Speed Problem Definition and Countermeasure Summary
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ISBN 0 7313 0118 8
RTA/Pub 00.132
Printed on recycled paper
Introduction

Legislation in NSW makes it an offence to travel at a speed greater than that specified by the speed limit. Speeding, however, can also involve travelling too fast for the prevailing conditions, despite travelling under the posted speed limit.

Since the introduction of Road Safety 2000 in 1991, the speed management program in NSW has incorporated a number of new initiatives to address this most significant road safety problem.

Recent speeding initiatives have included:

- the introduction of the Double Demerit Points Initiative in 1997 for major public holiday periods;
- the introduction of a 50 km/h urban speed limit in 1998;
- advertising campaigns based on the strategy and theme line “Safe speeding. There’s no such thing”. The campaign was first launched in June 1998 with the ‘Kid Brother’ campaign and subsequently followed by the ‘Mates’ campaign, targeting speeding on bends on country roads; and
- the installation of fixed, digital speed cameras at high accident locations (‘blacklengths’) commenced throughout NSW in December 1999.

Despite the success of these initiatives, speeding still accounts for around 40% of all fatal crashes in NSW and many drivers still consider that they can safely judge how fast they should travel rather than adhere to the posted speed limit.

Road Safety 2010, the framework for halving the road toll over the next decade, describes speeding as the greatest contributor to road fatalities in NSW.

This document defines the scope of the speeding problem and outlines the countermeasures currently being implemented or researched in NSW, to reduce the incidence and consequences of speeding.
Speeding increases the risk of a crash and the severity of crash outcome. Managing speed is a major road safety issue in NSW.

The speed issue includes both the problem of drivers who travel above the posted speed limit and drivers who travel at inappropriate speeds for the conditions. There are many situations where driving slower than the posted speed limit is appropriate, such as where there are many pedestrians about, in adverse weather conditions when visibility is poor and where the road is damaged.

Crash risk

Speeding greatly increases risk of injury and death. Research has shown that the risk of a crash causing death or injury increases rapidly, even with small speed increases above an appropriately set speed limit.

The relationship between travelling speed and the risk of a casualty crash relative to travelling at 60 km/h in a 60 km/h speed limit zone has been examined in a recent study and is as follows:

<table>
<thead>
<tr>
<th>Speed km/h</th>
<th>Relative risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>1.00 (base)</td>
</tr>
<tr>
<td>65</td>
<td>2.00</td>
</tr>
<tr>
<td>70</td>
<td>4.16</td>
</tr>
<tr>
<td>75</td>
<td>10.60</td>
</tr>
<tr>
<td>80</td>
<td>31.81</td>
</tr>
<tr>
<td>85</td>
<td>56.55</td>
</tr>
</tbody>
</table>

Notice that the risk at 65 km/h is approximately twice that at 60 km/h. The risk is more than 4 times at 70 km/h. Based on this research it can be concluded that:

*In a 60 km/h speed limit area, the risk of involvement in a casualty crash doubles with each 5 km/h increase in travelling speed above 60 km/h.*

A thorough account of why small speed reductions equal large differences in crash risk is included in Appendix A.

Speeding is common

Anyone who uses the road can see that speeding is common. This has been confirmed by both speed measurement and community attitude surveys. Control of a common behaviour that substantially increases risk will prevent a large number of deaths and injuries on NSW roads.
The RTA has arranged studies, where the researcher directly measures the speed of vehicles passing particular sites on the road. These studies are called speed surveys. Between September 1996 and June 1999, these surveys included 34 million measurements, at 87 sites. The speed measured is called a ‘free speed’ because the vehicle whose speed is measured must be at least six seconds behind the previous vehicle that passed the site.

In 60 km/h zones, for all vehicles at all times in these surveys, nearly one in five (19%) was exceeding the speed limit by 10 km/h or more. In 100 km/h zones, nearly one in eight (12%) was exceeding the speed limit by 10 km/h or more. These speed surveys demonstrate that speeding is common.

Speed trends
The speed measurement surveys have detected a reduction in speeds in 60 km/h zones in recent years. As explained, small changes in speeds have safety significance. There was also a reduction in the proportion of vehicles travelling over the speed limit from about 58% to about 54%. In 100 km/h zones, the speed surveys provide no evidence of an improvement. Graphs of the speed reductions for 60 km/h and 100 km/h are presented in Appendix B.

Criteria for determining speeding involvement in crashes
The identification of speeding (excessive speed for the prevailing conditions) as a contributing factor in road traffic crashes cannot always be determined directly from police reports. However, certain circumstances suggest the involvement of speeding. The RTA has therefore drawn up certain criteria for determining whether or not a crash is to be considered as having involved speeding as a contributing factor.
Proportion of fatal crashes involving speeding

The crash data used in this document are fatal crashes and fatalities in NSW for the period 1995-1999.

For the period 1995-1999, 37% of fatal crashes involved speeding. The proportions for each year are set out in Table 1.

Table 1: Proportion of fatal crashes that involved speeding for each year - 1995 to 1999

<table>
<thead>
<tr>
<th>Year</th>
<th>Proportion of fatal crashes involving speeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>34%</td>
</tr>
<tr>
<td>1996</td>
<td>38%</td>
</tr>
<tr>
<td>1997</td>
<td>36%</td>
</tr>
<tr>
<td>1998</td>
<td>40%</td>
</tr>
<tr>
<td>1999</td>
<td>39%</td>
</tr>
</tbody>
</table>

Multiple fatalities

Fatalities refer to the number of people killed per crash. Nearly all (91%) fatal crashes, speeding or otherwise, involve only one fatality (ie 1 person killed). Less than 2% involve more than two fatalities. Nevertheless, crashes involving multiple fatalities cause public concern. Speeding is more likely to be a factor in crashes where more than one person is killed. Table 2 shows the percentage of crashes where speeding was a factor, related to the number of people killed per crash.

Table 2: Proportion of crashes involving speeding, related to the number of people killed in the crash

<table>
<thead>
<tr>
<th>Type of fatality crash (No of persons killed)</th>
<th>Proportion involving speeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>All fatal crashes</td>
<td>37%</td>
</tr>
<tr>
<td>Crashes where one person was killed</td>
<td>37%</td>
</tr>
<tr>
<td>Crashes where two people were killed</td>
<td>44%</td>
</tr>
<tr>
<td>Crashes where three or more people were killed</td>
<td>59%</td>
</tr>
</tbody>
</table>
Involvement of speeding in the road toll

Speeding is a major contributor to the NSW road toll. A total of 577 people were killed on NSW roads in 1999. Of these, 245 people died as a result of a speeding driver. Therefore, speed was a factor in 42% of road fatalities in 1999.

Speeding and drink driving

There is a relationship between speeding and drink driving.

Of speeding drivers involved in fatal crashes, 31% were also drink driving. This compares with 6% of non-speeding drivers in fatal crashes.

Of drink-drivers involved in fatal crashes, 63% were also speeding. This compares with 20% of drivers in fatal crashes known not to have been drink driving.

Comparable crash risk of speeding and drink driving

The risk of a crash associated with speeding is directly comparable to that associated with drink driving: for example, travelling at 68 km/h in a 60 km/h zone poses the same crash risk as driving with a blood alcohol level of 0.08; and travelling at 75 km/h in a 60 km/h zone poses the same crash risk as driving with a blood alcohol level of 0.12.

Speeding and seatbelt and helmet use

There is also a relationship between speeding and seatbelt and helmet use. The relationship is weaker than that between speeding and drink driving.

Of speeding drivers involved in fatal crashes, 20% were unprotected (unbelted drivers and unhelmeted motorcycle riders). This compares with 14% of the non-speeding drivers.

Of unprotected drivers in fatal crashes, 33% were speeding. This compares with 24% of the protected drivers (those wearing a seatbelt or helmet).
Night and day

Fatal crashes involving speeding are more common at night. As an indication, consider the hours 6 pm to 6 am. During these times, there occurred:

- 43% of all fatal crashes;
- 39% of non-speeding-related fatal crashes; and
- 51% of speeding-related fatal crashes.

The speed surveys (measuring free speeds) indicate that speeds are a little higher during the hours of 6 pm to 6 am.

Because of inferior visual information at night, lower speeds at night would be more appropriate for safety. The speed survey evidence clearly indicates that drivers do not drive slower at night.

All months

Speeding fatal crashes occur throughout the year. For 1995-1999, the number of crashes involving speeding was similar over most months of the year. There was a slight reduction in the middle months of the year with only 7% of speeding-related crashes occurring in June. However, the numbers increased towards the end of the year with 9% of speeding-related crashes occurring in December.

Holidays and weekends

Table 3 shows the proportions of fatal speeding-related crashes and other crashes on each type of day.

Table 3: Proportion of fatal speeding-related crashes and other crashes by type of day, 1995-1999

<table>
<thead>
<tr>
<th>Type of day</th>
<th>Proportion of fatal crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Speeding-related</td>
</tr>
<tr>
<td>Public holiday</td>
<td>9%</td>
</tr>
<tr>
<td>Other school holiday</td>
<td>20%</td>
</tr>
<tr>
<td>Other weekend</td>
<td>27%</td>
</tr>
<tr>
<td>Other weekday</td>
<td>44%</td>
</tr>
<tr>
<td>All</td>
<td>100%</td>
</tr>
</tbody>
</table>

The table above indicates that speeding-related fatal crashes are more likely to occur on weekends or during holiday times.
Country or metropolitan

RTA crash statistics use the following definitions:

- Metropolitan roads are those within the Sydney, Newcastle and Wollongong metropolitan areas.
- Country roads are those outside these metropolitan areas.
  - Country non-urban roads are country roads with a speed limit greater than 80 km/h.
  - Country urban roads are country roads with a speed limit of 80 km/h or less.

In metropolitan areas, at least 32% of fatal crashes were speeding related, and in country areas of NSW, the proportion was 41%.

The proportion of all NSW fatal crashes (speeding-related or not) that happened on country roads increased from 57% to 62% between 1995 and 1999. This increase appears to be partly due to a worsening of speeding on country roads.

The proportion of speeding-related fatal crashes decreased a little on metropolitan roads from 35% in 1995 to 32% in 1999. In contrast, on country roads, the proportion of speeding-related fatal crashes increased from 34% to 44%.

Table 4 shows the proportions of speeding-related fatal crashes on metropolitan roads, country urban roads, and country non-urban roads, for each year 1995 to 1999.

Table 4: Proportions of fatal crashes that were speeding-related, for metropolitan, country urban, and country non-urban roads

<table>
<thead>
<tr>
<th>Year</th>
<th>Metropolitan</th>
<th>Country urban</th>
<th>Country Non-urban</th>
<th>State-wide</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>35%</td>
<td>36%</td>
<td>33%</td>
<td>34%</td>
</tr>
<tr>
<td>1996</td>
<td>32%</td>
<td>48%</td>
<td>42%</td>
<td>38%</td>
</tr>
<tr>
<td>1997</td>
<td>30%</td>
<td>39%</td>
<td>43%</td>
<td>36%</td>
</tr>
<tr>
<td>1998</td>
<td>32%</td>
<td>42%</td>
<td>46%</td>
<td>40%</td>
</tr>
<tr>
<td>1999</td>
<td>32%</td>
<td>44%</td>
<td>44%</td>
<td>39%</td>
</tr>
<tr>
<td>1995-1999</td>
<td>32%</td>
<td>42%</td>
<td>41%</td>
<td>37%</td>
</tr>
</tbody>
</table>
**Sydney metropolitan area**

Of the speeding-related fatal crashes in NSW, 35% occurred in Sydney Region. Of these, 88% occurred in the Sydney metropolitan area, 9% occurred in a country urban area of Sydney Region and 3% occurred on a country non-urban area of Sydney Region.

The proportion of fatal speeding-related crashes on roads zoned at 60 km/h or less in Sydney Region has remained the same over the last 5 years. However the proportion of fatal speeding-related crashes on 100 km/h roads in Sydney Region has increased in the last 5 years from 1.5% to 7%. These accidents occurred on 100 km/h unclassified or semi-rural roads in Hawkesbury, Camden or Blue Mountains.

**Drivers in country crashes are country residents**

Most drivers involved in fatal crashes on country roads are country residents. In the five-year period 1995-1999, 67% of all drivers in all fatal crashes on country roads were country residents.

For speeding-related crashes, this effect was similar. Of the fatal speeding-related crashes on country roads, 68% involved a country resident speeding driver. Of these country residents involved in fatal speeding crashes on country roads, 43% resided in the same LGA as the location of the crash.

**Type of road**

The data in Table 5 show that 37% of speeding-related crashes occurred on unclassified roads. This is a significant feature to consider in planning and developing speeding countermeasures.

**Table 5: Proportion of fatal speeding-related and other crashes by type of road, 1995-1999**

<table>
<thead>
<tr>
<th>Type of road</th>
<th>Proportion of fatal crashes</th>
<th>Speeding</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway/motorway</td>
<td>2%</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>State highway</td>
<td>27%</td>
<td>32%</td>
<td></td>
</tr>
<tr>
<td>Other classified road</td>
<td>34%</td>
<td>34%</td>
<td></td>
</tr>
<tr>
<td>Unclassified road</td>
<td>37%</td>
<td>32%</td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>
**Speed limit of road**

The data in Table 6 show that 72% of all speeding-related fatal crashes occur on 60 km/h and 100 km/h roads with 39% of speeding-related crashes occurring on 60 km/h roads and 33% occurring on 100 km/h roads.

**Table 6: Proportion of fatal speeding-related and other crashes by speed limit, 1995-1999**

<table>
<thead>
<tr>
<th>Speed limit Km/h</th>
<th>Proportion of fatal crashes</th>
<th>Speeding</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td></td>
<td>0.3%</td>
<td>0.2%</td>
</tr>
<tr>
<td>50</td>
<td></td>
<td>0.3%</td>
<td>0.4%</td>
</tr>
<tr>
<td>60</td>
<td></td>
<td>39%</td>
<td>43%</td>
</tr>
<tr>
<td>70</td>
<td></td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>80</td>
<td></td>
<td>12%</td>
<td>10%</td>
</tr>
<tr>
<td>90</td>
<td></td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>100</td>
<td></td>
<td>33%</td>
<td>30%</td>
</tr>
<tr>
<td>110</td>
<td></td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>All</td>
<td></td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Curves**

Of all fatal crashes (speeding-related or not) 35% happen on curves in the road. Of fatal crashes on curves, 73% involve speeding. Of these, 72% occur on country roads and 28% occur on metropolitan roads.
Residence

Based on the 1995-1999 crash data, Table 7 presents Local Government Areas (LGAs) that had high numbers of residents that were speeding drivers involved in fatal crashes.

Table 7: LGAs with ten or more residents that were speeding drivers involved in fatal crashes, 1995-1999

<table>
<thead>
<tr>
<th>Local Government Area</th>
<th>Speeding drivers in fatal crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blacktown</td>
<td>36</td>
</tr>
<tr>
<td>Liverpool and Sutherland</td>
<td>26</td>
</tr>
<tr>
<td>Wollongong</td>
<td>25</td>
</tr>
<tr>
<td>Lake Macquarie</td>
<td>24</td>
</tr>
<tr>
<td>Fairfield</td>
<td>23</td>
</tr>
<tr>
<td>Penrith</td>
<td>22</td>
</tr>
<tr>
<td>Campbelltown</td>
<td>21</td>
</tr>
<tr>
<td>Gosford and Newcastle</td>
<td>20</td>
</tr>
<tr>
<td>Wyong</td>
<td>18</td>
</tr>
<tr>
<td>Bankstown, Canterbury and Hornsby</td>
<td>17</td>
</tr>
<tr>
<td>Camden, Hawkesbury, Kur-r-in-gai, and Parramatta</td>
<td>13</td>
</tr>
<tr>
<td>Shoalhaven and Taree</td>
<td>11</td>
</tr>
<tr>
<td>Blue Mountains, Cessnock, Coffs Harbour, Muswellbrook &amp; Shellharbour</td>
<td>10</td>
</tr>
</tbody>
</table>

Many factors account for why some LGAs have high numbers of residents who have been involved in speeding-related crashes. One obvious factor is the population of the LGA, the types of roads and the nature of the travel undertaken.
**Gender of speeding drivers**

Of the total number of speeding drivers involved in fatal crashes from 1995 to 1999, 82% were men and 18% were women.

Table 8 indicates that both the number and proportion of male speeding drivers involved in fatal crashes has been higher than that for females over the last 5 years. In 1999, however, both the number and proportion of females involved in speeding-related fatal crashes reached its highest with 21% (43) of all speeding drivers involved in fatal crashes being female.

**Table 8: Numbers (and percentages) of male versus female speeding drivers involved in fatal crashes for each year in the period 1995-1999**

<table>
<thead>
<tr>
<th>Year</th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>162</td>
<td>33</td>
<td>195</td>
</tr>
<tr>
<td>1996</td>
<td>172</td>
<td>34</td>
<td>206</td>
</tr>
<tr>
<td>1997</td>
<td>155</td>
<td>36</td>
<td>192</td>
</tr>
<tr>
<td>1998</td>
<td>166</td>
<td>28</td>
<td>196</td>
</tr>
<tr>
<td>1999</td>
<td>160</td>
<td>43</td>
<td>203</td>
</tr>
<tr>
<td>Total</td>
<td>815</td>
<td>174</td>
<td>992</td>
</tr>
</tbody>
</table>
Age of speeding drivers

The age distribution of speeding drivers involved in fatal crashes has become very broad.

Speeding crash involvement, if not speeding, has been thought of as a younger driver's problem. Now it is clear that fatal speeding crash involvement involves all age groups. Among speeding drivers involved in fatal crashes, the number aged 25 years or under has decreased each year, at a rate similar to that at which the number aged over 40 years has increased.

Table 9 shows the proportion of speeding fatal crash-involved drivers in each of three age groups. The proportion aged 25 years or younger decreased from 62% in 1995 to 38% in 1999.

Table 9: Proportion of speeding drivers involved in fatal crashes by age group, 1995-1999

<table>
<thead>
<tr>
<th>Year</th>
<th>25 or younger</th>
<th>26 to 39</th>
<th>40 or older</th>
<th>Unknown</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>62%</td>
<td>28%</td>
<td>11%</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>1996</td>
<td>47%</td>
<td>33%</td>
<td>20%</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>1997</td>
<td>43%</td>
<td>37%</td>
<td>18%</td>
<td>2%</td>
<td>100%</td>
</tr>
<tr>
<td>1998</td>
<td>48%</td>
<td>27%</td>
<td>23%</td>
<td>2%</td>
<td>100%</td>
</tr>
<tr>
<td>1999</td>
<td>38%</td>
<td>36%</td>
<td>25%</td>
<td>1%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Figure 1: Numbers of fatal-crash involved drivers in two age groups: 40 years or older and 25 years or younger.

Figure 1 shows how the number of fatal crash-involved speeding drivers has declined for those aged 25 years or younger, and has increased for those aged 40 years or older. This means that targeting will have to be broader and that communications suitable for older drivers will have to be developed.
Licence status

Unlicensed drivers involved in a fatal crash were likely to have been speeding. Of unlicensed drivers in fatal crashes, 64% were speeding. This compares with 23% of licensed drivers.

Of course, unlicensed drivers are in a small minority of all drivers, and so this is not the major target for speeding. Still, 12%, or about one in eight, of speeding drivers in fatal crashes were unlicensed.

Type of vehicle

Table 10 sets out the numbers of each type of vehicle speeding in fatal crashes in 1995-1999.

Table 10: Speeding vehicles involved in fatal crashes by type of vehicle, 1995-1999

<table>
<thead>
<tr>
<th>Type of vehicle</th>
<th>Speeding</th>
<th>Non-speeding</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car &amp; light truck</td>
<td>789 (80%)</td>
<td>2215 (77%)</td>
<td>3004</td>
</tr>
<tr>
<td>Heavy trucks</td>
<td>55 (6%)</td>
<td>393 (14%)</td>
<td>448</td>
</tr>
<tr>
<td>Bus</td>
<td>3 (1%)</td>
<td>54 (2%)</td>
<td>57</td>
</tr>
<tr>
<td>Motorcycle</td>
<td>138 (14%)</td>
<td>161 (6%)</td>
<td>299</td>
</tr>
<tr>
<td>Other</td>
<td>7 (1%)</td>
<td>46 (2%)</td>
<td>53</td>
</tr>
<tr>
<td>Total</td>
<td>992 (100%)</td>
<td>2869 (100%)</td>
<td>3861</td>
</tr>
</tbody>
</table>
Figure 2 below demonstrates that cars or light trucks are by far the most common speeding vehicle in fatal crashes. Of speeding drivers/riders involved in fatal crashes, nearly 80% were drivers of cars or light trucks.

![Pie chart showing proportion of speeding vehicle types involved in fatal crashes](image)

*Figure 2: Proportion of speeding vehicle types involved in fatal crashes*

Note also the involvement of motorcycles. Of speeding vehicles in fatal crashes, 14%, or about one in seven, were motorcycles. Of motorcycles in fatal crashes, 46% were speeding. This compares with 26% of cars.

**Heavy vehicles**

The speeds of heavy vehicles are measured at culway stations. Culway is an Australian designed and manufactured weigh-in-motion (WIM) system that utilises existing road culverts as dynamic scales to estimate the weight of passing vehicles by lane. This system also records other data such as vehicle speed.

Heavy vehicles are subject to a speed limit of 100 km/h on the open road. Speed data were recently compiled on heavy vehicles at culway stations on key freight routes in NSW for the period 1997-1999. The speeds of around 12,300,000 heavy vehicles were measured during this three year period.

The speed data from these culway surveys revealed that during this period, despite being limited to 100 km/h, there were 3,200,000 separate incidents (or around 27%) of heavy vehicles travelling at speeds of between 100 km/h and 115 km/h and 105,000 separate incidents (or around 1%) of heavy vehicles travelling at speeds of more than 115 km/h.

It should be noted that it is not only speeds above 115 km/h that present a greater risk to heavy vehicle drivers and other road users. Heavy vehicles are invariably loaded to capacity and as such are operating at their performance limits in terms of braking and stability. This means that for heavy vehicles, travelling at even a little over the 100 km/h limit is of concern and greatly increases crash risk.

* Key freight routes are the Pacific, Monaro, Hume, Olympic, New England, Cobb and Newell Highways.
Driver attitudes and behaviour

Slowing down

Results from recent public education campaign evaluations on speed management suggest that drivers are changing their attitudes to speeding. There is a decline in the proportion of drivers who report travelling faster than 75 km/h in a 60 km/h zone and a rise in the proportion who report travelling no faster than 60 km/h in a 60 km/h zone.

However, the community still views speeding as acceptable behaviour. Almost 60% of respondents to a road safety campaign evaluation reported that they very often drive along with the traffic flow in excess of the speed limit.

- 33% of respondents said it was OK to speed when there is little or no traffic;
- 27% said it was OK to speed when the road conditions are good and there appears to be no reason to travel slowly.

The results of the attitude research confirm the main points of the speed measurement surveys:

- speeding is common; but
- there is some evidence of improvement.

Attitudes to speed limits

The RTA recently commissioned large-scale community attitude research into speed management policies and practices throughout NSW. Findings from this research enabled a segmentation of the population into four subgroups. The segmentation was based on their attitudes to speeding, speed zoning and signage.
‘Contented caring’
The researchers named the first group ‘contented caring’ road users. This was the largest segment, representing 35% (265) of those surveyed and was over-represented by females (66%), older people, non-drivers and those road users who are only ever pedestrians (ie never passengers or drivers in motor vehicles). They were supportive of current speed zoning and signage practices. They did, however, think that vulnerable road users needed greater protection, and favoured lower speed limits:

- near shops;
- in wet weather conditions and at night; and
- if conditions warrant it.

They thought speed limits were too high. About two thirds of this segment thought that the speed limit should be:

- 50 km/h or less for towns;
- 100 km/h or less for rural roads with or without a median strip; and
- lower if conditions warrant it.

‘Status quoers’
‘Status quoers’ comprised the second largest segment, representing 24% (180) of those surveyed. This group was over-represented by rural motorists and supported current zoning and signage practices, even more than the ‘contented caring’ group.

They did not favour changes to speed limits, for example in special conditions. Nor did they favour increases to speed limits.

‘Discontented drivers’
‘Discontented drivers’ comprised 22% (168) of the sample. This group was over-represented by Sydney drivers and had very few pedestrians. They tended not to be satisfied with current speed zoning and signage practices.

Although discontented, this segment had responsible attitudes. This group was more likely to believe that speed limits are inconsistently applied and that there are too many changes in speed limits.
‘Self centred speeders’

This was the smallest of the four segments, representing 18% (137) of those surveyed. This group was comprised almost exclusively of drivers (99%) and males (72%), particularly young males. Motorcyclists were also over-represented in this group.

This subgroup’s main criticism was that speed limits are too low. They wanted higher limits and could not see a need for lower limits in special conditions, such as wet weather or at night.

They were not critical of speed signage. They mainly wanted to be able to drive faster. They were most unlikely to exhibit cautious driving.

This was the group most likely to see themselves as safe speeders.

The speeding problem - summary

This document has revealed that defining the speed problem is quite complex. The problem definition has identified some specific conditions or factors that are involved in speeding-related crashes. They can be summarised as follows:

- over half of all speed-related fatal crashes occur at night;
- the rates of speed-related fatal crashes on unclassified country roads with country resident drivers are high;
- nearly three quarters of all speed-related fatal crashes occur on a road with a speed limit of 60 or 100 km/h;
- around 80% of speeding vehicles involved in fatal crashes are cars or light trucks; and
- male speeding drivers account for over 80% of all speeding-related fatal crashes.

In general, however, speeding is fairly ubiquitous and the conditions under which it occurs and the target groups involved are less well defined than is the case for other road safety issues such as drink driving. This means that countermeasures will have to address a broad cross section of the community and utilise a multifaceted approach to the speeding problem.
Countermeasures

Aim

Countermeasures should address identified problems specific to speeding and the target groups involved. However, as outlined in the problem definition, both speed measurement surveys and community attitude surveys show that speeding is a common behaviour which occurs over most age groups.

Actions to control speeding and prevent a large number of deaths and injuries on NSW roads are available. Initiatives, which have been evaluated and demonstrated to be effective, included the following:

- set appropriate speed limits;
- engineer the road environment;
- educate drivers about the significance of complying with speed limits;
- ensure that drivers know what the limit is;
- enforce the limits.

The education and enforcement programs have to be properly planned and conducted, strategically linked and intensive.

Initiatives

There have been some significant initiatives in NSW to address the speeding problem during the last few years.

One such initiative was the introduction of a 50 km/h urban speed limit. Where the new limit was implemented, there was a major impact on speeds. The proportion of drivers who exceeded 60 km/h fell from almost 38% to just over 15%. There were few, if any changes to the road environment associated with these lower speeds which were implemented by erecting new signs and conducting public education campaigns to ensure that drivers were aware of the initiative. Reductions in speeds demonstrated the community's willingness to reduce speed voluntarily.

The implementation of the double demerit points initiative on public holiday weekends coupled with enhanced enforcement has also been effective in reducing the road toll over holiday periods.

In 1999 the RTA commenced installation of fixed speed cameras on ‘blacklengths’ of road that have a poor crash history and a demonstrated speeding problem. This speeding countermeasure, while still relatively new, has already had an impact on driver behaviour. There have been significant reductions in both travelling speed and the number of drivers exceeding the speed limit at camera sites.
Current context

Road Safety 2010 describes speeding as the greatest contributor to road fatalities in NSW. If the road toll is to be halved by 2010, reducing excessive speeding and improving overall compliance with speed limits is a high priority. To meet this goal, a number of complementary strategies must be implemented.

Ensuring that speed limits are appropriate for conditions and consistent across the state is an important first step. If drivers are to comply with speed limits, it is essential that they know what the limit is. These issues are currently being addressed through the Review of Speed Zoning, Speed Limits and Signage Practices.

Public education campaigns are necessary to ensure that drivers understand the importance of speed limits for safety. They also need to understand the consequences of non-compliance. Publicity can help develop a belief among drivers that they will be caught if they speed, but this can only be achieved in combination with a very noticeable level of enforcement activity.

Enforcement is a crucial element of programs to achieve speed limit compliance.

Speed limits

What are speed limits

Speed limits indicate the maximum speed at which a driver can drive under good road and traffic conditions. It is an offence to travel at a speed greater than that specified by the speed limit. Speed limits may be imposed by legislation or by signposting.
Two main general limits apply under legislation:

- General urban limit (60 km/h) - applicable to all roads in built-up areas, unless signs indicate a different limit;
- State limit (100 km/h) - applicable to all roads in non-built-up areas, unless signs indicate a different limit.

Speed zones are speed limits established for particular lengths of road, or particular areas, for which the general speed limit is not appropriate. The aim is to set an appropriate speed limit, taking into account the surrounding environment, traffic and safety. The speed limit is indicated by signs and takes precedence over any general speed limits that might have applied.

Many urban roads throughout NSW now have a 50 km/h limit instead of a 60 km/h limit, under the 50 km/h initiative, described in more detail on page 22.

**Review of speed zoning, speed limits and signage practices**

The RTA is currently undertaking a review of speed zoning, speed limits and signage practices throughout NSW. The objective of this project is to provide a revised set of *Speed Zoning Guidelines* incorporating all aspects of speed zoning, speed limits and signage, which reflect the changed road environment, driver needs and behaviour, and are consistent with international best practice. The review is being undertaken in two phases.

The first phase is an extensive local and international literature review. A review of RTA documentation on speed management has been undertaken to assess effectiveness, clarity and ongoing appropriateness. The speed management policies and practices of other jurisdictions have also been evaluated.
The second phase is an extensive consultation with internal and external stakeholders, and the general community. The Review is being undertaken in consultation with a Speed Limit Zoning Advisory Group comprising representatives from the NRMA, the NSW Police Service, the Institute of Public Works and Engineering Australia, the Motor Accidents Authority and the Local Government and Shires Association.

Drivers have to know the speed limit to be able to comply. Signs and signage practices are crucial. Consistency and appropriateness of speed limits are also vital to raising knowledge and understanding of speed limits. The Review is addressing these issues.

50 km/h urban speed limit initiative

Streets zoned 60 km/h account for a large proportion of serious injury crashes. In 1999, of all casualty crashes in NSW that involved speeding, 40% were in Sydney; Newcastle or Wollongong metropolitan areas and 68% of those were on 60 km/h streets. Urban streets in country areas accounted for a further 28% of speeding involved casualty crashes.

Since July 1998 50 km/h urban speed limits have been implemented in 112 councils and two communities within unincorporated areas throughout NSW. All councils in the greater Sydney metropolitan area (bounded by Wollongong, Newcastle and Katoomba) have implemented this lower limit.

To determine the effectiveness of the broad implementation of the 50 km/h urban speed limit in NSW, the RTA implemented a major evaluation to study the impact of this initiative on accidents and vehicle speeds on streets zoned 50 km/h, and community attitudes.
Accidents

The effect of the 50 km/h urban speed limit on accidents was determined in a three-year pre-implementation period (September 1994 to August 1997) and a 21-month post-implementation period (April 1998 to December 1999). Key findings included:

- large reductions in crashes. Since the lower limit was applied, over a 21-month period, there were approximately 262 fewer crashes on roads that were speed zoned at 50 km/h than otherwise expected;
- the cost saving to the community that has resulted from the crash savings is estimated to be $6.5 million for the 21-month period;
- statistically significant reductions in the risks of ‘All casualty’ (22%), ‘Non injury (27%)’, ‘All reported’ (25%), ‘Young driver’ (19%; first year only), ‘Older driver’ (50%) and ‘Pedestrian’ (51%; first year only) accidents; and
- substantial reductions in the average estimated risk of ‘All reported’ accidents in urban (34%) and rural (18%) areas.

Vehicle speeds

The speed surveys were conducted in three phases: before implementation of the 50 km/h urban speed limit (Series 1), 6-12 weeks after the signs were installed (Series 2) and 3-6 months after installation (Series 3). The analysis included comparisons of the average mean and average 85th percentile speeds and the proportion of vehicles travelling above 60, 70 and 80 km/h. Key findings included:

- a 0.55 km/h (1%) reduction in the average speed from the pre-implementation average speed of 57.2 km/h; and
- a 0.77 km/h (1%) reduction in the average 85th percentile speed of 65.8 km/h 3-6 months after implementation.

In 1999, on NSW roads zoned at 60 km/h, there were 182 people killed and 16,593 people injured. With the relationships between speed and casualty and fatal crash probability, a 0.55 km/h (0.9%) speed reduction on all 60 km/h roads would provide:

- a 2.7% (n = 448) reduction in injury crashes;
- a 3.6% (n = 7) reduction in fatal crashes.

There were large reductions in the proportions of high-risk vehicles exceeding 60, 70 and 80 km/h on the 50 km/h speed-zoned streets. For example, the proportion of motorists that exceeded 60 km/h fell from almost 38% to just over 15%, after the introduction of the 50 km/h urban speed limit.
Community response to the 50 km/h urban speed limit

Community attitude surveys were conducted before and after the 50 km/h urban speed limit was implemented.

The survey responses before implementation revealed a very high incidence of awareness (89%) of the proposal to reduce the speed limit on some local streets from 60 km/h to 50 km/h. Nine months after implementation of the 50 km/h speed limit 94% of respondents in participating LGAs and 90% in non-participating LGAs were aware of the 50 km/h proposal.

Most respondents volunteered at least one advantage for the reduced speed limit, and only 13% could see no advantage. Three quarters of respondents considered the 50 km/h speed limit a “good” or “very good idea” and only 17% claimed that it was a “bad” or “very bad idea”.

Support for the lower limit was highest on streets where there are lots of pedestrians. The level of support increased for major cities/large towns and smaller country towns.

Council road safety officer initiatives

The Road Safety Officer (RSO) Program is a key strategy of the Local Government Road Safety Program and has been operating since 1992. RSOs work within councils liaising closely with local traffic engineers, local Police, the RTA, local service community groups and the community to develop strategy and action plans to:

- address the road safety issues which their community identifies;
- raise awareness of key issues which contribute to the local road toll; and
- implement highly localised countermeasures which are targeted to their community and which can effect behavioural change in road safety.
RSOs address road safety issues such as speeding by raising awareness of the particular speeding problem in their local government area. This can be achieved through local community education campaigns which are often combined with high profile local Police enforcement to enhance the deterrence effect. Some speeding public education campaigns target specific groups such as males aged 17-25 years, while others target all drivers in a particular LGA.

A recent strategy used by RSOs to raise awareness of speeding in the community is to provide complimentary speed checks for passing motorists using speed equipment at known high risk speeding locations in the LGA. This provides motorists with feedback about their speeding behaviour at locations where speeding is common. Speed monitoring surveys in response to these complimentary speed checks are often carried out by RSOs to monitor changes in speed in these areas. These surveys are often followed by Police enforcement to reinforce the idea that drivers should be aware of their speeding behaviour.

**40 km/h school zones and school bus speed limit**

**School zones**

School zones are short lengths of road outside schools that have a lower speed limit, usually 40 km/h at designated times. This speeding countermeasure is designed to reduce speed in school areas at times when the risk of hitting a child pedestrian is greater, such as when children are entering or leaving the school grounds. The RTA is currently revising the *School Zones Guidelines* (1997) to progressively implement 40 km/h school zones around primary schools in NSW.
**Speed limit around school buses**

Another speeding countermeasure aimed at preventing child pedestrian deaths and injuries is the school bus speed limit initiative.

In recent years, the numbers of children aged 5-18 years killed in pedestrian crashes after leaving a school bus are as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Number killed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>3</td>
</tr>
<tr>
<td>1993</td>
<td>4</td>
</tr>
<tr>
<td>1994</td>
<td>1</td>
</tr>
<tr>
<td>1995</td>
<td>2</td>
</tr>
<tr>
<td>1996</td>
<td>4</td>
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<td>1997</td>
<td>0</td>
</tr>
<tr>
<td>1998</td>
<td>1</td>
</tr>
<tr>
<td>1999</td>
<td>0</td>
</tr>
</tbody>
</table>

While there have been significant reductions over recent years in crashes involving young children as pedestrians, the Government’s package of school bus safety initiatives is aimed at further improving school bus safety. The package has been jointly funded by the Government and private bus companies, and commenced implementation Statewide at the beginning of Term 1, 1999.

It has involved:

- a prominent warning system of static signs and flashing lights on the 7,700 Government and private buses used to convey children to and from school;
- a requirement for traffic to slow to 40 km/h when overtaking a bus which has its wig-wag lights flashing;
- the introduction of clearly marked school bus zones with a 40 km/h speed limit on dual carriageways where speed limits are greater than 70 km/h;
- bus headlights that flash when school children are being picked-up or set-down at bus stops to warn oncoming motorists to take care as school children are about; and
- a statewide education campaign to inform parents and drivers about school child safety issues and the new regulations.

The effectiveness of this school bus safety countermeasure is currently being evaluated.
Education programs

School education

The NSW Road Safety Education Program is a major initiative of the NSW government which addresses road safety issues for children and adolescents. It aims to reduce injury to these groups and to produce safe adult road users. The program supports the delivery of road safety education through the Personal Development, Health and Physical Education (PDHPE) Syllabus, which is compulsory in schools and other key learning areas of the curriculum.

The program is linked to the school curriculum and delivered by teachers. These teachers receive training in the delivery of road safety education. Teaching resources produced by the RTA support the program. Only the resources in the high school program, entitled Young Driver, highlight issues relevant to speeding.

The Young Driver education program resource entitled ‘Go Back, You Are Going The Wrong Way’ is designed for years 7-12 and consists of a video and teacher guide. One of the topic areas covered in this resource kit is Speeding and Emotion. Another of the Young Driver resources, The Physics of Car Crashes, helps young people understand the relationships between speed and the likelihood and impact of crashes. All resources in the Young Driver program address underlying issues for young people in regard to speeding such as peer pressure, risk taking, understanding the complexity of driving and consequences of behaviour.

Road Whys is another road safety education resource and aims to develop safer road user attitudes, knowledge and skills in pre- and novice drivers who are in Years 9-12. These presentations are delivered by either a local police officer trained in Road Whys or a teacher or both. One of the four presentations offered in this resource concerns speeding and is entitled ‘Speeding Gets You Nowhere Fast’. This speeding presentation includes a short video, overhead transparencies and student worksheets.
Public education campaigns

RTA public education campaigns combine emotional messages about the fatal consequences of speeding with rational messages about police enforcement and the subsequent consequences of being caught, such as fines and demerit points.

Unless drivers look at their speedometers regularly, they are unlikely to estimate the speed of their vehicles accurately. The RTA has incorporated the key prompt “How fast are you going now?” into many of its anti-speeding messages, to remind drivers to check their speedometers.

The priority of RTA advertising campaigns is to slow speeding drivers by:

- raising drivers' awareness that speeding has serious - and even fatal consequences;
- raising drivers' awareness that speeding is linked to an increased risk of crashing and an increased incidence of severe injury and death in crashes;
- raising drivers' awareness that speeding in urban areas increases the risk and severity of crashes involving pedestrians and cyclists;
- dispelling the myth of ‘safe speeding’;
- raising drivers' awareness of the threat and consequences of speeding enforcement;
- reminding all drivers to check their speedometers frequently while driving.
Speeding in the country

Country areas of NSW experienced a significant decline in fatalities from 389 in 1994 to 297 in 1996. However, the trend has reversed with an increase to 376 in 1999. In addition, 64% of fatalities from speeding-related accidents on country roads occurred on roads zoned at 100+ km/h and 85% of these occurred on bends.

A new country speeding public education campaign was developed to increase drivers' awareness of the dangers of speeding around bends. The campaign was launched on January 14, 2000. The campaign comprised a 60 second television commercial ‘Mates’ and 3 x 45 second radio commercials and ran throughout regional NSW. Tracking studies show the campaign has attracted very high levels of awareness and has successfully put speeding around bends on the agenda as a road safety issue.

Enforcement

Penalties

All drivers are required by law to abide by the speed limits set for NSW. A driver caught speeding by the police will be both fined and incur licence demerit points. The penalties applying to drivers and riders are appended as Appendix C.

Perceived risk of being caught

Police enforcement activity can have substantial impact on drivers' speed when the perceived risk of being caught is high and the expected penalty is considered to be serious.

Enforcement activity can influence drivers, who have not been caught speeding, because they are made aware of the risk.

Drivers' perception of the risk of being caught is influenced by:

- their awareness of police enforcement activity; and
- their perceptions of the predictability of the location and time of this enforcement.

Consequences

The effectiveness of speed enforcement is partly dependent upon the perceived aversiveness of the consequences of being caught. This clearly relates to the size of the fine and the number of licence demerit points.

Targeting

Speed enforcement is a major road safety activity of police across the State. Specific areas targeted include major highways, school zones, high-density pedestrian areas and locations with a poor crash history.
Publicity and enforcement

Publicity can help to increase drivers’ expectations of being caught if they drive over the speed limit. The link between the two is important. It is self-defeating to advertise high levels of enforcement activity unless there really are high levels of visible enforcement operations. High levels of enforcement combined with advertising about enforcement increase drivers’ perception of the risk and expectation of being caught if they were to offend.

Enhanced enforcement

The aim of the Enhanced Enforcement Program is to achieve a higher level of visible Police enforcement. The RTA funds operations additional to the usual levels of police traffic enforcement activity.

These operations usually focus on locations with a poor history of serious casualty crashes. Enhanced enforcement also operates statewide when RTA statewide public education campaigns are running.

Enhanced enforcement is conducted:

- during holiday periods;
- when traffic volumes are high;
- where crash data indicate a need for intervention;
- where special caution is needed, such as ice on roads, potential danger from road works, or high alcohol-consumption events; and
- on roads with a high traffic volume of heavy vehicles and coaches.

The NSW Police Service manages the operations. RTA and police conduct audits.

At least 65% of the enhanced enforcement program involves speeding enforcement. An exact estimate is difficult because most enhanced enforcement operations combine enforcement of speeding with that of drink driving and restraint wearing.
Speeding anti-evasion legislation

Police have used radar-based devices to detect vehicle speeds for many years. However, police are now also using laser-based devices. Consequently, a new generation of devices and substances aimed at detecting and preventing speed measurement has appeared. Irrespective of the technology's effectiveness, drivers who use these devices are likely to act as though the threat of police detection has been reduced.

Legislation had previously banned radar-based detectors or jammers. In 1998, the legislation was extended to apply to devices or substances that interfere with laser-based speed measuring devices. Drivers who now choose to use these laser detectors or any evasion device will be required to surrender the device to police and will incur a fine.

Fixed speed camera program

Unattended, fixed speed cameras are one method of enforcing the posted speed limit. In late 1999, legislation was passed to permit fixed digital speed cameras to operate in NSW under the Road Transport (Safety and Traffic Management) Act 1999.

Fixed speed cameras represent an effective and efficient means of enforcement on specific high accident lengths of road which meet certain criteria.

Fixed speed cameras are able to enforce speed limits, and thereby reduce excessive speeding and the number of fatal and serious injury crashes 24 hours per day, 365 days per year. Fixed speed cameras also free up Police to perform other functions as well as offering a safe means of enforcement, as there is no requirement for an officer to stand on the side of the road.

Fixed speed cameras can be effectively implemented at sites which are difficult for the Police to enforce using conventional methods, where there is a problem with excessive speeding and where a serious or fatal crash would result in significant difficulties of access by ambulance and emergency vehicles to the crash site. This is why speed cameras have been installed in the Eastern Distributor and Harbour Tunnels in Sydney.
Signage

The objective of the fixed speed camera program is to prevent deaths and injuries on NSW roads. Every fixed speed camera is accompanied by high profile, advance warning signs and a media release detailing the camera location, accident history at the site and the date of commencement of camera operation.

There are three warning signs on approach to fixed speed cameras. These signs all depict an image of a speed camera, together with an applicable warning message, in the left panel and the regulatory speed limit in the right panel. The three signs appear in the following order on approach to the speed camera and read as follows:

- ‘speed camera 24 hrs’;
- ‘speed camera ahead’; and
- ‘heavy fines loss of licence’

Evaluation

Fixed speed camera technology is utilised throughout Europe. Research undertaken in Britain and Norway shows that this type of automatic enforcement can reduce injury accidents by around 20% when used at sites which meet certain criteria. NSW has adopted similar site selection criteria for determining the location of speed cameras as those used in Europe. Therefore, NSW can expect a similar reduction in injury accidents as a result of fixed speed camera enforcement.

Good results have already occurred following the use of speed cameras. Crash reductions have been achieved since the two speed cameras were installed as part of a package of road safety works, on the Burringbar Range section of the Pacific Highway in April 1999.

These two cameras were installed 1.6 km apart within a remote 5 km ‘blacklength’ section of the Pacific Highway between Burringbar and Murwillumbah which passes over the Burringbar Range. This section had one of the worst crash records on the Pacific Highway. In the five year period from 1 April 1994 to 31 March 1999 on this 5 km section of the Pacific Highway there were a total of 176 crashes, including three fatal crashes resulting in 6 fatalities, and 51 injury crashes resulting in 72 people being injured. Of the total number of crashes (176) on this ‘blacklength’, 81% were speed-related. Speed was a factor in all of the fatal crashes.
The economic cost of these crashes to the community was $7,665,400.

Since the cameras commenced operation in April 1999, there has been a dramatic decrease in the number crashes in this 5km section of road. As at 30 June 2000 there have been no fatal or injury accidents and only 7 towaway accidents at a cost of only $85,400 to the community.

In the six months following installation of fixed, digital speed cameras on the Hume Highway at Coolac; Cowpasture Road at Green Valley and Delhi Road at Macquarie Park, speed survey data have demonstrated a significant reduction in speeding vehicles at all sites.

At the Hume Highway site at Coolac, the percentage of vehicles exceeding the speed limit has dropped from 55% to 20%. At the Cowpasture Road, Green Valley site, the reduction is greater, down from 43% to just over 5%. At the Delhi Road, Macquarie Park site, the percentage has dropped from 65% to 35%.

A complete list of sites where fixed speed cameras have been installed is available on the RTA’s Internet site, under the ‘Speeding’ topic.

**Double demerit points**

**Background**

Legislation which doubled the demerit points for speeding offences and increased other demerit point offences by an additional point during holiday long weekend periods was first trialled for the 1997 Easter public holiday period. Since then, the initiative has been implemented consistently for public holiday long weekend periods.

**Reaction to the double demerit points initiative**

During 1997, 1998 and 1999 several surveys of drivers revealed high levels of awareness and acceptance of the initiative, as demonstrated by the following:

- there has been continuing high awareness (more than 90%) of double demerit points applying during public holiday long weekends;
- drivers reported increased levels of drink driving and speed enforcement.
- support for the measure has remained very high, with nearly 90% of respondents indicating that they thought the measure was a “good” or “very good” idea;
- the majority of drivers believed that the measure was likely to reduce crashes; and
- there has been an increase in the proportion drivers who reported that they drove more carefully or more slowly.
Effectiveness

This support for the initiative appears to have been translated into reduced traffic infringements and significant reductions in fatalities.

Large percentages of drivers in high risk speeding target groups reported that they slowed down - 67% of drivers who usually travelled at a speed where they believed they could be booked and 45% of drivers aged 18 to 29 years.

Despite high levels of police enforcement throughout the State during the holiday periods when double demerit points have applied, there have generally been reductions in traffic infringements and charges compared with the corresponding periods prior to the introduction of double demerit points.

There were 18 fatalities during the eleven-day 1999/2000 Christmas/New Year holiday period, four less fatalities than the corresponding period in 1996/97, the last Christmas/New Year holiday period before double demerit points started.

Over the 15 holiday periods (86 days) in which double demerit points have applied there have been 140 fatalities, down 35 (20%) on the number of fatalities for the same holiday periods prior to the introduction of double demerit points. The community savings from these reductions in road trauma were estimated at around $27 million. Figure 3 shows the cumulative lives saved under this initiative.

Figure 3: Cumulative lives saved under double demerit points

*Note: Expectations are based on the number of fatalities for the corresponding period prior to the introduction of double demerit points.

Appendix D shows the Fatality and Fatal Crash Statistics for Double Demerit Point Periods.
Road environment

There is a strong link between the road environment and the speed drivers choose to travel - either deliberately or sub-consciously. Wide straight roads, with few roadside distractions and infrequent intersections will result in lower demands on driver attention which will, in turn, lead to higher speeds. Conversely, a cluttered road environment will lead to drivers slowing down to allow them to process the complex information their senses are receiving.

This effect has impacts on the selection of speed limits and the engineering of local roads and main streets so that their form is appropriate for their function.

Perceptual countermeasures

Perceptual countermeasures to speed are designed to reduce travel speeds through influencing speed perception, mental workload, risk perception and/or driver comfort. Such countermeasures are relatively low cost, non-obtrusive road markings usually involving only paint, gravel or both.

They have the potential to lower vehicle speeds by introducing additional line marking or other visual cues to cause drivers to slow down. Trials of perceptual countermeasures are currently underway to investigate the most effective ways of reducing travelling speeds.

Local area traffic management (LATM)

Experience with reductions in the speed limit to 40 km/h or lower suggest that to be effective these zones should be accompanied by road environment changes. If this is not done, particularly on old roads with wide alignment, drivers will respond to the road environment rather than the lower speed limit. A typical approach is to use LATM schemes.

LATM is concerned with planning and managing the road space within a local area. It aims to improve the safety and amenity of that local environment by overcoming problems such as speeding.
LATM schemes often involve a change in speed zones, in conjunction with some physical changes to the street environment. These may be raised paved areas, speed humps, road narrowing or roundabouts to help prevent inappropriate speeds. LATM is usually applied to residential areas but the principles are applicable to different types of areas, including local shopping areas or school zones.

**Divided roads**

At high speeds, head-on crashes become particularly severe and these can be eliminated through the provision of adequate median protection on divided roads. The building of key lengths of divided roads such as the M2, M4, M5, F3 and F6 motorways as well as other main routes such as the Pacific Highway and the Hume Highway has made a substantial difference to the number of crashes by allowing higher travel speeds to be sustained safely and consistently. Research shows that a rural undivided road has an accident rate at least 4 times higher than a rural divided road\(^7\). Therefore, divided roads are an effective road environment countermeasure to speeding-related crashes and all crashes on rural roads.

**Forgiving road environment**

A road environment that has fewer roadside hazards, such as trees, poles, culverts, and steep embankments is more forgiving to drivers by allowing them more space to recover from an error. When crashes do occur, a forgiving road environment will reduce the severity of these by removing or protecting hard unyielding objects. At higher speeds, these demands placed on the road environment are increased.

Road environment safety programs identify roadside hazards and treat the locations of greatest risk. However, many hazards cannot be addressed directly because of topography or environmental concerns and, in these areas, the consequences of speeding can be grave. In 1997, 28% of all fatal crashes involved a roadside hazard. Research also indicates that many multiple-vehicle crashes on rural roads involve drivers leaving their lanes. This can result from excessive speeds. Improvement in lane delineation and shoulders should help to reduce the number of serious speeding-related crashes.
Vehicle safety

Limiters

One way to control speed is to limit the maximum speed at which a vehicle can travel.

Speed limiter technology has been developed for heavy vehicles and can readily be applied to cars and other light vehicles. Car manufacturers can incorporate this into engine management systems of modern vehicles at a very low cost per vehicle. An electronic chip in the system limits the maximum speed. Currently these systems are set at very high speeds based on constraints such as tyre or brake performance rather than road safety objectives. However, even if these speed limiters were set at more realistic maximum speeds for public roads (e.g. 110 km/h), this would not prevent drivers from exceeding the speed limit in a 60 km/h zone and as such the road safety benefit would be small.

Speed alerts

Speed alerts are low cost devices that make a noise when the vehicle exceeds a speed that the driver has pre-set. They are useful for drivers who want to avoid inadvertently allowing their vehicle's speed to increase. These are currently fitted as standard equipment in a number of popular cars. While there is no evidence to prove the effectiveness of these devices, they are an option for drivers to consider if they wish to have additional reminders of their speed.

Intelligent transportation systems

Intelligent Transport Systems may be used in the future to control the speed of vehicles. These systems can be based on a roadside transponder or a global positioning system (GPS). Vehicles could then be fitted with automatic speed limiters, which prevent the vehicle being driven in excess of the posted speed limit, or speed alarms which sound a warning if the posted speed limit is exceeded. The RTA will monitor overseas trials of these technologies which are currently underway. Automatically limiting vehicle speeds to the posted speed limit would ensure that vehicles travel at speeds appropriate for local conditions, and reduce both the number of crashes and the severity of crashes.
Future directions

- Ensure that speed limits and zones are appropriate and consistent throughout NSW and that people are always aware of the speed limit of the road on which they are driving.

- Implement additional 40 km/h zones in commercial or built up areas where there are large numbers of pedestrians about (eg CBD).

- Continue with double demerit points program on public holiday long weekend periods such as Easter.

- Install more digital, fixed speed cameras on ‘blacklengths’ of road throughout NSW.

- Ensure that country drivers are aware that it is country drivers who have the most fatal crashes on country roads.

- Develop a new, more extensive public education campaign that targets the more recently identified broader age groups of speeding drivers (ie the older drivers) and the increasing number of women who speed.

- Continue with the identification of key roadside hazards and implement programs to address these hazards.

- Conduct research into the effectiveness of various perceptual countermeasures to speeding and trial such measures.
Speed and crash risk

There are at least three reasons why small reductions in speed make such a large
difference to risk:

1. Small differences in vehicle speeds, before braking begins, can result in large
differences in impact speeds.
2. Even small differences in impact speed make a large difference to the
probability of serious injury.
3. Small differences in speeds mean differences both in time to collision and
in speed prior to collision such that the crash is disproportionately difficult
to avoid.

These points follow from long-established principles of Newtonian physics.

1. Small differences in vehicle speeds, before braking begins, can result in large
differences in impact speeds.

In a report on speed and pedestrian safety, researchers from the University of
Adelaide use the following example:

...consider two cars travelling side by side at a given instant, one car travelling
at 50 km/h and the other overtaking at 60 km/h. Suppose that a child runs onto
the road at a point just beyond that at which the car travelling at 50 km/h can
stop. The other car will still be travelling at 44 km/h at that point*.
(McLean, Anderson, Farmer, Lee and Brooks, 1994.)

2. Moderate differences in impact speed make a large difference to the probability
of fatal injury.

The reason for this difference is that the force of the crash varies with the square
of the impact speed. For example, a 70 km/h collision has about twice the force
a 50 km/h collision.

3. Small differences in speeds mean differences both in time to collision and
in speed prior to collision such that the crash is disproportionately difficult
to avoid.

Even if a vehicle cannot be stopped in the available distance, the collision can still
sometimes be avoided. When speeding is involved, however, less time is available
for either the speeding driver or the other road user with which there is danger
of a collision. They have less time to decide what evasive action to take and less
time to take evasive action. In any case, a vehicle travelling at a higher speed
is more difficult to manoeuvre.
Speed trends

The speed measurement surveys have detected a reduction in speeds in 60 km/h zones in recent years. Figure 1 shows changes in the mean speed. Although the change is small, it is statistically significant. As explained, small changes in speeds have safety significance.

There is a similar reducing trend in the proportion of vehicles over the speed limit. The reduction was from about 58% to about 54%.

Figure 1: Mean speed in surveys where the same set of 60-km/h sites was used. Each point represents the date of the survey and the mean speed. The fitted line indicates a downward trend in the mean speed.

Figure 2: Mean speed in surveys where the same set of 100-km/h sites was used. Each point represents the date of the survey and the mean speed. The fitted line indicates no statistically significant trend in the mean speed.

In 100 km/h zones, the speed surveys provide no evidence of an improvement. There are only three survey dates for 100-km/h sites, limiting the statistical power. Figure 2 shows the mean speeds in the three surveys. In 100 km/h zones, the proportion exceeding the speed limit was a low of 45% in May 1998, and averaged 49%. In 100-km/h zones, the proportion exceeding the speed limit by 10 km/h or more averaged 12% and showed little variation.
Appendix C

Penalties for speeding offences

Information about current penalties is available on the RTA’s internet site at:

Penalties for speeding offences

Information about current penalties is available on the RTA's internet site at:

## Fatality and fatal crash statistics for double demerit point periods

<table>
<thead>
<tr>
<th>Period</th>
<th>Without Double Demerit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Killed</td>
</tr>
<tr>
<td>Easter (12 days)</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td>-</td>
</tr>
<tr>
<td>1997</td>
<td>13</td>
</tr>
<tr>
<td>Easter (5 days)</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td>-</td>
</tr>
<tr>
<td>1997</td>
<td>3</td>
</tr>
<tr>
<td>1998</td>
<td>12</td>
</tr>
<tr>
<td>Queens Birthday - June (4 days)</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td>-</td>
</tr>
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<td>1997</td>
<td>8</td>
</tr>
<tr>
<td>1998</td>
<td>9</td>
</tr>
<tr>
<td>1999</td>
<td>4</td>
</tr>
<tr>
<td>Labour Day - October (4 days)</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td>-</td>
</tr>
<tr>
<td>1997</td>
<td>6</td>
</tr>
<tr>
<td>1998</td>
<td>4</td>
</tr>
<tr>
<td>1999</td>
<td>6</td>
</tr>
<tr>
<td>Christmas-New Year (12 days)</td>
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</tr>
<tr>
<td>1996/97</td>
<td>-</td>
</tr>
<tr>
<td>1997/98</td>
<td>15</td>
</tr>
<tr>
<td>Christmas Day Holiday Weekend (5 days)</td>
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</tr>
<tr>
<td>1996</td>
<td>-</td>
</tr>
<tr>
<td>1998</td>
<td>14</td>
</tr>
<tr>
<td>New Years Day Holiday Weekend (4 days)</td>
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</tr>
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<td>1996/7</td>
<td>-</td>
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<tr>
<td>1998/9</td>
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</tr>
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<td>1998</td>
<td>10</td>
</tr>
<tr>
<td>Anzac Day Holiday Weekend (4 days)</td>
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<tr>
<td>1997</td>
<td>-</td>
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<tr>
<td>1999</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>140</td>
</tr>
</tbody>
</table>

Note 1: Totals for the ‘without double demerit points periods’ are for all periods matching the ‘with double demerit points periods’. Over the 15 holiday periods (86 days) in which double demerit points have applied there have been 140 fatalities, down 35 (20%) on the number of fatalities for the same holiday periods immediately prior to the introduction of double demerit points. Similarly fatal crashes were down by 33 (22%) for the same comparison.
References


