


Queensland  
Government  
Department of  
Emergency Services


# Australasian Road Safety Research Policing and Education Conference 2006

## *“Emergency Services & Road Safety”*




Queensland Fire  
and Rescue  
Service

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President, Australasian Road Rescue Organisation




Australasian Road  
Rescue Organisation



Queensland  
Government  
Department of  
Emergency Services

# Presentation Overview

1. The role of the Queensland Fire & Rescue Service (QFRS) attending Road Accidents
2. An introduction to the Australasian Road Rescue Organisation (ARRO)



Queensland Fire  
and Rescue  
Service

## Statistics

### **RACQ Road Crash Statistics**

- 300 Queenslanders die each year
- 6000 seriously injured
- \$3.9 billion cost to Queensland economy
- 2.8% of Queensland's gross state income



Queensland Fire  
and Rescue  
Service

## About QFRS

- 237 Urban Fire Stations
- 1550 Rural Fire Brigades
- 2000 full time
- 2000 part time
- 40000 Volunteers
- Attended 11800 road accidents last year
- Average of 800 motor vehicle accidents requiring extrication each year
- Road Awareness & Accident Prevention (RAAP) program delivered to over 30000 students each year
- Provides fire protection, scene safety and rescue services at accident scenes



Queensland Fire  
and Rescue  
Service

# QFRS Legislation

## S53 Powers of authorised office in dangerous situations

- (1) An authorised fire officer may take any reasonable measure –
  - (a) to protect persons, property or the environment from danger or potential danger caused by a fire or chemical incident; or
  - (b) to protect persons trapped in any vehicle or building or otherwise endangered.**



# Equipment carried by QFRS



## Why the need



### *ROAD ACCIDENT RESCUE*

## TYPES OF CONSTRUCTION

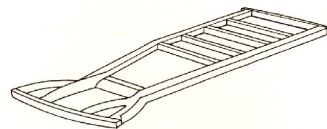
### Monocoque

Majority of passenger vehicles are *monocoque* construction meaning one integral body and frame construction (**each component relies on the next to give overall strength**).



### Ladder Chassis

*Ladder chassis* construction consists of two steel rails running the length of the vehicle and linked together by cross members. The body is fitted to the chassis as a separate component.





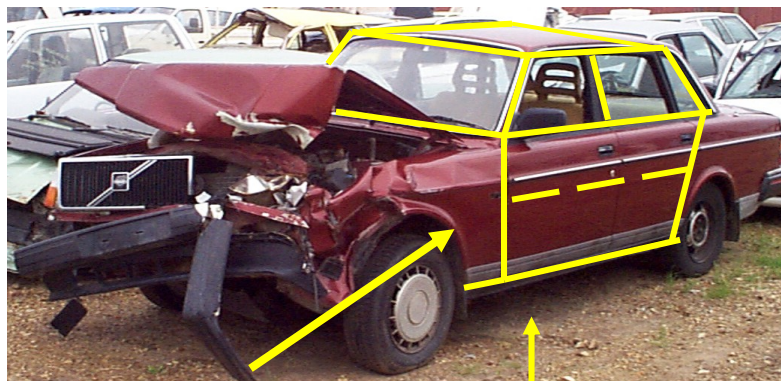
## MONOCOQUE CONSTRUCTION



- bonnet crumples
- doors deformed
- boot deformed
- side intrusion bars in some vehicles
- lighter weight ~

## MONOCOQUE CONSTRUCTION

Integral body/frame construction

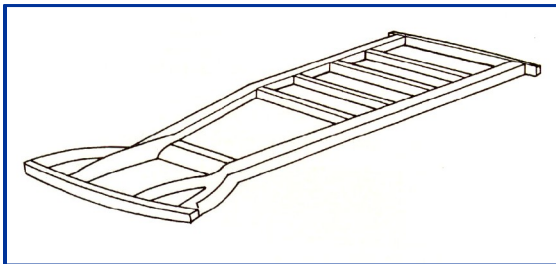


Passenger compartment:  
main structural component

Floorpan ~

## LADDER CHASSIS CONSTRUCTION

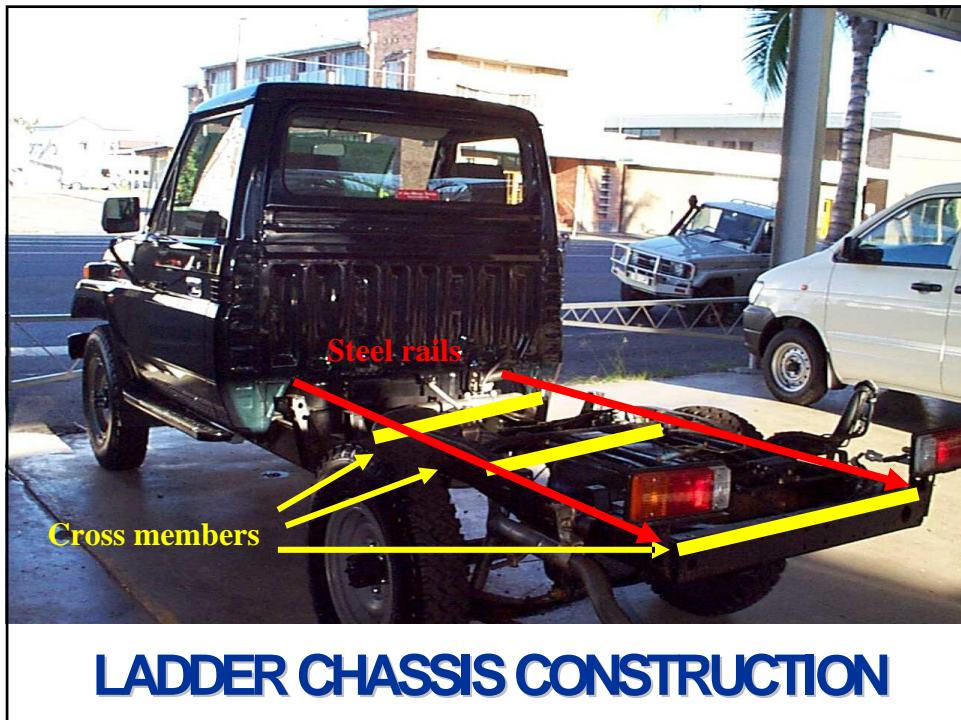
Not as prone to crumple as a monocoque-type constructed vehicle, making gaining access easier.  
Found on older vehicles, most 4-wheel drives, trucks, buses, etc.



## LADDER CHASSIS CONSTRUCTION

- No crumple zones
- Greater weight
- Occupants more prone to injury
- Steering column frequently driven into the abdomen/chest of driver







## Topics

- What is ARRO?
- The demand for our services
- A short history of advances in motor vehicle safety
- Implications and challenges for rescuers
- Challenges for rescuers in the future



## What is ARRO?

- A 'Not for profit' volunteer organisation.
- Individual and corporate members drawn from road rescue agencies across Australia and New Zealand.
- Formed in 1996 to improve the general skills, knowledge and capability of road rescue providers.
- In excess of 6,500 hours per year toward improving the science of rescue
- A founding member and leading influence in the World Rescue Organisation (WRO).





## Australasian Road Rescue Organisation

### What we do

- Research and Development;
- Technical Bulletins; and
- Training.



## Australasian Road Rescue Organisation

### What we do

- Annual Rescue Challenges and Learning Symposia





## Australasian Road Rescue Organisation

# What we do

## Interactive web site

**Australasian Road Rescue Organisation**

Home | Mission & Vision | Challenge | Sponsorship | Merchandise | Links | Contact Us

Username:

Password:

Login

Become a Member

Forgot Your Password?

Proudly Sponsored By:

**Chubb**

**holmatro**

Proudly Supported By:

**GORE**

Welcome to the official Australasian Road Rescue Organisation (ARRO) website.

ARRO is the peak body in Australasia for the development of knowledge and skills in road crash rescue.

ARRO was established as the Australian National Road Accident Rescue Association (ANRARA) in 1996. ANRARA changed its name to ARRO in 2002 to better reflect its position on the [World Rescue Organisation](#). ARRO represents Australasia on the council.

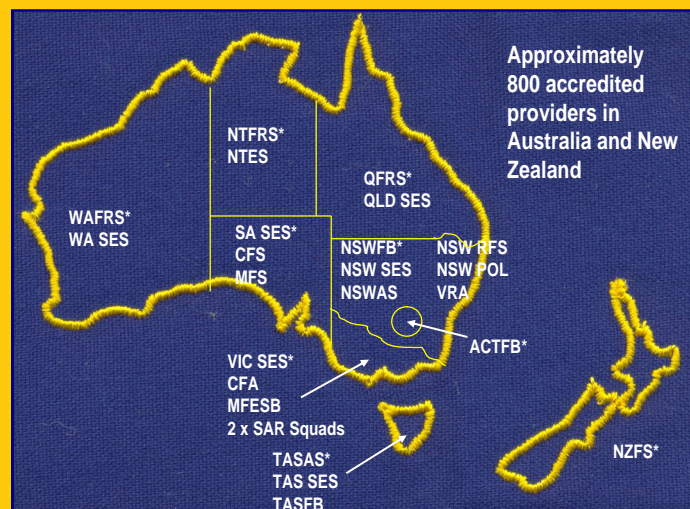
Through its involvement in road rescue challenges, and knowledge of the latest technologies, ARRO strives to improve the science and quality of rescue services provided to casualties and, therefore, a reduction in the severity of injuries.

ARRO is a membership based organisation and relies on the support of members to exist. Members can be individuals, emergency service organisations, individual stations, brigades and units, as well as corporates with an interest in the rescue industry. Membership details are available on this website.



## Australasian Road Rescue Organisation

# Australia and New Zealand Road Rescue Providers



\*Primary provider, plus various private providers such as mines rescue services



## Why are we doing this?

FOR EVERY 1 DEATH  
there are  
3 LIFE LONG DISABLEMENTS  
and there are  
10 MAJOR TRAUMA PATIENTS REQUIRING SURGICAL  
INTERVENTION  
and there are  
30 CASES THAT REQUIRE MEDICAL CARE.  
Prof.Murray MacKay, Birmingham University Accident  
Research Centre UK.

AND ... There is one road trauma death every  
26.9 seconds somewhere in the world OR 3205 people a day  
OR 22435 a week (Source: WHO)

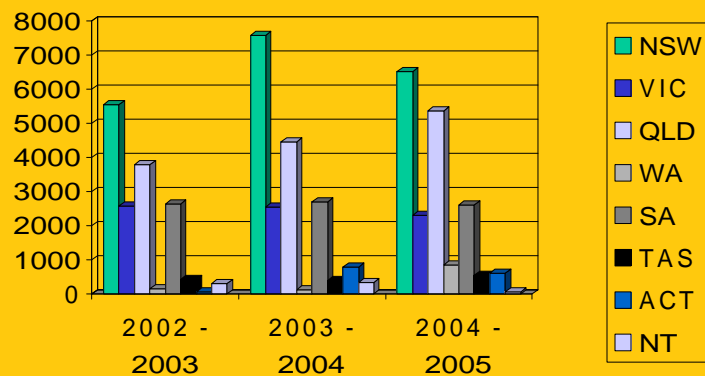


## Australian Road Rescue Statistics

from Report on Government Services 2006 (ROGS)

(please note: this data is more restrictive than individual agencies provide)

### Reported Road Rescue Incidents 2002 - 2005







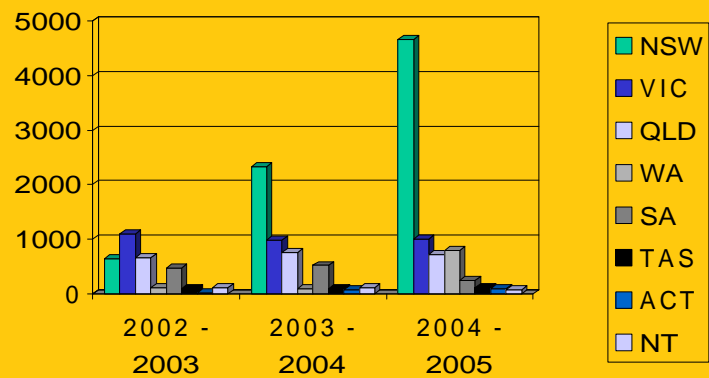
## Australasian Road Rescue Organisation

# Australian Road Rescue Statistics

from Report on Government Services 2006 (ROGS)

(please note: this data is more restrictive than individual agencies provide)

### Reported Road Rescue Extractions 2002 - 2005







## Integrated rescue

- Multi agency road rescue teams
- Combined rescue and medical training
- Enhanced cross-skilling in both disciplines
- Increased hazard awareness for all personnel
- An effective scene management approach from a rescue commander who understands the medical imperatives and communicates effectively.

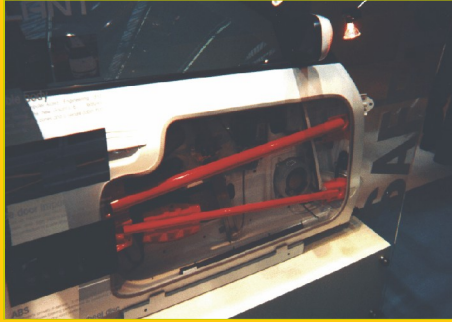


## Advances in vehicle design

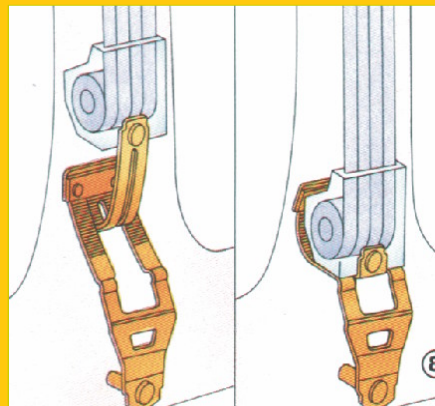
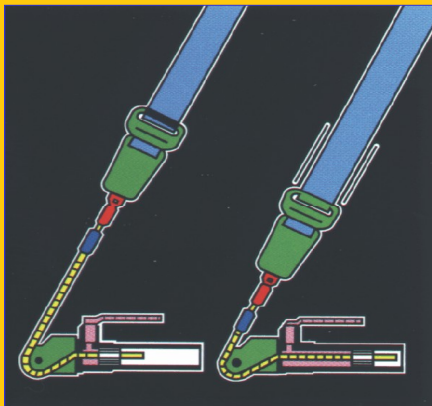
- **60's - Nader pins**
- **70's - Seat belts**
- **80's**
  - SRS (both multiple and multi stage airbags)
  - Seat belt pre-tensioners
  - Crumple zones
  - Anti intrusion bars
- **90's**
  - Lighter materials (high strength low alloy metals)
  - Structurally integrated windscreens & laminated side glass
  - More electronics and technology than on the Apollo moon mission rockets



## Anti-intrusion Bars



## Seat Belt Pre-Tensioners & 'G' Force Limits





## Energy Deflection Systems



- All designed to assist with the 3 stages of deceleration



## Rescue techniques and impact on vehicle construction

*Basic rescue techniques used at road rescue incidents*



Evolutions:

- **Side removal / flap**
  - Glass, doors, pillars
- **Roof removal / flap**
  - Glass, doors, pillars
- **Dash roll / lift**
  - Glass, doors, pillars, hinges
- **Vehicles may be on wheels, side or roof, and involved with other vehicles or objects.**



## Australasian Road Rescue Organisation

### The need for more knowledge on passenger and heavy vehicles



- Ongoing changes in general vehicle design and function



- High Intensity Discharge (HID) headlights
- Hybrid vehicles increasing in numbers



Toyota Prius Series 1



Honda Insight



Toyota Prius Series 2



## Australasian Road Rescue Organisation

### New Car Construction



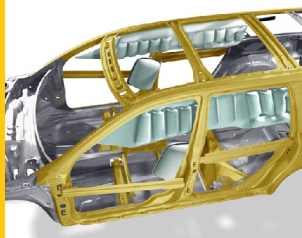




## Australasian Road Rescue Organisation

# Rescue techniques and impact on vehicle construction

### Construction materials and methods



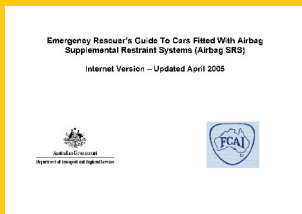
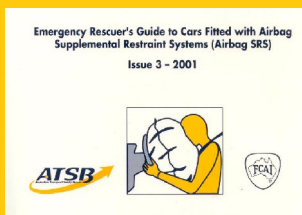
- **Materials**
  - Increasing resilience, HSLA, Boron, Alloys, polycarbonates and composites.
- **Construction**
  - Traditional monocoque or chassis construction, combined with Safety and crumple zones; and
  - Hydro forming, blanking and multi layering of materials.
- **Glazing**
  - Polycarbonates and multi laminates (rear and side).

### Future trends in vehicle design



## Australasian Road Rescue Organisation

# ATSB-DOTARS / FCAI Rescuers Guide to Vehicles fitted with SRS



Make	TOYOTA Hiace	TOYOTA Hiace	TOYOTA Hiace SBV	Make
Airbag fitted	0*	0*, P*	0*, P*	Airbag fitted
Type	Electronic, internal sensors	Electronic, internal sensors	Electronic, external sensors	Type
Fitted from	Aug 1980 - July 2000	Aug 80	May 1980 - Nov 2003	Fitted from
VIN	8ZUR...11*	8ZUR...11*	8ZUR12...22	VIN
VIN position	Front fender outer panel next to driver's seat, manufacturer's plate under front passenger's seat	Front fender outer panel next to driver's seat, manufacturer's plate under front passenger's seat	Outer panel next to driver's seat, manufacturer's plate in engine compartment	VIN position
Identifiers	SRS logo on steering wheel. Label on sunvisor or inside glovebox lid 90 sec.	SRS logo on steering wheel. Label on sunvisor or inside glovebox lid 90 sec.	SRS logo on steering wheel/door. Label on sunvisor or inside glovebox lid 90 sec.	Identifiers
Deactivation period	Turn ignition to LOCK. Disconnect negative battery terminal. Wait 90 sec.	Turn ignition to LOCK. Disconnect negative battery terminal. Wait 90 sec.	Turn ignition to LOCK. Disconnect negative battery terminal. Wait 90 sec.	Deactivation period
Pretensioner fitted	0	0	0	Pretensioner fitted
Pretensioner Type				Pretensioner Type
PreL Location				PreL Location
PreL deactivation method				PreL deactivation method
Other information				Other information

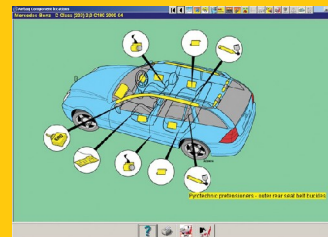
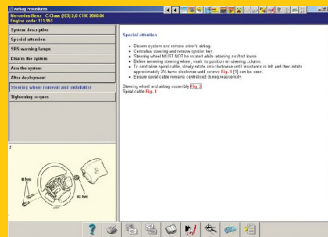
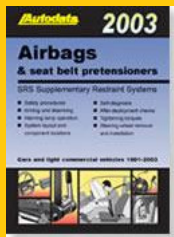
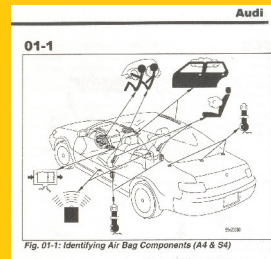
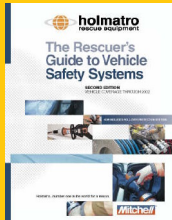
Valuable road rescue resource:

- Originally in hard copy version,
- Recent electronic version only, and
- Both versions limited in pictorial details to reference all SRS features.



## Australasian Road Rescue Organisation

### Examples of current vehicle SRS technology and construction info



## Australasian Road Rescue Organisation

### Issues faced by Road Rescue providers

#### Community expectations

- New vehicles, new technology, safer in an accident;
- Deaths, injuries and trauma will be reduced initially; and
- People shouldn't die in accidents because they are still trapped.

#### Vehicle design – current and proposed

- New construction materials and shapes are more difficult to cut with current rescue tool technology, replacement equipment costs will exceed \$50M over the next 5 years Nationally; and
- New car technology (SRS & Hybrid Vehicles) present greater risks to rescuers.

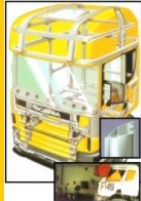
#### Limited research availabilities

- Most focused on trauma aspects and medical intervention.
- Very little on effectiveness of rescue in relation to current and future vehicle construction and design.

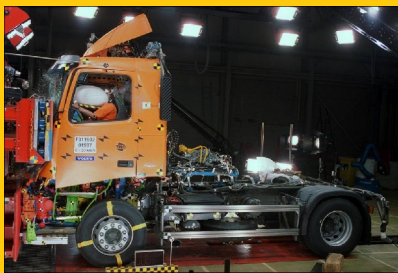


## Australasian Road Rescue Organisation

### The need for more knowledge on passenger and heavy vehicles



- Ongoing SRS developments in passenger and heavy vehicle industry



## Australasian Road Rescue Organisation

### Positive impacts on our Service Delivery

Greater efficiencies in road rescue operations



less risk, and time on scene



improved patient recovery and survivability



A quantum shift toward better prepared road rescue agencies; able to implement techniques based on well planned and informed decisions.





## Australasian Road Rescue Organisation

Questions?



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