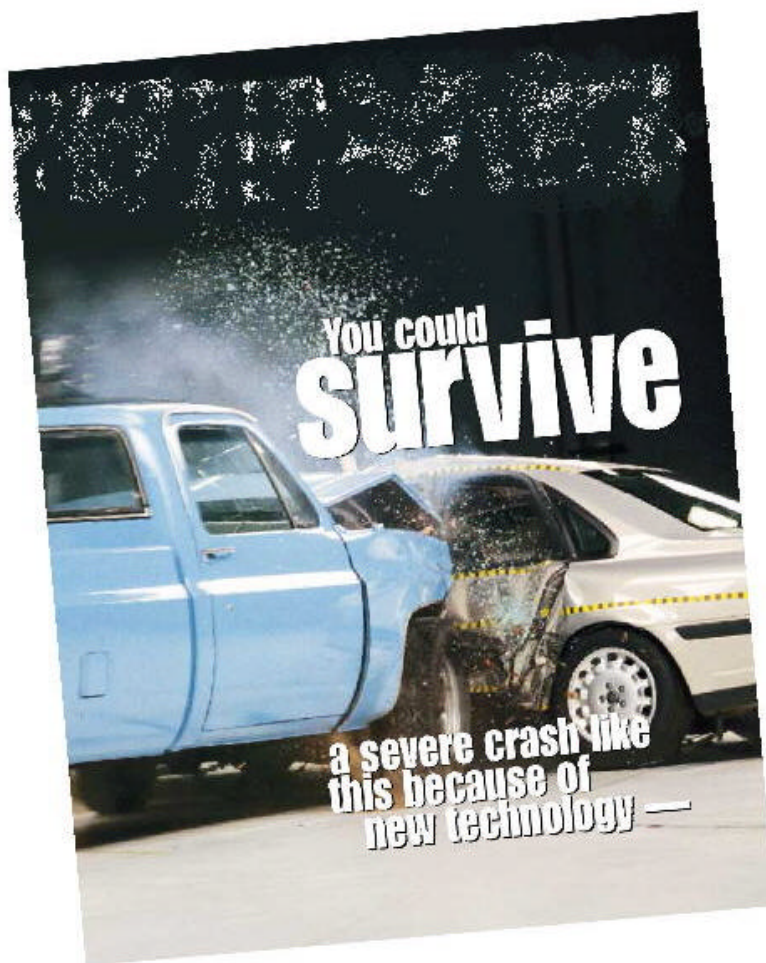


# ENCOURAGING THE PURCHASE OF SAFER VEHICLES

## MAIN PROJECT REPORT



Prepared by Michael Paine  
Vehicle Design and Research Pty Limited  
for  
Department for Planning and Infrastructure, Western Australia  
December 2002

## REPORT DOCUMENTATION PAGE

---

Report No.	Report Date	Pages
G227	December 2002	23

---

### Title and Subtitle

Encouraging the Purchase of Safer Vehicles - Main Project Report

---

### Authors

Michael Paine

---

### Performing Organisation

Vehicle Design and Research Pty Limited  
10 Lanai Place, Beacon Hill NSW Australia 2100

---

### Sponsoring Organisation

Department for Planning and Infrastructure, Government of Western Australia  
Vehicle Safety Branch, 21 Murray Rd South, Welshpool WA 6106

This was a project under the Road Safety Council Research Program (RSCR) administered by the Research Advisory Group (RAG). The project was managed by Trevor McDonald of the Vehicle Safety Branch, Department for Planning and Infrastructure.

---

### Abstract

Road safety research shows that there could be substantial benefits arising from encouraging the purchase of safer vehicles. Fleet and private vehicle buyers need to be targeted in such strategies. To assist in the development of effective strategies three strands of research have been conducted: an analysis of the potential benefits and costs of more than 60 safety features that are available or under development; an analysis of impediments to the uptake of these safety features and an analysis of the trends with the crashworthiness of the West Australian light vehicle fleet.

The analysis identified priority safety features that provide cost-effective reductions in serious injuries and fatalities in Western Australia. Ways of encouraging the purchase of vehicles with above-average crashworthiness and safety features of proven effectiveness have been examined. Lack of consumer awareness of the safety issue is perhaps the greatest obstacle but there are also numerous impediments to a safety-aware consumer obtaining the level of safety they desire.

A range of possible actions to address these issues has been developed.

---

### Keywords

PASSENGER VEHICLE, OCCUPANT, INJURIES, AIRBAG, CRASHWORTHINESS

---

### Disclaimer

*The views expressed in this report are those of the author and do not necessarily represent the views or policy of the West Australian Government or its departments.*

## CONTENTS

Executive Summary .....	2
Introduction.....	2
Key findings .....	2
Cost effectiveness of safety features .....	2
Impediments to the uptake of priority safety features.....	2
Safety characteristics of the West Australian fleet .....	3
Policy implications and recommendations.....	3
Introduction .....	4
Research Findings .....	4
A. Costs and effectiveness of safety features.....	4
<i>Features that are readily available</i> .....	5
<i>Features that are not generally available as optional equipment</i> .....	5
<i>Features that are rarely available in Australia</i> .....	5
B. Impediments to inclusion of priority safety features.....	6
C - Safety characteristics and trends with the West Australian light vehicle fleet .....	9
Lessons from market research.....	11
Target groups.....	12
Fleet buyers.....	12
Private buyers of new cars .....	13
Private buyers of second hand cars .....	13
Stakeholders .....	14
Potential action .....	16
Fleet buyers.....	18
Private buyers of new cars .....	19
Private buyers of second hand cars .....	20
Conclusions .....	20
References.....	20

Note: Cover illustration from Status Report Vol. 36 No.1, January 2001, published by the Insurance Institute for Highway Safety, Virginia, USA.

# Executive Summary

## *Introduction*

Road safety research shows that there could be substantial road safety benefits arising from encouraging the purchase of safer vehicles. The Swedish insurance organisation Folksam has estimated that at least 30% of fatal and serious injuries could be avoided if the average crashworthiness of the fleet was raised to that of the best vehicles currently available. Fleet and private vehicle buyers need to be targeted in such strategies. To assist in the development of effective strategies three strands of research have been conducted:

1. An analysis of vehicle safety features that are available or are under development. A substantial literature search was conducted in order to establish, where possible, the likely benefits and costs of these features.
2. An analysis of the availability of safety features for new vehicles, the degree to which manufacturers and motor dealers go to promote these features and the impediments to consumers taking up these safety features.
3. An analysis of safety features that are likely to be available for, and the crashworthiness of, the current West Australian light vehicle fleet and the possible future trends.

This report outlines the findings of that research and identifies action that could be taken to address key issues.

## *Key findings*

### **Cost effectiveness of safety features**

A methodology for estimating and comparing the benefit/cost ratio of safety features has been developed. The methodology was applied to more than 60 safety features, based on information derived from a substantial literature search. 18 of these stood out as having relatively favourable benefit/cost ratios. These are considered to be priority safety features.

Priority safety features that are readily available are: driver airbag, side airbag with head protection, ABS brakes, cargo barrier in wagons and vans and front passenger airbag

Priority safety features that are not generally available as optional equipment are: headlights "on" alarm or automatic headlights or daytime running lights, seat belt load limiters for front seats, side airbags for the rear outboard seats, speed alarm (set by driver), seat belt pretensioner for front seats, anti-submarining seat design and hazard lights activating in a severe crash.

Priority safety features that are rarely available in Australia are: top speed limiter (set at 120km/h), seat belt interlock (smart alarm), high transmittance glazing, knee bolster/padding and laminated or shatter-proof glazing for all windows.

### **Impediments to the uptake of priority safety features**

An analysis was conducted of the availability of safety features on new vehicles, the attitude of car purchasers towards safety and the degree to which motor dealers go to promote these features. Key findings were:

- A lack of awareness of vehicle safety and the significant differences in crashworthiness between vehicles. This may be associated with the perception that all vehicles are "safe".
- A lack of understanding of the extra protection that some safety features can be expected to produce. In particular, there is very little to guide consumers about the safety benefits of a better equipped variant.
- Impediments to ordering vehicles with non-standard safety features - price, long delivery times, pressure from salespeople.

Fleet vehicles account for more than half of all new vehicle purchases. The extra issues concerning fleets are:

- Senior managers in corporations are often not aware of the hidden costs of accidents and the benefits of specifying safer vehicles. Budgets for new vehicle purchases are closely controlled but the costs of accidents are rarely monitored.
- Fleet managers are unable to get away from day to day problems and so do not usually have time for implementing safety initiatives.
- Occupational health and safety personnel could give much greater attention to work-related road crashes.
- Fringe Benefit Tax provisions encourage the purchase of commercial vehicles that generally offer inferior occupant protection to that of large cars.

### **Safety characteristics of the West Australian fleet**

A method of estimating the proportion of vehicles with certain safety features was developed and applied to the West Australian light vehicle fleet, using a snapshot of WA registration records in November 2001. There are encouraging trends with the uptake of driver airbags, front passenger airbags and ABS brakes. By 2001 the uptake of these features was similar to that in Europe. Uptake of side airbags was, however, well behind Europe.

An analysis of crashworthiness ratings, derived from real-world crashes in Victoria, New South Wales and Queensland (the "Used Car Safety Ratings"), revealed a general improvement for the West Australian fleet during the 1990s, with the notable exception of small cars. Some small cars that became very popular in the mid 1990s have a serious injury rate (proportion of drivers killed or hospitalised) at least twice that of the fleet average. It is a concern that these cheap cars are now coming onto the second hand market and are likely to be purchased by high-risk driver groups.

### ***Policy implications and recommendations***

There are limitations to the degree, and particularly the swiftness, with which safety can be improved through regulation (either State or Federal). Strategies that use market forces to achieve safety outcomes are likely to be more successful and timely.

A list of potential action has been developed to address each of the key issues identified from this project. These action lists involve several stakeholders and it is recommended that they be consulted so that policies and strategies can be further refined.

## Introduction

Analysis of real world crashes shows that vehicles vary widely in their ability to protect their occupants in the event of a crash. The Swedish insurance organisation Folksam has estimated that at least 30% of fatal and serious injuries could be avoided if the average crashworthiness of the fleet was raised to that of the best vehicles currently available. Considerable information about the relative safety of vehicle models is now available from the Australian New Car Assessment Program (ANCAP) and the Used Car Safety Rating (UCSR) program.

In addition there is a wide range of safety features and products available for motor vehicles that can assist in avoiding accidents or making them less severe. There would be benefits for Australian road users arising from making some of these safety features more widely available and encouraging vehicle purchasers to buy vehicles with these features.

The Australian Design Rules for Motor Vehicles (ADRs) set minimum safety standards under nationally agreed processes. These include harmonisation with international requirements, preparation of Regulatory Impact Statements and avoiding unilateral/ unique safety requirements within individual States/Territories. Due to these processes the ADR system is not suitable for swift implementation of safety initiatives and, to some degree, the introduction of these initiatives is left to market forces. It is therefore appropriate to develop strategies to encourage the purchase of vehicles that clearly exceed the minimum standards set under the ADRs.

The Workplace Safety Task Force of the West Australian Office of Road Safety has initiated road safety strategies to encourage the purchase of safer vehicles. The present project builds on that work. In particular, an information package that focuses on safety issues will assist in influencing the purchase of safer new vehicles. To assist in the preparation of such a package three strands of research have been conducted:

4. An analysis of vehicle safety features that are available or are under development. A substantial literature search was conducted in order to establish, where possible, the likely benefits and costs of these features (Paine 2002a).
5. An analysis of the availability of safety features for new vehicles, the degree to which manufacturers and motor dealers go to promote these features and the impediments to consumers taking up these safety features (Paine 2002b).
6. An analysis of safety features that are likely to be available for, and the crashworthiness of, the current West Australian light vehicle fleet and the possible future trends (Paine 2002c).

This report summarises the research from these three strands and identifies action that can be taken to encourage the purchase of safer vehicles.

## Research Findings

### ***A. Costs and effectiveness of safety features***

A comprehensive range of vehicle safety features was evaluated. Road safety research literature was analysed to determine, where possible, the likely influence of these safety features on road accidents. Economic analysis methodology (as used by the Roads and Traffic Authority of NSW) was applied to each safety feature to derive an estimate of long-

term benefits and costs. The resulting benefit/cost ratios contained some surprises - features commonly regarded as cost effective did not rank high in the list. This was based on average values across the general vehicle population. Further analysis, that took into account the exposure factors such as higher annual kilometres travelled for fleet vehicles, revealed more favourable cost effectiveness for some of these features.

Greater awareness amongst consumers of the safety features that have a significant influence on serious crashes would go some way towards the goal of encouraging purchase of safer vehicles.

### **Priority safety features**

Priority safety features are listed below. These either have favourable benefit cost ratios, when compared with a driver airbag or are effective at reducing serious crashes. In some cases above average exposure has been assumed, as might be expected with fleet vehicles. With some features it is sometimes difficult to establish whether a particular vehicles has them as standard or optional equipment.

#### *Features that are readily available*

- Driver airbag (fortunately most models now have a driver airbag as standard)
- Side airbag for driver and front passenger
- ABS brakes
- A cargo barrier in wagons and vans
- A front passenger airbag

#### *Features that are not generally available as optional equipment*

- Headlights “on” alarm or automatic headlights or daytime running lights
- Seat belt load limiters for front seats
- Side airbags for the rear outboard seats
- Speed alarm (set by driver)
- Seat belt pretensioner for front seats
- Anti-submarining seat design
- Hazard lights activate in a severe crash

#### *Features that are rarely available in Australia*

- Top speed limiter (set at 120km/h)
- Seat belt interlock (smart alarm)
- High transmittance glazing
- Knee bolster/padding
- Laminated or shatter-proof glazing for all windows

## ***B. Impediments to inclusion of priority safety features on vehicles***

An analysis was conducted of the availability of safety features on new vehicles, the attitude of car purchasers towards safety and the degree to which motor dealers go to promote these features.

### **Literature review - fleet safety**

A literature review revealed that for fleet buyers:

- Safety considerations may influence which level of car is purchased within a manufacturer's range (or which options are selected). Vehicle selection is generally a choice of the safest possible car within reasonably tight constraints, rather than the safest possible car on the market.
- The move to maximise resale values has led to consideration of the resale implications of some safety features (this can possibly encourage airbag fitting). However, there is a general perception that adding safety options to base models does not achieve full resale value in the used car market so *fleets generally avoid adding options*. Higher level models with more standard safety features may achieve better returns.
- There is a general emphasis on counting accidents and repair costs rather than injuries. Many organisations do not appear to count the hidden costs of crashes (eg lost time and productivity) which can be four to twenty times the accountable costs.
- In the USA and Canada, fleet managers rate safety among the top factors when selecting vehicles. It is said to be high in Australia but there are several "excuses" for not making it so.
- In Australia there is some confusion or uncertainty as to the actual cost-benefit trade off of various options and so inappropriate decisions might be made.
- Management time and resources are likely to be the main barriers to action to improve fleet safety. Tax incentives for vehicles with safety features and greater awareness of (and commitment to) safety issues by senior management would assist.
- The majority (54% of all and 70% of the medium/large car segment) of the new vehicle market in Australia is purchased initially for business use. Most of these will become part of the general Australian vehicle pool within 2-3 years.
- The NSW Parliament Road Safety Committee, in its report *Staysafe 36*, identified that fleet vehicles typically travel about three times the distance of the average private vehicle.
- In Australia, road crashes are the most common cause of work-related death, injury and absence from work. They account for nearly 50% of all work-related fatalities.

In the case of non-fleet buyers

- In USA in 1999 80% of new car purchasers (non-fleet) surveyed indicated that safety was important to their purchase decision. Nearly 70% sought safety information prior to making a decision (Insurance Research Council, USA).
- The attitude of Australian private car buyers is unknown but is likely to be similar to that in the USA a few years ago.



## Survey of motor dealers

A planned survey of dealers and manufacturers was not successful. Out of 23 dealers from Sydney and Perth who were approached only four participated in the survey. However these four responses did provide some insight into the attitude of the motor industry towards vehicle safety. Key findings were:

- Of those that responded, safety was ranked highly in the promotion of vehicles. They liked to point out that their vehicles had better safety features than (cheaper) competing models.
- There were usually impediments if safety features were ordered as an optional accessory. In addition to the extra cost, there was frequently a much longer delivery time for a vehicle with options. In these cases customers were encouraged to consider a variant with higher specifications. This might cost more than an optioned up vehicle but delivery times were usually much better.

Anecdotal comments were:

- More and more customers were expecting to find dual airbags as standard on vehicles.
- Customers were generally unaware of the need for side airbags.
- Commercial vehicle purchasers were generally not interested in safety.
- Women were more likely to ask about vehicle safety

Dealer responses to ideas for improving uptake of safety features were:

- Tax concessions - good idea (note that the NSW government is about to introduce stamp duty discounts for "green" cars - this may be a useful model for safety features).
- Regulations or voluntary agreements to make some features standard would also be welcomed (would mainly affect "the competition")
- Make some features "standard" but give customers the option of deleting them when ordering. May be too confusing. Too cumbersome.
- Resale value. Will agree with customers if they suggest that a safety feature increases the resale value but would not raise it first.
- Some safety features must be available, at least as an option. They didn't really see the point (mainly that it should help to increase public awareness and lower the cost of these features).
- Government/ANCAP brochures. Each dealer would be interested in receiving supplies of ANCAP brochures etc (assuming the models they sell do well).
- Manufacturer's information. Manufacturers could do a better job promoting safety features. For example, videos showing how they work could be displayed in showrooms (maybe scope for some ANCAP videos here - although videos of crashing vehicles are not a good idea).

Other ideas that were raised:

- Controls on advertising might help. Customers' main priority is price. They have decided they can spend a certain amount and want to get the most for their money. A cheaper, less equipped model is too attractive (CD player instead of airbags). Perhaps

an industry agreement to only advertise models with, say, dual airbags would "raise the bar".

- Insurance concessions for vehicles with safety features. There is a fundamental problem with the nature of the insurance industry that may preclude this. There is no great financial incentive to insurers to save lives. On the other hand, it costs more to repair vehicles with airbags.

### **Newspaper advertisements by dealers**

A review of 28 dealer advertisements in Sydney and Perth newspapers revealed that safety features were either well promoted or not promoted at all.

- It is likely that safety is given greater prominence in ads for "family" vehicles. Ads for sporty or commercial vehicles are less likely to mention safety features.
- High prominence is given to airbags in some of the cheaper makes that have only recently introduced airbags as standard equipment. However one dealer that sells a mixture of low and mid-range makes appears to be ignoring the standard safety features on the cheaper vehicles.
- Some of the makes with traditional safety reputations do not appear to be giving much prominence to safety in advertisements.
- Used car advertisements suggests that airbags are likely to be mentioned if they are fitted. It is likely that there is greater interest in airbags from used car purchasers.

### **Manufacturer's brochures**

A review of 63 manufacturer's brochures revealed that 5% gave high, 49% gave good and 8% gave no prominence to vehicle safety. Only Alfa Romeo and, surprisingly, Volvo (in two of three brochures checked) made no mention of safety.

Driver airbags, side airbags (including curtains) and dual airbags were well promoted, where fitted. ABS brakes were less prominent. The less well known seat belt pretensioners were also reasonably well promoted.

The Federal Chamber of Automotive Industries declined to assist with a survey of manufacturers/distributors in Australia. The FCAI questions the validity of promoting safety features on vehicles, in the absence of an assessment of real world performance.

### **Survey of fleet managers**

Attempts to contact Australian fleet managers (government and private) were largely unsuccessful. This tended to confirm the views that fleet managers are too busy to be concerned about safety. The two detailed responses that were received indicated that these particular fleets did place a high priority on safety and actively sought out safety information before purchasing vehicles. Brief discussions about fleet vehicle safety were also held with public service union and workplace safety personnel. Key findings were.

- Fleet managers tended to be "too busy" to think about vehicle safety in day to day work. Time therefore needs to be set aside and workshops or working parties are a good idea.
- Federal Fringe Benefits Tax (FBT) policy tends to encourage the purchase of commercial style vehicles to minimise taxation for "private use". This may result in the purchase of vehicles with fewer safety features.

- Policies that encourage the purchase of locally manufactured vehicles can decrease competition for safety features and performance. On the other hand, recent NCAP results suggest the Commodore and Falcon utilities provide much better occupant protection than the imported light utilities that generally do not have a driver airbag.
- Safety features like airbags are unlikely to improve the resale value of commercial vehicles.
- Company management fails to appreciate the full effects of a serious road crash on the organisation. Tangible costs such as repair costs might be monitored but other less tangible costs and effects are not.
- Greater attention should be given to work-related road crashes as an occupational health and safety issue.

### **Private buyers**

It is evident that private car buyers are faced with a wide range of attitudes from new car salespeople towards safety. Some salespeople will talk up safety if the vehicle they are trying to sell is well equipped but downplay it if the model is not well equipped. This can even happen where the same make has different levels of safety features between models.

Where safety features are available it appears that salespeople need to be much better informed about their purpose and benefits. There also needs to be ways to expedite locating models with optional safety features to avoid long delays in delivery.

In summary, there is scope for much greater awareness about vehicle safety and the benefits of safer vehicles amongst private and fleet car buyers, senior management of corporations, car salespeople and occupational health and safety professionals.

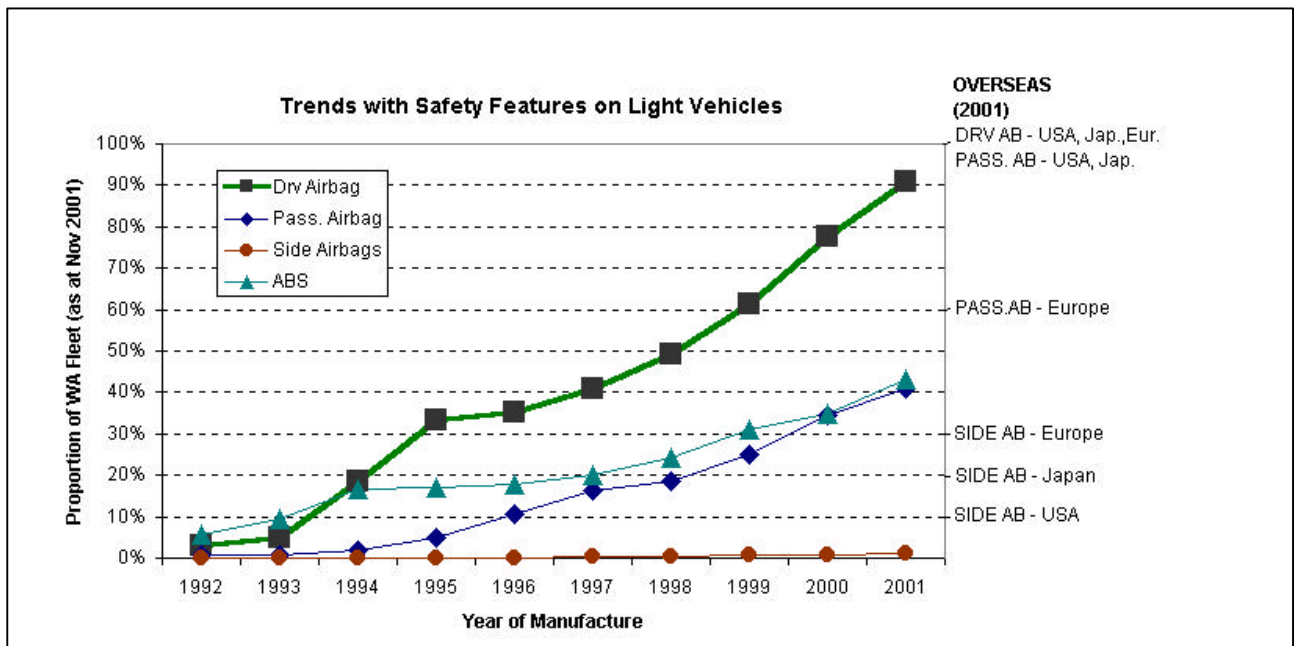
### ***C - Safety characteristics and trends with the West Australian light vehicle fleet***

A methodology was developed to estimate the uptake of key safety features in the West Australian (WA) vehicle fleet. Information about models on West Australian registration records was combined with data about safety features on models (derived from a popular buyer's guide to vehicles) to derive an estimate of the proportion of vehicles on the road with these safety features. The data were analysed by year of manufacture, as shown on registration records. The records were based on a snapshot of the WA fleet as at November 2001.

Assumptions were made about the uptake of optional safety features and about the proportions of variants for each model. Subject to these assumptions, and a lack of data for a wide range of commercial vehicles, the following trends were evident from the analysis of the West Australian fleet:

- The proportion of WA light vehicles with a driver airbag has steadily risen from 5% of WA vehicles built in 1993 to 91% of vehicles built in in 2001. This compares with 100% uptake in Europe, Japan and the USA.
- The proportion of WA light vehicles for dual front airbags has steadily risen from 1% of WA vehicles built in in 1993 to 41% of WA vehicles built in in 2001. This compares with 100% uptake in Japan and the USA and around 60% uptake in Europe (non-luxury cars)

- The proportion of WA light vehicles with side (thorax) airbags is low, with just 1% for year of manufacture 2001. Luxury vehicles are better with 21% listed as having side airbags. For non-luxury cars the uptake is around 30% in Europe, 10% in the USA and 20% in Japan. The rate, overseas, for head protecting side airbags (curtains) is about half the rate for side airbags (Australian data was considered to be unreliable for this feature but the uptake is evidently less than 1%).
- The proportion of WA light vehicles with ABS brakes rose from 9% of vehicles built in 1993 to 43% of vehicles built in 2001. Uptake overseas was not available but is likely to be similar.

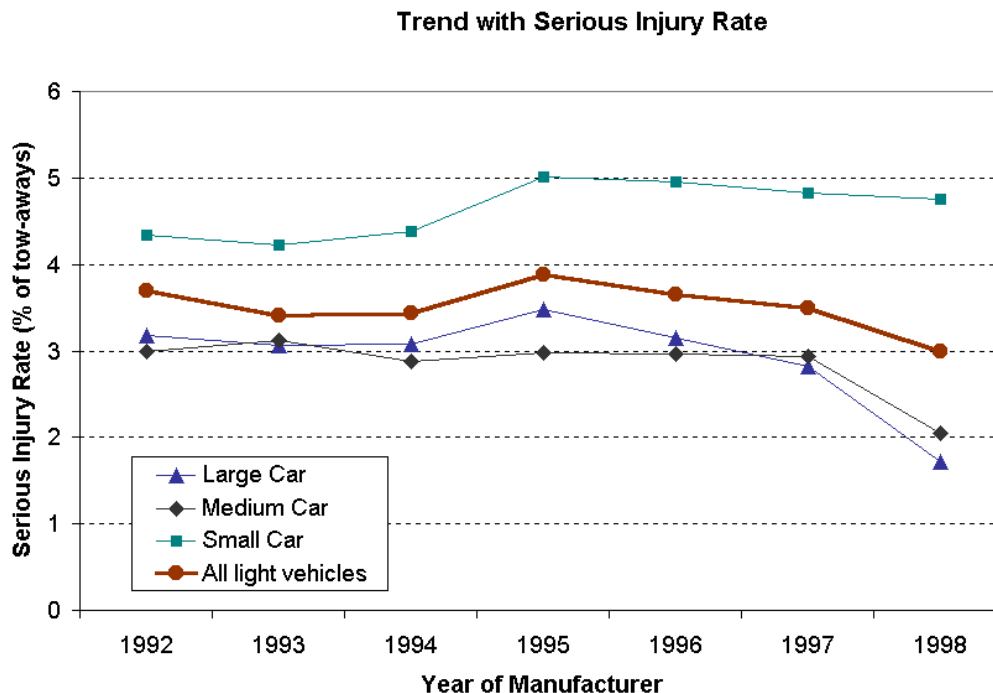


An analysis of crashworthiness of the West Australian light vehicle fleet (Paine 2002c), derived from Australian Used Car Safety Ratings (analysis of real-world crashes in NSW, Victoria and Queensland), shows that there was a slight overall improvement between vehicles built in 1992 (3.7) and those built in 1998 (2.99). However, the serious injury rate for small cars increased (became worse) for vehicles built between 1994 and 1995 and, by 1998, still remained above the minimum value of 4.23 for this group over the study period. This could be due to the popularity of some small car models that have poor crashworthiness ratings. For example, it is estimated more than 50% of small cars on the register that were manufactured in 1995 have a serious injury rate greater than 6.0 (more than double the overall rate).

An analysis of the limited number of ANCAP crash-tested vehicles suggests that there has been a major improvement in crashworthiness for small cars since 1998. It is too early to determine whether these improvements will be reflected in the Used Car Safety Ratings (the ANCAP tests do not cover all aspects of crashworthiness). Also, given that the average age of Australian cars is around 10 years, it will be a considerable time before a major proportion of the fleet is made up of these safer small cars.

It was concluded that the crashworthiness of recent designs of small cars should be monitored to establish whether recent dramatic improvements in ANCAP crash test ratings are reflected in real world crash outcomes. Due to the inherent delay in producing Used Car Safety Ratings this may not be possible for a few more years. However a tentative

analysis suggest that, by 2010, there is potential for the number of car drivers killed or seriously injured to reduce by about 20%, simply due to the steady uptake of safer small cars. This rate of improvement could be accelerated by encouraging the replacement of 1990s small cars by more recent models.



### Lessons from market research

A brief review of market research references revealed the following key points associated with the marketing of vehicles:

- A key aim of marketing managers is to have their product readily recognised as having a good reputation for the task. An aim of safety researchers should therefore be to ensure that vehicle safety is included amongst the *essential qualities of a desirable motor vehicle* and that vehicles with good safety performance are acknowledged and promoted.
- The point should be made that safety is independent of the typical influences on car buyers: price versus prestige and sportiness versus conservativeness. Examples of good safety performers can be found at all of the extremes of these influences.
- "Safety" is a key basic need of humans but it appears to be taken for granted by consumers in the case of motor vehicles. There is perhaps a perception that all cars meet minimum levels of safety and so none are "unsafe". This does not recognise that in some types of crashes the chances of a serious injury are much greater in some models than in the best performing models. In other words, depending on the circumstances of the crash, some models can be regarded as "unsafe" when compared with the best performers.

- It is possible that the safety motive is suppressed by people seeking higher motives such as peer acceptance and status (for example, in order to avoid the appearance of insecurity). However, the safety of family members can be a very effective motivator.
- The influence of women and children on car purchasing should not be overlooked.

## **Target groups**

The main target groups for encouraging purchase of safer vehicles are:

- Fleet buyers
- Private buyers of new cars
- Private buyers of second hand cars

The issues to be addressed across all groups are:

- A lack of awareness of vehicle safety and the significant differences in crashworthiness between vehicles. This is associated with the perception that all vehicles are "safe" ("They meet the safety regulations don't they?").
- A lack of understanding of the extra protection that some safety features can be expected to produce. In particular, there is very little to guide consumers about the safety benefits of a better equipped variant.
- Inadequate and inconsistent information about the availability of safety features on vehicle models and particularly variants within models.
- Impediments to ordering vehicles with non-standard safety features - price, long delivery times, pressure from salespeople.
- Advertising and promoting the cheapest (and therefore the least equipped) variants for a model.
- The polarisation of the fleet into large four-wheel-drives and small cars that are more vulnerable in collisions with the larger vehicles.
- There may be conflicting priorities in the insurance industry, where greater attention is given to repair costs than to injuries. This may be due to the situation where different insurers, or branches within an insurer, are responsible for insuring different aspects of accidents.
- The limitations of the regulatory system for introducing safety initiatives -- the Federal (ADR) processes are not conducive to swift introduction of safety initiatives and States should not introduce unilateral safety requirements. Therefore alternatives to regulation should be sought.

### ***Fleet buyers***

Fleet vehicles account for more than half of all new vehicle purchases. Various fleet safety initiatives have been undertaken to encourage the purchase of safer vehicles. However there are several obstacles. The main issues are:

- Senior managers in corporations are often not aware of the hidden costs of accidents and the benefits of specifying safer vehicles. Budgets for new vehicle purchases are closely controlled but the costs of accidents are rarely monitored.

- Fleet managers are unable to get away from day to day problems and so do not usually have time for safety initiatives.
- There needs to be a greater commitment to safety within corporations. Occupational health and safety personnel could give much greater attention to work-related road crashes. Current workplace safety (Workcover) systems do not necessarily ensure that all serious road crashes are reported.
- Drivers of commercial vehicles may be regarded as "tougher" and in less need of protection in a serious crash (this perception is not aided by advertising campaigns claiming a vehicle is "unbreakable").
- Fringe Benefit Tax provisions encourage the purchase of commercial vehicles that generally offer inferior occupant protection to that of large cars.

### ***Private buyers of new cars***

Issues associated with private new car buyers are:

- A lack of credibility of the numerous sources of safety information. Conflicting advice seems to come from motoring organisations, government, motoring journalists, car manufacturers and motor dealers.
- Lack of safety information in car showrooms.
- Need for more emphasis on "family" safety - including teenage drivers.

### ***Private buyers of second hand cars***

Issues specific to the buyers of second hand cars are:

- The less-safe vehicles already exist. Any measures to discourage the purchase of less safe vehicles will probably result in their price dropping and so they will be more accessible to a different category of car buyer - perhaps young drivers who are more exposed to the risk of a serious crash.
- On the other hand, suppressed resale value for vehicles that do not offer good protection or have certain safety features may influence the purchasers of new vehicles who would not want their "investment" to lose value unnecessarily.
- Need for greater awareness of the availability and benefits of safety features on used vehicles.

## Stakeholders

The main stakeholders in the car purchase process are set out in the table. The abbreviations are used in the next section.

Table 1. Main stakeholders with an influence on vehicle safety

Stakeholder	Main influences concerning vehicle safety
Vehicle Manufacturer [MANUF}	<ul style="list-style-type: none"> <li>• Decides on vehicle models to be offered and the level of safety of these models</li> <li>• Issues brochures and specifications, maintains websites</li> <li>• Issues press releases and media presentations</li> <li>• Builds vehicles and arranges delivery schedules</li> </ul>
Automotive engineers (employed by manufacturers) [AUTOENG]	<ul style="list-style-type: none"> <li>• Design vehicles to meet (sometimes conflicting) requirements of regulations, engineering practice, marketing desires and consumer demands.</li> <li>• Sometimes involved in crash tests and in-depth crash studies to learn more about sources of injury.</li> </ul>
Marketing personnel employed by manufacturers [MARKET]	<ul style="list-style-type: none"> <li>• Conduct market research</li> <li>• Influence vehicle design through price, appearance, added features etc</li> <li>• Develops and issues advertisements and press releases</li> </ul>
Motor dealers (and fleet sales managers) [DEALERS]	<ul style="list-style-type: none"> <li>• Promote vehicles in showrooms and advertisements</li> <li>• Deal directly with clients</li> <li>• Provide information for clients</li> <li>• Sells new vehicles</li> <li>• Perhaps trade-in the old vehicle.</li> </ul>
Australian NCAP and its sponsors [ANCAP]	<ul style="list-style-type: none"> <li>• Conduct crash tests of popular variants</li> <li>• Issue brochures and press releases and maintain websites of crash test ratings</li> <li>• Meet with manufacturers to discuss assessments and potential for improvement</li> </ul>
Used Car Safety Rating and its sponsors [UCSR]	<ul style="list-style-type: none"> <li>• Conduct analyses of real world crashes and rate vehicles</li> <li>• Issue brochures and press releases and maintain websites of ratings</li> </ul>
Federal government [FED]	<ul style="list-style-type: none"> <li>• Manages national vehicle regulations such as the Australian Design Rules</li> <li>• Is responsible for national road safety strategies</li> <li>• Monitors road crash statistics</li> <li>• Conduct (or sponsor) some road safety research.</li> <li>• Sometimes runs road safety campaigns</li> <li>• Manages tax requirements associated with vehicle purchase and use</li> <li>• Manages Commonwealth car fleet</li> </ul>
State governments [STATE]	<ul style="list-style-type: none"> <li>• Register vehicles</li> </ul>



Stakeholder	Main influences concerning vehicle safety
	<ul style="list-style-type: none"> <li>• Some collect stamp duty on vehicle sales</li> <li>• Responsible for vehicle roadworthiness (defects) and compliance with road rules - enforcement</li> <li>• Deal with modified vehicles - including aftermarket safety devices</li> <li>• Record and monitor road accidents</li> <li>• Sometimes run road safety campaigns</li> <li>• Contribute to the development of national vehicle standards</li> <li>• Participate in ANCAP and UCSR</li> <li>• Conduct (or sponsor) some road safety research.</li> </ul>
Motoring organisations (eg RAC, NRMA) [AAA]	<ul style="list-style-type: none"> <li>• Participate in ANCAP and UCSR</li> <li>• Conduct road tests and evaluations of new models</li> <li>• Contribute to the development of national vehicle standards</li> <li>• Sometimes run road safety campaigns</li> <li>• Publish motoring magazines</li> <li>• Maintain websites that include safety information</li> </ul>
Federal Chamber of Automotive Industries [FCAI]	<ul style="list-style-type: none"> <li>• Lobbies at a Federal level on behalf of vehicle manufacturers</li> <li>• Comments (generally negative) on crash test releases by ANCAP</li> <li>• Arranges industry meeting associated with road safety (in-house and with ANCAP)</li> </ul>
Society of Automotive Engineers Australasia and Institution of Engineers Australia. [PE]	<ul style="list-style-type: none"> <li>• Issue engineering magazines that sometimes include articles about safety</li> <li>• Arrange road safety conferences and meetings</li> <li>• Provide a professional network for automotive engineers.</li> </ul>
Vehicle Insurers [INSURERS]	<ul style="list-style-type: none"> <li>• Conduct research on the costs of vehicle accident claims</li> <li>• Conduct research on repair costs (minor accidents)</li> <li>• Sometimes run road safety campaigns</li> <li>• Conduct (or sponsor) some road safety research.</li> </ul>
Motoring journalists [JOURN]	<ul style="list-style-type: none"> <li>• Conduct road tests and evaluations that sometimes include safety assessments (but rarely refer to ANCAP)</li> <li>• Sometimes consult with road safety researchers and ANCAP about road safety issues</li> <li>• Communicate with vehicle marketing and sales people and (perhaps) attempt to dictate fashion and trends.</li> </ul>

It is evident that there is considerable overlap, and frequently conflicting advice, in the influences of these stakeholders.

## Potential action

This section identifies action that can be taken to address the issues raised under "Target Groups". The abbreviations in brackets indicate that stakeholders that might be involved in, or responsible for the action - this is indicative and is intended for discussion purposes.

**Issue A:** A lack of awareness of vehicle safety and the significant differences in crashworthiness between vehicles. This is associated with the perception that all vehicles are "safe" (they meet the safety regulations don't they?).

- A1. Improve the availability of information about relative safety that is available in new car showrooms, magazines and on the Internet. This should focus on the results of ANCAP and UCSR. [ANCAP, UCSR, AAA, STATE, FED, MANUF, FCAI, DEALERS]
- A2. Improve awareness of ANCAP and UCSR through advertising [ANCAP, UCSR, AAA]
- A3. Look at identifying case histories of survival with "safer" vehicles and point out the influence of crashworthiness (taking care not to inspire over-confidence) [STATE, FED].
- A4. Arrange demonstrations of crash outcomes - obtain vehicles that were involved in crashes of similar (high) severity that had different injury outcomes [STATE, FED, AAA, JOURN].

**Issue B:** A lack of understanding of the extra protection that some safety features can be expected to produce. In particular, there is very little to guide consumers about the safety benefits of a better equipped variant.

- B1. Develop easy-to-read guides to the performance of priority safety features - the extra protection they can be expected to provide. Note this was done by the Federal Government on the basis of ANCAP tests of vehicles with and without a driver airbag during the late 1990s [STATE, FED, ANCAP, AAA].
- B2. Look at identifying case histories of survival with "safer" vehicles and point out the influence of crashworthiness [STATE, FED].
- B3. ANCAP to look at testing a sample of higher-equipped variants in addition to the popular models that are usually the least equipped [ANCAP].
- B4. UCSR to look at the feasibility of identifying better equipped variants within models (a difficulty is that the resulting small sample sizes might produce considerable uncertainty and even misleading results) [UCSR].

**Issue C:** Inadequate and inconsistent information about the availability of safety features on vehicle models and particularly variants within models.

- C1. Require (by regulation or voluntary agreement) that all new models have a safety feature checklist that indicates whether the priority safety features are available as standard or optional equipment on each variation [FED, FCAI, STATE (fleets)].
- C2. Develop a consumer guide to priority safety features available on vehicles for sale in Australia (similar to that produced by Japan NCAP) [ANCAP, STATE, FED, AAA, FCAI]

**Issue D:** Impediments to ordering vehicles with non-standard safety features - price, long delivery times, pressure from salespeople.

- D1. Apply pressure to reduce unreasonable prices of some safety options [FED through ACCC?, FCAI, MANUF, STATE (fleets)]
- D2. Encourage availability of variants with the safety features as standard [STATE (fleets), FED, FCAI, MANUF].
- D3. Improve the sharing of information between dealers about the availability of models (to expedite delivery of optioned-up vehicles) [FCAI, MANUF]
- D4 Require vehicles to have priority safety features as "standard" and for the purchaser to decide to delete them ("Option down" rather than "option up") [STATE, FED, FCAI, MANUF].
- D5 Increase awareness about safety amongst vehicle purchasers so that pressure to buy an inferior (but available) vehicle is less likely to succeed [ALL]
- D6 Introduce tax concessions for safety features [FED].

**Issue E:** Advertising and promoting the cheapest (and therefore the least equipped) variants for a model.

- E1 Industry agreement to only advertise the price for variants equipped with a minimum level of safety equipment [FED, FCAI, MANUF]
- E2. Industry agreement to give safety features a priority when advertising extras. For example a CD player or sunroof could only be advertised if the vehicle already had dual front airbags, side airbags and ABS {FED, FCAI, MANUF}.

**Issue F:** The polarisation of the fleet into large four-wheel-drives and small cars that are more vulnerable in collisions with the larger vehicles.

- F1 Improve promotion of aggressivity ratings of UCSR. Point out the large difference in aggressivity of similar large vehicles [UCSR, STATE, FED, AAA].
- F2. Point out the range of disadvantages of owning a large 4WD in the city and that, on average, crashworthiness is similar that of large cars despite the weight advantage of the bigger vehicles [UCSR, STATE, FED, AAA].
- F3 Encourage the uptake of head-protecting side airbags for cars. US research suggests that curtain airbags can provide exceptional protection for occupants of cars struck in the side by an aggressive vehicle [ALL].
- F4. Provide economic disincentives for owning large 4WDs (in place of the current tax incentives) [FED, STATE].

**Issue G:** Possible conflicting priorities in the insurance industry, where greater attention may be given to repair costs than to injuries.

- G1. Identify and address circumstances where a segment of the insurance industry only concerns itself with property damage and repair costs and is not "accountable" for injuries and society loses [INSURERS, FED, STATE].

**Issue H:** The limitations of the regulatory system for introducing safety initiatives -- the Federal (ADR) processes are not conducive to swift introduction of safety initiatives and States should not introduce unilateral safety requirements. Therefore alternatives to regulation should be sought.

- H1 Propose mechanisms to expedite worthwhile safety initiatives under the ADR system - particularly optional safety features and new international standards.
- H2 Participate in the development of international safety standards.
- H3 Develop strategies that encourage manufacturers to change through market forces rather than depending on regulation.
- H4 Introduce systems to monitor the uptake of worthwhile safety initiatives in the WA fleet and the success of safer vehicle strategies.

### ***Fleet buyers***

**Issue I:** Senior managers in corporations are often not aware of the hidden costs of accidents and the benefits of specifying safer vehicles. Budgets for new vehicle purchases are closely controlled but the costs of crashes are rarely monitored.

- I1. Prepare an information package targeted at senior corporate managers pointing out the benefits of selecting safer vehicles and the hidden costs associated with work-related road crashes. The package should stress the mutual benefits (corporate and community) arising from the purchase of safer vehicles [STATE, FED, INSURERS].
- I2 Develop methodology to assist organisations monitor the real cost of road accidents [STATE, FED, INSURERS].

**Issue J:** Fleet managers are unable to get away from day to day problems and so do not usually have time for safety initiatives.

- J1. Arrange regular fleet safety workshops for fleet managers [STATE, FED, INSURERS].
- J2. Publish a newsletter (electronic?) about fleet safety for circulation to fleet managers. Also enhance/support existing websites that deal with fleet safety [STATE, FED, INSURERS].

**Issue K:** Occupational health and safety personnel could give much greater attention to work-related road crashes. Current "Workcover" systems do not necessarily ensure that all serious road crashes are reported.

- K1. Review OH&S systems to ensure that road crashes are monitored and recorded as work-related injuries [STATE (Workcover)].
- K2. Prepare OH&S guidelines for improving the safety of vehicle fleets (methods of assessing the safety of the fleet and the potential improvements through replacement vehicles) [STATE, ANCAP, UCSR].

**Issue L:** Drivers of commercial vehicles may be regarded as "tougher" and in less need of protection in a serious crash.

- L1. Voluntary industry agreement to introduce safety into the advertising of commercial vehicles and avoid the stereotype of "toughness" {FCAI, FED, MANUF}.
- L2. Publish information about the risk of serious injury in commercial vehicles and safety tips by buying and operating these vehicles - targeted at drivers and fleet purchasers [STATE, ANCAP, UCSR, AAA].

**Issue M:** Fringe Benefit Tax provisions encourage the purchase of commercial vehicles that generally have inferior safety to that of large cars.

- M1. Review FBT provisions to remove incentives for purchasing large and possibly aggressive vehicles [FED].

### ***Private buyers of new cars***

**Issue N:** A lack of credibility of the numerous sources of safety information. Conflicting advice seems to come from motoring organisations, government, motoring journalists, car manufacturers and motor dealers.

- N1. Consumer-oriented organisations (AAA, STATE, FED) could mount a coordinated campaign on vehicle safety issues. There is a perception that current campaigns are too fragmented [STATE, AAA, FED, ANCAP, UCSR].
- N2 Consumer-oriented organisations could prepare press kits and media days (crash tests?) to bring vehicle safety to the attention of the media (see also action A4) [STATE, AAA, ANCAP, UCSR, JOURN].

**Issue O:** Lack of safety information in car showrooms.

- O1. ANCAP approaches motor dealers directly with offers of supplies of ANCAP brochures [ANCAP, DEALERS].
- O2. Prepare a consumer checklist on vehicle safety and distribute to dealers (possibly associated with action C1) [STATE, AAA., FED].
- O3. Vehicle safety resources made available to dealers: pamphlets, videos, CD-ROMs, World Wide Web links [MANUF, DEALERS, STATE, ANCAP, AAA].

**Issue P:** Need for more emphasis on "family" safety - including teenage drivers.

- P1. Conduct market research and/or human behaviour research on the attitude towards, and understanding of, vehicle safety amongst family members [STATE, FED, AAA, INSURERS].
- P2. Develop a campaign that targets family members (particularly women) and stresses the difference in safety performance between vehicles and the need to give safety a high priority in the purchasing decision [STATE, FED, AAA, INSURERS].
- P3 Develop a guide to selecting a safe vehicle for teenage drivers. This could include advice about second hand vehicles (see also next section) [STATE, FED, AAA, INSURERS].

## ***Private buyers of second hand cars***

**Issue Q:** The less-safe vehicles already exist. Any measures to discourage the purchase of less safe vehicles will probably result in their price dropping and so they will be more accessible to a different category of car buyer - perhaps young drivers who are more exposed to the risk of a serious crash.

On the other hand, suppressed resale value for vehicles that do not offer good protection or have certain safety features may influence the purchasers of new vehicles who would not want their "investment" to lose value unnecessarily.

- Q1. Consider ways to encourage the "early retirement" of vehicles that have relatively poor crashworthiness ratings (UCSR) [STATE, FED, AAA, INSURERS]. Ideas include:
  - A bounty for de-registration and scrapping,
  - Restrictions on vehicle usage by high risk drivers (speed limit, number of passengers, removing front passenger seat, time of day?)
  - Increasing registration and third-party insurance costs for these vehicles

Great care will be needed to ensure that any action does not have unintended adverse consequences and does not unfairly disadvantage the potential purchasers of cheap motor vehicles.

## **Conclusions**

An analysis of road safety research findings shows that there could be substantial benefits arising from the replacement of most of the current fleet with safer vehicles. A tentative analysis of West Australian data suggests that, by 2010, there is potential for the number of car drivers killed or seriously injured to reduce by about 20%, simply due to the steady uptake of safer small cars. This is based on crashworthiness ratings produced by the Used Car Safety Rating program.

The analysis has also identified priority safety features that provide cost-effective reductions in serious injuries and fatalities.

Ways of encouraging the purchase of vehicles with above-average crashworthiness and safety features of proven effectiveness have been examined. Lack of consumer awareness of the safety issue is perhaps the greatest obstacle but there are also numerous impediments to a safety-aware consumer obtaining the level of safety they expect. However, there are limitations to the degree, and particularly the swiftness, with which safety can be improved through regulation. Strategies that use market forces to achieve safety outcomes are likely to be more successful and timely.

A range of possible actions to address these issues has been developed. It is recommended that this report be circulated to obtain feedback from stakeholders.

## **References**

The following reports contain further references.

Paine M (2002a) *Encouraging the Purchase of Safer Vehicles – Benefits and Costs of Safety Features*, Research report G227A prepared for Department for Planning and Infrastructure, Government of Western Australia, September 2002.

Paine M (2002b) *Encouraging the Purchase of Safer Vehicles – Impediments to Greater Uptake of Safety Features*, Research report G227B prepared for Department for Planning and Infrastructure, Government of Western Australia, September 2002.

Paine M (2002c) *Encouraging the Purchase of Safer Vehicles – Safety Characteristics of the West Australian Fleet*, Research report G227C prepared for Department for Planning and Infrastructure, Government of Western Australia, September 2002.