

Building more flexible barriers to save lives on country roads

August 9 2018, by David Logan



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Each year in Victoria around 75 people are killed—and more than 500 hospitalised—after running off the road or having a head-on crash on high-speed country roads. Many of these are country Victorians, with 47

per cent of fatal and serious injury crashes occurring within 20 kilometres of the person's home postcode.

These 75 deaths represent more than half of the 145 people who lose their lives each year outside of Melbourne.

One solution to significantly reducing the tragic loss of lives and serious injuries is through the installation of safety barriers, along the sides and between opposing directions of travel, along key rural highways that carry much of the traffic between Victorian regional towns and cities.

While there are a number of different barrier types suitable for country highways, flexible safety barrier has been demonstrated around the world and locally to be particularly effective at preventing vehicles from running off the road and hitting trees, rolling over into paddocks or crossing the centre line into high speed head-on crashes with oncoming vehicles. Compared to other barrier types, flexible safety barrier has proven to be more effective in preventing injury to drivers and passengers.

Imagine a car travelling along a straight section of country highway at just under 100 km/h. The fatigued driver drifts into a 'microsleep' and the car strays gently towards the centre of the road, on a seemingly inevitable course towards the headlights of an oncoming SUV. As the car moves just a few metres to its right onto the wrong side of the road it collides with the SUV.

Four tonnes of metal come into contact and within a few tenths of a second all the kinetic energy is dissipated into the crash structures as the front of both vehicles crush most of the way to the windscreen. The occupants are violently decelerated. The front airbags deploy, but the energy of the impact—three times that of an urban head-on crash—overwhelms their ability to protect the vehicle occupants from

serious injury or worse. As the two wrecked vehicles rebound and come to rest the silence reveals another two families irreversibly affected by road trauma.

With a centre line flexible safety barrier, the outcome is vastly different. This time, the drifting car makes contact with the multi-cable, high tension ropes just past a support post. Immediately the taut wires capture the vehicle, stretching and yielding to absorb the impact. At the same time, the car rapidly slows down as the metal posts bend at the ground and the car slides along the wire rope, inflicting little more than surface damage.

In half a dozen metres the car's speed has reduced to around 60 km/h. A few metres later, as the safety barrier catches the vehicle, the vehicle slows to around 20-30 km/h. The driver applies the brakes and brings the car to a stop. No airbags have deployed, and the occupants are startled and shocked, but uninjured.

The Monash University Accident Research Centre (MUARC) evaluated 100 kilometres of flexible safety barriers in Victoria and found they eliminated 80-90 per cent of fatal and serious head-on and run-off-road crashes, backing up similar research findings from Europe and North America.

This evaluation played a major part in providing the impetus for the Transport Accident Commission (TAC) and VicRoads to commit to installing these barriers on high-risk regional roads throughout Victoria as part of the \$1.4 billion Safe System Road Infrastructure Program.

What about the downsides?

Flexible safety barrier performs best for light vehicles, which make up 80 per cent of run-off-road and head-on road trauma. Protection is also

provided by flexible barriers both for and from heavy vehicles, although these crashes comprise a smaller proportion of serious trauma.

The topic of motorcyclists and flexible safety barrier has raised considerable controversy. The claim that barriers act as 'cheese cutters' has no foundation in robust research evidence.

What the research has found, reinforced by the physics of injury, is that motorcyclists travelling at highway speeds are extremely vulnerable to any impact, whether with a barrier, roadside object, another vehicle and even the road surface itself.

Nevertheless, an analysis of fatal motorcycle crashes between 2001 and 2006 found that standard guardrail ('W-beam') comprised 72 per cent of barriers by installed length and around 73 per cent of fatalities, concrete barrier nine per cent of barriers and 10 per cent of fatalities. Flexible safety barrier made up 16 per cent of total barrier length, yet only resulted in eight per cent of fatalities.

Emergency services have recently expressed concerns about barrier systems limiting access to emergency response sites. These concerns are legitimate and have been faced by other jurisdictions.

In Sweden for example, road safety authorities have worked with emergency services to design barrier systems with appropriate overlaps to give access behind the barrier. Emergency services personnel have also been trained to unhook the wire rope from the barrier so it can be driven over. This ability to lower the barrier is another advantage flexible barriers have over fixed barriers such as concrete or W-beam.

Similar partnerships between agencies should be forged in Australia to allow life-saving flexible barriers to be installed without impeding emergency service work.

The Safe System philosophy that forms the backbone of Victoria's Towards Zero road safety strategy says that no road user should be killed or seriously injured in our road system. The strategy acknowledges that it is everyone's responsibility to keep themselves and others safe on the roads. It also acknowledges that the designers and operators of the road network need to take responsibility and improve the system as people will always make mistakes.

Roadside safety barriers are the best solution currently available if we want to continue to move around regional Victoria at the speeds we have been used to. The only way of achieving the Safe System without barriers would be to reduce highway speeds to 60-70 km/h, where a modern 5-star vehicle has adequate crashworthiness to protect us.

We have made huge progress towards eliminating road trauma in Victoria.

In 1970, 1061 lives were lost on our roads. Last year, it was 258. At this level, some 2500 people will die on our roads over the next 10 years and many thousands more will be hospitalised.

That is not a figure we can or should accept.

The goal of eliminating death and serious injury is ambitious, however it is the only ethical path. Underpinned by robust research evidence, roadside safety barriers—including flexible safety barrier—are one of the keys to achieving Towards Zero, and should continue to be rolled out as ongoing research aims to make them even better.

Provided by Monash University

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