

# Reducing Serious Injury and Death from Run-off-Road Crashes in Victoria - Turning knowledge into action

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# Royal Automobile Club of Victoria (RACV) Ltd

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### Title

Reducing Serious Injury and Death from Run-off-Road Crashes in Victoria – Turning knowledge into action.

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### Abstract

Road trauma is firmly entrenched as the single largest cause of unintentional death and serious injury to Victorians in the first five decades of life. While excellent gains have been made, the injuries and deaths that result from road traffic crashes remain in the top rank of public health problems facing Victoria. Vehicles running off the road account for around 40 per cent of all road crash deaths – of the order of 140 Victorians per annum.

There are three fundamental strategies for dealing with the run-off-road crash problem and, within each strategy, there are a number of proven, effective measures. This study examined literature and convened stakeholder forums to determine what the barriers are to implementation of these proven strategies.

Four key actions to overcome the identified impediments were developed: creating a constituency for the run-off-road crash problem, the formal adoption of a “safe system” strategy as an underpinning philosophy in future road safety planning, the need for clear and sharply defined lines of accountability and improvement in the quality and quantity of technical resource available to all stakeholders.

### Keywords

Road safety, crash prevention, run off road, roadside safety, single vehicle crashes.

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## Executive Summary

Victoria has been among the most successful jurisdictions in reducing road trauma. In the last twenty years the road crash death rate per 100,000 population has more than halved (from around 17 in 1985 to around 7 in 2004).

Nevertheless, while the rates continue to fall the ever increasing amount of road use leaves road trauma firmly entrenched as the single largest cause of unintentional death and serious injury to Victorians in the first five decades of life. While excellent gains have been made, the injuries and deaths that result from road traffic crashes remain in the top rank of public health problems facing Victoria.

The crash type accounting for the largest single proportion of serious injury and death is where a vehicle (usually a single vehicle) runs off the road and collides with a tree, pole, embankment or other piece of roadside “furniture” or overturns on non-traversable terrain. This crash type accounts for around 40 per cent of all road crash deaths – of the order of 140 Victorians per annum.

It has long been recognised as one of the major problems facing road safety policy makers. However, as the road toll has reduced, the proportionate importance of this crash type has increased. We have made little progress. This project sought to find out why and, then, to suggest ways to “turn the tide”.

There are three fundamental strategies for dealing with the run-off-road crash problem and, within each strategy, there are a number of proven, effective measures.

Strategy 1: Crash Prevention Type A – Identify the immediate (behavioural) causes for vehicles leaving the road and reduce their incidence.

Strategy 2: Crash Prevention Type B – Reduce the probability of a vehicle leaving the roadway, no matter what the immediately preceding driver/vehicle behaviour.

Strategy 3: Injury Reduction – Reduce the consequences of crashes after vehicles have left the road

A cross-section of senior people from all key stakeholder groups was brought together in a workshop format, at the RACV's Healesville facility on 15 and 16 September 2004, to develop a consensus view of what constitutes a risk reducing and crashworthy road system, to identify the major impediments to achieving such a system and to identify strategies to overcome each of the major impediments.

Information was also collected from several different sources, including an international survey of three countries, which are widely acknowledged as the global leaders in road safety performance. The questionnaire, derived from the insights gained from the Victorian Stakeholder Workshop, was sent to key personnel in each of these countries in an effort to identify further potential innovations.

The Victorian Parliamentary Road Safety Committee completed its public “Inquiry into Crashes Involving Roadside Objects”, releasing its report in March 2005. Since a wide range of interested parties had made submissions, the report was closely examined for additional insights into the way forward.

Finally, a focus-group style discussion was held with a number of VicRoads' staff in July 2005 in an effort to consider the potential of the Road Safety Act, and its method of application, to contribute to overcoming the inertia apparent in the application of Type 2B and Type 3 strategies.

The above research elements identified four main categories of impediment to the application of known and effective measures for reducing serious injury and death from run-off-road crashes. The categories are as follows:

1. Run-off-road crashes lack community and political salience.
2. The diversity of objectives among the key stakeholders creates conflicting priorities.
3. Lines of accountability are ill-defined.
4. There are technical short-comings.

The first three categories of impediment are obviously inter-related. If there was community and political salience then the lines of accountability would likely become clearly defined. If the accountabilities for individual stakeholders begin to be defined then the ways in which the stakeholders interact will likely change dramatically.

Several key actions to overcome the identified impediments were developed, and are briefly described below;

- Creating a constituency for the run-off-road crash problem must be a fundamental plank of a longer-term strategy.
- The formal adoption of a “safe system” strategy as an underpinning philosophy in future road safety planning is desired.
- The lines of accountability for all stakeholders need to be clearly and sharply defined.
- The quality and quantity of technical resource available to all stakeholders must be improved.

There are four suggested planks on which to build a long-term strategy to bring under control the burden of death and serious injury from run-off-road crashes. These four planks address the fundamental impediments to systematic action.

### **1. A formal commitment to a Safe Infrastructure System**

It is important that the Victorian Parliament debate and adopt a safe system philosophy. There are parallels in other areas of safety, for example, in workplace safety where the concept of employer responsibility extends to the possibility of charges of corporate manslaughter. It needs to be stressed that the safe system philosophy is designed to underpin the development of an error-tolerant system, not road infrastructure that protects people behaving illegally.

### **2. Assign specific accountabilities for reducing serious injury and death from run-off-road crashes to key agencies**

Specific targets need to be set for VicRoads for the road network under its direct management. There will need to be separate targets for rural roads and for urban roads, since the problems and potential solutions are different. It may even be worthwhile considering the possibility of setting targets for the reduction of serious injury and death from run-off-road crashes on specific routes.

### **3. Making performance transparent**

When the Swedish Parliament formally adopted the Vision Zero philosophy it made the Swedish Road Administration accountable for designing, building and operating an infrastructure that was safe for road users who behaved legally. It also created a road safety inspectorate as an independent unit to monitor and publicly report progress in achieving the objectives of the safe system.

If the Victorian Parliament is to formally adopt a safe system philosophy then it is important to create a mechanism by which the achievement of the objectives of that philosophy can be reported publicly to the Parliament.

### **4. Re-examine all extant standards and warrants to overcome both technical and practical limitations**

This plank is of quite a different character from the previous three and can proceed independently. There are two issues to be confronted.

First, the standards that do exist have been applied in a very limited fashion. Whether or not a particular standard – for example a nine metre clear zone for a rural road – is applied depends upon a “warrant”.

Secondly, there are a number of technical deficiencies in the standards and the potential flaws in both the clear zone standard and the application of flexible barrier systems have been noted.

Further, a number of short term actions have been designed to create a community, institutional and political climate in which the probability of implementation of the long-term strategy is increased.

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# 1. Setting the Scene

The benefits of minimally constrained personal mobility are valued highly by the vast majority of people, and road use grows continuously. The number of vehicles registered in Victoria grew by some twenty per cent in the decade of the 1990s and is forecast to grow by slightly more than this again in the first decade of the twenty-first century. These inexorable increases in motorisation have a safety downside.

Victoria has been among the most successful jurisdictions in reducing road trauma. In the last twenty years the road crash death rate per 100,000 population has more than halved (from around 17 in 1985 to around 7 in 2004). Using registered vehicles as a surrogate for the amount of travel, the reduction in the fatality rate per unit of road use is even larger – from around 28 deaths per 100,000 registered vehicles in 1985 to around 9 in 2004. Victoria's current road fatality rates compare favourably with the best achieved in countries with similar levels of motorisation, road transport systems and urban form.

Nevertheless, while the rates continue to fall the ever increasing amount of road use leaves road trauma firmly entrenched as the single largest cause of unintentional death and serious injury to Victorians in the first five decades of life. While excellent gains have been made, the injuries and deaths that result from road traffic crashes remain in the top rank of public health problems facing Victoria. Viewed in this light, it can hardly be argued that the current road toll, despite being at an historic low, is an acceptable price for personal mobility.

We face a conundrum. The more we bring the road transport system under control and the lower we drive the risk of injury per trip, the harder it is to keep making gains sufficient to offset the increase in population exposure to risk – which is what we must do if the absolute level of trauma is to continue to fall.

In the past we have taken the gains wherever we could get them, repeatedly sidestepping the really difficult problems such as run-off-road crashes. We can no longer sidestep.

## 2. The “Hard Nut” of Run-off-Road Crashes

The crash type accounting for the largest single proportion of serious injury and death is where a vehicle (usually a single vehicle) runs off the road and collides with a tree, pole, embankment or other piece of roadside “furniture” or overturns on non-traversable terrain. This crash type accounts for around 40 per cent of all road crash deaths – of the order of 140 Victorians per annum. There are over 3,000 casualty crashes of this type each year in Victoria; accounting for some twenty per cent of all non-metropolitan casualty crashes and some fifteen per cent of all casualty crashes in metropolitan Melbourne.

The high frequency and the particularly high severity of the run-off-road crash type is not a new discovery. It has long been recognised as one of the major problems facing road safety policy makers. However, as the road toll has reduced, the proportionate importance of this crash type has increased. We have made little progress. This project sought to find out why and, then, to suggest ways to “turn the tide”.

There are three fundamental strategies for dealing with the run-off-road crash problem and, within each strategy, there are a number of proven, effective measures. We know what to do but we just aren't doing anywhere near enough.

### **Strategy 1 Crash Prevention Type A – Identify the immediate (behavioural) causes for vehicles leaving the road and reduce their incidence**

The immediate causes of run-off-road events are not unique but are shared with many other crash types – drink driving, speeding, fatigue, errors of judgement, distraction, and so on. We already have preventive programs addressing at least some of these causes. Intense random breath testing and intense enforcement of speed limits, for example, have been shown to reduce serious injuries and death by moderating both at-risk behaviours. While the extent to which these interventions impact different crash types is largely unknown it is suspected that they have a somewhat lesser effect on run-off-road crashes because of the very high levels of blood alcohol and speed found in these crashes.

Despite this, there is considerable support for behaviour control measures, especially from interest groups concerned about the impact of alternative measures for dealing with run-off-road crashes. The following quote from an article in *The Age* of 15 April 2004 illustrates the point perfectly:

*“The French realise that drinking and speeding, not trees, cause road deaths.”*

The article went on to lament the large number of maples, planes and poplars that local authorities have felled from roadsides in order to protect motorists. Tree-protection groups are seeking to have the policy reversed, arguing for more resource for the enforcement of drink driving and speeding. A spokesperson for the group stated:

*“It's drinking and speeding that are the real problem. If you tackle them, the deaths drop.”*

This quotation provides a clue as to why so little progress has been made in addressing the run-off-road problem: there are many competing priorities in the management of road infrastructure and the various special interest groups tend to argue only from their narrow perspective rather than seeking win-win interventions.

Type A crash prevention measures are a necessary but not a sufficient countermeasure to run-off-road crashes.

## **Strategy 2 Crash Prevention Type B – Reduce the probability of a vehicle leaving the roadway, no matter what the immediately preceding driver/vehicle behaviour**

The types of measure available include:

- improving the road alignment (particularly horizontal curvature), especially for individual curves of unexpectedly small radius relative to the preceding road alignment
- providing sealed shoulders on rural roads
- routinely repairing pavement “drop off” occurrences where sealed pavements meet unsealed shoulders
- improving the skid resistance of pavements, particularly on short radius curves and the approaches to high-crash intersections
- ensuring high quality roadside delineation (post-mounted delineators, chevron signs, raised reflective pavement markings, pavement markings, etc.), with special emphasis on tactile edge lines on rural roads
- improving vehicle stability; for example recent evidence suggests that Electronic Stability Programs (ESP) are reducing single vehicle crashes by substantial amounts (ESP senses imminent loss of control and intervenes directly)
- reducing travel speeds in order to decrease the probability of loss of control.

Re-alignment, shoulder sealing, particularly for two-lane two-way rural roads; delineation, particularly tactile edge lines; and vehicle ESP systems are the most promising from this armoury.

One of the seventeen initiatives in “arrive alive!” is Road Design and Roadside Safety. The strategy commits Victoria to sealing the shoulders on 1,100 kilometres of rural road, adding “rumble strip” edge lining to 1,200 kilometres of rural roads and widening pavement on crests and curves at an unspecified number of high risk locations. These targets are to be achieved over the six-year life of the Strategy. There is no estimate in the strategy of the crash reduction outcomes expected.

Type B crash prevention measures have been our front-line attack on run-off-road crashes. The road-based measures have produced reductions in run-off-road casualty crashes of the order of 10% - well worth having but not sufficient to “crack this hard nut”, particularly since the level of investment in retrospective improvements is very small relative to the size of the problem.

While vehicle handling gains show great promise it will be many years before developments such as ESP penetrate the vehicle fleet to a substantial degree.

## **Strategy 3 Injury Reduction – Reduce the consequences of crashes after vehicles have left the road**

The measures available include:

- making poles and other roadside furniture more crashworthy
- clearing the immediate roadside of any rigid obstacles
- ensuring all roadside vegetation is crashworthy
- installing some form of crash barrier to better manage energy transfer in a crash
- reducing travel speeds and, thus, impact speeds
- improving the crashworthiness of vehicles in impacts with trees and poles, embankments, etc. and in rollovers.

The substantial improvements that have been progressively achieved in overall vehicle crashworthiness have had their smallest impact in run-off-road crashes. Collisions with trees and poles involve the most sudden transfers of kinetic energy because of their rigid nature and often narrow dimensions, as well as the typically high impact speeds. The level of protection achievable with current technology for the typically high levels of deceleration and resultant intrusion is quite moderate. Moreover, at prevailing travel speeds we cannot expect more than marginal gains in the level of vehicle-based crash protection in pole/tree crashes over the next decade or so.

Historically, road and traffic engineers have relied upon the concept of a roadside clear zone. The rationale for a clear zone is that, given sufficient recovery room, most drivers can regain control and return to the pavement. The origin of clear zone standards lay in the empirical, retrospective measurement of the spatial distribution of incursions into the median on U.S. interstate highways. As with many standards, the value chosen was that distance in which 85 per cent of errant vehicles could recover without collision. The logical flaw in this risk-based decision process is that, by definition, 15 per cent of vehicles that leave the road will not be able to recover within that distance. If the traffic volumes on a given road are high and the probability of a road departure moderate then collisions resulting from 15 per cent of those road departures may well lead to a large absolute number. Moreover, the potential benefits of clear zones have been limited by the use of liberal "warrants" which have precluded widespread application. Even where clear zones are plainly warranted, practical impediments often prevent such an intervention. Finally, the clear zone concept does not easily extend to urban areas where run-off-road crashes are a substantial problem.

The major alternative has been the installation of a protective barrier. Unfortunately, traditional installation has been limited to sections of road with significant vertical drop-offs and to the protection of structures such as bridge abutments. More recently, there has been a recognition of the wider value of crash barriers and "arrive alive!" commits to the installation, over the life of the strategy, of new safety barriers or upgraded existing barriers at 1,400 locations.

While all the measures in the Strategy 3 armoury have been known for decades their implementation has been very limited.

## 3. Project Method

### 3.1 The Victorian Stakeholder Workshop

The parties with interests in how Victoria's road infrastructure is designed, built, operated and managed are many and varied. In addition to being the platform for traffic movement, the road and road reserve:

- provide the means for the distribution of energy and telecommunications services within and between communities
- have a major impact on urban form and appearance
- impact upon ambient air quality and noise levels
- (to a degree) have cultural and heritage significance
- (to a degree) contain significant remnant vegetation
- (to a degree) provide habitat for endangered species
- require integration with the needs of road-based public transport and light rail.

Stakeholders frequently have conflicting goals, such that application of the known countermeasures would satisfy some but appear to disadvantage others. Understanding these community and institutional impediments to specific countermeasure action should enable a path to progress to be plotted.

A cross-section of senior people from all key stakeholder groups was brought together in a workshop format to develop a consensus view of what constitutes a risk reducing and crashworthy road system, to identify the major impediments to achieving such a system and to identify strategies to overcome each of the major impediments.

A facilitated workshop was held at the RACV's Healesville facility on 15 and 16 September 2004. It was attended by twenty-four persons drawn from:

- energy and telecommunications service providers
- light rail operators
- town planners and planning regulators
- road designers and traffic engineers (both government and private sector)
- both urban and rural local government
- government environmental managers and regulators
- police
- academics
- injury compensation insurers
- RACV.

While it was important to gain a cross-section of experiences and perspectives it was vital that the attendees understood that they were not representing their parent institution or class of institutions.

It was stressed that the workshop was to be considered an intellectual exploration and not a process of consultation. It was to be a search for possible ways forward with “blame and shame” to be avoided. The independent facilitator worked hard to ensure this mind-set was retained throughout.

In advance of the workshop, the organisations invited to attend were asked to complete a questionnaire describing their understanding of the issue of roadside safety and the nature of policies and programs that they might have in place.

### **3.2 A Selective Search for International Innovation**

Three countries are widely acknowledged as the global leaders in road safety performance. They not only have the lowest per capita road death rates in the world but they are accepted as having the most progressive conceptual underpinning to their national road safety strategies – Sweden’s Vision Zero, The Netherlands’ Sustainable Safety and the UK’s Danger Reduction.

A questionnaire, derived from the insights gained from the Victorian Stakeholder Workshop, was sent to key personnel in each of these countries in an effort to identify further potential innovations. Replies were received from the Swedish Road Administration, SWOV (the research arm of the Dutch Ministry of Transport) and the Institute of Highway Engineers in the UK.

### **3.3 Victoria’s Parliamentary Road Safety Committee**

During the course of the project the Victorian Parliamentary Road Safety Committee completed its public “Inquiry into Crashes Involving Roadside Objects”, releasing its report in March 2005. Since a wide range of interested parties had made submissions the report was closely examined for additional insights into the way forward.

### **3.4 Examination of the Road Management Act 2004**

This act was passed in 2004, with amendments effective in January 2005. Its purpose was to clarify the accountabilities of road users, road authorities and other agencies with a direct or indirect effect on the road reservation.

A focus-group style discussion was held with a number of VicRoads’ staff in July 2005 in an effort to consider the potential of the Act, and its method of application, to contribute to overcoming the inertia apparent in the application of Type 2B and Type 3 strategies.

## 4. The Blockers Between Knowledge and Action

Synthesizing the inputs from the Victorian Stakeholder Workshop, the international questionnaires, the Parliamentary Committee Inquiry report and the review of the Road Management Act resulted in the identification of four categories of impediment to the application of known, effective measures.

### 1. Run-off-road crashes lack community and political salience

There can be little doubt that the Victorian community, the key transport agencies and the Government regard road trauma as a substantial issue to be addressed. However, despite representing the single largest crash type, the sub-set of run-off-road crashes receives little specific attention and appears to have no “constituency”.

Part of the explanation lies in the way we conceive the causes of road trauma and the traditional strategies we have used for trauma reduction. Historically, Australia in general, and Victoria in particular, have used direct behaviour modification as the primary road safety countermeasure strategy. For example, we:

- pioneered mandatory self protection – with motorcyclist helmets (early 1960s), seat belts (early 1970s) and bicyclist helmets (1990s)
- have among the most restrictive traffic laws (for example, among the lowest permissible blood alcohol levels, among the lowest traffic law enforcement tolerances, etc.)
- are internationally renowned for both the intensity and innovativeness of traffic law enforcement, particularly for drink-driving and, more recently, speeding
- are at the forefront of public education programs, particularly those integrated with legislative, regulatory and enforcement initiatives.

While we have also implemented many effective road and vehicle engineering safety measures the principal strategic thrust has clearly been behaviour modification.

This strategic thrust has been highly successful but it has also reinforced the general community belief that most crashes are caused by “faulty” behaviour, and frequently by “misbehaviour”. The earlier media quote from France that “drinking and speeding, not trees, cause road deaths” no doubt also resonates with Australians.

This culture of blaming the victim is most apparent in run-off-road crashes. The media highlights the most extreme crashes and the accompanying reports typically implicate very high speeds and, frequently, extreme risk-taking behaviours.

It is hardly surprising, then, that there is little community support for large public expenditures to raise the overall levels of roadside crashworthiness. Run-off-road crashes are seen to be the result of extreme behaviours and those leaving the roadway are seen to be a threat mostly to themselves and not to other road users. Seen from this perspective, the lack of willingness for large public expenditure is understandable.

### 2. The diversity of objectives among the key stakeholders creates conflicting priorities

As already pointed out, the road – and road reserve – serve a surprisingly diverse range of purposes: some intended (such as the most convenient way of distributing power to communities) and some unintended (such as the last preserve for endangered fauna and flora in rural areas following land

clearing for agriculture). The plethora of stakeholders includes road asset managers, tourism interests, conservation interests, suppliers of power and telecommunications services, urban planners and landscape architects, and so on. The questionnaire sent to organisations invited to contribute to the workshop sought information as to levels of appreciation of the run-off-road crash problem and of relevant policies and practices to address the problem. The responses gave little sign of an awareness of the competing demands between the core objectives of the individual stakeholders and the overarching safety objective. Discussion of trade-offs was generally lacking. There was a general view that compliance with such standards as exist was the only necessary institutional behaviour.

It is not surprising then, that the crashworthiness of the road network was not a shared priority. Two examples cited at the workshop serve to illustrate.

The first relates to the provision of power and telecommunications services. The Essential Services Act does include public safety provisions - power supply authorities must ensure that the provision of services does not result in electrocution and does not lead to bush fires. Not only is there no reference to a duty of care with regard to the placement of power poles but the Act enables the authorities automatically to recover the costs of pole repair or replacement from the road user involved in the collision. Both are substantial disincentives to addressing the role of poles in run-off-road crash trauma.

Similarly, despite the existence of tree-planting guidelines designed to ensure the planting of impact attenuating vegetation, many urban planners, landscape architects and local authorities continue with plantings that are far from crashworthy.

The only tenable conclusion is that urban appearance, the preservation of remnant vegetation and the lowest cost provision of essential services all take precedence over potential adverse safety impacts. This is clear when one examines the KPIs of the different stakeholder organisations.

### **3. Lines of accountability are ill-defined**

It is surprisingly rare in the field of road safety for the specific accountabilities of stakeholder groups, including government agencies, to be clearly defined. For example, while the Victorian 2002-2007 road safety strategy ("arrive alive!") sets a target of a reduction of twenty per cent in the absolute number of fatalities and serious injuries it does not explicitly assign accountability for this outcome beyond the Ministerial Council for Road Safety, which comprises the Ministers for Transport, Police and Emergency Services, and the TAC. While there are seventeen initiatives in the strategy and some agencies are assigned accountability for inputs and outputs – for example VicRoads has to seal the shoulders on 1,100 kilometres of category "A" roads – there are no explicit links between program outputs and road safety outcomes. There are no trauma reduction sub-targets related to any of the initiatives or the action programs proposed under each. If the twenty per cent Victorian target is not met it will be impossible to determine where the "failure" occurred. While there is a general need to sharpen accountabilities for the achievement of progress with specific road safety problems the need is especially urgent for the problem of run-off-road crashes because it has no constituency to champion action.

It is interesting to consider the Road Management Act (RMA) in this context. Its origin appears to lie in the earlier successful challenge to the nonfeasance defence which had protected road authorities for a "failure" to maintain or repair a road. With a Road Maintenance Plan (RMP) a road authority can now demonstrate a regime of inspection, maintenance and repair which serves as a prioritised implementation of its duty of care. Unfortunately, however, the focus is on crash risk not roadside crashworthiness. For example, VicRoads' RMP makes reference to roadside trees in terms of their risk of falling, foliage obscuring sight lines, and the like but no reference to them as hazards for errant vehicles. Thus, accountability is effectively limited to reducing crash types other than run-off-road. Moreover, the RMA explicitly assigns responsibility to the road user to drive safely in the prevailing conditions. Almost by definition, run-off-road events would be deemed to stem from unsafe behaviour.

#### **4. Technical short-comings**

While secondary to the three major categories of impediment described above it is important to recognise that a number of technical issues remain unresolved.

First, we need to address the role of relative risk in the process of making decisions about countermeasure program investments. We have an over-reliance upon our exposure-related measures of relative risk. The risk of a vehicle running off the road on the Hume Highway – per million vehicle kilometres – is among the lowest of major rural highways in Victoria yet the absolute numbers of persons killed and seriously injured in such run-off-road crashes is high, simply because of the volumes of traffic.

(In the five years to 2001, there were 115 fatal and serious run-off-road casualty crashes on the section of the Hume between Melbourne and Wangaratta – a stretch widely regarded as “safe”. Similarly, in Melbourne, there were 39 fatal and serious casualty run-off-road crashes on the 12 kilometre segment of the Princes Highway between Hoddle Street and Warrigal Road over the five years to June 2004 – a segment of road Melbournians praise for its “beauty”).

Communities, and therefore governments, respond to absolute numbers. As already discussed, the road safety issue of paramount importance is not how to reduce crash and injury rates but how to reduce the total road trauma despite continuing increases in travel.

Secondly, there are a number of flaws in the relevant standards. Recent research into median encroachments, for example, uncovered the weakness in our standards relating to the provision of guard rail for otherwise unprotected central medians. Similarly, questions have been raised as to the adequacy of the clear zone concept and current barrier installation warrants. Sadly, the RMA reinforces, rather than challenges, the extant technical standards.

Thirdly, our speed limit setting processes give insufficient recognition to the level of crashworthiness of the section of road under consideration. The sheer volume of kilometres of uncrashworthy road in Victoria will almost certainly mean that, at least in the short-term, reductions in open road speed limits on the worst sections of road will be a fundamental holding measure. Speed limit setting guidelines must explicitly consider roadside safety.

#### **5. Conclusions**

The first three categories of impediment are obviously inter-related. If there was community and political salience then the lines of accountability would likely become clearly defined. If the accountabilities for individual stakeholders begin to be defined then the ways in which the stakeholders interact will likely change dramatically.

It may seem odd that a lack of financial resources has not been mentioned as a fundamental impediment to the widespread development of a crashworthy road network. The lack of resources – primarily financial but also technical – was mentioned frequently during the workshop, however it appeared to be cited more as a justification for a relative lack of action than as a fundamental impediment to action. The relative lack of resource is a natural consequence of the absence of community and political salience and the lack of direct lines of accountability. In that sense, simply recommending the assignment of greater financial resource would be ineffective.

## 5. Overcoming the Blockers

### 1. Creating a constituency

Creating a constituency for the run-off-road crash problem must be a fundamental plank of a longer-term strategy.

There are many actions that might contribute:

- disseminating material describing the frequency and severity of the run-off-road crash problem and the returns likely from specific interventions. Such material needs to be circulated widely to politicians and to key decision makers within all stakeholder groups.
- supplementing the above material through the conduct of specific short courses for all key decision makers and for key professionals in all the stakeholder groups
- convening a high-profile “task force” to create an on-going public debate on the topic (leveraging off the inquiry by the Parliamentary Road Safety Committee)
- identifying a series of road sections with high run-off-road crash frequencies and typical examples of poor road crashworthiness, giving them a public profile and inviting the public to identify similar sections of road within their local community
- creating a sub-element within the AusRAP program to focus public attention on crashworthy roads
- identifying “innocent victims” of run-off-road crashes and telling their stories publicly

This list is meant to be illustrative not definitive. What is important is that there be specific attempts to educate decision makers and to create a public understanding and acceptance of the need for significant investment.

The public education campaigns of the TAC with regard to both drink-driving and speeding contain many useful lessons for the creation of a climate for action. They:

- justified apparently “draconian” enforcement to the community
- helped educate the police officers and encourage vigorous enforcement
- created political saliency.

### 2. The formal adoption of a “safe system” strategy as an underpinning philosophy in future road safety planning

In Sweden in 1997 the national parliament formally adopted a philosophy in which no road user, while acting legally, should be killed or seriously injured on Swedish roads. The impact was the acceptance of an unprecedented level of accountability by the Swedish Road Administration for the provision of an inherently safe road infrastructure. The Dutch formally adopted the concept of Sustainable Safety. They defined three functional classes of road (flow, distributor and access) and then specified a minimum level of road and roadside safety that must be built into each functional class. Functional classification of roads is not, of course, new. What is new is the recognition that each class has a different basic safety structure in both design and operation. The “flow” roads are high standard, high speed roads where safety stems from the infrastructure itself, while the “access” roads derive their safety primarily from very low travel speeds.

Both philosophies start from the assumption that road users will make errors and that a safe system will be error tolerant. Note it does not assume that the designer must design for illegal behaviour. These philosophies have much in common with Victoria’s emerging Safe System philosophy.

It is important to ensure that formal statements of intent and formal statements of stakeholder obligations are built into the successor Victorian strategy to “arrive alive!” and to the national road safety strategy when it is next updated. The importance of achieving these philosophical commitments cannot

be overemphasised. Together with the development of a constituency for the resolution of the run-off-road crash problem and the sharpening of stakeholder accountabilities these commitments will facilitate the development of longer term strategies and short term action plans.

The following elements are critical:

- a sharpening of the road classification process with specific crashworthiness standards for roads of different function. This will help determine priorities for initial investment as the roads with functions other than high speed point-to-point travel can be initially managed through travel speed reductions.
- the road classifications and re-developed crashworthiness standards need also to be anchored in the State planning scheme and its derivative documents
- road links with special features (such as heritage issues or significant vegetation issues) must be identified so that they may be dealt with as special cases.

### **3. Sharpen lines of accountability**

The general principle is that there be clear lines of accountability for each of the key players. The most obvious short term developments would include:

- the setting of specific targets for VicRoads to reduce the frequency of death and serious injury from run-off-road crashes on roads under its direct control
- the setting of similar targets for individual local government authorities for their road networks
- the addition of a public safety requirement for the prevention of death and injury from pole crashes in the Essential Services Act covering power supply organisations and the simultaneous removal of the automatic right to recover costs of pole damage from road users.

In setting these targets it is important that the focus include the absolute numbers of death and serious injury and not just rates per unit of road use.

It will also be necessary to examine the KPIs for all the other stakeholders such as tourism authorities, urban planners, landscape architects, and so on to ensure that the safety objective is not compromised. At a very minimum, Road Management Plans prepared under the Road Management Act should explicitly address roadside safety.

One further possibility worth exploring is the creation of a small, independent road safety “watch dog” to monitor progress and to regularly report its findings publicly. It may be possible for the RACV to play this role.

### **4. Improving the quality and quantity of technical resource**

As already stated, it is important that decision makers and professionals among all the stakeholder groups receive training to raise their level of understanding of the issues, of the influence of different forms of KPI and of the likely impacts of different types of intervention.

For some stakeholders, particularly for local government authorities, there is a shortage of professional staff. This might be addressed by the appointment of a small number of experts in road safety who can be shared across several local government authorities.

There is also an urgent need to re-examine most of the extant standards, particularly those relating to clear zones and the warrants for the installation of guard rail.

With respect to guard rail, a program of research is needed to overcome some of the technical difficulties with, for example, flexible barrier systems. There are issues relating to the minimum separation between a flexible barrier system and the object it is protecting motorists from, regarding the installation of flexible barrier on the inside of curves and the differential effectiveness of flexible barriers for different categories of road user. The Swedes have shown the power of demonstration projects to test innovations which are, at first blush, inconsistent with extant standards - the installation of mid-road barrier being the classic example.

## 6. An Outline of a Strategy

This section “formalises” a little further the ideas introduced in the previous section.

There are four suggested planks on which to build a long-term strategy to bring under control the burden of death and serious injury from run-off-road crashes. These four planks address the fundamental impediments to systematic action. Achieving their implementation will not be easy. Therefore, a series of specific actions is also recommended which can be implemented quickly and relatively easily and which should assist in creating a climate that will facilitate the implementation of the long-term strategy.

### 6.1 The four fundamental planks

#### 1. A formal commitment to a Safe Infrastructure System

It is important that the Victorian Parliament debate and adopt a safe system philosophy. There are parallels in other areas of safety, for example, in workplace safety where the concept of employer responsibility extends to the possibility of charges of corporate manslaughter. It needs to be stressed that the safe system philosophy is designed to underpin the development of an error-tolerant system, not a road infrastructure that protects people behaving illegally.

The parliamentary debate might be initiated by the Ministerial Road Safety Council or it might result from a special inquiry conducted by the Parliamentary Road Safety Committee. As an aside, it is noted that the Parliamentary Road Safety Committee inquiry into roadside safety had, as far as can be ascertained, its origins not in either public or political concern about the problem but in the actions of a small number of professionals seeking to raise the level of debate on this neglected topic.

Even without a formal Parliamentary endorsement the safe system principles must be an explicit underpinning of the next Victorian road safety strategy, due for development in 2006. There are already signs in the latest action plan of the national road safety strategy that the safe system language is beginning to appear. However, this is a long way from achieving the implementation of the principles in road safety practice. Addressing run-off-road crashes must be a major focus of the next Victorian road safety strategy.

#### 2. Assign specific accountabilities for reducing serious injury and death from run-off-road crashes to key agencies

Without specific targets and without clear lines of accountability to measure performance against those targets, it will be difficult to ensure systematic and sustained interventions from key agencies.

Specific targets need to be set for VicRoads for the road network under its direct management. There will need to be separate targets for rural roads and for urban roads, since the problems and potential solutions are different. It may even be worthwhile considering the possibility of setting targets for the reduction of serious injury and death from run-off-road crashes on specific routes.

Similarly, specific targets need to be set for individual local government agencies.

To the greatest extent possible, specific targets and lines of accountability should be set for other stakeholder groups. For example, public transport providers need to manage the road safety implications of their siting of bus stops, tram stops, and for the placement of poles providing

power to their vehicles. Similarly, the suppliers of energy and telecommunications services need to accept some responsibility for the outcomes of crashes with their hardware. As previously mentioned, the lack of any responsibility in the Essential Services Act and their ability to recover costs automatically are totally at odds with what is needed.

The recent Road Management Act goes some way towards this objective of defining accountabilities. However it places most of the onus on VicRoads to monitor unsafe practices and to direct interventions in very specific cases. It is argued that a more systematic setting of targets and a far more systematic assignment of accountabilities are required to lead to a large-scale attack on this problem.

Confronting the effect of competing objectives among stakeholders is also critical. As part of the formulation of Victoria's next road safety strategy a working group of stakeholders should be tasked with producing two draft strategies for reducing death and serious injury from run-off-road crashes – one for urban roads and one for rural roads, complete with targets and accountability mechanisms for all agencies with roles to play.

### **3. Making performance transparent**

When the Swedish Parliament formally adopted the Vision Zero philosophy it made the Swedish Road Administration accountable for designing, building and operating an infrastructure that was safe for road users who behaved legally. It also created a road safety inspectorate as an independent unit to monitor and publicly report progress in achieving the objectives of the safe system. It is interesting to note that Ches Baragwanath, in his recent review of the fixed speed camera performance and contractual arrangements in Victoria, commented on the indistinct lines of accountability for road safety, given the number of institutional players. He recommended that the government appoint a Road Safety Commissioner that was independent of these institutions and who was able to monitor performance and publicly report the outcomes. An option would be to have a non-government "watch-dog" using its public standing to create accountability.

If the Victorian Parliament is to formally adopt a safe system philosophy then it is important to create a mechanism by which the achievement of the objectives of that philosophy can be reported publicly to the Parliament.

### **4. Re-examine all extant standards and warrants to overcome both technical and practical limitations**

This plank is of quite a different character from the previous three and can proceed independently. There are two issues to be confronted.

First, the standards that do exist have been applied in a very limited fashion. Whether

or not a particular standard – for example a nine metre clear zone for a rural road – is applied depends upon a "warrant". The warrant is based typically on traffic volumes such that the standards are only applied to the highest classes of road. Even here though, there are many exceptions granted, for example, by compromise agreement with parties arguing that they would be disadvantaged by the application of the standard in that instance.

Moreover, in many cases where there should be standards there are simply guidelines. For example, the tree planting guidelines, particularly for urban roadsides, are frequently by-passed.

Secondly, there are a number of technical deficiencies in the standards and the potential flaws in both the clear zone standard and the application of flexible barrier systems have already been noted.

Finally, there is no Victorian tradition of demonstration projects where innovations outside extant standards are trialled.

## 6.2 Short-term Actions Designed to Create a Community, Institutional and Political Climate in which the Probability of Implementation of the Long-Term Strategy is Increased

There are a number of actions which can be taken. The following list is not intended to be exhaustive. It has a focus on things that the RACV can either undertake or promote as initiatives for others.

1. Make the creation of safe roadsides a special feature of the AAA Safer Roads Campaign. This could involve the promotion of specific, known interventions for different classes of road such as rural highway, rural arterial, urban freeway, urban arterial and urban undivided road.
2. Subject to satisfying itself on the acceptability of the recommendations which emerged from the Victorian Parliamentary Road Safety Committee's Inquiry into roadside safety the RACV could generate a public education campaign promoting the key initiatives suggested (probably linked with the program suggested above).
3. In association with the AusRAP initiative, the RACV could develop and apply a "star rating" system explicitly for roadside safety and rate the major Melbourne metropolitan routes and the major Victorian rural routes. These could be published on a web site ([howsafeismyroute.com.au](http://howsafeismyroute.com.au)). Route segments that are especially "uncrashworthy" could be extensively publicised.
4. As a subset of the above database the RACV could identify the least crashworthy routes in terms of the hardware installed by or on behalf of energy or telecommunications services providers, public transport institutions, etc.
5. Develop and implement a "star rating" system for the different categories of design of roadside furniture; the purpose being to provide information to facilitate the choice of the most crashworthy infrastructure and to provide some incentive for hardware manufacturers to improve their products.
6. Use the various star rating systems described above to rate Victorian local government authorities on their infrastructure safety performance. Note the objective is not so much to produce a "shame file" as to acknowledge good practice and to provide a template of best practice for local government authorities to aspire to.
7. Linked to 3 through 6 above is the notion of promoting key demonstration projects. Specific problem roads or road segments (for run-off-road crashes) in urban and rural areas can be identified and comprehensive "best practice" interventions proposed. Demonstration projects have the advantage of documenting benefits at minimal cost.
8. Develop, and run, short courses in how to create crashworthy roadsides and how to balance all the competing objectives. The target audience for these courses would be the key decision makers and professionals drawn from all stakeholder groups.
9. Lobby the government to ensure run-off-road crashes are one focus of the next Victorian road safety strategy and contribute towards the development of separate urban and rural strategies.
10. Use NCAP to promote the early, widespread adoption of vehicle safety features such as ESP. Lobby the government and other large fleet owners to make ESP part of their specification for vehicle purchase.





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