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Australian Child Restraint Systems: Lessons and Challenges

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Outline

- Standards and legislation in Australia
- Road Crash data in Australia
- Motoring Club involvement
- Fitting Surveys
- Harmonisation with Europe / USA
- Improvements and lessons



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Australian Standard

- AS 1754
 - 1st edition in 1975
 - Latest edition released in 2000
- Main Features
 - 3 points of attachment
 - Top tether strap (1)
 - Single point adjustment (2)
 - Six point harness (3)
 - Side “wings” for side impact protection



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AS 1754 – Dynamic Tests

- Sled Tests for child seats
 - Frontal impact @ 49 km/hr, peak deceleration of 24g
 - 90 side impact test @ 32 km/hr, peak deceleration of 14g
 - Rear impact @ 32 km/hr, peak deceleration of 14g
- Infant restraints
 - As above plus
 - Inverted tests at 16 km/hr to simulate a rollover



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Australian Legislation

- Australian Road Rules
 - Infant (< 6 months); CRS complying with AS 1754
 - Child (< 16 yrs); CRS meeting AS 1754 or seat belt
- Australian Design Rule 34
 - All passenger and light commercial vehicles
 - Top tether anchorage location, strength, number
- Mandatory since 1980's
 - Government programs
 - Hiring of CRS
 - Retrofitting top tether anchorage points



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Road Crash Data

- 2002 Study² using coronial data in NSW; 1995 – 2000
- 15-16 child (<6 y.o.) road fatalities per year
 - 50% - motor vehicle passengers
 - 20% - not restrained
 - 25% - inappropriate or sub-optimal restraints
- 3-5 child (<6 y.o.) fatalities per year with CRS
- NSW population 6.5 million
 - 1998 road toll⁴; 550 fatalities and >26,000 injuries

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Fitting Surveys

- Car park surveys
- Results show up to 30% incorrectly restrained³
- Breakdown shows that approx 1/3 is serious
 - No restraint
 - Top tether strap not connected (predominately rear facing CRS)
 - Seat belt incorrectly threaded or not buckled
 - Anchorage point not used or used incorrectly

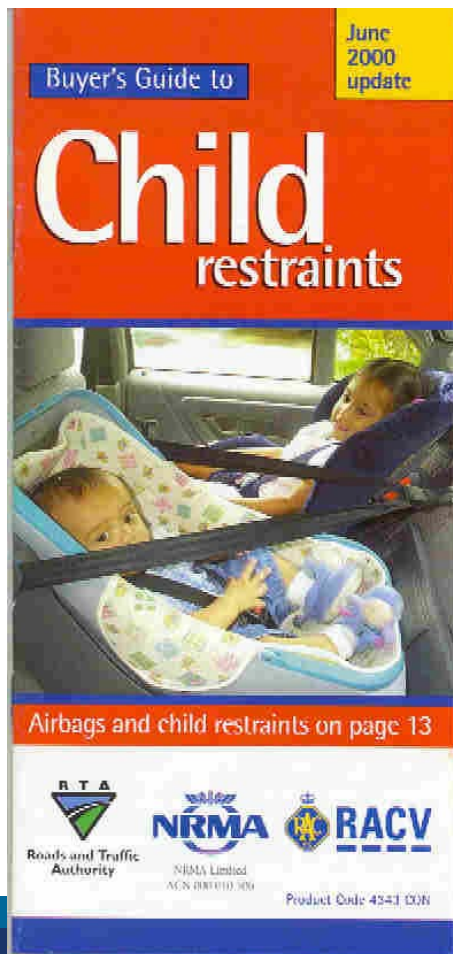
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Australian Motoring Clubs

- Various levels of involvement
- “Branded” and recommended fitting stations
- Sale of CRS – discount to members
- Advise and checking - members
- Representation on Standards Committees
- Lobbying for improvements
- Consumer information e.g. CREP



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CREP

- Child Restraint Evaluation Program⁵
- Started 1995
- Australian Standard tests *plus*
 - Frontal impact @ 56km/h, 34g
 - 90° and 45° side impacts with a simulated door structure
 - P6 dummy in frontal, P3/4 in others
- Restraints assessed and rated

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Harmonisation

- Review AS 1754 - align with Europe or USA
- Change ADR 34 for;
 - Rigid lower anchorages
 - Greater area for top tether anchorage
- Concerns with a reduction in safety
- Test program to assess both frontal and side impact performance
 - Frontal tests underway – initial results being evaluated
- Will harmonise if improved safety outcome;
 - Reduce “mis-fitting” or
 - Better safety performance



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Improvements

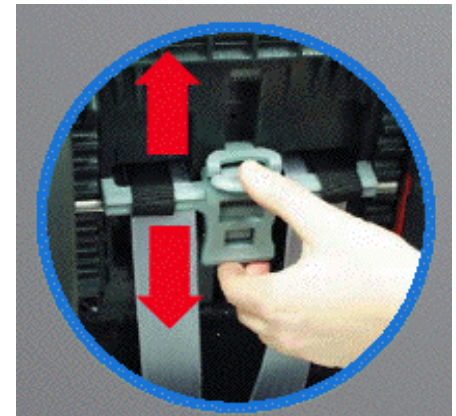
- Top tether anchorage locations
 - Reduce area
 - Reduce tether length
 - Hatchbacks, wagons.
- Improve seat strength
 - Luggage loads
 - Luggage restraints



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Improvements

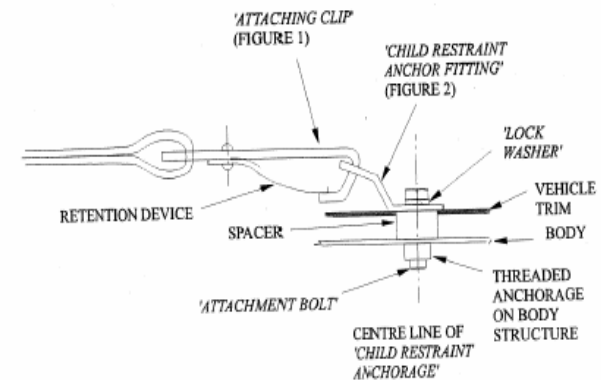
- Improve side impact protection on CRS
 - Retain head (larger “wings” of CRS)
 - Energy absorption
 - Prevent rotation of CRS (rigid fixing?)
- Seat design to prevent “submarining”
- Visual indications for correct fitting
- Simpler shoulder strap adjustment
- Better dummies and computer models



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Lessons

- Legislation on use and standards
 - Programs to make CRS easy to use
- Provision of public information
- Trained “fitters”
- CRS and car design
 - Need to complement each other
 - Continual improvements in seat design
- Make decisions on best data available



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Summary and Conclusions

- Australia has been active in CRS since 1970
- Very low levels of fatalities and serious injuries
- Very high levels of safety in Australian CRS
- Role for motoring clubs
- 10% of CRS have serious incorrect fitting
- Researching benefits of harmonising with Europe/US
- Still potential for further improvements



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References

1. Australian Standard 1754:2001- Child Restraint Systems for Use in Motor Vehicles.
2. Williamson, et al. “Analysis of Motor Vehicle Related Fatalities Involving Children Under the Age of Six Years (1995-2000).” Report for the Motor Accidents Authority July 2002.
3. Paine, M. & Vertsonsis, H. “Summary of Child Restraint Use in New South Wales.” 17th Enhanced Safety of Vehicles Conference. Amsterdam 2001.
4. Road Safety 2010 – A Framework for Saving 2,000 Lives by the Year 2010 in NSW. http://www.rta.nsw.gov.au/roadsafety/downloads/roadsroads1_dl1.html
5. <http://www.mynrma.com.au/motoring/drivers/safety/child.shtml>

