Safer Vehicles for Young Drivers - *Matching Vehicles to Drivers' Ability*

by Michael Paine, Manager Vehicle Design & Research Pty Ltd

This article was contributed by the SaferRoads Program

Automotive safety consultant Michael Paine looks at the role of the vehicle in young driver crashes and the new technologies that will eventually save many young lives.

SaferRoads
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Take a young, inexperienced driver and combine with a car that has twice the serious injury rate of a typical modern car – this should make for a deadly cocktail. And yet that is precisely the mix that is occurring on Australian roads.

Road safety campaigns around the world have, quite rightly, targetted the behaviour of young drivers and tried to make them " safer drivers" . However, a strategy missing from most of these campaigns is " safer vehicles for young drivers" .

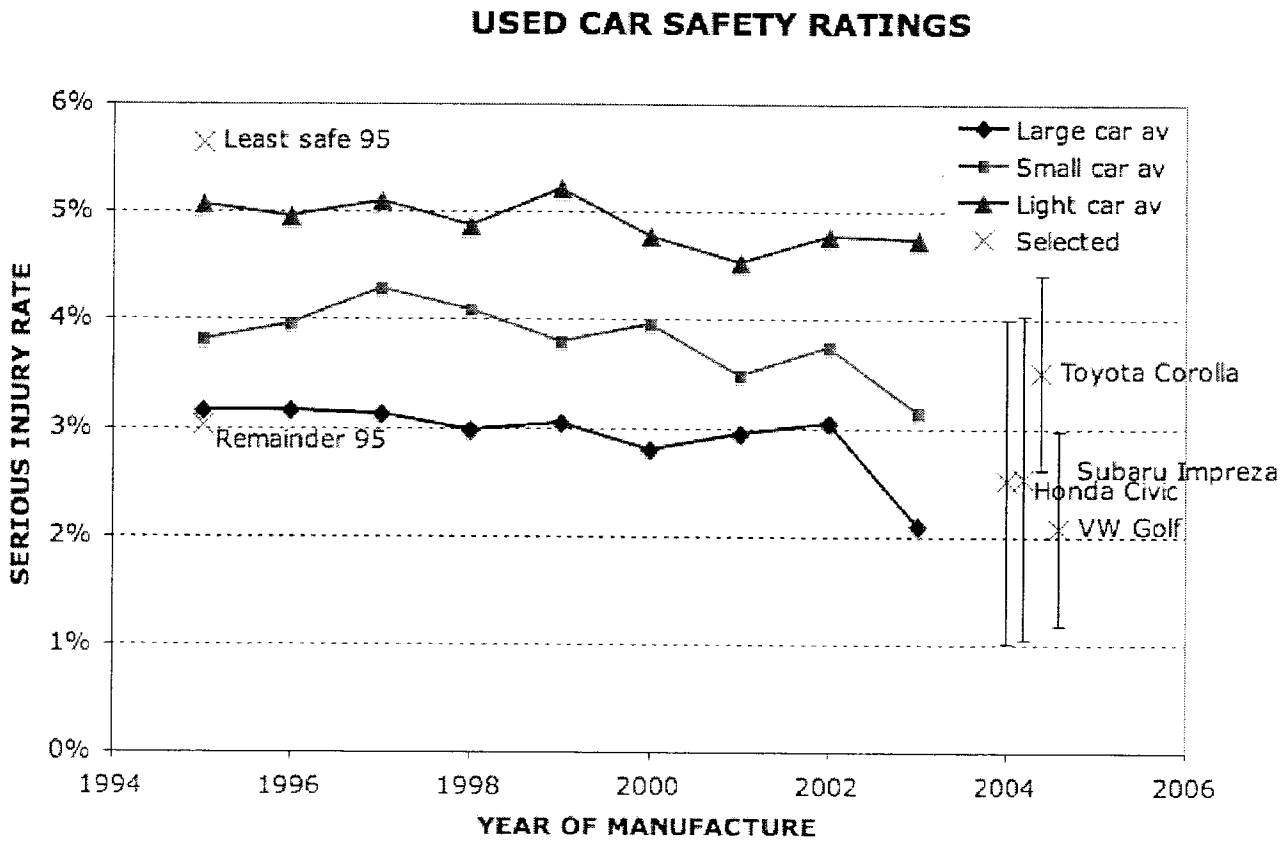
The Used Car Safety Ratings are a measure of the safety of vehicles, based on actual accident statistics. The ratings are published by a group of government and motoring organisations. A " serious injury rate" is calculated for each vehicle based on the percentage of all crashes where the driver is seriously injured. The statistics are adjusted to eliminate the effects of driver' s age, location of crash and the like.

These ratings are used to assess and classify cars in the interests of consumers.

Vehicle Types Driven by Young Drivers

Three years ago I carried out an analysis of the West Australian car fleet and found that small cars made up one third of all cars built in the 1990s. On average, these small cars had twice the serious injury rate of all cars of that age (and three times that of the latest cars).

This means that about 60% of seriously injured drivers in 1990s cars are in small cars. More than half of the small cars on the WA register that were manufactured in 1995 have a serious injury rate in excess of 6%. These models became very popular during the 1990s and, being cheap used vehicles, they are now being bought by young drivers.



Strategies for Discouraging this Deadly Mix

Early scrapping of the least-safe vehicles is one option. If these vehicles are not scrapped then they will end up being driven by drivers older than 25 - a less desirable outcome. However, since these drivers are at less risk of having an accident there are net savings to the community.

It is possible to give a rough estimate of the benefits of a strategy to reduce the number of young drivers in the least safe vehicles:

- Based on WA vehicle registrations, 17% of the light vehicle fleet has a serious injury rate of 5% or more. The average serious injury rate for this group is 5.64%. The average of the remaining group (serious injury rate less than 5%) is 3.02%. This indicates that about half (5.64/3.02) **of the young drivers who died in a vehicle that is in the least safe group would be alive today if they had been driving a vehicle from the safest group.**
- If it is assumed that currently the proportion of least safe vehicles that are driven young people is the same as other age groups (17%) **then replacing these vehicles with safer vehicles will results in a serious injury rate of 3.02, or a saving of 13% in young driver serious injuries and fatalities.**
- It is more likely that young drivers have a higher proportion of the least safe vehicles than older drivers. **Assuming that 30% of young driver vehicles are in the least safe category, then there is a potential saving of 21% in young driver serious injuries and fatalities.**

Of course, it would be best if all of the least safe vehicles were removed from the road, in which case there would be a 14% decrease in all driver fatalities. That will eventually happen as vehicles age and are scrapped.

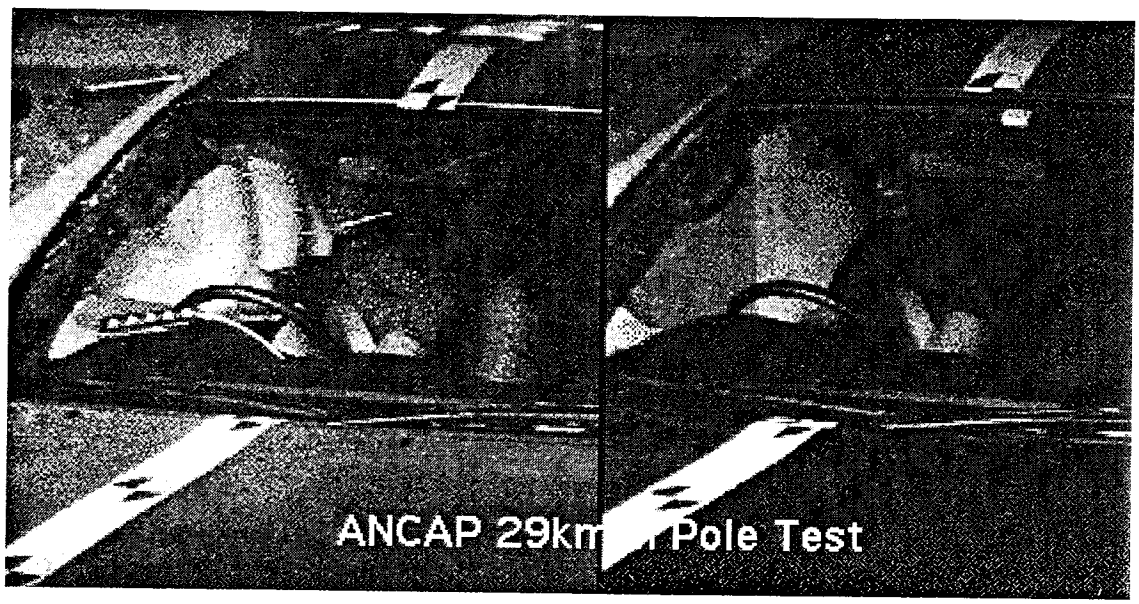
Safety Features on New Small Cars

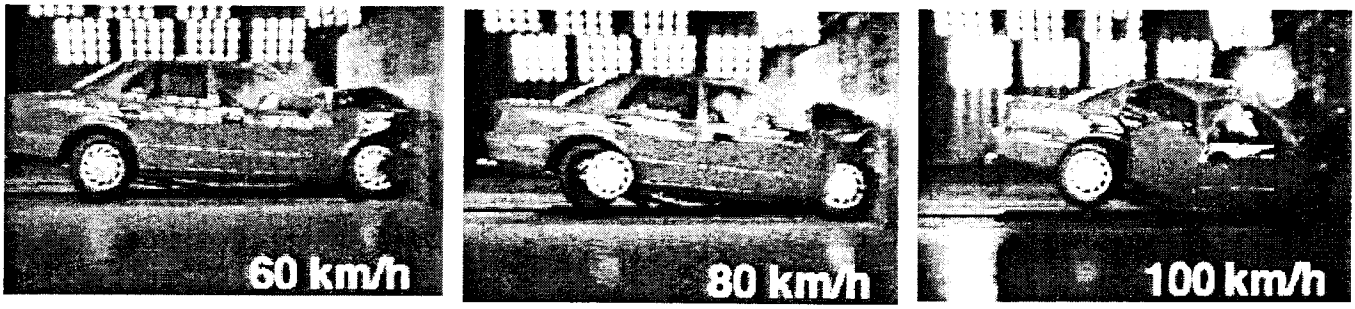
Crash tests by the Australian New Car Assessment Program (ANCAP) have shown huge improvements in the crash safety of new small cars in the last few years. Driver and passenger airbags are now standard on many small cars, along with seat belt pretensioners and other safety improvements.

These life-saving features should be encouraged as these will be the cars that are popular with young drivers on the secondhand market in several years.

In the case of small cars, a very recent development is head-protecting side airbags. Many models in Europe and North America now have these as standard. The ANCAP pole crash test has shown that a sideways slide into a pole or tree can be deadly at an impact speed of just 30K (km/h) without this protection. A side curtain or airbag that protects the head makes it an easily survivable crash. US research indicates that these devices could prevent nearly 50% of fatalities in intrusive side impacts.The head injury reading without the curtain indicated a fatal impact. With a curtain, the crash was easily survivable.

This leads to the next issue that needs to be stressed to young motorists...





Most Fatal Crashes are Low Speed

Newspapers and TV are keen to use dramatic pictures of cars torn in half during high-speed fatal crashes. Crash statistics tell a different story. **More than half of all fatal crashes occur at impact speeds under 60km/h and a typical side impact fatality occurs at less than 40km/h.**

In a modern car, travelling at 65 in a 60 zone feels quite safe. But unfortunately that is an illusion. When things get out of control, such as a car suddenly appearing from a side road, those few km/h can make a big difference. **South Australian research has found that each 5km/h above the speed limit doubles the risk of being involved in a serious crash. This means that travelling at 70 in a 60 zone quadruples the risk.**

This arises from Newton' s laws of physics and these cannot be broken!

RTA video on crash tests

Controlling Speeds

In Europe and Australia, very promising trials of Intelligent Speed Adaptation (ISA) are underway. With these systems, the vehicle automatically " knows" the posted speed limit and takes action if the vehicle is exceeding that speed limit. The action can be as simple as making the accelerator pedal stiffer or making it vibrate, or the vehicle can be prevented from exceeding the posted speed limit.

These clever systems are likely to become available in Australia during 2007. It will be many years before the typical vehicles bought by young drivers have ISA as standard but retrofit kits could be encouraged for young drivers.

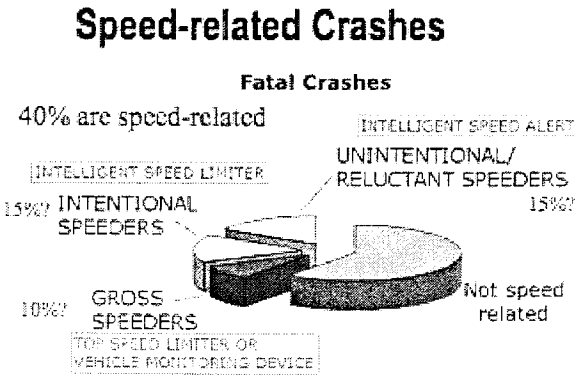
The technology does not even need to be built into the vehicle. During 2006 an intelligent speed advisory system ("SpeedAlert") was launched in Sydney. This uses a pocket computer (PDA) with built-in GPS receiver to determine location and speed and beeps if the posted speed limit is exceeded.

There are also several spin-offs from this technology that could be applied to young drivers:

- Top speed limiting – preventing prolonged travel in excess of a set speed. Most modern cars have an electronic engine management system with a built-in top speed. They are all set way too high but it should be easy for manufacturer' s to reprogram the chip to a sensible value. A bonus for car owners is that top speed limiting is a great deterrent to car thieves and joy-riders. Aftermarket kits are available for top-speed limiting older vehicles and have been used in the mining industry for decades.
- A more sophisticated top-speed limiter could have a coded over-ride that allows the driver to temporarily exceed the set speed. Even fancier is a smart card system that sets the top speed according to the driver, who is identified by an electronic ignition key (that also automatically adjusts the driver' s seat and mirrors). But that is getting away from our concern about young drivers who cannot afford to buy a brand new BMW.
- Monitoring speeds: Black-box recorders can be fitted to vehicles to record speed and other parameters. Later, the data is downloaded to a computer and analysed. Speeding violations can then be detected. Drivers who are repeatedly convicted of speeding could be required to only drive vehicles with such a black box recorder (their vehicles should also be speed-limited).
- Most GPS receivers that are used for bushwalking are capable of recording in a car. The resulting " track" can be later analysed by computer and the speed driven along various sections of road can be displayed. Systems that use a mobile phone in a similar way are also available.

Seat Belts

Smart seat belt reminder systems are becoming common on new vehicles. These detect when the driver or front seat passenger is not wearing a seat belt while the vehicle is moving. They sound a distinctive alarm if this happens. A retrofit kit would be a good idea for older vehicles, particularly



Estimated effectiveness of 80% (Regan 2003) gives 30% saving

those driven by young drivers, since non-wearing of seat belts is often a factor in their serious crashes.

Electronic Stability Control

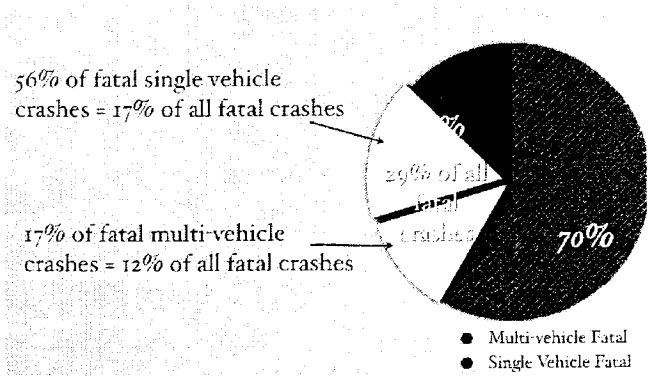
In September 2004, a preliminary study of the effectiveness of Electronic Stability Control (ESC) was released in the USA. ESC works to prevent the vehicle' s handling limits from being exceeded. The study found that vehicles fitted with ESC were much less likely to have single-vehicle crashes (such as running off the road) than the same models without ESC.

The benefits were particularly evident with sports utility vehicles (SUVs – four-wheel-drives) - a 67% drop in accident rate. So far, ESC is only available on luxury vehicles. It could be expected to be very effective for inexperienced drivers but they don' t usually drive these vehicles.

Conclusion

Vehicle engineering provides plenty of ways to discourage risk-taking by drivers and to make cars more forgiving of human error. Young drivers, in particular, could do with this assistance.

This would be far more positive than campaigns that try to use scare tactics, blame and punishment.



Estimated benefits from Electronic Stability Control

More information

http://idisk.mac.com/mpaineau-Public/paine_young_drivers.pdf

Road Safety web links:
http://www4.tpg.com.au/users/mpaine/roadsafe.html

Used Car Safety Ratings
http://www.mynrma.com.au/used_safety_ratings.asp

Road Advertising

by Ken Smith RRSP, ACRS Fellow

You' re driving along, quietly minding your own business and concentrating on the road and traffic conditions (naturally), when suddenly your attention is caught by the logo or symbol for a well known family restaurant, a soft drink, or any of the myriad of other products and services that are brought to our attention every day. Nothing very unusual about that – except that this time it' s painted on the road surface in front of you. This could be in our future, although not if ACRS' views prevail.

Your College has been approached about this question over recent weeks, and some members of the ACRS National Executive have been interviewed by the media.

It appears that some local government authorities in NSW have been approached by advertising agencies proposing painting of advertisements on road surfaces. We understand that this has been proposed as a means of boosting Councils' road maintenance funding, and that some Councils have been giving the idea favourable consideration.

ACRS opposes painting advertisements on road surfaces, for several reasons. Our overriding concern is that it is a potential safety hazard. ACRS believes painting advertising signs on road surfaces is undesirable because of

Distraction: symbols or logos on the road surface could provide a hazard by distracting the driver' s attention from other, necessary features of the road environment. For example, a pedestrian could pop out from between parked cars at the instant your attention was on an advertisement.

Confusion: At present the only markings on road pavements in traffic lanes are zigzags on approach to pedestrian crossings, speed limits, merge and give way warnings and similar safety messages. These messages should not be diluted by signs and symbols that are nothing to do with safety or direction messages.

Glare: There is a risk that painting on road pavements could create glare in headlights at night or in wet weather. To be effective, signs and symbols would have to be in strong colours with reflective beads in the paint.

Skidding: Like other pavement markings, paint on road surfaces creates a risk of skidding when wet, especially for motorcyclists.

ACRS recognises that there is always need for more road funding than is available. One of our policy statements deals with improving road system black spots and road safety audits, which imply more funding, and we join with other groups such as the Australian Automobile Association and the SaferRoads partnership (see www.aaa.asn.au/saferroads) in lobbying for safer roads in every aspect. However we consider that this way of raising funds is inappropriate and creates an undesirable precedent.

If you hear of the matter being raised, please support your College' s view.