THE AGING OF THE AUSTRALIAN CAR FLEET AND OCCUPANT PROTECTION

Lauchlan McIntosh
Australian Automobile Association
Australia
Paper Number 98-S6-O-13

ABSTRACT

Concerns have been raised over the ageing of the Australian car fleet and the effect that this might have on occupant protection provided in crashes by these older vehicles. This paper outlines best estimates on the factors influencing occupant safety in older vehicles. It also suggests research areas that need investigation to better quantify the expected safety effects of a younger fleet.

Investigations in other international countries show what has been achieved elsewhere when action has been taken to reduce the age of the passenger car fleet and the action necessary to implement the change. From the study several factors emerge that could be used to change the age mix of the fleet in Australia , and how this could be achieved by financial, regulatory or other action.

One section of the paper presents data on the present Australian passenger car fleet age. Another section investigates some of the many options available together with future scenarios and their broad impacts on fleet characteristics. Finally the policy options are outlined that reduce the age of the fleet plus a study to quantify the improvement with benefits to the community.

INTRODUCTION

Australia has reached a level of vehicle use per 1,000 population and is second to the United States as shown in figure 1. However the rate of increase in vehicle ownership has slowed and is now relatively static. New vehicles less than one year old make up a surprising low percentage of the fleet and in Australia at less than 6%, compared to many European countries up to better than 20%.

Table 1.
International VehicleOwnership. 1997

	Motor vehicles per 1,000 population
USA	770
Australia	595
France	500
United Kingdom	475
Japan	475
Canada	385

One significant reason is the low corrosion rates for Australian cars that do not operate in severe winter conditions when compared to Europe and in North America. Consequently scrap rates remain low across Australia at 3 to 3.5 percent out of a total fleet of 8.6 million. Stringent vehicle inspection programs are not in force in most regions, allowing the few badly corroded vehicles to remain in service. Not all of the vehicles that are scrapped are the oldest in the fleet, crashes can mean near new vehicles can be scrapped, a factor which aslo contributes to the ageing of the total fleet.

New vehicle sales have remained relatively static in absolute numbers between 400,000 and 500,000 new passenger vehicles each year (5.5%) for the past decade, with the net result that the age of the fleet has increased slowly.

Using Australian Bureau of Statistics data the Australian fleet profile has been drawn in figure 1 to show the fleet age is growing at the rate of almost one quarter of a year every year.

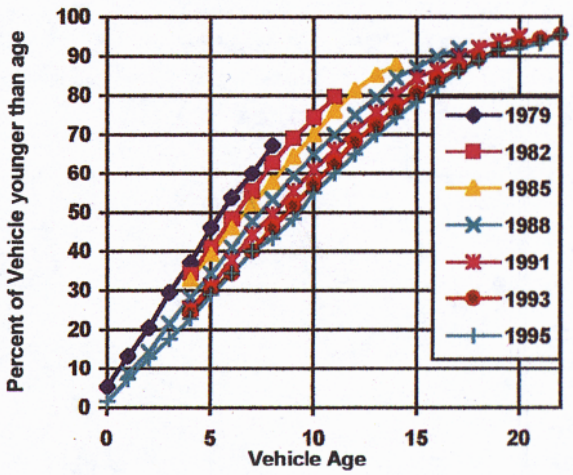

Figure 1 Australian Fleet Age 79-95

RELATIONSHIP TO OCCUPANT SAFETY

Firstly it is acknowledged that there is debate about how occupant safety should be measured, and there is no universal way that manufacturers, legislators or consumer interest groups have agreed to determine occupant safety. Many factors make a contribution to vehicle occupant protection level: Vehicle Mass, build date and therefore legislated occupant safety design level of equipment and vehicle, manufacturers specification of equipment that may significantly exceed the legislated safety level, personal use of restraint systems, deterioration of safety equipment over long time periods, overall design specification of the vehicle plus active and passive safety features, maintenance level of the vehicle at the time of the crash.

Crashworthiness and the risk of injury

Monash University has used data from many crashes to publish the risk of hospitalisation or death as a percentage for a wide range of vehicle models operating on Australian roads. As an example, the poorest performing small cars made in the same year, have three times the risk of serious injury or hospitalisation as the best small cars.

Table 2.
Percent risk of serious injury

Honda Civic	% risk of serious injury (hospital)
year 82-3	2.64
84-87	3.78
88-91	2.90
91-94	2.57

Table 2 demonstrates as one example, the variation which can occur for a particular model over a decade

For large cars models the worst rated have twice the risk of the those with the best rating for death, serious injury or hospitalisation. These are large changes when all of the vehicles are made to meet the same legislated level of safety performance. The data can be seen in Figure 2 which shows the Vehicle Crashworthiness by year of Manufacture. More detailed specific model data is also available in consumer friendly formats for vehicles made since 1982.

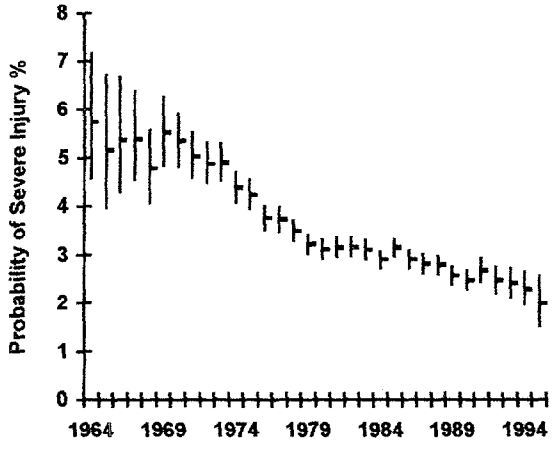

Figure 2. Crashworthiness by Year of Manufacture

ANCAP and Changes in Occupant Protection

An active ANCAP publishing and distribution program commenced in Australia in 19993 when the first crash test results were made available to consumers. Later programs have been able to document the improvements that been made to new vehicles since starting ANCAP in 1993. Large family sized cars have improved with significant reductions in head and chest injury, but even greater reductions are available if the consumer options the vehicle with a driver and passenger airbag. For small cars significant improvements have also been achieved but there still remain many models that are at a very poor level of occupant protection. The consumer quest for lowest cost purchase price means that most of the low cost products are sold without driver airbags with lower levels of occupant protection. The mixture of models in the market place will make the task of statisticians more difficult in the future as the year of manufacture of a vehicle means that there were several levels of occupant protection available for that particular vehicle.

Table 3.
Injury Risk Improvements from ANCAP Tests

Year vehicle built	Driver Injury Risk	Passenger Injury Risk
1993	59	47
1994	53	36
1995	44	28
1996	31	20
1997	29	29

The results in Table 3 show the risk of injury declined steadily over the years, for the driver the introduction of more airbags in models made up a significant proportion of the gain in years 1996 and 1997. There were no passenger airbags fitted in any of the ANCAP vehicles tested in ANCAP over this time period.

Another source of data on the occupant protection safety of older vehicles is the USA NCAP results. These results need to be treated with care, as the vehicle specification of a Honda Civic in the USA in 1978 the year testing commenced may be considerably different to the Australian specification vehicle. We are also not sure how many of the changes that were subsequently made to USA vehicles were also made to other international market vehicles.

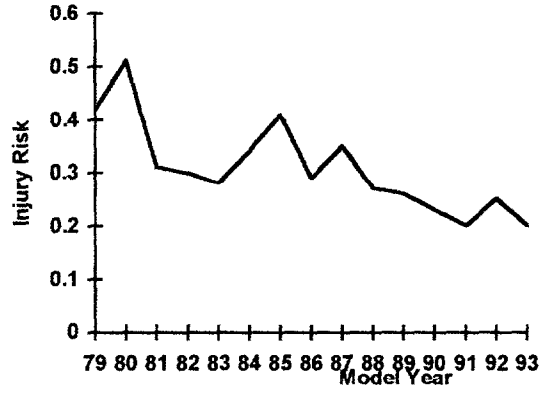

Figure 3. USA NCAP Combined Head & Chest Injury Risk

Figure 3 shows the improvements to combined head and chest injury risk measured by NHTSA in the NCAP

test results. There is a significant downward trend from 1979 to 1993 when the risk of a serious injury was down to half that at the commencement of the program. This is a real benefit to consumers that may have a vehicle crash.

Older Vehicle Safety Data

One source of vehicle safety data that is not available on older models is manufacturers test data on models. This is possibly due in Australia to the fact that most of the data was generated overseas up to the 1990's and there was no consumer group publishing material or significant demand for knowledge for improved safety. There was no legislative requirement for dummy crash test data until a version of FMVSS 208 was introduced in 1996 and before then, the only frontal crash requirement was the limit on rearward movement of the steering column to 127mm in a 48 km/h crash introduced in Australia in 1973. It is interesting to note that was no dummy in the vehicles used to show compliance with this test requirement. Researchers are therefore unable to make accurate occupant protection level predictions of older vehicles.

Consumers and Crashworthiness

Consumers are seeking the continued involvement of motoring organisations in running car safety crash tests as a worthwhile activity to obtain independent comparable safety material. However there are continuing misconceptions about what makes a car safe. Although those equating car strength with safety in an accident have declined, over one half of surveyed motorists continue to place undue emphasis on strength. Accident prevention features such as good brakes, and impact absorption features are minority mentions. References to safety features such as airbags and seatbelts have increased, however, and they are now mentioned by two thirds of Australian motorists.

Table 4.
Crashworthiness, A Consumer Perspective

What Helps to Make a Car Safe in a Crash	
Top Features	1997
Safety features. Airbags, Seatbelts, Headrests.	66%
Strong body. Bigger cars.	54%
Reinforcing bars. Side reinforcement strength.	19%
Accident prevention features. Brakes	19%
Impact Absorption. Crumple zone	13%

While the use of airbags is a commonly nominated safety feature, airbags are a vexed and often misunderstood issue among motorists. Fewer that half of motorists say they want an airbag in the next car that they buy. The main concerns about airbags are that they can cause injury, especially to children and they go off too easily. This data follows bad US press of US airbags. Australian airbags, given the high seat belt usage, are more user friendly.

Policy Changes to Reduce the Fleet vehicle Age

New Vehicle Taxation - *Reduce the Government net tax take so that the benefits to Government and community are in excess of the loss of revenue.* The benefits to government need to be calculated to realise the long term safety from this change in policy as many of the benefits may only be realised over the life of a motor vehicle, possibly ten to twelve years.

Government to increase the rate of depreciation allowed for new vehicles. This policy change would have a significant positive effect on the fleet market by making it more financially attractive to change fleet vehicles at regular intervals. An innovative approach to allow private buyers to be able to claim depreciation would also improve the attractiveness of more frequent turn over of vehicles. The benefits would need to be revenue neutral to government to be acceptable.

STRATEGIES TO REDUCE THE FLEET AGE

New Vehicles Benefits Task Force - A task force of industry, academia, government and motoring club representatives has been convened to review possible actions to reduce the Australian fleet age to improve occupant safety, emissions and reduce fuel usage. It is evident that reduction in the age of the fleet will take many years to accomplish and require many interventions to be successful. Economic costing of each proposal is essential to show the net benefits to the total Australian economy.

Recent qualitative opinion surveys have shown a strong dislike for 'cash for clunker' schemes as users of older vehicles see no potential, even with cash incentives, to purchase new vehicles.

The Taskforce is likely to look at what information consumers receive in terms of the benefits of newer vehicles to ensure positive messages on safety and environmental benefits are being received. These could include more specifically:

Increase Awareness of benefits of new cars - A major awareness program would need to be introduced to change the perception of owners of older vehicles with the benefits of owning a newer vehicle. Research to complement this program would be needed to measure the effectiveness. Much more must be done to make the information available to consumers more comprehensive and easier for consumers to interpret and use. This could include integration of manufacturer, regulator and consumer safety information.

Programs need to be introduced to measure and publish the benefits of newer vehicle ownership. This may

include the NCAP testing of some older models similar to the EuroNCAP tests on some old vehicles.

Introduce financial incentives - Many European countries have offered significant financial incentives to scrap older vehicles, Germany, France and Italy have recently provided cash incentives to scrap old vehicles with varying success. For example, in Germany a cash incentive of $3,000 incentive was allowed for a ten year old car. A program would need to be revenue neutral to be politically acceptable, with benefits emanating from the lower fuel use, emissions and safety benefits that would result in lower hospital admissions.

CONCLUSIONS

The Australian fleet is ageing with the average vehicle over ten years old. There are significant community costs associated with this trend, that will increase if no action is taken to reverse the trend. Newer vehicles are safer for occupants which means less hospital admissions with serious injury per crash. There are considerable savings to government health costs as road crashes contribute a large percentage to the health rehabilitation of injured occupants. Considerable evidence from the Australian and United States NCAP programs show the trend to improved occupant protection packages. Injury risk in Australian vehicles which lagged United States equivalent vehicles in 1993/4 now show signs of approaching the same level of occupant protection. The low rate of small cars fitted with driver airbags remains a concern and price sensitive buyers are not ordering the airbag model.

Strategies to reduce the age of the vehicle fleet will depend on a collective approach from manufacturers, regulators and consumer groups. Cost incentives to encourage older vehicle owners to trade up to a new model have only been partly successful when tried overseas, and to be successful would need to be funded for many years.

ACKNOWLEDGEMENTS

The assistance of Chris Coxon of the SA Department of Transport in the preparation of this paper is gratefully acknowledged.

REFERENCES

Holgate James, "The Aging of the Australian Car Fleet" July 1997.

ANOP Research Services, "What Australian Motorists are Thinking" , 1997 National Survey.

Newstead, Cameron, Le, "Vehicle Crashworthiness Ratings and Crashworthiness by Year of Manufacture" Report 107 March 1997.

GAO/PEMD-95-5 "Highway Safety Reliability and Validity of DoT Crash Tests. May 1995.