INTRODUCTION

Modern child restraints are designed to be compatible with modern cars that have i-Size anchorages.

This combination provides exceptional crash protection for child as well as minimising risks due to incorrect installation in vehicles.

This presentation looks at ways to safely transport children in older vehicles that don’t have the latest safety systems.

It is based, in part, on experience and crash studies in Australia in the 1990s, when many vehicles did not have 3 point seat belts in rear seats.
PRINCIPLES OF CHILD RESTRAINT

- The child should be retained within the vehicle;
- The child’s head and torso should be prevented from hitting the interior of the car;
- The restraining systems *in forward-facing devices* should distribute the crash forces between the chest and pelvis, without heavy loading of other parts of the body

(Henderson 1994)

CHILD RESTRAINT DESIGN

- For young children (~3 years old) these principles can be best met by using a child seat with built-in harness;
- The child seat needs to be securely anchored to the vehicle with a means to prevent it tipping forward;
- In older vehicles this can be achieved by using a seat belt to anchor the bottom of the child seat and a top tether to anchor the top of the child seat
- This configuration has been used in Australia since the mid-1970s and has been found to provide exceptional protection
VEHICLE DESIGN

This child seat configuration is suitable for vehicles with 2-point or 3-point seat belts in the rear seat;

Most recent cars designed for international markets already have provision for top tether anchorages;

Sedans with a parcel shelf can be easily retrofitted with top tether anchorages

There are solutions for most other styles of vehicle

This is an extract from Indian Automotive Industry Standard 72

VEHICLE DESIGN - SEAT BELTS

Floor-mounted non-retracting 2-point seat belts can also be readily fitted to the rear seats of vehicles

The combination of a 2-point seat belt and a top tether anchorage means the vehicle is suitable for a child seat with an in-built harness and a top tether

Children in these restraints (with harness & top tether) can survive very severe crashes without serious injury

FIGURE 8 - Collision with tree in country; child in restraint in centre rear position uninjured (13513)

dV = 80 km/h

FIGURE 9 - Head-on collision with another car; eighteen-month-old girl in child restraint in left rear position uninjured (18613)

dV = 70 km/h
What about older children who need a 3-point seat belt with or without a booster seat? Retrofit kits and design guidelines are available for retrofitting 3-point seat belts to rear seats.
**HOW MUCH SAFER?**

Clearly a child seat with a built-in harness is the best protection.

**RECOMMENDATIONS**

- Where seat belts are fitted to rear seats, encourage the fitting of top tether anchorages to vehicles that do not have them.

- Where seat belts are not fitted, encourage the fitting of 2 or 3-point seat belts and top tether anchorages.
RECOMMENDATIONS

Encourage schemes to support automotive repair shops and similar businesses to retrofit top tether anchorages and seat belts to older vehicles

Publish guidelines for this purpose

Encourage the purchase of child restraints with top tethers for use in older vehicles

Encourage the use of child restraints that are appropriate for the size of the child
RECOMMENDATIONS

Consider supporting the production of simple, low-cost child restraints

Thank you

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Extracts from a video by Japan NCAP/NASVA