

PERIODIC VEHICLE INSPECTIONS IN TASMANIA

*ROADWORTHY AND CRASHWORTHY:
A ROAD SAFETY PERSPECTIVE*

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CONTENTS

BACKGROUND	3
ROADWORTHINESS	3
THE INFLUENCE ON SERIOUS CASUALTY CRASHES	3
PERIODIC VEHICLE INSPECTIONS (PVI)	4
CRASHWORTHINESS	6
CONCLUSION	8
REFERENCES	17

PERIODIC VEHICLE INSPECTIONS IN TASMANIA

ROADWORTHY AND CRASHWORTHY: A ROAD SAFETY PERSPECTIVE

BACKGROUND

Periodic vehicle inspection systems are aimed to decrease the number of serious casualty crashes by reviewing the safety condition of vehicles either:

- Annually
- Annually for vehicles older than five years, or
- Upon transfer of ownership.

However, current studies of serious casualty crashes have shown minimal association between crash rates and vehicle defects.

Most serious casualty crashes listing 'vehicle defect', were synonymous with high risk behaviors, such as excessive speed, inexperience and alcohol consumption.

Vehicle age is often suggested as a core factor influencing the crash rate. There is no statistical correlation between vehicle age and vehicle defects reported in crash data. The marginal over representation of older vehicles in crash statistics is not related to roadworthiness, but attributed to the lack of primary or secondary crash avoidance systems compared to newer model vehicles which is a measure of crashworthiness.

Despite the absence of supportive evidence, the perception that older vehicles contain defects which contribute significantly to crashes is high.

ROADWORTHINESS

THE INFLUENCE ON SERIOUS CASUALTY CRASHES

Tasmania

Statistical analysis of Tasmania's crash data (2007-2011) revealed that Tasmania Police indicated vehicle defect as a possible causal factor in:

- 4.12% of fatal crashes
- 2.56% of serious injury crashes

See Appendix A for detailed causes of fatal and serious injury crashes in Tasmania from 2007-2011. Significant causal crash factors such as "alcohol and drugs", "excessive speed" and "inattention" are more often grouped together than with environmental or vehicular factors.

From a random sample of serious casualty crash reports (1997-2011) listing 'vehicle defect' as a causal factor it was evident that where a defect is described, they commonly cited:

- Under inflated tyre
- Worn tyre/lack of tread
- Light not functioning (motorcycle specific)

Other Jurisdictions

Despite crash statistics to the contrary, there is still strong belief in some areas that vehicle defects contribute substantially to crashes. This is also true in other jurisdictions.

VicRoads data submitted to an Inquiry into Victoria's Vehicle Roadworthiness System showed only 1.1% of vehicles had defects that caused or contributed to a crash.

The Parliamentary Committee overseeing this Inquiry concluded that, of those vehicles involved in fatal and serious injury crashes between 1994-1999, the total defect rate was 3.55%. This included cases where vehicle defects might have had any relationship to the crash, not just as a primary factor.

In its submission to the same Inquiry, Monash University Accident Research Centre stated that *"a defect was identified as a causal factor in just 1.3% of fatal crashes"*.

In a 1999 report the Federal Office of Road Safety indicated vehicle defects, on a national average, contributed to just 2.3% of fatal crashes involving light vehicles.

When looking at the contribution to both fatal and serious injury crashes, a national average composite rate of 3.7% was suggested. Based on the same data a State-by-State rate of 2.2% in Victoria, 1.7% in South Australia, and 4% in Queensland was calculated.

After analysis of specific South Australian metropolitan data, researchers concluded that none of the defects identified as a major or possible contributory cause of any of the crashes associated with vehicle defects, would definitely have been identified prior to the crash.

The detection and subsequent analysis of safety related defects is based on judgement as to what classifies as a defect. Definitions vary widely between researchers, Police and state motoring authorities.

PERIODIC VEHICLE INSPECTIONS (PVI)

Periodic Vehicle Inspections (PVI) refers to a government mandated requirement for motor vehicles to be inspected to provide a measure of roadworthiness.

Diversity in policy on PVI programs is apparent within Australia and internationally, as opinions differ between stakeholder groups including government agencies, consumers and their representatives including motoring organisations. Therefore, the age at which vehicles are required to be inspected and the intervals between inspections vary according to jurisdiction.

These arrangements are summarised in Table 1.

Other Jurisdictions

NSW is currently the only Australian state requiring annual inspection of vehicles over five years before registration can be renewed. NSW, Queensland and Victoria require safety inspections to be carried out before the sale of any vehicle.

Other than NSW, all other states that were performing annual periodic vehicle inspections have ceased to do so after evaluation revealed:

1. That vehicle defects contribute to a small number of crashes and road trauma
2. The periodic inspection of light vehicles has little effect in reducing the incidence of vehicle defects that contribute to crashes
3. The prevalence of older vehicles in crash statistics is attributed to crashworthiness, rather than roadworthiness.

Tasmania

In 1995 Tasmania decided not to introduce annual inspections or inspections at change of ownership in favour of random roadside inspections.

Tasmania Police Officers and DIER Transport Inspectors regularly conduct roadside inspections of light vehicles across Tasmania. From March 2011 until February 2012, Tasmania Police issued 7,163 light vehicle defect notices. For the period March 2011 until March 2012, DIER Transport Inspectors have conducted 5,323 light vehicle and motorcycle inspections. This does not include taxi inspections which are additional and focus on taxi specific requirements. Refer to Appendix B for further details of vehicle inspections and issuing of defect notices.

PURPOSE OF PVI

The basis for PVI programs should primarily be road safety related as PVI leads to an improved condition of the fleet, thus reducing crashes and their severity.

This argument assumes that:

- motor vehicles commonly contain defects which render them unsafe
- vehicle defects increase with the age of the vehicle
- vehicle defects are easy to identify upon inspection
- the nature of inspections and the interval between inspections have been set to provide confidence that vehicle defects will not occur between inspections.

Roadworthiness is not a constant attribute, a vehicle might be roadworthy at the time of inspection, however after a short period of time it may be considered unroadworthy due to failure of a component or components of the vehicle, for example, a front headlight globe may cease to function.

Issues

PVI presumes that defects present in a manner which is amenable to identification at inspection, but this is not necessarily so. It assumes that defects will be present at the time of inspection, but defects are highly likely to develop during the interval between inspections and it assumes PVI inspection systems are reliable and produce consistent outcomes.

More recent national and international studies of crashed vehicles have shown very little association between crash rates and vehicle defects.

The American National Highway Traffic Safety Administration (NHTSA) reviewed existing research and data but was unable to establish a correlation between the detection of motor vehicle defects arising from PVI and a reduction in vehicle crashes.

Analysis of the Federal Office of Road Safety (FORS) fatal file concluded that *“a wide range of defects were either not identified at PVI, were not amenable to identification at PVI, or probably developed subsequent to PVI.”*

“Even when it can be established that a crash has been caused by a vehicle defect it does not automatically follow that a scheme of regulated vehicle inspection would have led to the particular defects being both identified and fixed, and therefore the crash being avoided.

For example, crashes may be caused by under-inflation of tyres and inflation pressure needs to be checked more frequently than yearly. In other cases, crashes are caused by defects in vehicles that may develop a matter of weeks before causing a crash”.

Research states that PVIs do not have an “enduring effect” and that “benefits have been demonstrated to diminish significantly within six months, and are unlikely to be apparent after one year.”

The Victorian Parliamentary Committee report cited examples of vehicles being found unroadworthy within hours of inspection, mostly due to deliberate changes to the vehicle.

Statistical anomalies can be explained by the cyclic process of PVI and motorists awareness of the need for maintenance before a vehicle inspection compared to the need for regular maintenance.

CRASHWORTHINESS

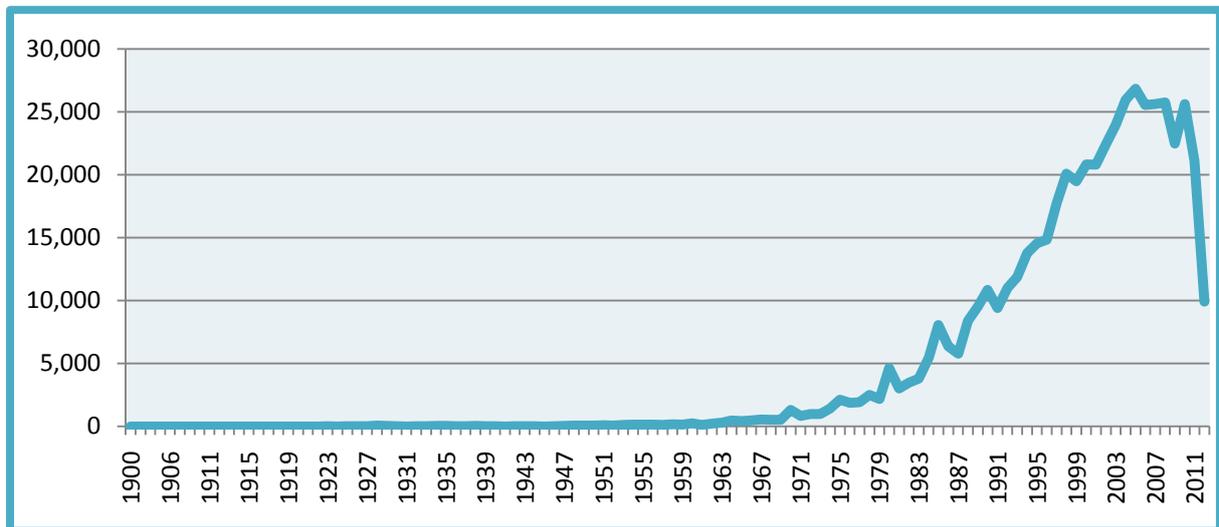
VEHICLE AGE

Vehicle age is often suggested as an important factor when examining the effect of roadworthiness on crash rate. However, crashworthiness is a more appropriate way of considering the impact of vehicle age.

Crashworthiness refers to the ability of a vehicle to manage the energy of an impact to minimise the risk of injury. The average crashworthiness of vehicles improves with year of manufacture, implying that drivers of newer cars are less likely to be killed or admitted to hospital after a crash. Data suggests that the rate of serious and fatal crashes increased 2.53% per year of vehicle age.

According to the Australian Bureau of Statistics:

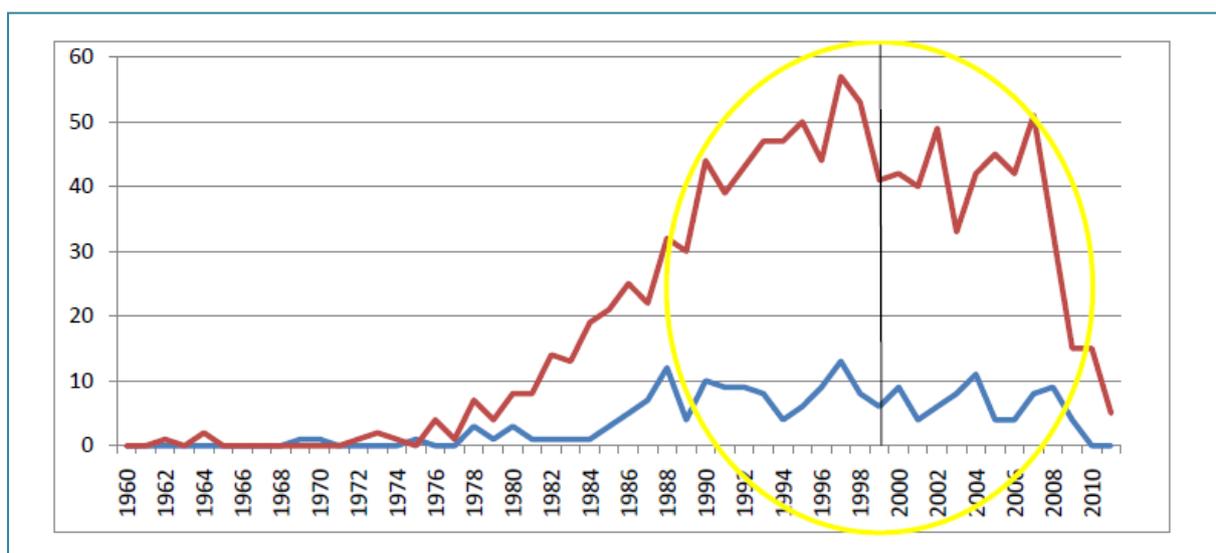
- the average age of passenger vehicles registered at 31 January 2011 in Tasmania is 11.6 compared to New South Wales where the average age is 9.3 years.
- Tasmanian passenger vehicle ownership of 582 per 1,000 of population is considered high compared to 516 in New South Wales where public transport is more abundant.



Current Registered Light Vehicles by Year of Manufacture in Tasmania

Examination of crash statistics has provided evidence that the prevalence of crashes is spread proportionately across the registered fleet, when the average age of vehicles owned is considered.

When taking the average age of the Tasmanian fleet into consideration, the numbers of crashes are slightly higher for vehicles manufactured before 1999 and even more pronounced for vehicles manufactured between 1982 and 1988.



Number of registered vehicles by year of manufacture involved in fatal (blue) and casualty crashes (red) 2007 - 2011.

Older vehicles lack many of the primary and secondary safety features built into newer vehicles (ABS, air bags, ESC, lap sash seat belt). Small engineering advances can have dramatic effects on crash incidence and severity for example in a pre-1970 model vehicle the risk of being injured in a crash is double that for a 1990 model vehicle.

A study of real world crashes in Australia by MUARC concluded:

- the risk of severe injury, *once a crash has occurred*, decreases steadily by year of manufacture
- on average, cars manufactured in 1982 had 30% higher risk than those manufactured in 1992
- cars manufactured in 1972 had twice the risk.

Recent safety improvements, such as airbags, are likely to result in further significant reductions in the risk of severe injuries to car occupants. There are, therefore, potential road safety benefits available from strategies which reduce the average age of the vehicle fleet.

European researchers have noted that PVI can improve vehicle maintenance, prolonging the service life of vehicles, thereby increasing the age of the fleet¹.

In various studies it was concluded that random inspection encourages motorists to maintain their cars in a roadworthy condition at all times, whereas PVI encourages motorists to maintain their vehicles in a roadworthy condition only at inspection times².

However, it is not clear that periodic vehicle inspections will achieve this aim.

CONCLUSION

Analysis of Tasmania's crash data confirms vehicle defects are not a significant factor in fatal and serious injury crashes. If vehicles are subject to periodic inspections many defects listed in crash reports would not be present at the time of any inspection as the vehicle might be roadworthy at that time but become unroadworthy shortly thereafter due to failure of a component of the vehicle.

Based on 2012 vehicle registration data, the estimated costs to the Tasmanian community of periodic vehicle inspection would be:

- \$51.3 million for all light motor vehicles inspected annually
- \$41.3 million for all light motor vehicles 5 years of age or older
- \$33.4 million for all light motor vehicles 10 years of age or older
- \$11.1 million for light motor vehicles inspected at transfer of registration

¹ Fosser, 1992

² Asander, 1992; Crain, 1981

- \$5.55 million for light motor vehicles 10 years of age or older inspected at transfer of registration

From an economic perspective, the costs associated with PVI not only include the direct and operating costs associated with vehicle inspection but also time costs.

Tasmania has a longstanding position of Tasmania Police and DIER transport inspectors undertaking random inspection of light vehicles which results in a significant number of inspections being undertaken on a regular basis and defect notices issued where required.

In various studies random inspection encourages motorists to maintain their cars in a roadworthy condition at all times, whereas PVI encourages motorists to maintain their vehicles in a roadworthy condition only at inspection times.

Whilst older vehicles are overrepresented in crash statistics research shows that this is not due to roadworthiness but to crashworthiness. Newer vehicles are fitted with increased safety features (ESC, multiple airbags etc) which render the vehicles safer.

To optimise the benefits of advances in vehicle design and occupant safety - reducing the severity of casualty injuries and number of road crashes there would need to be a significant reduction in the age of the existing vehicle fleet. This would mean newer, safer vehicles on the road and the adoption of strategies to address fleet renewal as opposed to PVI (summary of proven strategies to renew vehicle fleet listed in Appendix C).

Tasmania's current approach to PVI is consistent with the majority of other states.

FIGURE 1: Summary of light vehicle inspection requirements in Australia

SUMMARY OF LIGHT VEHICLE INSPECTION REQUIREMENTS IN AUSTRALIA						
	TAS	NSW	VIC	QLD	SA	WA
New or Expired Registration	Yes	Yes	Yes	Yes	Yes	Yes
Annual Inspection	No	No	No	No	No	No
Specified Period	No	Yes (vehicles 5yrs+)	No	No	No	No
Change of Ownership	No	No	Yes	Yes*	No	No
Transfer Interstate	Yes	Yes	Yes	Yes	Yes	Yes
Random	Yes	No	Yes	Yes	Yes	Yes
	1995 – Tasmania decided not to introduce annual inspections or inspections at change of ownership in favour of random roadside inspections.	In New South Wales, vehicle owners are informed on the registration renewal notice if a vehicle safety check is required for their vehicle. A safety check is needed to renew the registration on any vehicle more than five years old as well as on vehicles previously registered in a different state or territory. A certificate is valid for 42 days from the time it is issued.	2001 – the Victoria Road Safety Committee found no compelling evidence to support the introduction of PMVI's, finding that vehicle defects were not a proven significant factor in crashes. This Committee recommended that random roadside inspections be increased and a culture encouraged of vehicle users regularly checking their vehicles.	1990 – the Parliamentary Travelsafe Committee reported it was not convinced that mechanical defects were a significant causal factor in crashes to warrant the introduction of inspections.	1995 – a Parliamentary Committee concluded that the claimed benefit of inspections had not been proven and there was little evidence to suggest substantial benefits would be derived from their introduction.	
	www.transport.tas.gov.au	www.rms.nsw.gov.au	www.vicroads.vic.gov.au	www.tmr.qld.gov.au	www.sa.gov.au	www.transport.wa.gov.au
	Appendix 1 Appendix 2	Appendix 3 Appendix 4	Appendix 5 Appendix 6	Appendix 7	Appendix 8	Appendix 9

*A road safety certificate is needed to sell a vehicle in all but the most rural and remote parts of Queensland. In Queensland, a vehicle is classified as a car, motorbike, caravan, trailer and any other vehicle with a gross vehicle mass up to 4.5 tons. The certificate must be displayed in an obvious place on any registered light vehicle as soon as it is offered for sale. For private sellers a certificate is valid for two months or 2,000 Km of driving, whichever comes first, from the date of issue. A certificate can only be used for one sale of a vehicle even if it is put up for sale again within the two month or 2,000 Km limit.

NB: The RACV, RACQ, and the RAA are opposed to PVI. However PVI programs operate in New South Wales and the Northern Territory and PVI is supported by the National Roads and Motorists' Association (NRMA) and Federal Chamber of Automotive Industries.

APPENDIX A: Factors contributing to fatal and serious injury crashes in Tasmania from 2007-2011

Severity: Fatal – Number of fatal crashes by contributing crash factors	2007	2008	2009	2010	2011
Alcohol	13	14	16	7	5
Animal on road	0	1	0	1	0
Asleep - fatigue	6	6	6	4	1
Distraction - external to vehicle	6	4	4	5	0
Distraction - in vehicle	1	1	6	4	0
Drugs	11	16	14	11	3
Exceeding speed limit	12	14	12	7	4
Excessive speed for the conditions / circumstances	11	11	14	8	7
Fail to give way	2	3	5	3	0
Fail to obey traffic signals	1	0	0	1	0
Fail to observe road signs and markings	2	4	6	3	0
Improper overtaking	2	0	4	1	2
Inattentiveness	20	17	23	2	1
Inexperience	9	6	17	7	7
Other obstruction on road	1	1	0	0	0
Pedestrian on road	3	1	3	5	5
Reversing without care	1	0	0	0	0
Road defect	3	4	4	1	0
Turning without care	2	2	3	3	0
Unwell - infirm	5	7	14	7	5
Using a mobile phone	1	0	0	1	0
Vehicle defect	4	6	15	2	2
Total of all crash factors	116	118	166	83	42

NB: Tasmanian Police may select more than one possible contributing factor.

Note: The whole numbers refer to the number of collisions resulting in fatalities, not number of persons killed, as regularly published in the DIER Annual Report.

Severity: Serious – Number of casualty crashes by crash factors.	2007	2008	2009	2010	2011
Alcohol	58	62	53	48	46
Animal on road	8	6	4	7	5
Asleep - fatigue	27	7	14	6	11
Distraction - external to vehicle	19	23	31	26	32
Distraction - in vehicle	9	6	5	9	8
Drugs	34	16	27	13	16
Exceeding speed limit	23	26	25	22	21
Excessive speed for the conditions / circumstances	55	50	55	50	55
Fail to give way	20	27	22	22	29
Fail to obey traffic signals	4	7	2	5	5
Fail to observe road signs and markings	7	14	13	12	11
Improper overtaking	9	7	11	10	11
Inattentiveness	92	113	116	67	9
Inexperience	80	66	86	74	59
Other obstruction on road	7	5	11	15	11
Pedestrian on road	19	18	25	20	28
Reversing without care	3	5	3	5	7
Road defect	13	14	14	18	7
Turning without care	8	13	15	13	20
Unwell - infirm	22	23	22	27	28
Using a mobile phone	0	1	1	1	1
Vehicle defect	16	10	16	10	13
Total of all crash factors	533	519	571	480	433

NB: Tasmanian Police may select more than one possible contributing factor.

Note: The whole numbers refer to the number of collisions resulting in casualties, not number of persons injured, as regularly published in the DIER Annual Report

APPENDIX B: Defect notices issued by Tasmania Police
over 12 months and the number of
vehicle inspections carried out by DIER

Defect Notices Issued by Tasmania Police

Month	Number
Mar-11	512
Apr-11	676
May-11	668
Jun-11	393
Jul-11	960
Aug-11	576
Sep-11	736
Oct-11	689
Nov-11	515
Dec-11	483
Jan-12	504
Feb-12	451
Total	7,163

Source: Corporate Performance Reports

DIER Vehicle Inspections March 2011 - 2012

	Light Vehicles (CA)	Motorcycles (MC)	Total
Vehicles Inspected at roadside	5315	8	5323
Vehicle Inspection - taxi roadside	1725	N/A	1725
Miscellaneous Inspection	409	11	420
Other	193	N/A	193
Total	7642	19	7661

STRATEGIES TO RENEW TASMANIA'S VEHICLE FLEET		
Options	Analysis	Issues
1. Fleet Purchasing Policies		
I. Government	<ul style="list-style-type: none"> Introduce strict policies directing the purchase of ANCAP 5 star rated vehicles for operational and SES staff. 	<ul style="list-style-type: none"> Through vehicle contracture, safe and well maintained vehicles are available to the general public at reduced prices. About 30% of the registered vehicles in Australia are used in business and 60% of all new vehicles are purchased initially for commercial purposes (Wheatley, 1997).
II. Private	<ul style="list-style-type: none"> Encourage strict policies governing the purchase of ANCAP 5 star rated vehicles for operational and SES staff. Provide an incentive based scheme for small businesses to purchase ANCAP 5 star rated vehicles for operational use. 	
2. Incentive Programs		
I. Cash for scrap	<ul style="list-style-type: none"> A scrappage program is a government budget program to promote the replacement of old vehicles with modern vehicles. Scrappage programs were touted with different names, mostly referring to an environmental benefit. Similarly, the United States Congress devised a scrappage scheme, commonly referred to as "cash for clunkers," as part of a general Automotive Stimulus package series; however, the voucher is only given when the newer car has a better fuel efficiency than the old car. In the 1990s, many countries had introduced tax rebate programs for new cars that meet a modern emission standard, but, with the Kyoto 	<ul style="list-style-type: none"> Federal Government withdrew support for a similar program aimed to reduce emissions in 2011.

Protocol, some countries made the public offer dependent on the scrappage of old cars.

- However such programs have effectively destroyed the second-hand car market. For people on small budgets it was virtually impossible to buy any cars under the price of E2500 as they had all been destroyed.

II. Reduced insurance premiums

- Reduced insurance premiums based on the cost benefit analysis of primary and secondary safety features built in to newer vehicles.
*“Most insurance companies, including those tied to motoring clubs such as the NRMA, RACV and RACQ, have been vocal supporters of new technology such as electronic stability control, which can detect a skid and bring a car back under control by braking individual wheels.
But few make it cheaper to insure cars fitted with the technology.” Richard Blackburn for Drive.com*
*Subaru’s decision to add an extra pair of eyes to its range-topping Liberty mid-size station wagon and Outback soft-roader models has helped owners focus on a new incentive - cheaper insurance.
The car maker has struck a deal with insurance company Allianz to knock another 20 per cent, or about \$160 on a standard quote - off the insurance bill for cars fitted with its Eyesight collision avoidance technology, helping owners to cut the running costs of the vehicles.
The car-based Eyesight system uses a pair of forward-looking cameras mounted in the Outback 3.6R Premium and Liberty 3.6R Premium models to watch the road ahead.
Subaru Australia spokesman David Rowley says the deal was struck because the Eyesight system provides several real-world safety benefits, including preventing drivers straying from their lanes, monitoring whether a driver is fatigued, and even avoiding a low-speed collision altogether by automatically hitting the brakes.
If a collision cannot be avoided, the Eyesight system can minimise the damage, saving on repair costs, Subaru says.*
- *Subaru has said the technology, introduced to the line-up in December last year, will soon flow down into more affordable models in the car maker’s line-up.*

SMH May 2012

3. State Regulation

- I. **Minimum safety standard for state registration and sale**
 - Before a road vehicle can be registered for the first time in Australia it must meet the requirements of the *Motor Vehicle Standards Act 1989* (the Act), which applies to new and used imported vehicles and locally manufactured vehicles. The Act requires vehicles to meet the national standards covering safety and emission requirements known as the Australian Design Rules (ADRs). When a new vehicle has been certified as meeting the ADRs it can be fitted with a compliance plate. The fitment of a compliance plate is mandatory under the Act, and it indicates to the registering authority that the vehicle meets all the required ADRs.
 - To enhance the safety benefits of new vehicle technology Victoria mandated when new vehicles are first registered in Victoria, they must be fitted with electronic stability control (ESC). This has now become the national standard. Similar regulation could be applied to other safety based technology to increase fleet safety across the state.

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