

RESTRAINT SYSTEMS FOR CHILDREN



Rimini - Il nuovo Grand Hotel

C Mercier-Guyon, CERMT, Annecy, France



Restraint Systems for Children (RSC)

- Children and road accidents
- The effects of the laws
- The regulations in USA and Europe
- The effectiveness of the use of RSC
- The role of prevention actions




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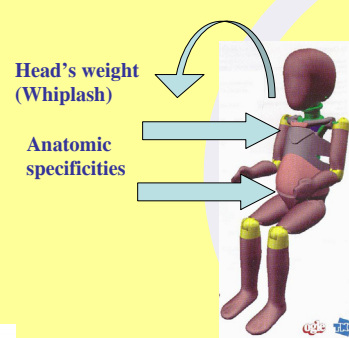
The specific risks

- Risk of being ejected X 6 or 7 if non fastened (generally side windows)
- Risk of crash against the front window
- At 50 km/h, weight X 30
- A child of 30 kg become a 900 kg's bullet (= fall from 3 floors)




The specificity of accidents

- 40 % of fatal accidents involving children happen on distances less than 3 km
- 30 - 50 % of children are not fastened on short distances

Head's weight (Whiplash)

Anatomic specificities



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Study ONISR 1995, France accidents involving kids 0-14 years old

| | Fatalities | Injuries |
|--------------|------------|--------------|
| Passengers | 206 | 6626 |
| Pedestrians | 91 | 5819 |
| Cyclists | 60 | 1847 |
| Motorcycles | 18 | 1171 |
| Total | 375 | 15463 |



Study ONISR, France accidents involving kids 0-14 years old

| Year | Fatalities | Serious Injuries | Other injuries |
|-------------------------|------------|------------------|----------------|
| 1988 | 520 | 4049 | 14307 |
| 1992* Law 01 01 1992 | 384 | 2946 | 11196 |
| 1995 | 375 | 2885 | 13042 |



Swedish Insurance Companies Study, 1989

- 2763 accidents involving children:
- Non fastened: 15,6% injured
- Fastened: 6,9% injured



The laws implementing mandatory seat belt use and Restraint systems

- Sweeden: 2/3 less fatalities since the law of 1986
- France: 659 children killed in road accidents in 1982, 375 in 1995 (law in 1992)



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NHTSA recommendations

Proper Child Safety Seat Use Chart

| | INFANTS | TODDLER | YOUNG CHILDREN |
|-------------------|--|---|---|
| Weight | Birth to 1 year at least 20-22 lbs. | Over 1 year and Over 20 lbs.-40 lbs. | Over 40 lbs. Ages 4-8, unless 4'9" |
| Seat Type: | Infant only or rear-facing convertible | Convertible / Forward-facing | Belt positioning booster seat |
| Position | Rear-facing only | Forward-facing | Forward-facing |
| Always Make Sure: | Children to one year and at least 20 lbs. in rear-facing seats. Harness straps at or below shoulder level. | Harness straps should be at or above shoulders. Most seats require top slot for forward-facing. | Belt positioning booster seats must be used with both lap and shoulder belt. Make sure the lap belt fits low and tight across the lap/upper thigh area and the shoulder belt fits snug crossing the chest and shoulder to avoid abdominal injuries. |

EC Directive 91/671

3. Child restraints fall into five "mass groups":

- Group 0 for children of a mass less than 10 kg;
- Group 0+ for children of a mass less than 13 kg;
- Group I for children of a mass from 9 kg to 18 kg;
- Group II for children of mass from 15 kg to 25 kg;
- Group III for children of mass from 22 kg to 36 kg.

4. Child restraint systems may be of two classes:

- an integral class comprising a combination of straps or flexible components with a securing buckle, adjusting device, attachments, and in some cases a supplementary chair and/or impact shield, capable of being anchored by means of its own integral strap or straps;
- a non-integral class that may comprise a partial restraint, which, when used in conjunction with an adult belt, which passes around the body of the child or restrains the device in

EC Directive 91/671

| Type of restraint | Approx. age range | Approx. weight range |
|-----------------------------|---------------------|----------------------|
| Infant carrier or baby seat | birth to 9 months | up to 10 kg |
| Child or toddlers seat | 6 to 4 years | 9-18 kg |
| Booster seat | 6 months to 6 years | 9-25 kg |
| Booster cushion | 4 years to 11 years | 15-36 kg |

Derogations

- Taxis
- Rental cars (but often equipment available)

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ONISR France 1992

- 31 % non correctly fastened
- 25 % Restraint System not used for short distances



Use of safety belts and restraint systems

| Member State + year of observation | Usage rates in percentages |
|------------------------------------|--|
| Austria (1994) | Front safety belts – 56%; front child system – 21%; rear safety belts – 31%; rear child system – 31% |
| Denmark (1993) | 0-7 years – 70%; 8-15 years – 55% |
| Finland | Rear seats, child system : 0-5 years – 82%; 6-14 years – 60% |
| France (1992) | 0-5 months – 75%; 6 months to 2 years – 87%; 3-9 years – 65% |
| Germany (1995) | built-up areas, child systems : 0-5 years – 80% 6-11 years – 23% |
| Greece (1995) | 0-6 years – 15% |
| Netherlands (1994) | Front 0-12 years – 54%; rear 0-12 years – 32% |
| Sweden (1994) | rear seats safety belts + child systems : 0-15 years – 87% |
| UK (1995) | rear seats safety belts + child systems : 0-4 years – 85%; 5-13 years – 72% |

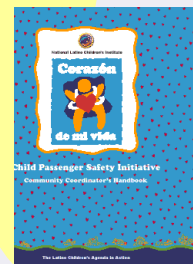


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Importance of Prevention and Information Campaigns



References

- nhtsa.dot.gov
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Thank you
for
your attention

