Safer vehicles for young drivers

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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 a deadly cocktail. And yet that is precisely the mix that is occurring on Australian roads. 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.

Road safety campaigns around the world have, quite rightly, targeted 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".

Types of vehicle driven by young drivers

During the 1990s cheap small cars became very popular among new car buyers. These vehicles can now be bought very cheaply second hand and they appear to be popular as a first car 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.

Two 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 need to be developed – early scrapping of the least-safe vehicles is one option. If these vehicles are not scrapped then they will end up being driven by older drivers - 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.** People under 26 comprise 15% of driver licences but are involved in 36% of road fatalities (RTA 2004). Taking this into account, and the slight increase in older driver fatalities (assuming the proportion driving the least safe vehicles increases from 17% to 20%) then the net effect is a 3.4% reduction in driver 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.** The net effect is a 5% reduction in driver 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 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 second-hand 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.

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

Most fatal crashes are at surprisingly low speeds

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 elusion. 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!

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.

It will be many years before we see these clever systems in widespread use, and even longer before the typical vehicles bought by young drivers have such features. However, there are 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 allowed the driver to temporarily exceed the set speed (say for that occasional drive in the unrestricted Northern Territory!). 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 drivers 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).
- You don't even need a device built into the vehicle to monitor the teenager who is borrowing the family car. 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 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.

Wrap-up

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.

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

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