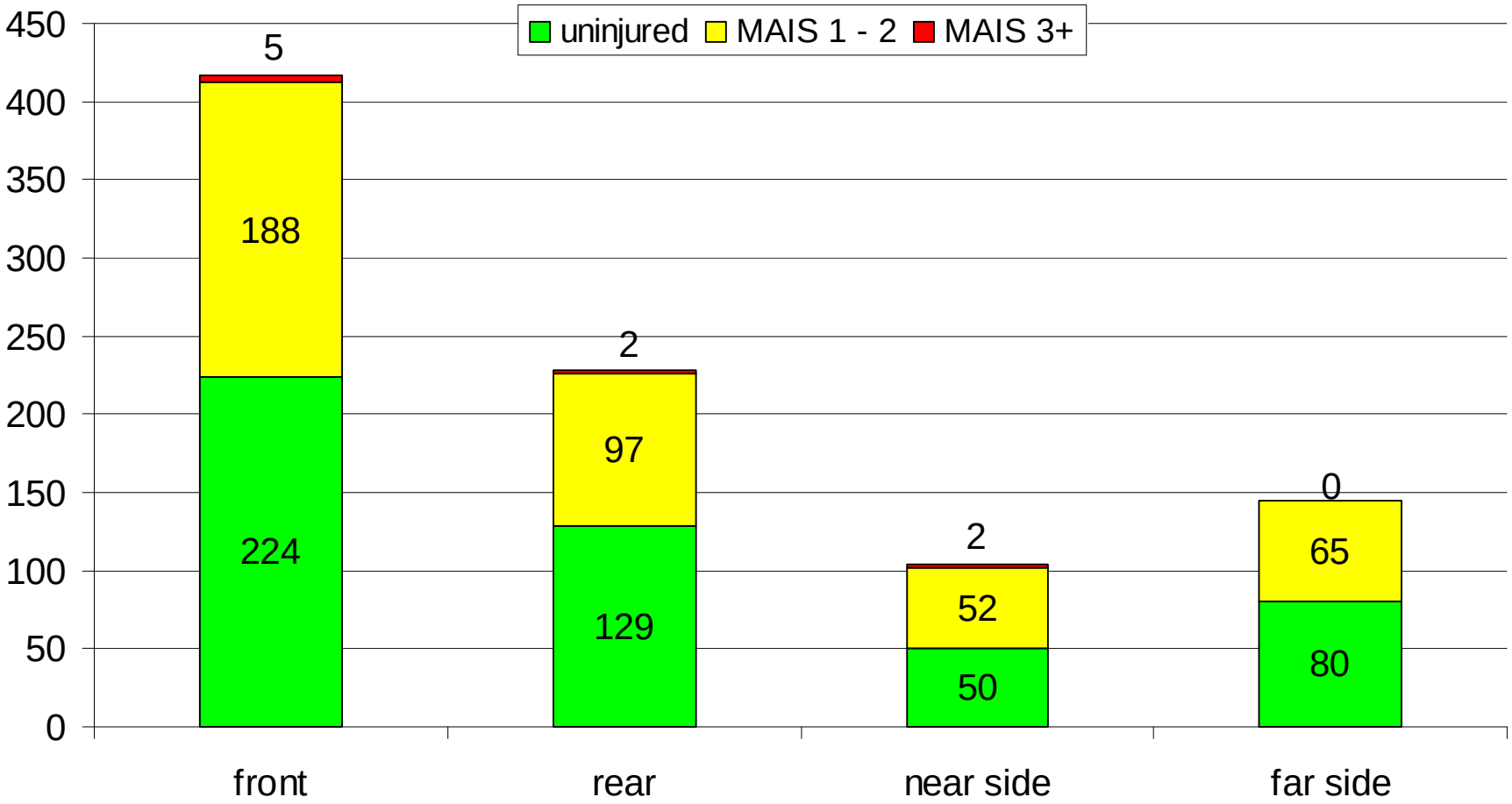
- **Main results per type of crash**
  - FRONTAL
    - Not correctly restrained = 55% (including 32% not restrained at all)
    - Crash severity over physiologic limits (EES>=75kph) = 25%
  - SIDE IMPACT
    - with intrusion (72% of side impact)
      - 57 % level of intrusion >=450mm at seating position
      - 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** (**G**erman **I**n **D**epth **A**ccident **S**tudy)
  - 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

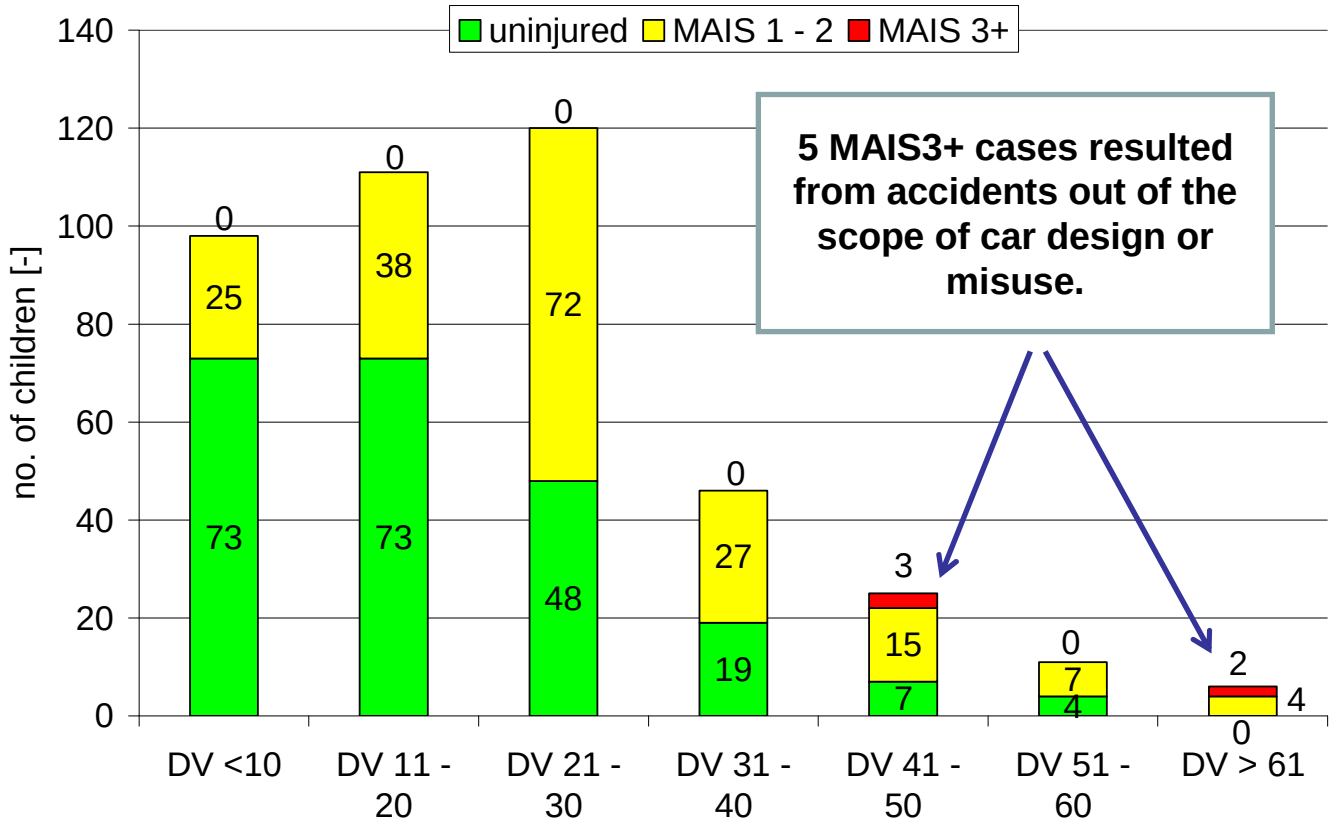
Representative real world data GIDAS

Injury level per impact direction



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)

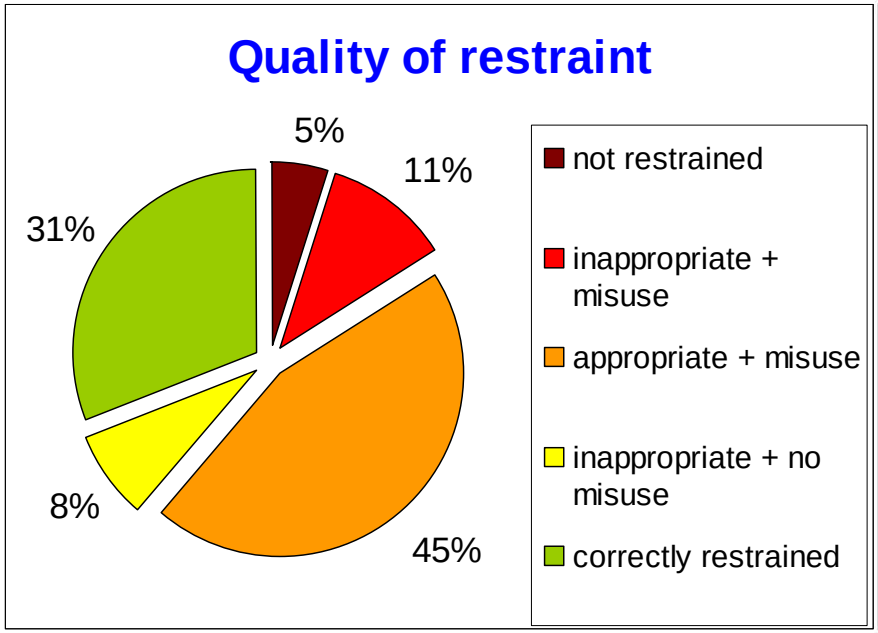
Observation data campaign

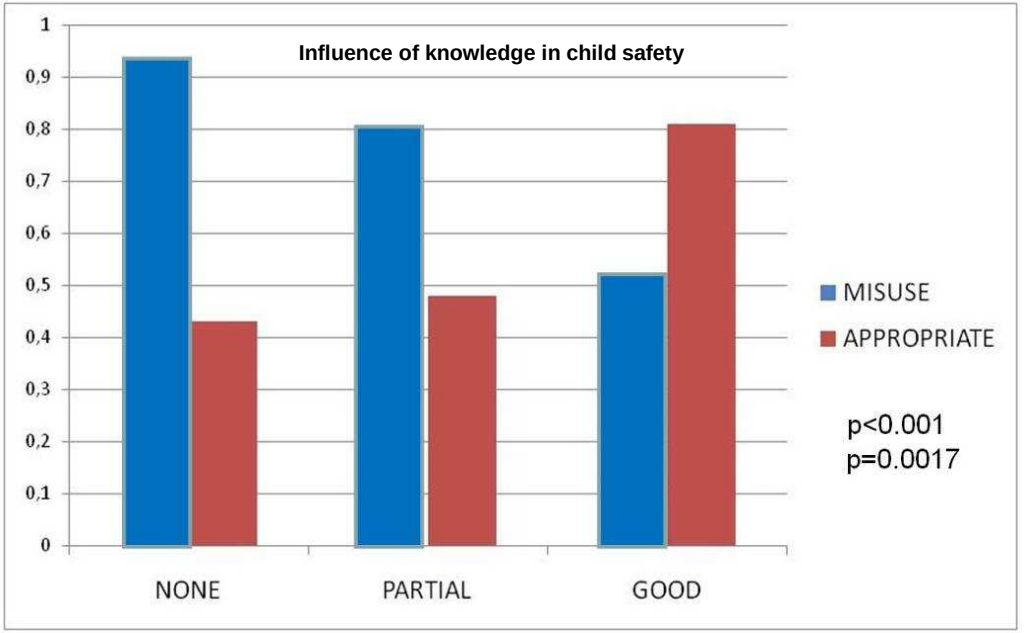
- **CEDRE** *(**C**ontrole et **E**tude de **D**ispositifs de **R**etenue **E**nfant):*
  - **Aim:** getting a better understanding of
    - the global situation of transportation of children in cars
    - the main reasons of incorrect use (profiles of “mis-users”)
  - 419 children in France (177 vehicles - 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:** **C**hild **A**dvanced **S**afety **P**roject for **E**uropean **R**oads
  - 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

philippe.lesire@lab-france.com

heiko.johannsen@tu-berlin.de