Submission No 47

INQUIRY INTO VULNERABLE ROAD USERS

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NSW Centre for Road Safety

RTA

RTA SUBMISSION TO THE STAYSAFE INQUIRY INTO VULNERABLE ROAD USERS – MOTORCYCLISTS AND CYCLISTS

CONDUCTED BY THE PARLIAMENTARY JOINT STANDING COMMITEE ON ROAD SAFETY

JULY 2010

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Appendix 8:	*Beyond the Pavement RTA Urban Design Policy Procedures and Design Principles*, Roads and Traffic Authority of NSW (July 2009)

TERMS OF REFERENCE

STAYSAFE INQUIRY INTO VULNERABLE ROAD USERS

In May 2010 following on from its recent inquiry into pedestrian safety in 2009, the Staysafe (Road Safety) Committee self-referred an inquiry into vulnerable road users, with particular regard to motorcycle and bicycle safety.

The table below provides a reference point for each of the Staysafe Inquiry terms of reference within the RTA submission.

Terms of Reference	**Location/Reference in RTA Submission**
a) Patterns of motorcycle and bicycle usage in New South Wales	Part 2
b) Short and long term trends in motorcycle and bicycle injuries and fatalities across a range of settings, including on-road and off-road uses	Part 3
c) Underlying factors in motorcycle and bicycle injuries and fatalities	Part 3
d) Current measures and future strategies to address motorcycle and bicycle safety, including education, training and assessment programs	Part 4, 5
e) The integration of motorcyclists and bicyclists in the planning and management of the road system in NSW	Part 6
f) Motorcycle and bicycle safety issues and strategies in other jurisdictions	Part 1 (reference only)
g) Any other related matters	Part 7

PART 1 – INTRODUCTION

The increasing exposure of vulnerable road users such as motorcyclists and cyclists is a key emerging road safety issue. There is currently very strong growth in motorcycle sales and bicycle usage in NSW.

In the last five years (2004-2009) motorcycle registrations increased by 50% and the number of motorcycle licences increased by 18%.

The number of people riding bicycles continues to grow. Information from the Household Travel Survey shows on an average day in 2008/09, Sydney residents made more than 150,000 bike trips of up to 10 km. Average weekday cyclist numbers using the Sydney Harbour Bridge Cycleway rose by 30 per cent between 2008 and 2009, and by 25 per cent for the Anzac Bridge Cycleway. There has also been strong growth of recreational cycling, with the most recent Australian Government figures showing that in 2008 over half a million NSW adults, 20% more than the year before, rode a bike for exercise, recreation or sport (NSW Bike Plan, 2010).

The increased motorcycle and bicycle usage means greater exposure of these vulnerable road user groups across the road network.

Analysis of fatal crashes for the calendar year ending 31 December 2009 (provisional data) revealed that:

- Speeding was a factor in around 46 per cent of fatalities.
- At least 20 per cent of fatalities were the result of a crash involving a driver or rider with a blood alcohol level above the legal limit.
- At least 20 per cent of people killed in motor vehicles were not wearing available restraints.
- Driver fatigue contributed to about 18 per cent of fatalities.
- At least nine per cent of motorcyclists killed were not wearing helmets. Motorcyclists accounted for 15 per cent of fatalities.

Motorcycle crash data - summary

The data analysis shows that motorcycle casualties are predominantly male and mostly occur on straight metropolitan roads or curved country roads. Other factors relevant to motorcycle trauma include:

- Over-representation of motorcyclist casualties from motorcycle-object crashes, particularly those involving trees and bushland;
- Motorcycle riders under the influence of currently legal levels of alcohol have a disproportionately high casualty crash involvement rate compared to motor vehicle drivers;
- Young motorcyclist fatalities (under 30 years) tend to occur on metropolitan roads with lower speed limits (particularly at intersections);
- 30-49 year-old motorcyclist fatalities tend to occur on country roads (particularly classified roads); and
- Older motorcyclist fatalities (50 years and above) tend to occur on country roads with higher speed limits (particularly two-way undivided curved roads)

Pedal cycle crash data - summary

- Pedal cyclists account for only a small percentage of overall road trauma levels in NSW however whilst there have been significant reductions in the long term trends for overall fatalities and injuries, the levels of pedal cycle fatalities and injuries have remained relatively unchanged in recent years.
- The majority of pedal cycle fatalities and injuries occur in the metropolitan areas.
- Over the long term, child aged pedal cycle casualties have decreased but these have been offset by increases in the older age groups.
- The majority of injuries occur at intersections whilst the majority of fatalities occur away from intersections on single undivided carriageways, divided carriageways or dual carriageway freeways/motorways.
- Pedal cycle fatalities are more prevalent on high speed higher order RTA classified roads, whilst injuries are more prevalent on low speed unclassified (local) roads.
- The majority of pedal cyclist casualties involve an impact with another vehicle, with impacts involving heavy trucks over-represented amongst pedal cycle fatalities.
- The majority of pedal cycle casualties have no error coded for the pedal cyclist, but 11% of fatalities involved the pedal cyclists disobeying a traffic control.
- Around one in seven pedal cyclist casualties (with a recorded alcohol result) are 0.05 or more.
- Around one third of fatalities and 18% of injuries are not wearing a helmet.

Addressing the road safety issues of motorcyclists and cyclists is a key focus for road safety in NSW.

Nearly half of fatal crashes involve speed as a contributing factor. Addressing speed through speed enforcement measures (such as the recently introduced mobile speed camera program) and appropriate speed zoning are key to addressing road safety for all road users. Speed management is *the* key tool to protect vulnerable road users.

Many of the initiatives in the Road Toll Response Package, that was announced in March 2010, such as enhanced speed enforcement, more funding for safety barriers, curve widening, and highway safety route reviews will have a positive impact for motorcycle safety.

In recognition of motorcycle safety as a key emerging issue in NSW, the NSW Government has asked the Roads and Traffic Authority to develop a NSW Motorcycle Safety Strategy as part of the Road Toll Response Package. The RTA will commence development of this strategy in 2010 and will do so in consultation with key stakeholders. The RTA welcomes the information and recommendations that will be gained from this Inquiry and will use this as input to inform the development of the overall NSW Motorcycle Safety Strategy.

The RTA is currently scanning a range of motorcycle safety research and strategies from overseas and other jurisdictions in Australia. Vic Roads has produced a comprehensive motorcycle safety strategy that is available on their website Reference: http://www.vicroads.vic.gov.au/NR/rdonlyres/5C578CDD-9FE2-421D-B770-177D1261CDDF/0/PTWPlan20092013.pdf.

The RTA has implemented a numbers of measures to target motorcycle safety such as improved road infrastructure, protective equipment guidelines and campaigns to target rider and other road user's behaviour. The introduction of a Graduated Licensing Scheme (GLS) for motorcyclists in 2009 was an important initiative focused on the gradual easing of restrictions as novice riders gain experience and skills. It is hoped that future crash data will highlight a reduction in fatalities and injuries for novice motorcyclists, in a similar trend to the reductions gained in P1 and P2 driver involved crashes since a GLS was introduced and refined for novice drivers.

The NSW State Plan has set an ambitious target of 5 per cent travel by bike across Sydney, for trips up to 10 km long, by 2016. To achieve this target the Metropolitan Transport Plan includes $158 million over 10 years to deliver Sydney metropolitan cycle paths with an additional $5 million per year for cycleways in regional NSW.

The NSW BikePlan will deliver cycleways throughout urban and regional NSW, progressively completing many of the high priority missing links within our current network. The RTA is also committed to ensuring provisions are made for bicycles in all new major infrastructure and maintenance works.

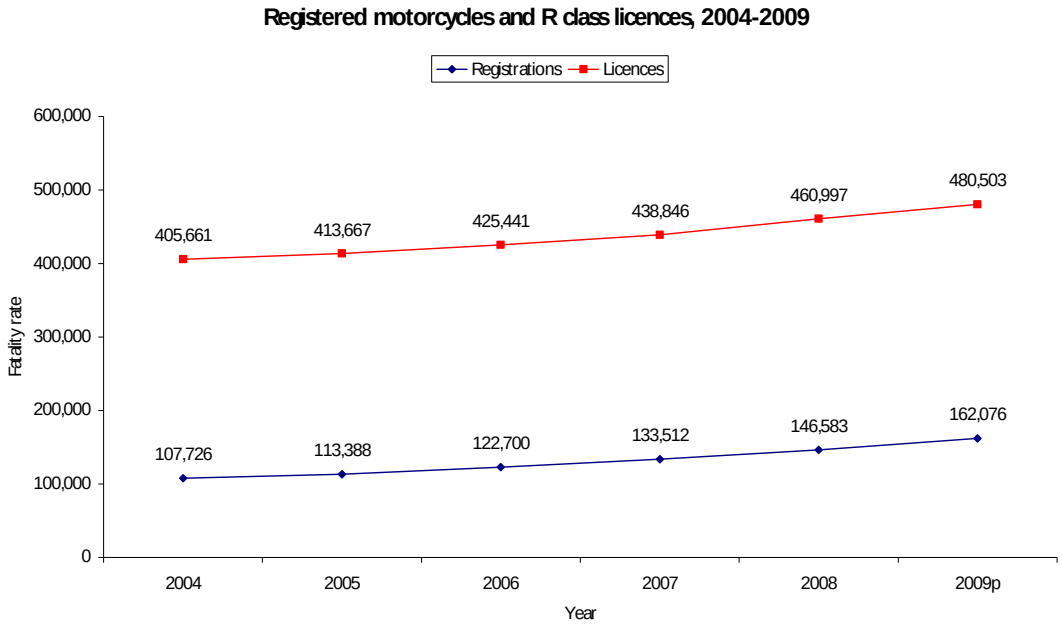
The separation of cyclists on dedicated cycleways is the optimum solution from a road safety perspective, provided that intersections can be effectively addressed. However, in circumstances where these separate paths regularly cross other roads safety gains may be compromised. The Bike Plan is the cornerstone for achieving improved road safety outcomes for cyclists in NSW.

The RTA has undertaken research and implemented a number of initiatives to improve road safety for bicycle users. These have included speed enforcement measures, traffic management measures, infrastructure investment (especially in off road cycle networks) and education and awareness campaigns.

PART 2 – PATTERNS OF MOTORCYCLE AND BICYCLE USE

2.1 Motorcycle Usage

In the period 2004 to 2009, motorcycle registrations in New South Wales increased by 50% and the number of motorcycle licences increased by 18%.



2.2 Bicycle Usage

It is estimated that 159,000 trips are made by bike on the average weekday in Greater Sydney (NSW Bike Plan, 2010, page 7). Information on bicycle use in New South Wales is held by a variety of public and private stakeholders. There is an incomplete understanding of who rides bicycles, as well as why and where they ride. The data collected by various stakeholders is scattered and inconsistent and of varying quality. Stakeholders are concerned with sharing data because of privacy and quality issues.

In 2008, the Roads and Traffic Authority (RTA) and the Department of Environment and Climate Change and Water (DECCW) commissioned Parsons Brinckerhoff Australia (PB) to develop a more robust picture of cycling in NSW, identifying:

- The current and potential role of cycling for transport
- The characteristics of existing cyclists

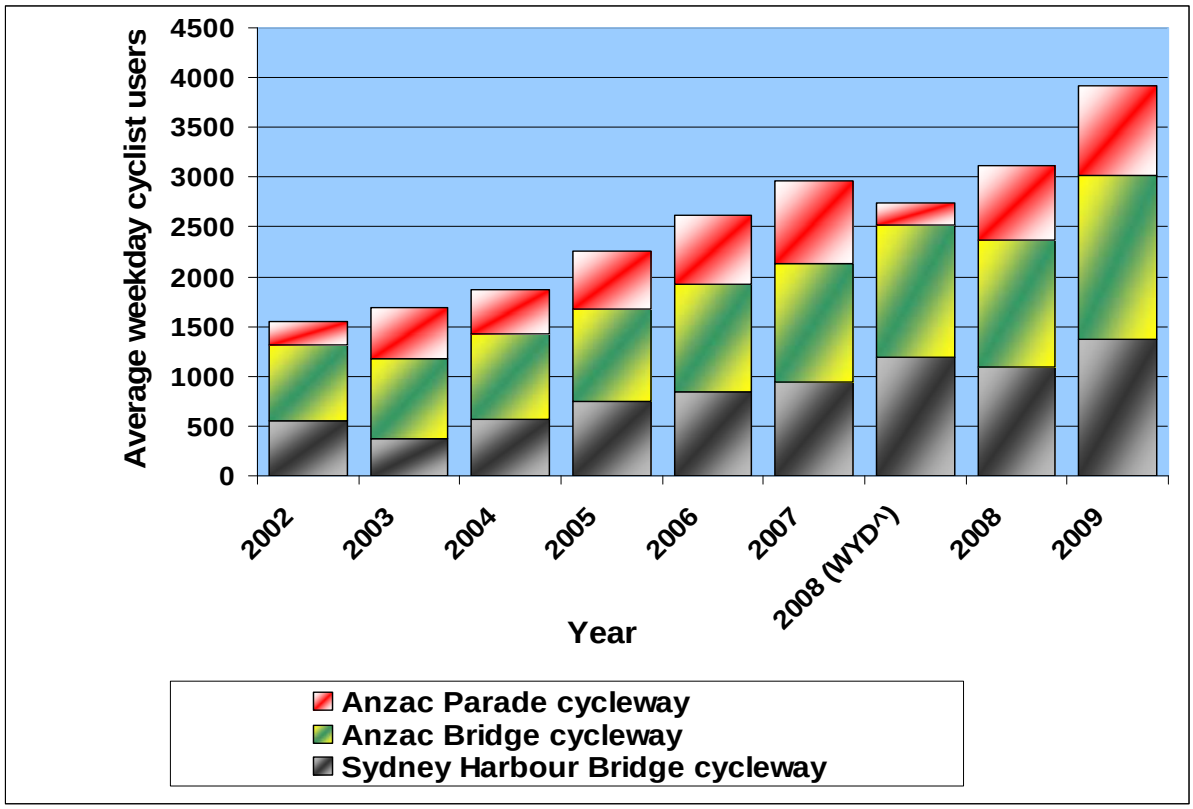
- The road safety issues for cyclists

The aim of this data collection project was to establish an evidence base for short to medium-term bicycle planning and policy development. A copy of the PB report is attached at Appendix 1.

- As a partial reporting measure, data from RTA permanent bicycle counters is shown below. Except in cases of technological failure these data are captured continuously, in 15-minute bins, at approximately 20 locations on the Metro Sydney Bike Network.
- Although numbers remain relatively low, 2009 average data show that an increase in cycle usage was recorded at nearly all counter locations over the 12 months to 31 December 2009. Across all sites the average annualised daily count increased by approximately 19 per cent from 2008.
- Weekday bike access on major routes to / from Sydney CBD grew particularly strongly between 2008 and 2009, with growth of 30 per cent and 25 per cent seen on the RTA's Sydney Harbour Bridge and Anzac Bridge cycleways respectively.

Average weekday numbers of cyclists using major Sydney CBD access routes, 2002 to 2009 (both directions)

Year	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008 (World Youth Day period)**	**2008**	**2009**
Iron Cove Bridge cycleway		263	284	309	298	355		392	416
Anzac Bridge cycleway	549	377	569	744	842	943	1190	1095	1372
Sydney Harbour Bridge cycleway	769	798	855	935	1080	1188	1330	1278	1653
Anzac Parade cycleway	234	518	446	572	700	827	224	748	888



PART 3 – ANALYSIS OF CASUALTY TRENDS

3.1 Motorcycle – Casualty Trends

After six years of reductions in the NSW road toll, there was a reversal in this trend during 2009. Motorcycle fatalities were amongst a number of road toll characteristics to increase last year.

Motorcycles comprise approximately 2 per cent of registered motor vehicles and account for approximately 0.5 per cent of all motor vehicle travel. However, motorcycles are involved in approximately 15% of all fatal crashes. It is estimated that motorcycle riders and passengers are around 20 times more likely to be killed than car occupants.

Scope of the Analysis

This analysis of motorcycle fatality and injury data covers:

- Long-term trends in motorcycle trauma

- Characteristics and factors involved in motorcycle trauma (with more detailed analysis for the most recent five year period 2005 to 2009p)
- Other relevant issues relating to motorcycle trauma

Data for 2009 are preliminary, although approximately 99% complete.

Definitions

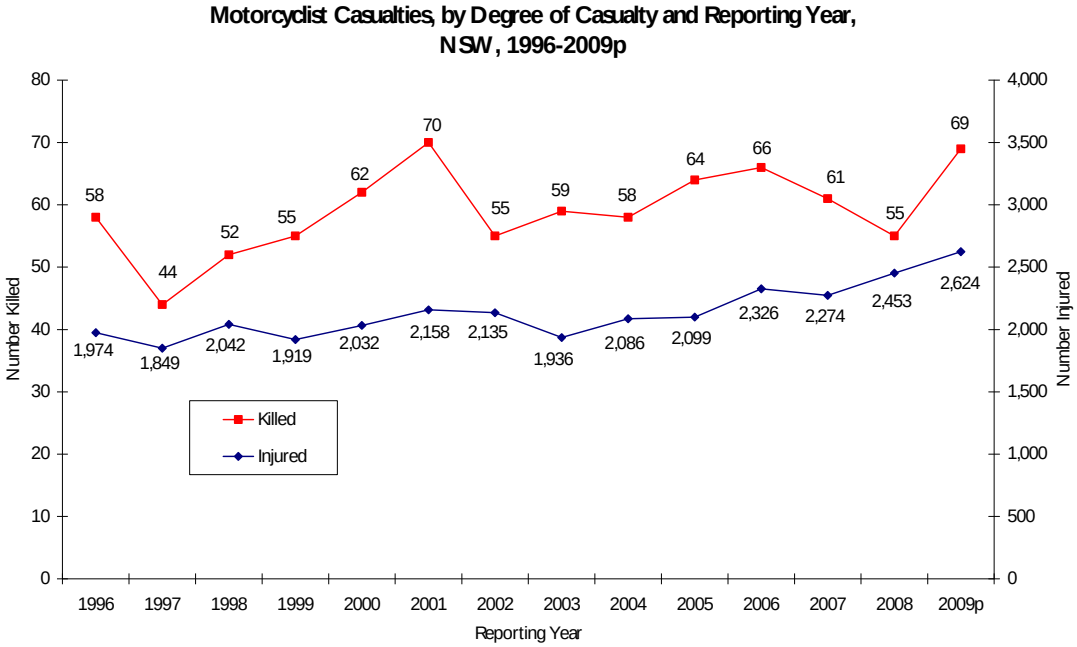
For the purposes of this analysis a "motorcyclist" refers to any motorcycle rider or passenger.

Regarding urbanisation, the metropolitan area is defined as the Sydney, Newcastle and Wollongong Conurbation and the non-metropolitan area as the rest of NSW. The Sydney, Newcastle and Wollongong Conurbation is the area which includes the Newcastle metropolitan area, Wyong, Gosford, Hawkesbury, Blue Mountains, Wollondilly local government areas, Sydney metropolitan area and Wollongong metropolitan area.

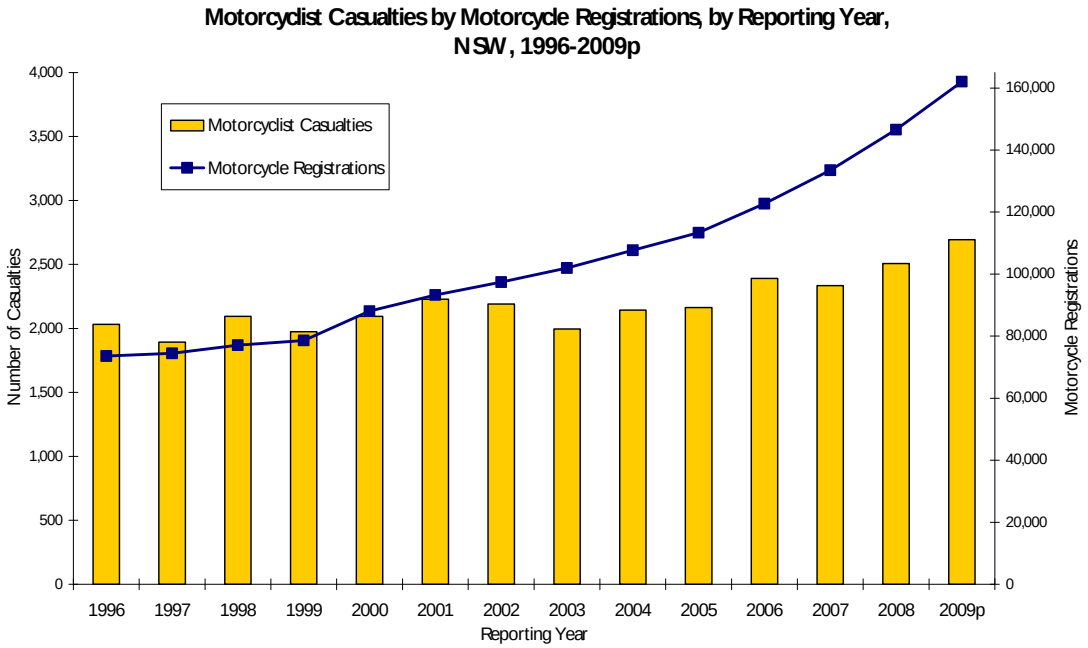
Only crashes which are reported to the Police and in which at least one person has been killed or injured, or at least one vehicle has been towed away are recorded in the RTA crash database. A fatality is a person who dies within 30 days of a crash from injuries received in the crash.

Long-Term Trends in NSW Motorcyclist Casualties

The table below presents the number of motorcyclists killed and injured between 1996 and 2009. This table demonstrates that motorcyclist fatalities have fluctuated since 1996, and – after a downward trend between 2005 and 2008 – have increased by 25% from 55 in 2008 to 69 last year. In terms of injuries, there has been a steady long-term increase in the number of motorcyclists injured, particularly since 2003.



The table below presents the total number of motorcyclist casualties and motorcycle registrations, by reporting year since 1996. This table highlights the substantial increase in motorcycle registrations over recent years – motorcycle registrations have doubled since 1999, with an average increase of around 11% per annum. The table also demonstrates that the upward trend in motorcycle casualties is consistent with increasing motorcycle registrations, suggesting that exposure may be behind the increase in motorcyclist casualties over recent years. However, the increase in casualties is not as pronounced as the increase in registrations – with an observed 25% increase in motorcyclist casualties between 2005 and 2009p, compared with a 43% increase in motorcycle registrations over the same period.



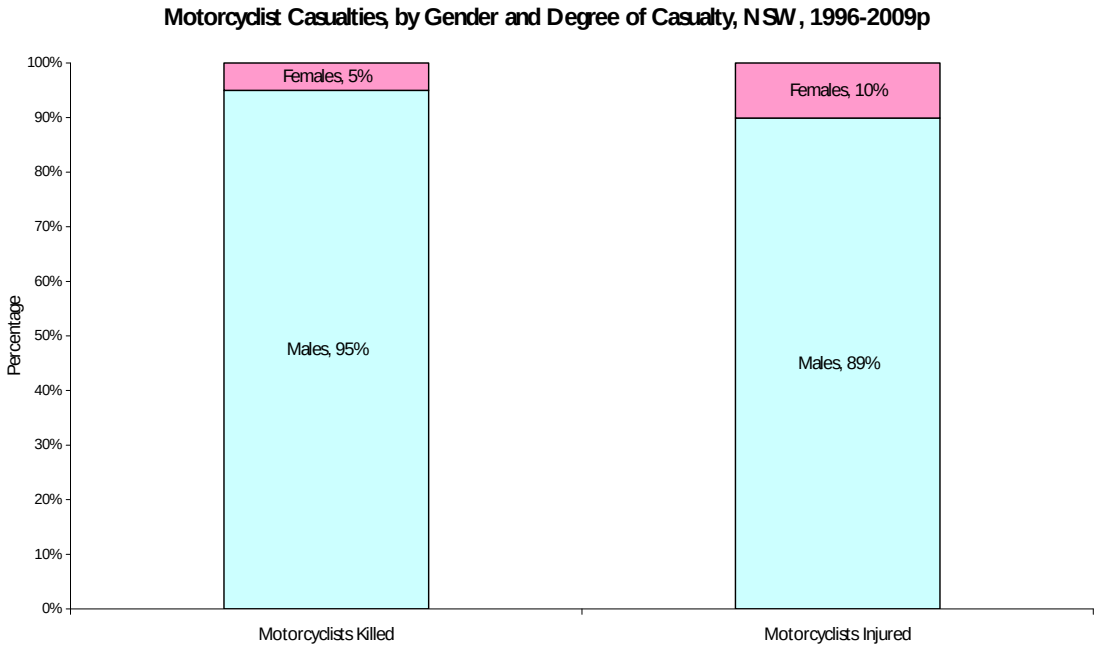
3.2 - Underlying Factors / Characteristics of Motor Cyclist Fatalities and Injuries, 2005 to 2009p

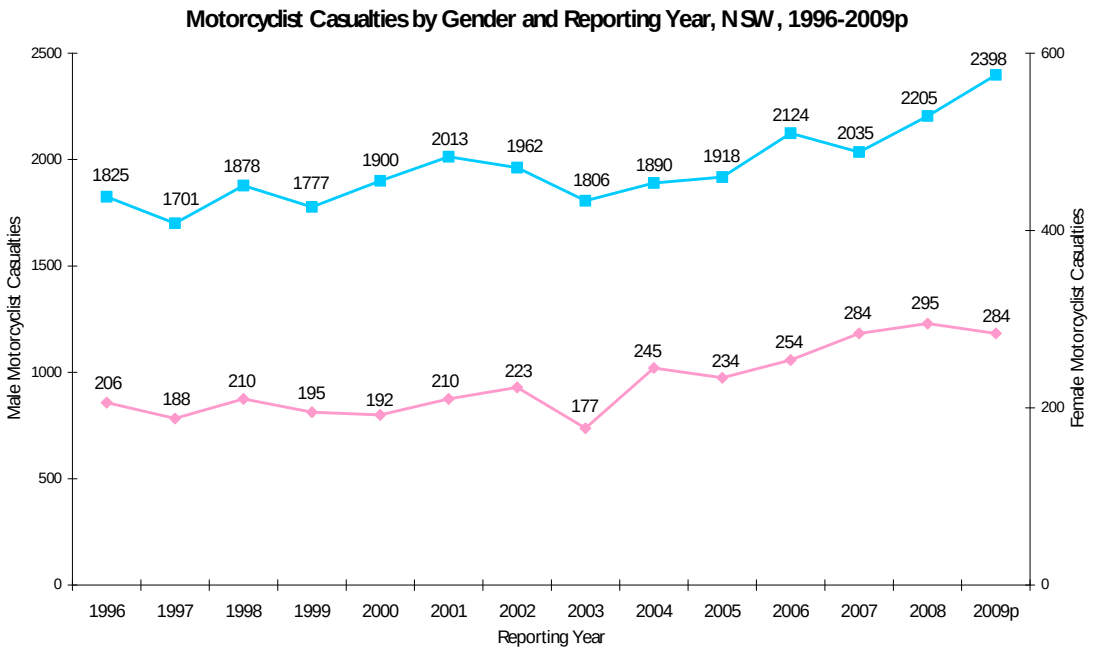
The following sections outline key characteristics and factors involved in motorcycle trauma, with more detailed focus on the most recent five year period 2005 to 2009p.
Between 2005 and 2009p there were a total of 12,091 motorcyclist casualties, of which 315 were fatalities and 11,776 were injuries.

Tables detailing the characteristics of motorcyclist fatalities and injuries for the most recent five year period are found in Appendix 2. These tables cover gender, age, urbanisation, location type, speed limit, road classification, road alignment, road surface condition, day of week, time of day, natural lighting, weather, first impact, and type of crash.

Gender

As demonstrated in the first graph below, motorcyclist casualties in NSW are predominantly male. The second graph presents long-term trends in motorcyclist casualties separately for males and females, and demonstrates that both male and female motorcyclist casualties have been increasing since 2003. More recently, however, there has been a divergence in motorcyclist casualties by gender – since 2007 the trend in female motorcyclist casualties has remained even, while male motorcyclist casualties have increased by 18% over the same period.



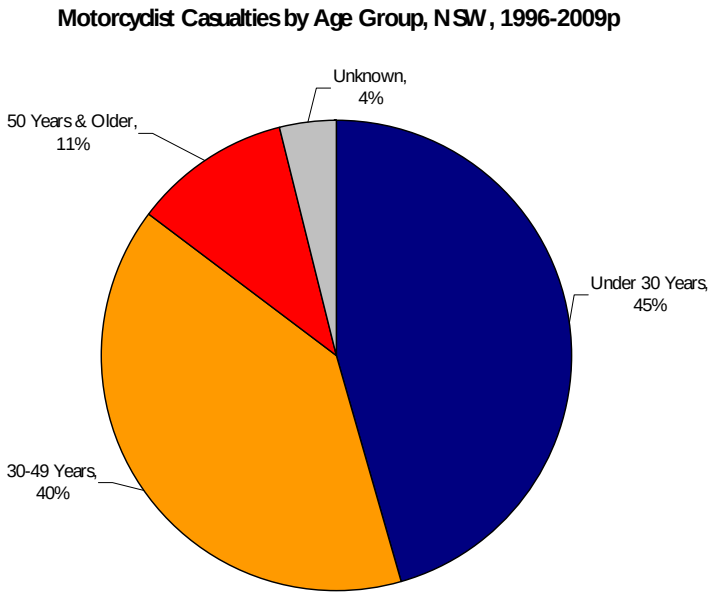


Age Group

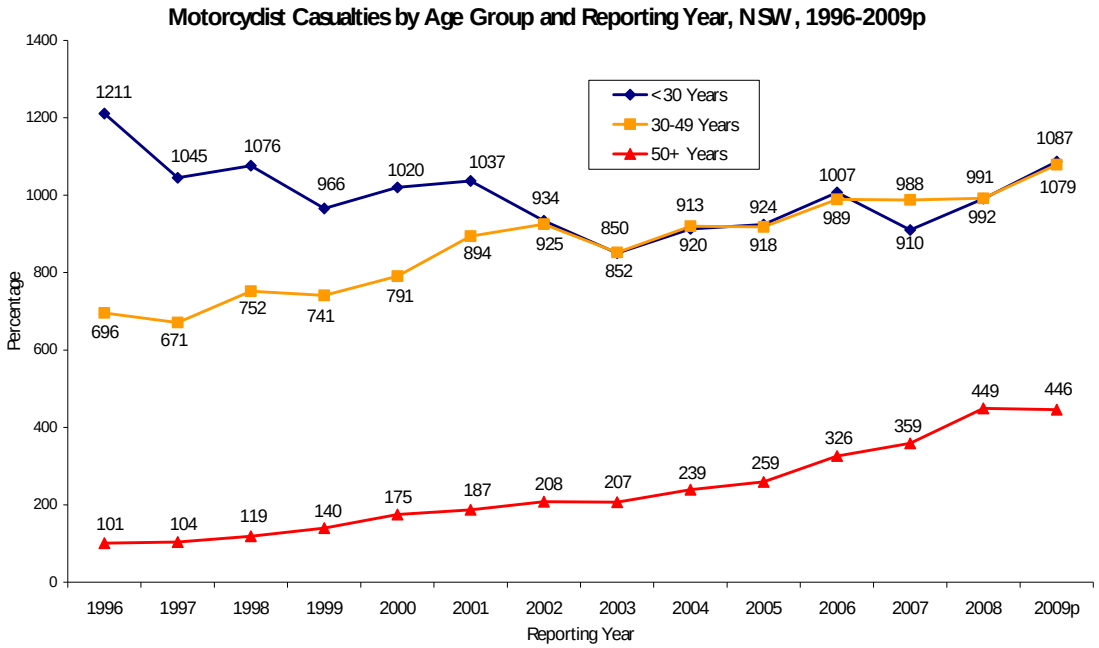
The graph below highlights the three main age groups that account for motorcyclist casualties in NSW:

- Motorcyclist casualties under the age of 30 years (45% of all motorcyclist casualties).
- Motorcyclist casualties aged 30-49 years (40% of all motorcyclist casualties).

- Motorcyclist casualties aged 50 years and older (11% of all motorcyclist casualties).

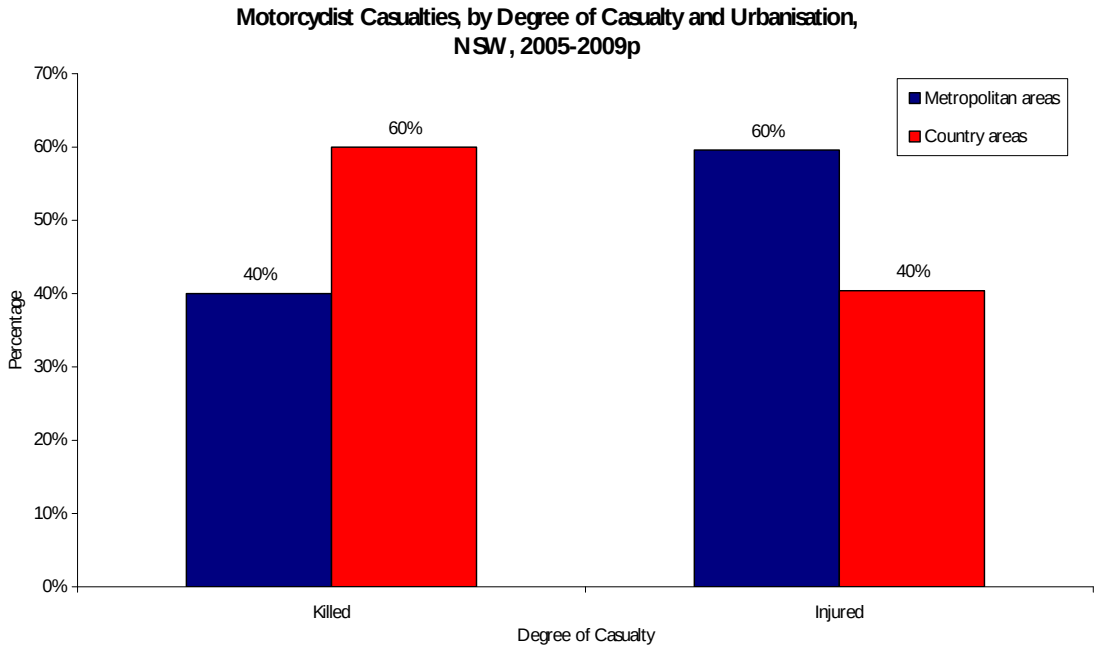


The following graph presents the long-term trends in motorcyclist casualties, separately for the three age groups identified above. This graph demonstrates that, while under 30 year-olds account for a greater number of motorcyclist casualties, this age group has trended downwards since 1996, now roughly equivalent to the trend for 30-49 year-old motorcyclist casualties. Alternatively, while the older age group accounts for a lower number of motorcyclist casualties, there has been a steady upward trend in casualties in this age group. Importantly, the graph also highlights that, while motorcyclist casualties in all three age groups have increased over recent years, casualties in the older age group appear to be increasing at a greater rate – with motorcycle casualties aged 50 years and older more than doubling since 2003, compared to smaller increases of 28% for under 30 year-olds and 27% for 30-49 year-olds over the same period.



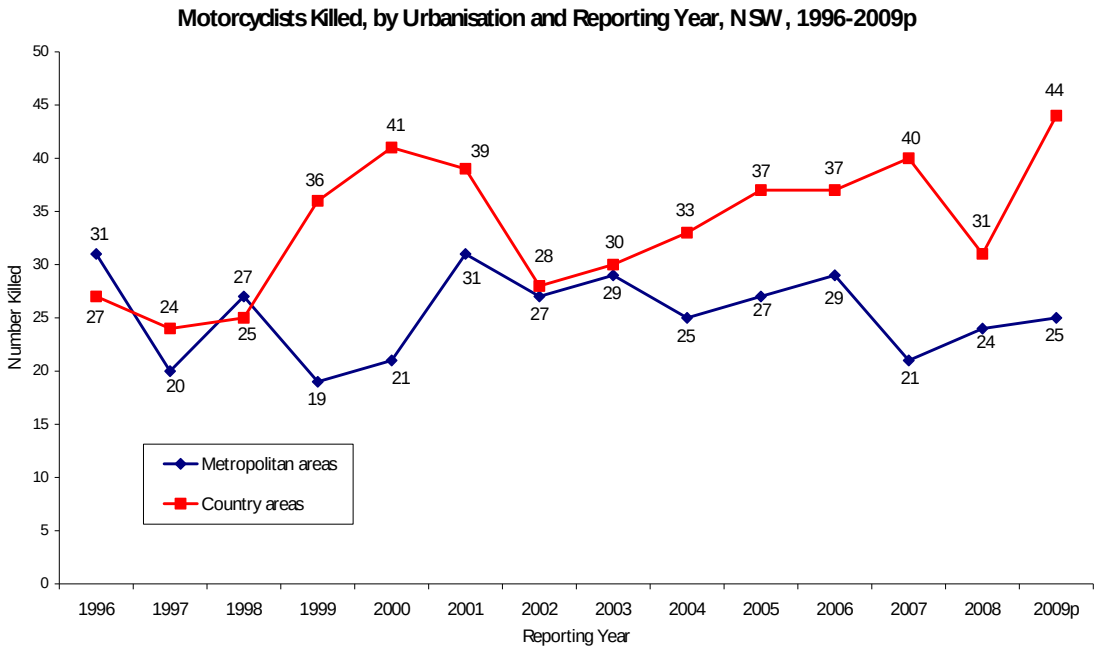
Urbanisation

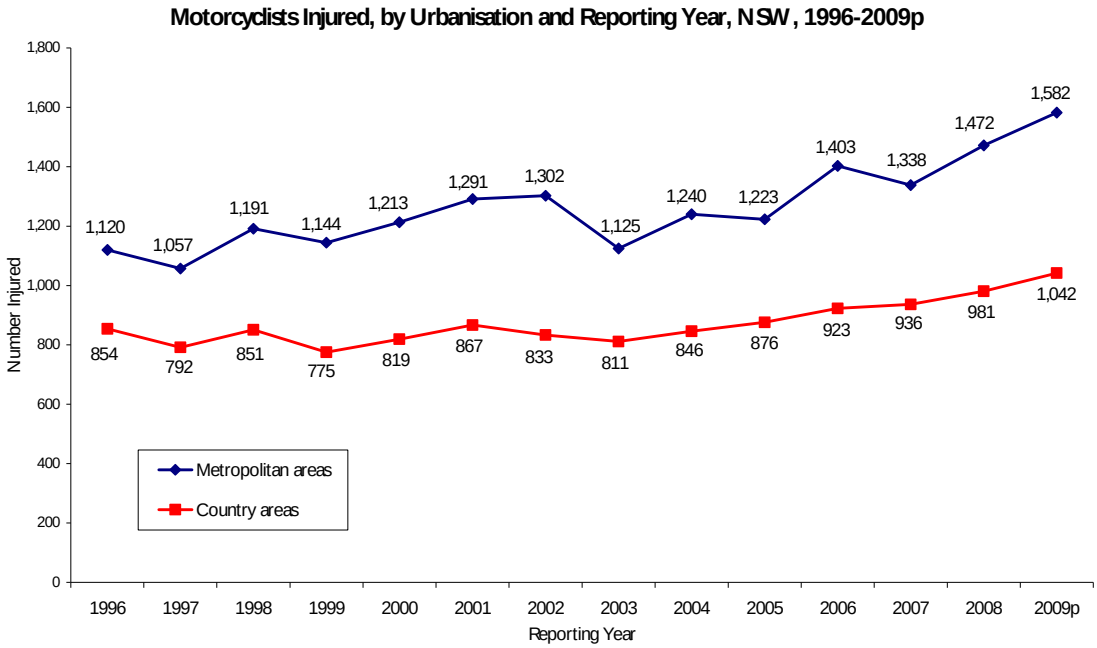
The graph below presents motorcyclist casualties by urbanisation and degree of casualty. While most motorcyclist injuries occur in metropolitan areas, the majority of motorcyclist fatalities occur in *country areas*. With country areas tending to have higher posted speed limits (and thus higher impact speeds), as well as these areas perhaps having longer emergency service response times, a higher risk of a fatality outcome is not unexpected.



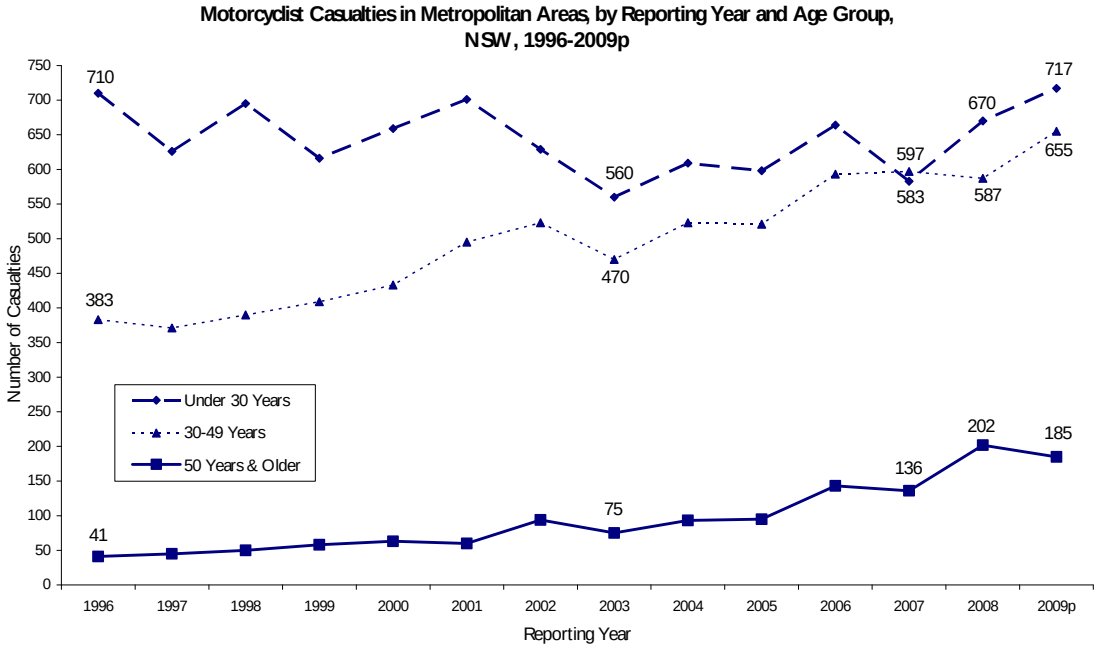
The following two graphs present long-term trends in motorcyclist casualties in metropolitan and country areas, separately for motorcyclists killed and injured.

Despite some fluctuation, motorcyclist fatalities in country and metropolitan areas were at similar levels in 2003, but have diverged since then – with metropolitan fatalities trending down, and country fatalities trending upward. The increase in country area fatalities is more pronounced since 2008 – with a 33% increase last year. Motorcyclist injuries in both country and metropolitan areas have increased steadily since 2003, although more recently this increase in injuries has been slightly more pronounced in metropolitan areas (18% since 2007) than in country areas (11% since 2007).

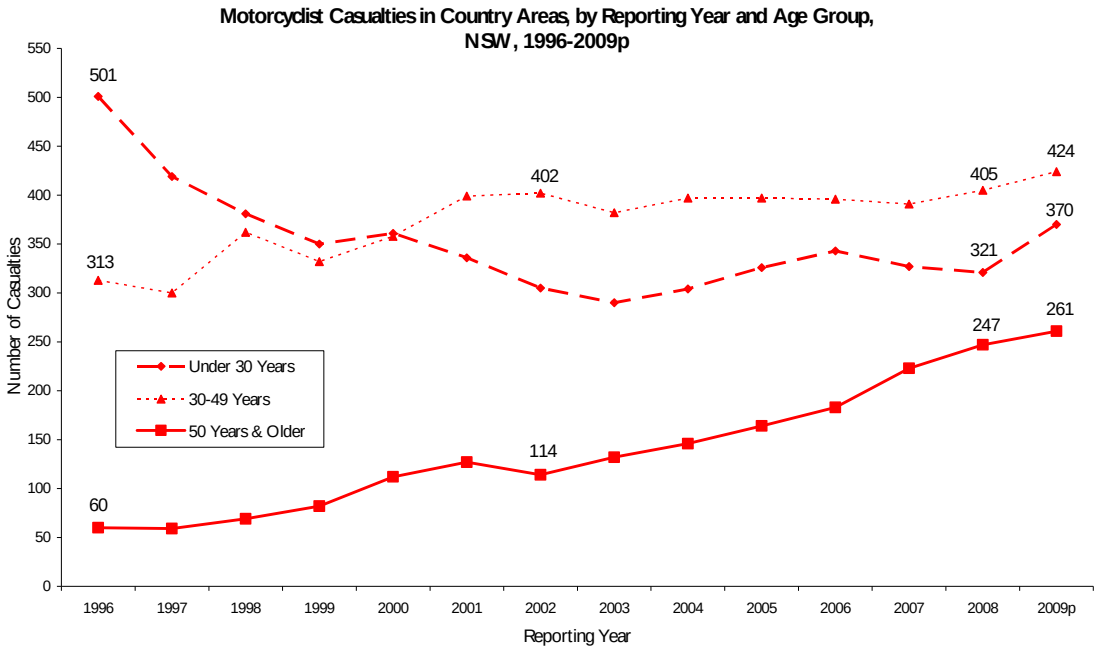




The next graph presents long-term trends for motorcyclist casualties in metropolitan areas only, separately for the three key casualty age groups previously identified. In metropolitan areas, 30-49 year-old motorcyclist casualties have increased consistently over the long term. Recent increases for this age group (since 2008) are similar to those observed for younger motorcycle casualties (who now account for the highest number of motorcyclist casualties in metropolitan areas). Older motorcyclist casualties have increased steadily over the long term, but have dropped slightly since 2008.



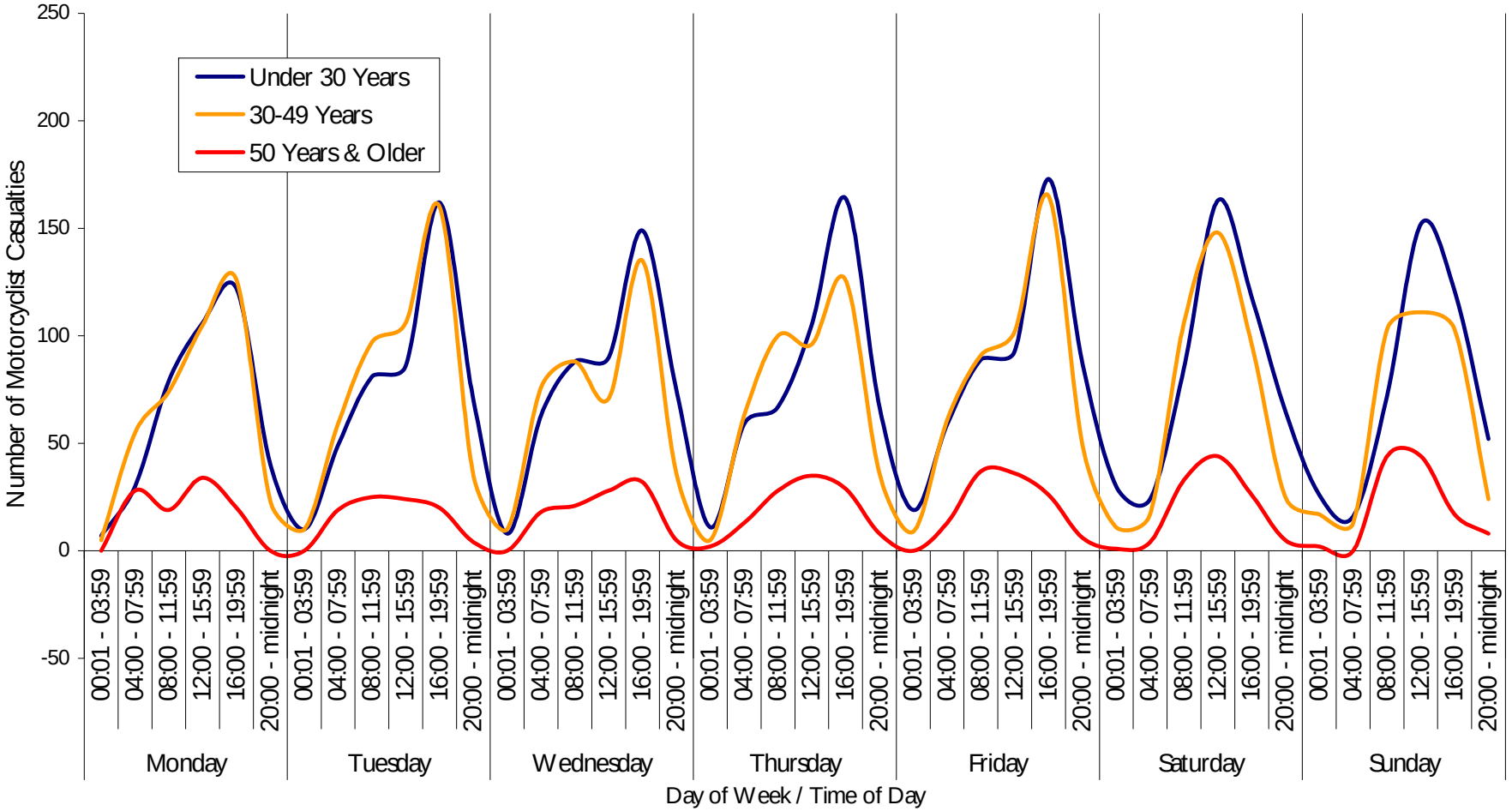
Regarding long-term trends for motorcyclist casualties in *country* areas, older casualties have increased consistently since 2002, compared with an even trend for 30-49 year-old casualties (although this age group accounts for the highest number of motorcyclist casualties in country areas). Young motorcyclist casualties have dropped over the longer term, although there was a 15% increase between 2008 and 2009 for this age group.



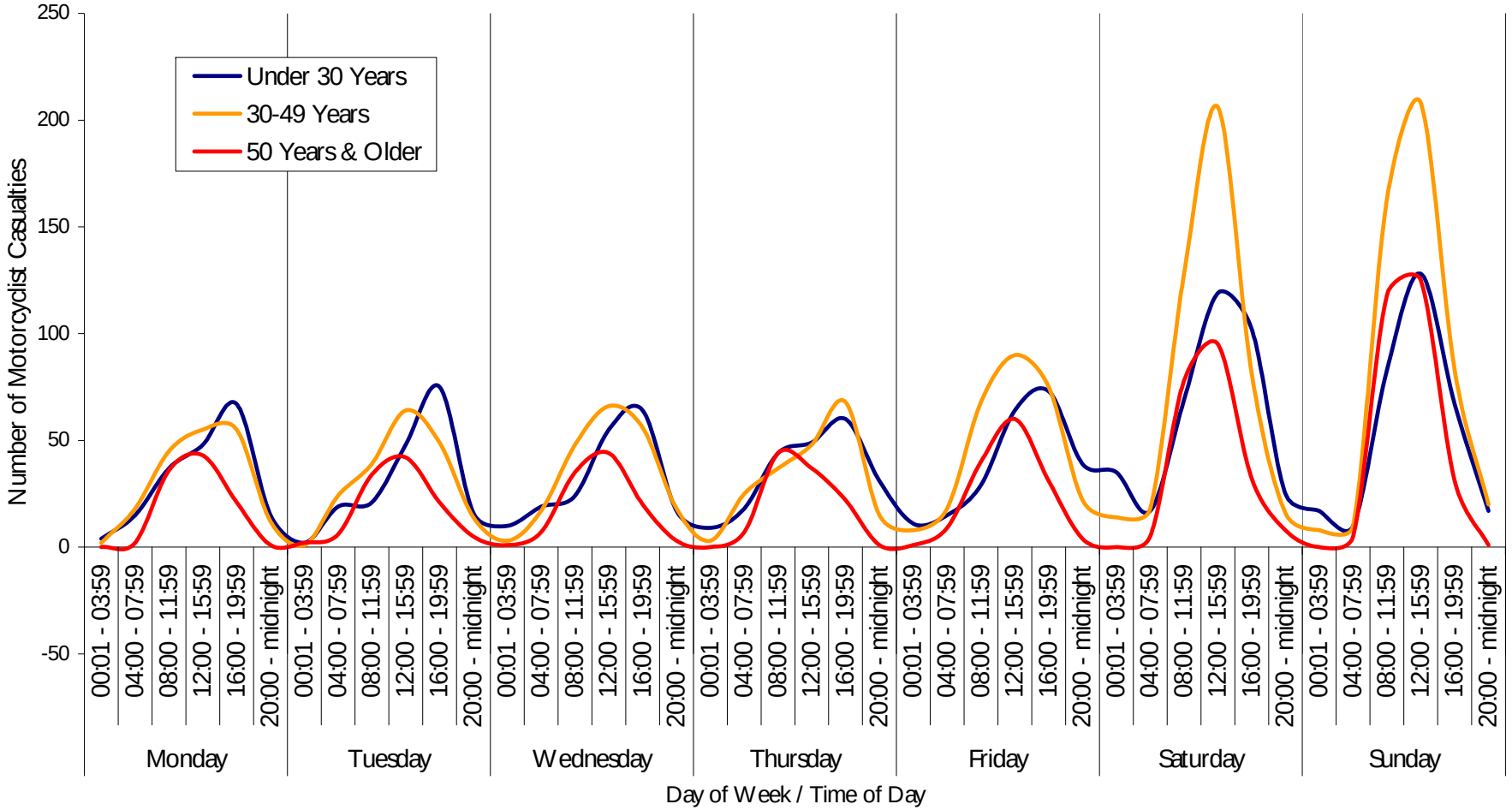
Day of Week / Time of Day

The following two graphs present motorcyclist casualties by day of week/time of day (in four-hour blocks) for the three key age groups, separately for metropolitan and country area casualties. In metropolitan areas, motorcyclist casualties tend to occur evenly throughout the week, with a peak casualty period of 4-8pm during weekdays, and 12-4pm on weekends. In country areas, across all age groups the peak motorcycle casualty period is clearly 12-4pm on Saturdays and Sundays – and this trend is particularly pronounced for 30-49 year-olds, which is consistent with the tendency for motorcyclists of this age group to embark on weekend leisure rides.

Motorcyclist Casualties In Metropolitan Areas, Day of Week/Time of Day, by Age Group, NSW, 2005-2009p

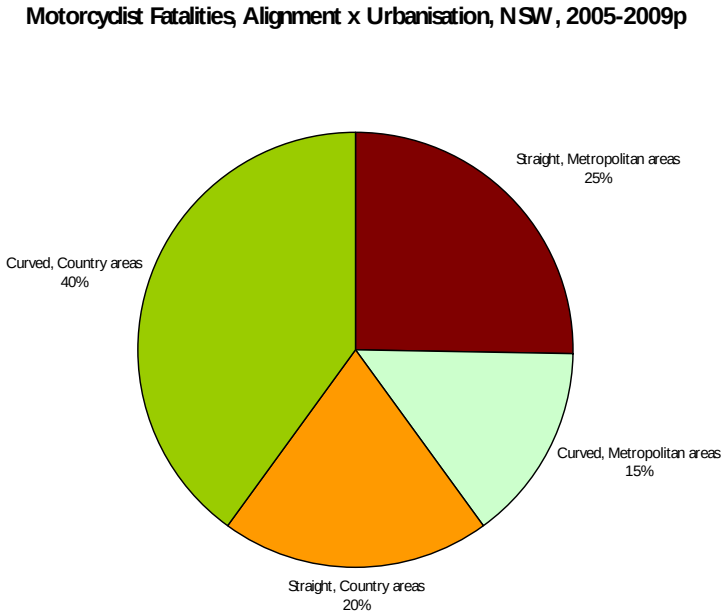


Motorcyclist Casualties In Country Areas, Day of Week/Time of Day, by Age Group, NSW, 2005-2009p

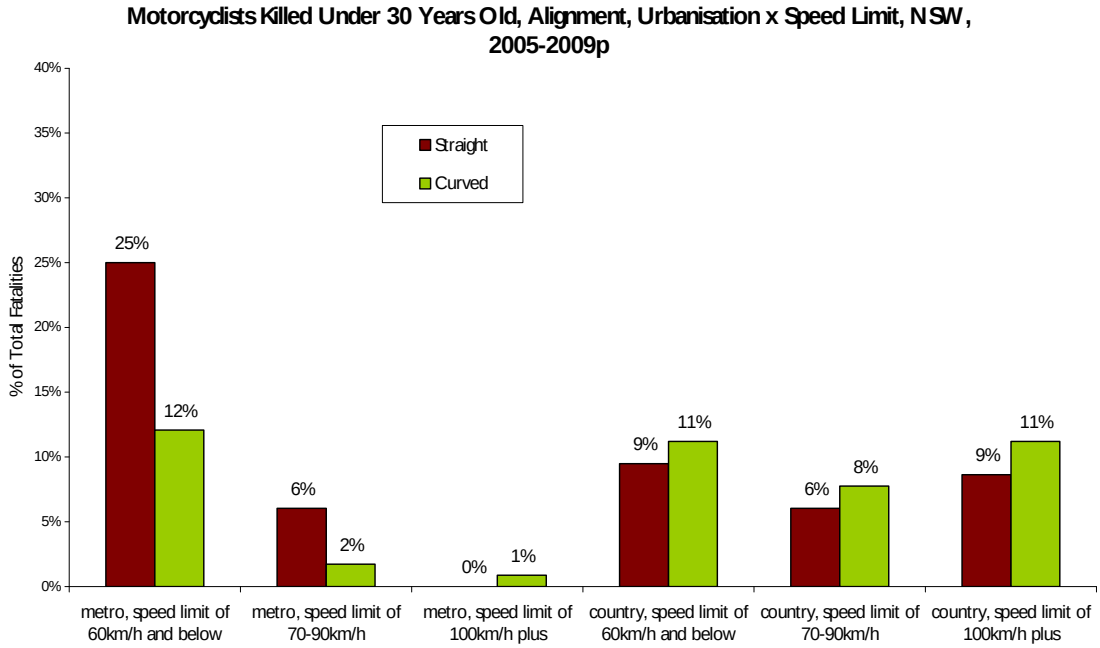


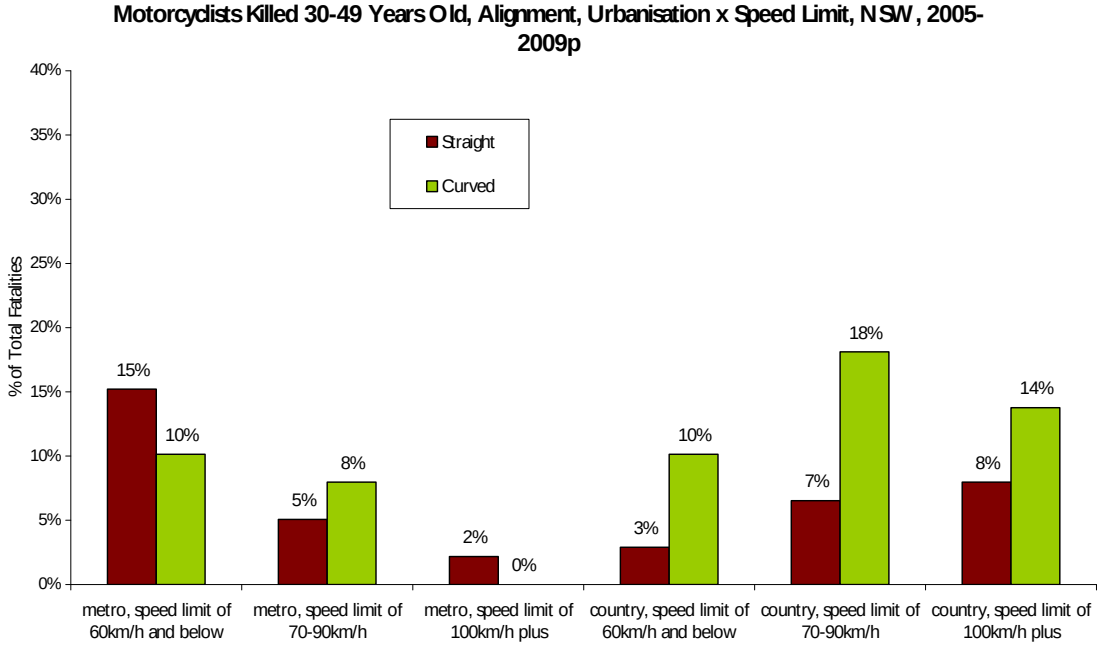
Road Alignment

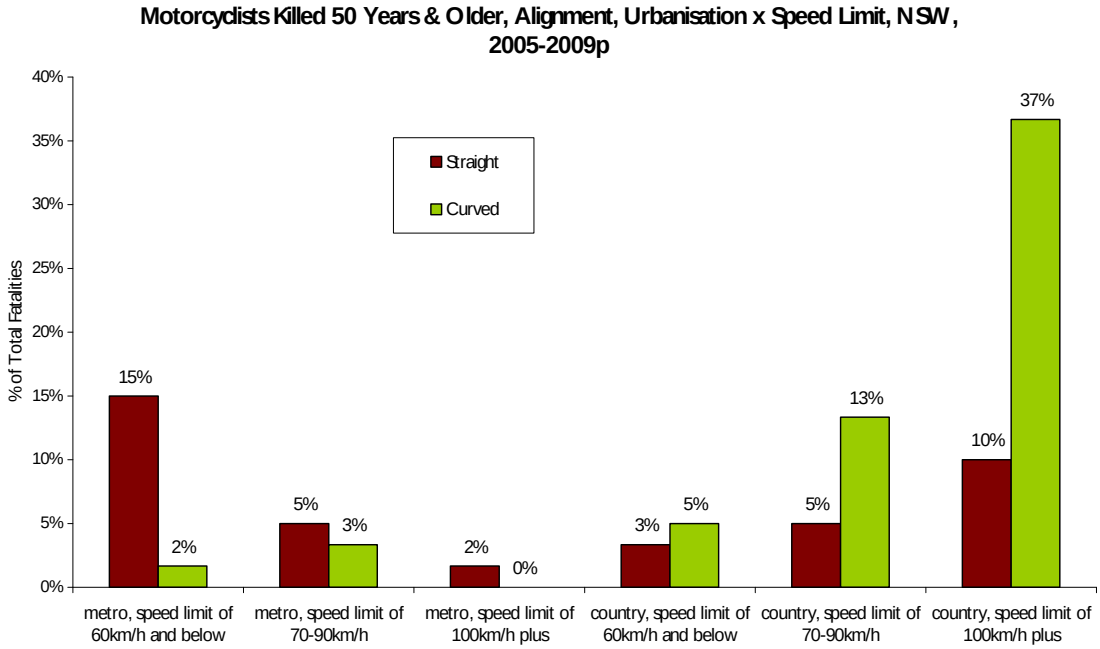
In terms of road alignment, motorcyclist fatalities occur mostly on curved sections of country roads (40%), but also on straight sections of metropolitan roads (25%).



The next three graphs present motorcyclist fatalities by alignment, urbanisation and speed limit, separately for each of the three casualty age groups. A higher proportion of young motorcyclist fatalities occur on straight metropolitan roads with lower speed limits (25%). In contrast, 30-49 year-old motorcyclist fatalities tend to occur on curved country roads (42%). Similarly, older motorcyclists are killed on curved country roads (55%), but more particularly on those with higher speed limits (37%).





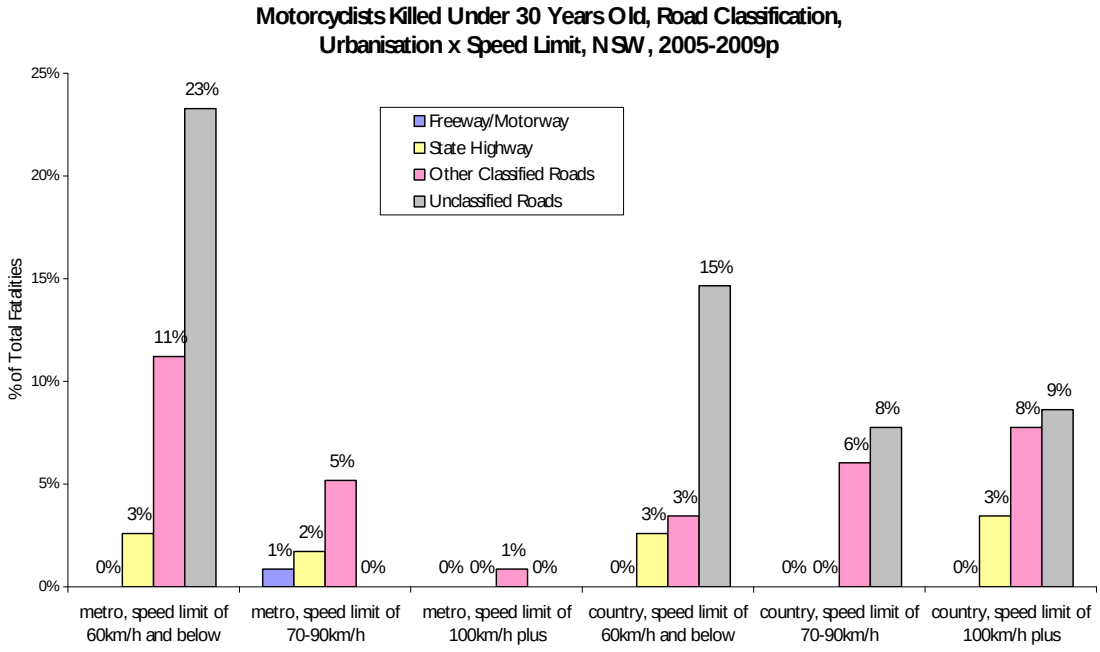


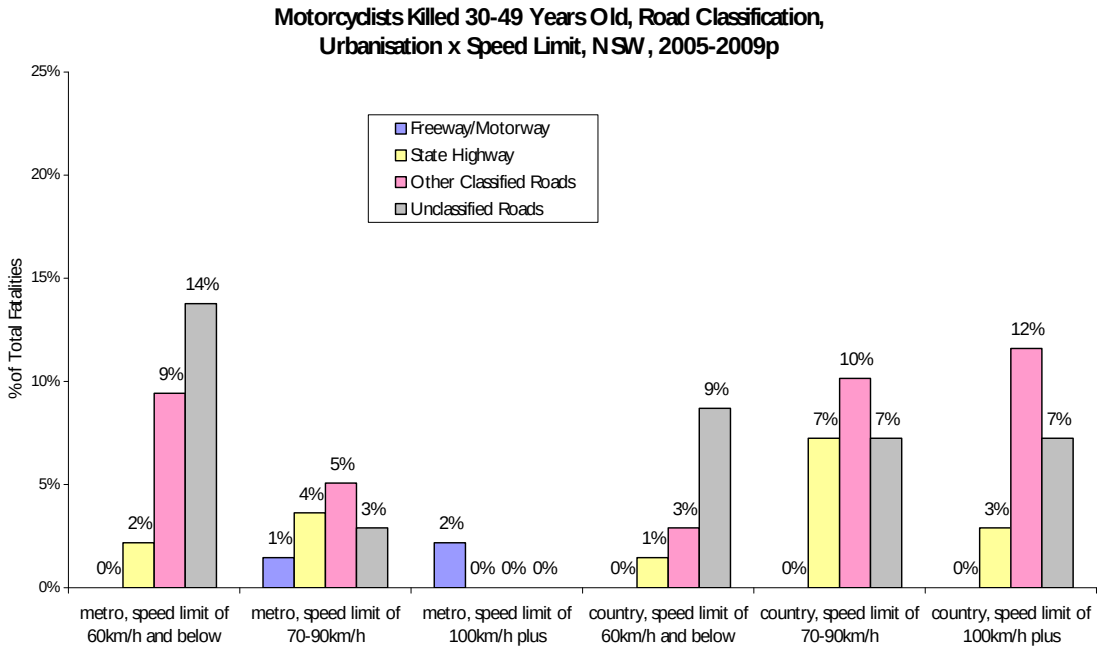
Road Classification

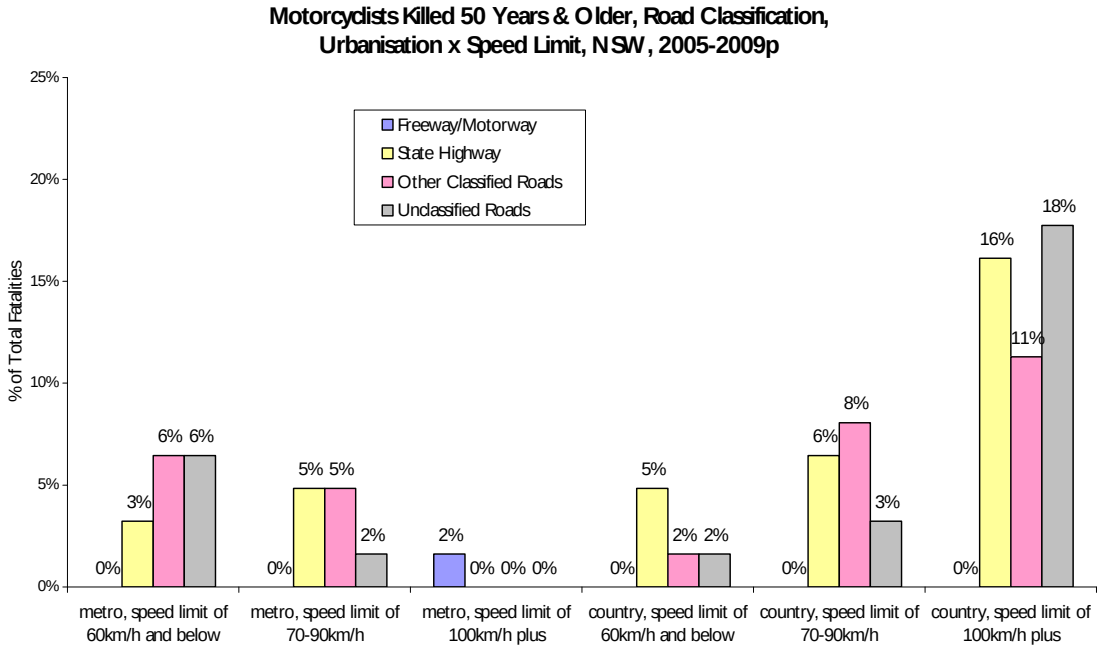
Most motorcyclist fatalities occur on either unclassified roads (44%) or classified roads other than freeways/motorways and state highways (36%).

The following three graphs present motorcyclist fatalities by road classification, urbanisation and speed limit, separately for each of the three age groups. A greater proportion of young motorcyclist fatalities occur on metropolitan unclassified roads with lower speed limits (23%). In contrast, many 30-49 year-old motorcyclists are

killed on country classified roads with mid-range and higher-end speed limits (32%). Older motorcyclist fatalities tend to occur on country unclassified roads with speed limits of 100km/h and above (18%), as well as high speed-limited country area state highways (16%).

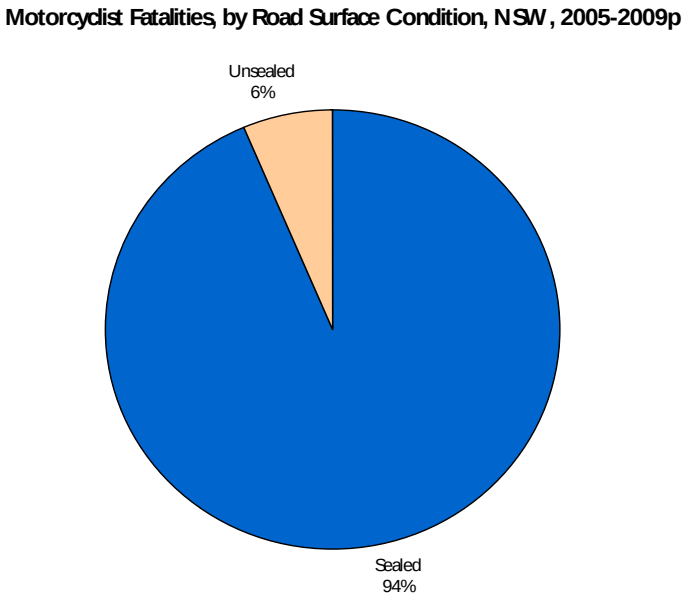






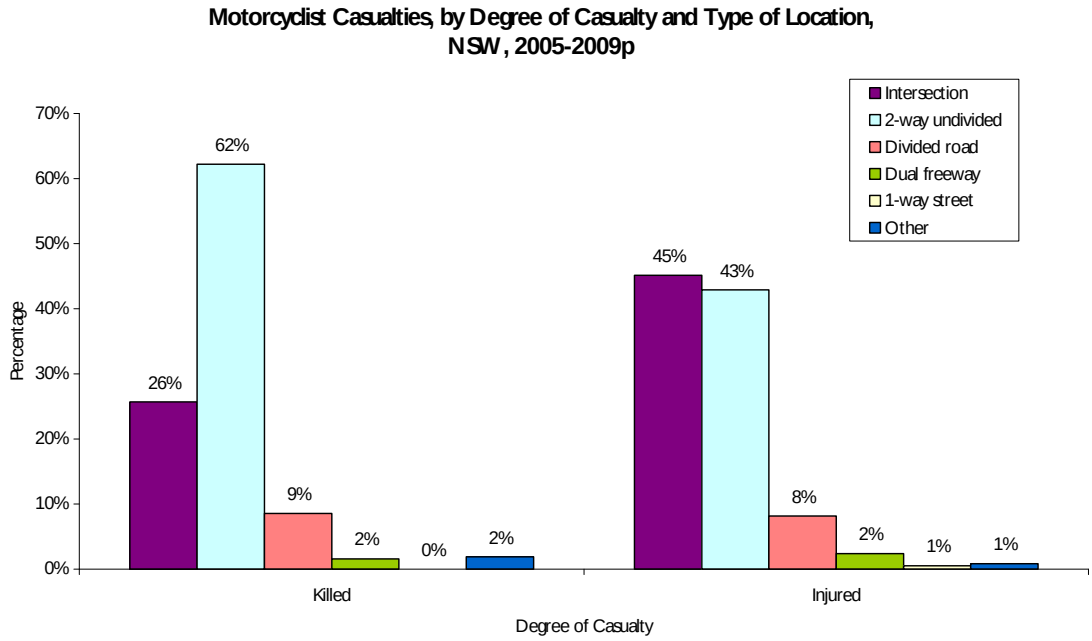
Road Surface Condition

The strong majority of motorcyclist fatalities occur on sealed roads (94%). Consistent with previous age group trends, younger motorcyclist fatalities tend to occur on metropolitan sealed roads with lower speed limits, whereas older motorcyclist fatalities tend to occur on country sealed roads with higher speed limits.

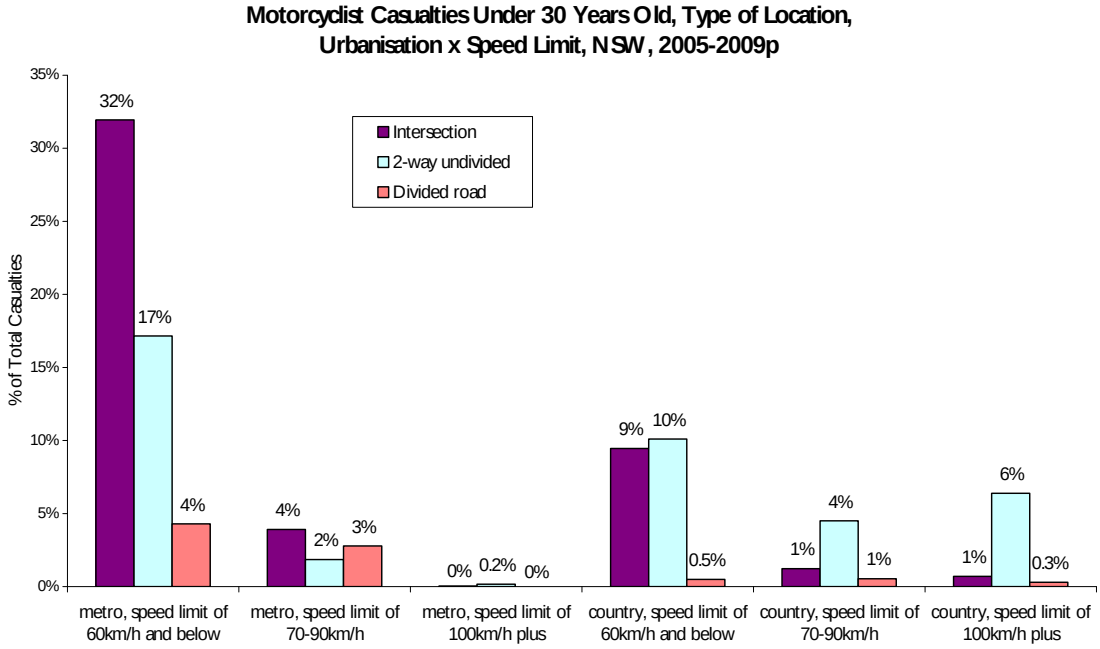


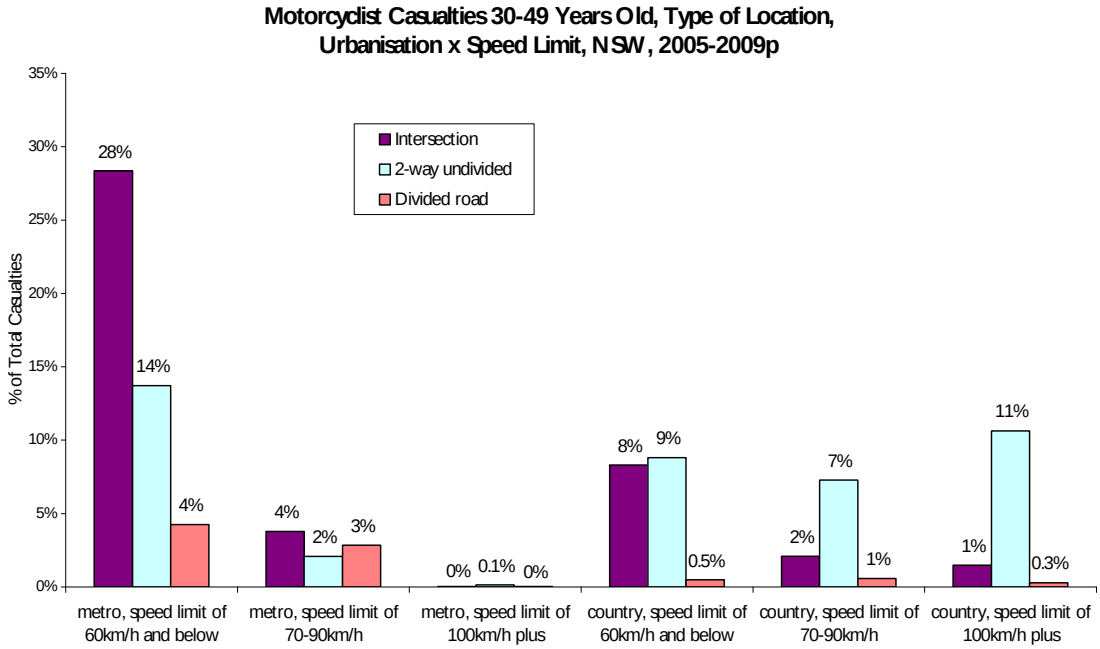
Location Type

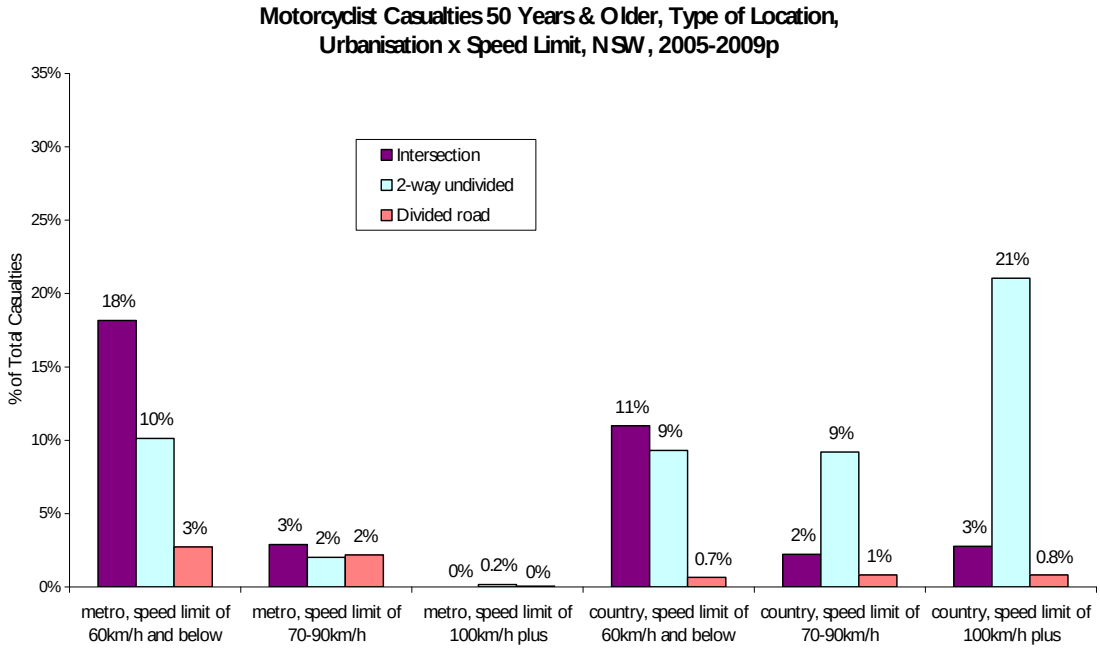
The graph below demonstrates that motorcyclist casualties tend to occur at intersections and on two-way undivided roads – with a strong majority of fatalities occurring on two-way undivided roads (62%).



The following three graphs present motorcyclist casualties by three main location types, urbanisation and speed limit, separately for each of three casualty age groups. A higher proportion of young motorcyclist casualties occur at intersections in metropolitan areas with lower speed limits (32%). This trend is also observed for 30-49 year-old motorcyclist casualties – although casualties in this age group also tend to occur on two-way undivided roads in country areas (27%). In contrast, older motorcyclist casualties tend to occur on two-way undivided country roads (39%), particularly those with higher speed limits (21%).

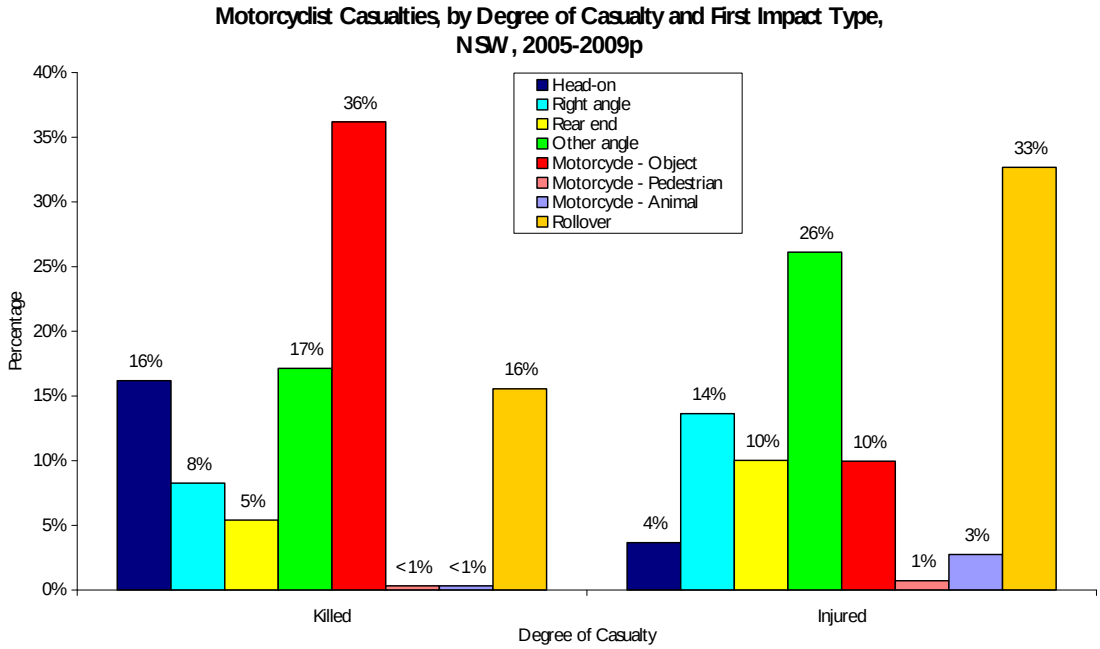






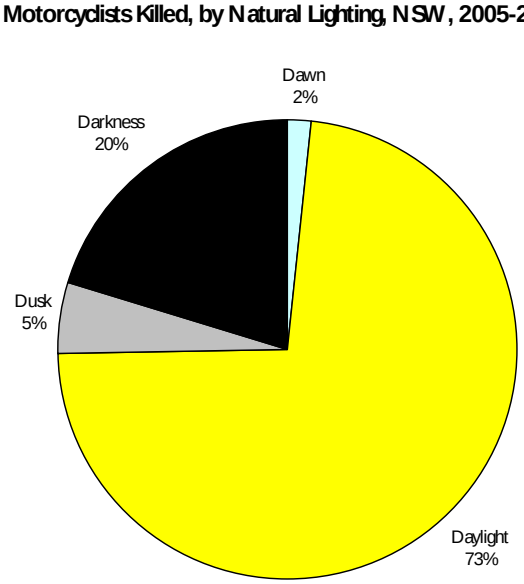
First Impact Type

The graph below presents motorcyclist casualties between 2005 and 2009 by first impact type and degree of casualty. This graph highlights the greater proportion of motorcyclists killed from motorcycle-object crashes (36% of motorcyclist fatalities), and the greater proportion of motorcyclists injured from angle crashes (40% of motorcyclists injured) and rollover crashes (33%).



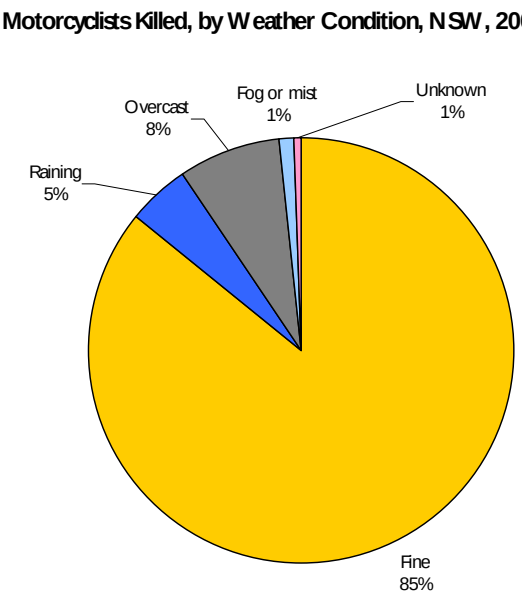
Natural Lighting

Almost three-quarters (73%) of all motorcyclist fatalities occur in natural daylight, compared to only 20% that occur where the natural lighting was darkness.



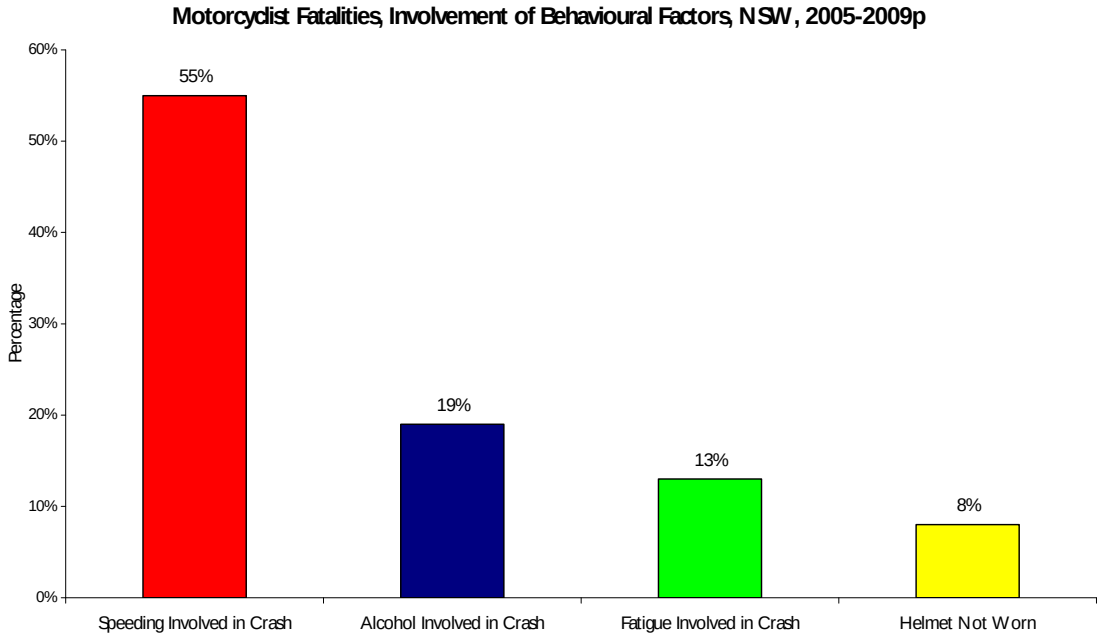
Weather

In terms of weather conditions, the overwhelming majority of motorcyclist fatalities occur in fine weather.



Behavioural Factors

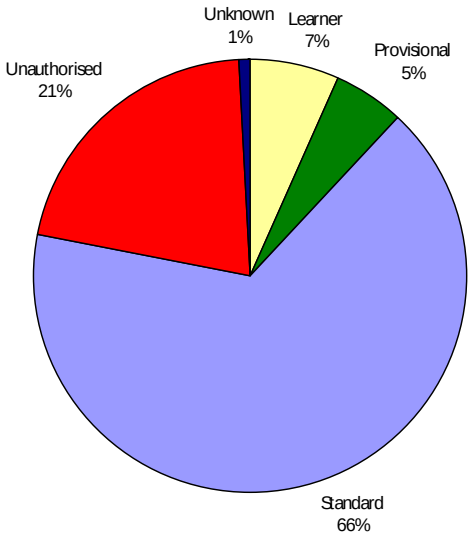
The graph below presents the involvement of behavioural factors in motorcyclist fatalities in NSW. The majority of motorcyclist fatalities between 2005 and 2009 were speed-related (55%), which is much higher than the proportion of speed-related fatalities observed for all NSW road users over the same period (around 40%). Almost 20% of motorcyclist fatalities involved alcohol as a factor, which is similar to the proportion observed for all NSW road users.



Rider Licence Status

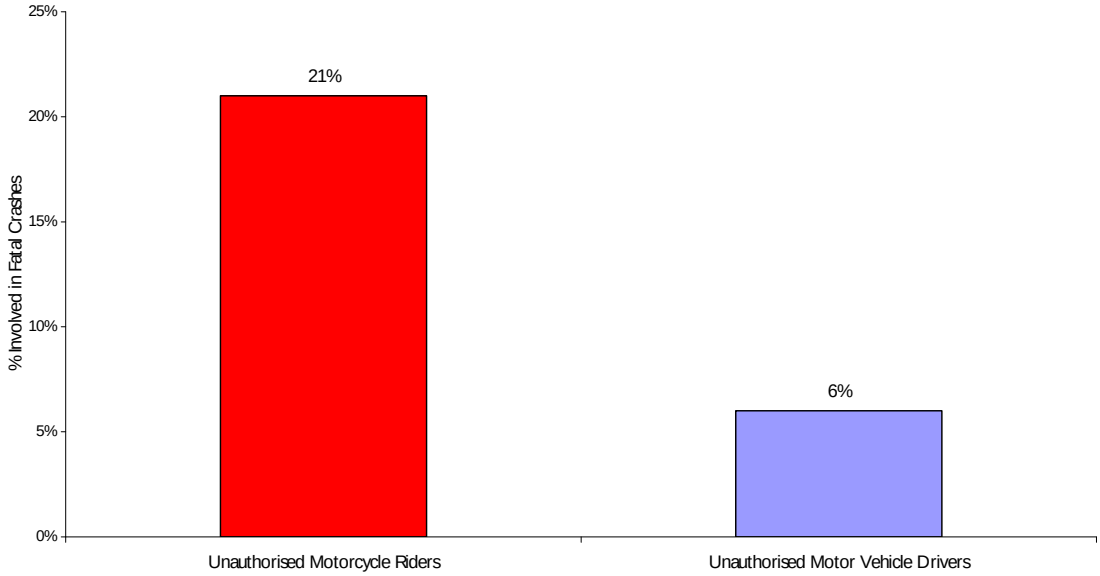
As demonstrated below, the majority of motorcycle riders involved in fatal crashes are standard licence holders – however, more than 20% of riders involved in fatal crashes are holding an unauthorised licence.

Motorcycle Riders Involved in Fatal Crashes, by Licence Status, NSW, 2005-2009p



Unauthorised motorcycle riders are over-represented in fatal crashes when compared to the involvement of unauthorised motor vehicle drivers. The graph below highlights that unauthorised riders are 3-4 times more likely to be involved in a fatal crash than unauthorised drivers.

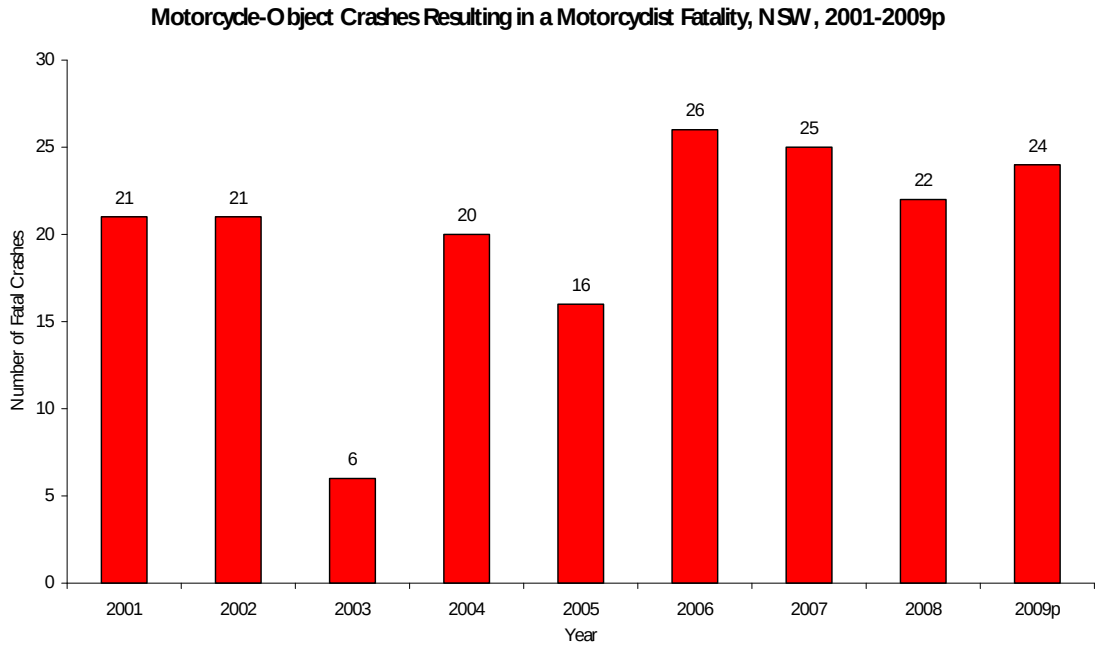
Unauthorised Licence Holders Involved in Fatal Crashes, Motorcycle Riders Versus Motor Vehicle Drivers, NSW, 2005-2009p



Other Issues Relating to Motorcycle Casualties

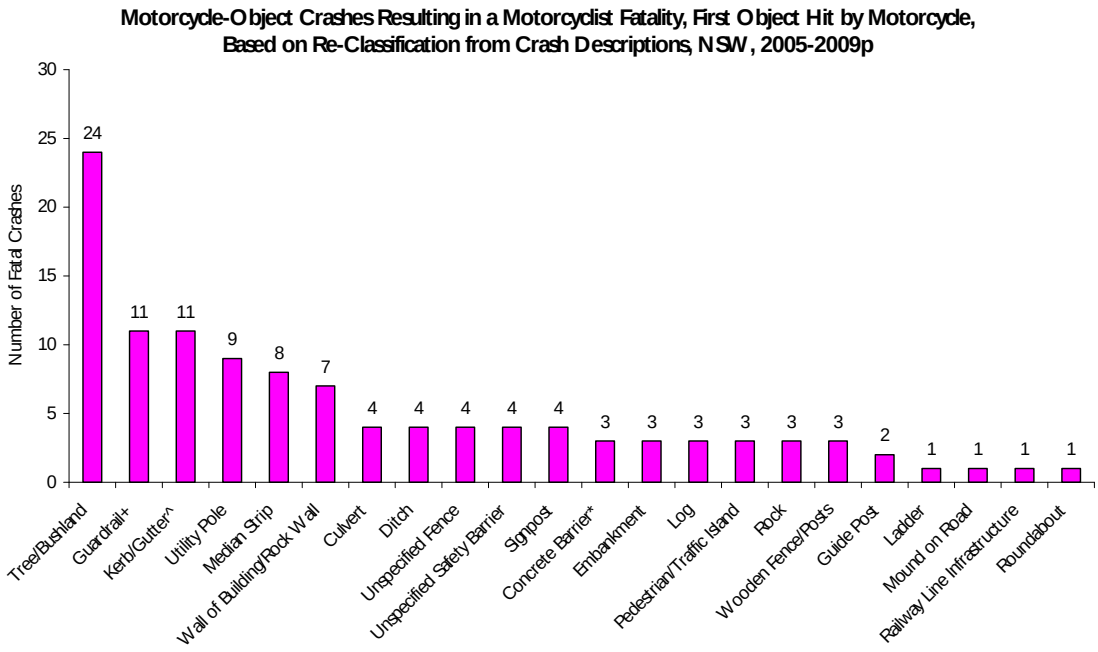
Motorcyclists Killed From Motorcycle-Object Crashes

As demonstrated previously, a high proportion of motorcyclists are killed in motorcycle-object crashes in NSW (36% of all motorcyclist casualties between 2005 and 2009). Thus, this section will examine the specific types of objects hit by motorcycle riders in these crashes. The graph below highlights that motorcycle-object fatal crashes have been increasing since 2003, and annual figures for the last four years are higher than figures observed near the beginning of the decade.



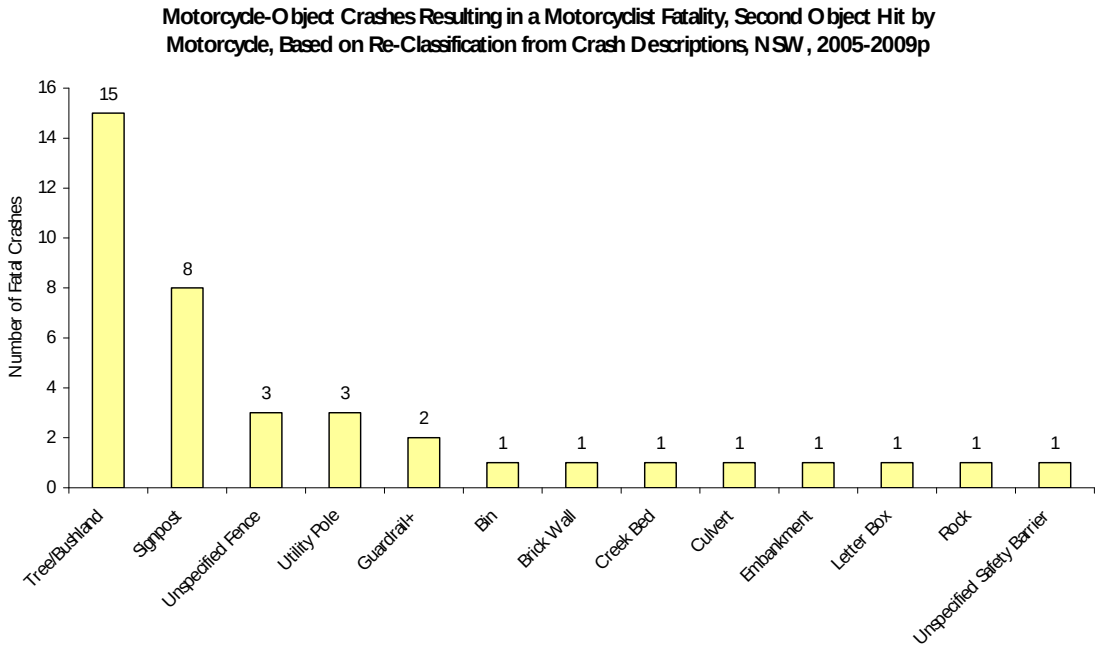
Between 2005 and 2009 there were a total of 113 motorcycle-object fatal crashes. The following two graphs present the number of motorcycle-object fatal crashes, separately for first and second object hit by the motorcycle, based on investigation of narrative data from fatal crash descriptions to ascertain specific objects hit in the crash, and subsequent re-classification of crashes based on this investigation.

Trees stand out as the most frequent object hit in the first impact of a crash, while guardrails and kerb/gutters are the second most frequent objects hit. Utility poles, median strips and walls are also hit often in the first impact of these fatal crashes. Also of note, there were no motorcycle-object fatal crashes involving a first impact with a wire rope safety barrier.



+ Includes objects described as "Armco Barrier"
^ Not coded in Crashlink, and derived directly from crash descriptions
** Includes objects described as "Jersey Barrier"*

Of the 113 motorcycle-object fatal crashes between 2005 and 2009, 39 involved a second object being hit in the crash. Again, trees are the most frequent second object hit in a crash. Signposts also seem to be hit often in the second impact of these fatal crashes. Again, there were no motorcycle-object fatal crashes involving a second impact with a wire rope safety barrier.

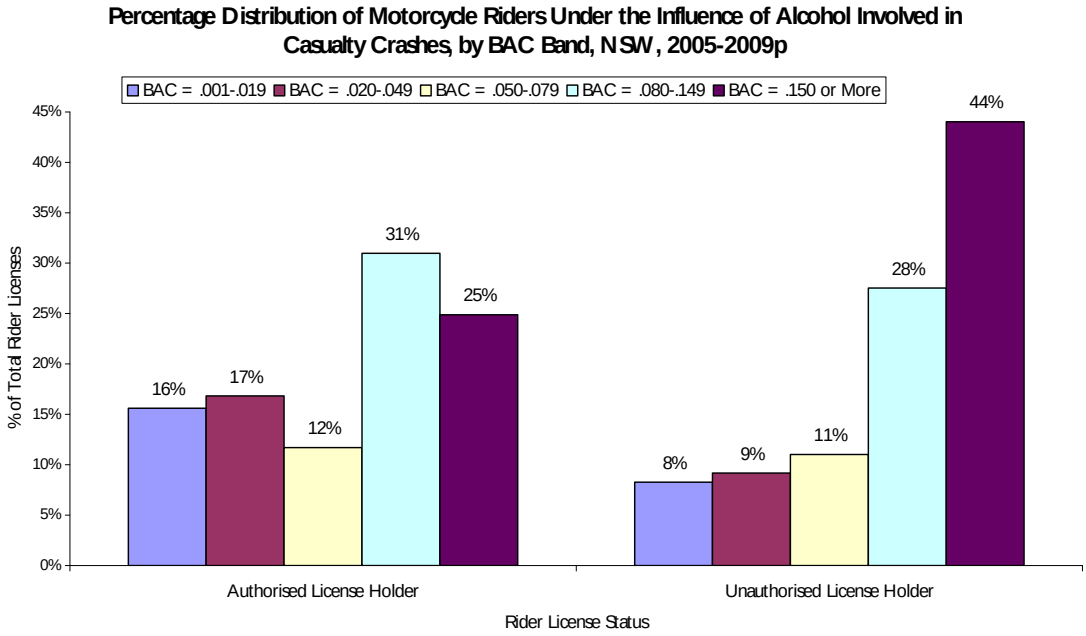


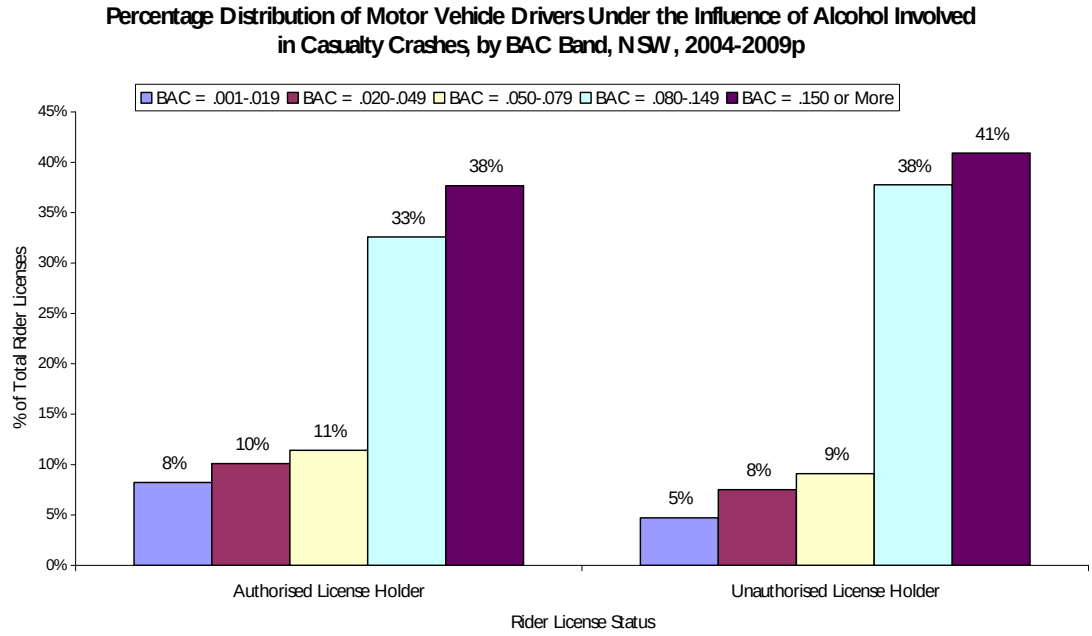
+ Includes objects described as "Armco Barrier"

Alcohol Involvement of Authorised and Unauthorised Motorcycle Riders in Casualty Crashes

The over-representation of unauthorised motorcycle riders involved in fatal crashes has been highlighted earlier. The graphs below present the proportion of authorised and unauthorised license holders under the influence of alcohol involved in casualty crashes by BAC band between 2004 and 2009p, presented separately for motorcycle riders and motor vehicle drivers. The first graph demonstrates an over-representation of the casualty crash involvement of unauthorised motorcycle riders under the influence of alcohol in the highest BAC band (44% compared to 25% for authorised riders). These data suggest that unauthorised motorcycle riders may simply disregard enforced BAC thresholds given that they are already breaking the law.

Alternatively, compared to unauthorised riders, almost twice as many *authorised* motorcycle riders under the influence of alcohol are involved in casualty crashes in *lower-end* BAC bands (33% compared to 17% for unauthorised riders). The second graph shows that fewer authorised motor vehicle drivers under lower levels of alcohol are involved in casualty crashes, when compared with authorised riders – this suggests that lower-level alcohol involvement is a relevant factor for authorised motorcycle riders.





Summary of Main Features

The present analysis demonstrates that the key features of motorcycle trauma in NSW include motorcyclist casualties that:

- Are predominantly male
- Mostly occur on straight metropolitan roads or curved country roads
- Are more likely to occur on weekends between 12pm and 4pm (particularly 30-49 year-olds in country areas)

In addition, the following issues appear particularly relevant to motorcycle trauma:

- Motorcyclist casualties from motorcycle-object crashes, particularly those involving trees and bushland
- Crash data suggests that motorcycle riders under the influence of currently legal levels of alcohol have a disproportionately high casualty crash involvement rate compared to motor vehicle drivers

This analysis also highlighted three key casualty age groups (under 30 year-olds, 30-49 year-olds, and 50 year-olds and over), with the following characteristics observed:

- Young motorcyclist fatalities (under 30 years) tend to occur on metropolitan roads with lower speed limits (particularly at intersections)
- 30-49 year-old motorcyclist fatalities tend to occur on country roads (particularly classified roads)
- Older motorcyclist fatalities (50 years and above) tend to occur on country roads with higher speed limits (particularly two-way undivided curved roads)

3.3 Bicycle - Casualty Trends

The following report details the investigation of the RTA crash database with respect to the STAYSAFE terms of reference (b) and (c)

Scope of the Analysis

This analysis of pedal cycle fatality and injury data covers

- an extended historical overview of the NSW road toll, especially with regard to the levels of pedal cycle trauma,
- recent and historic trends for pedal cycle trauma in the metropolitan and non metropolitan areas
- characteristics and factors involved in pedal cycle trauma for the most recent five year period 2005 to 2009p

As at the time of this analysis the 2009 pedal cycle casualty data are preliminary and incomplete. The data are therefore subject to change.

Definitions

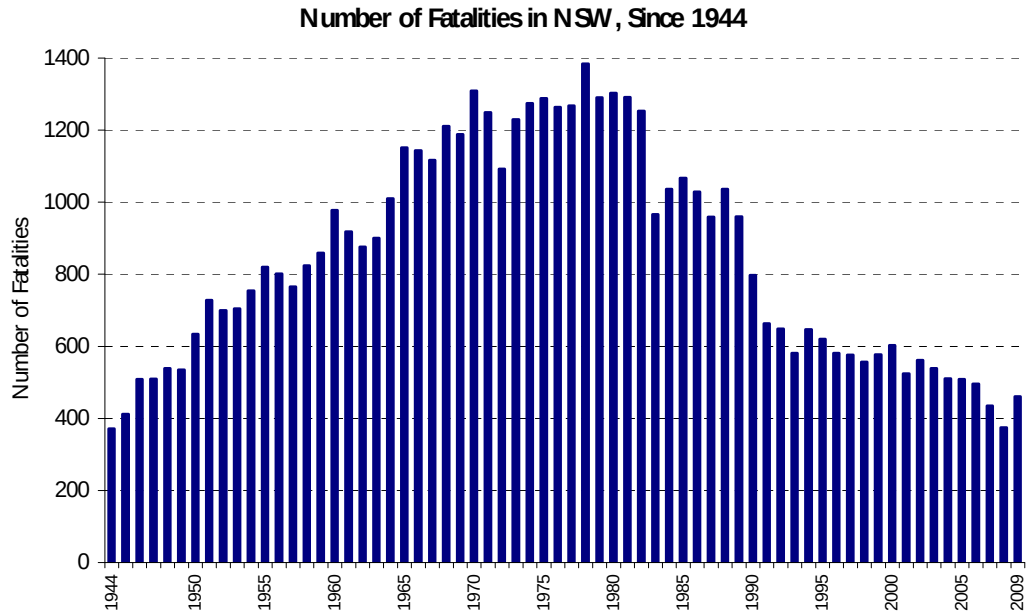
Only crashes which are reported to the Police and in which at least one person has been killed or injured, or at least one vehicle has been towed away are recorded in the RTA crash database. A fatality is a person who dies within 30 days of a crash from injuries received in the crash. For the purposes of this analysis the metropolitan area is defined as the Sydney, Newcastle and Wollongong metropolitan areas and the country area as the rest of NSW.

Note that these statistics are based on the reported crashes contained in the RTA crash database. Based on studies of hospital trauma it is believed that pedal cycle casualties in NSW are under-reported to the NSW Police and therefore the RTA crash database. This may be due to the fact that many involve children and that many pedal cycle incidents may involve the pedal cycle only or an unidentified motor vehicle. This under-reporting is offset by the fact that the hospital data includes pedal cycle incidents which are off road and therefore would not be included in the official crash statistics under the National guidelines for reporting road crashes.

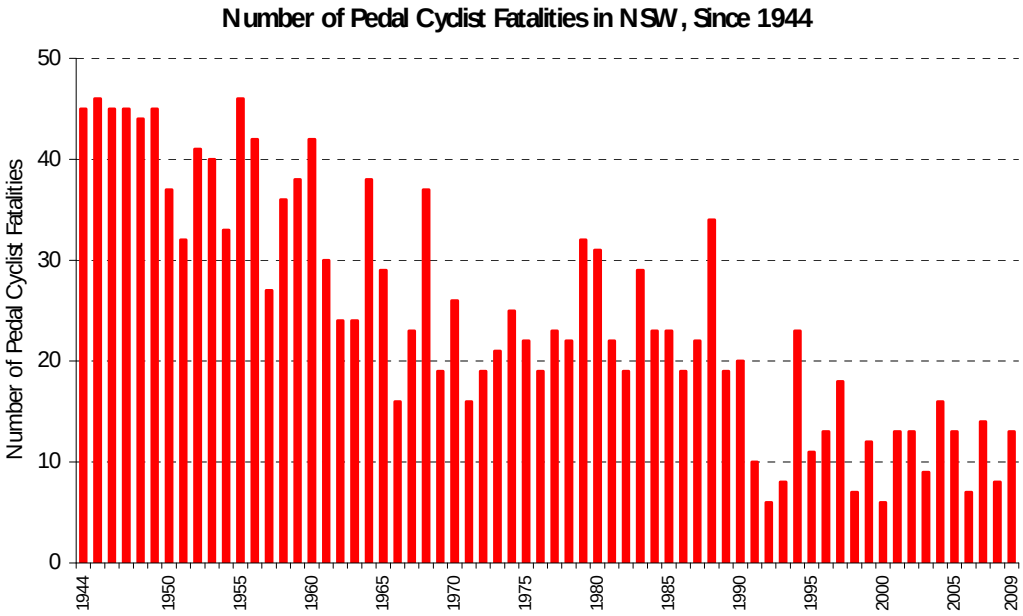
Historical Road Trauma Trends

There were a total of 460 persons killed in NSW in 2009 (provisional figure as at 1 January 2010), 86 (23%) more fatalities than 2008, the first annual increase since 2002. The 2009 road toll was still the third lowest annual road toll since 1945. It should be noted that the 2008 was the lowest annual total since 1944.

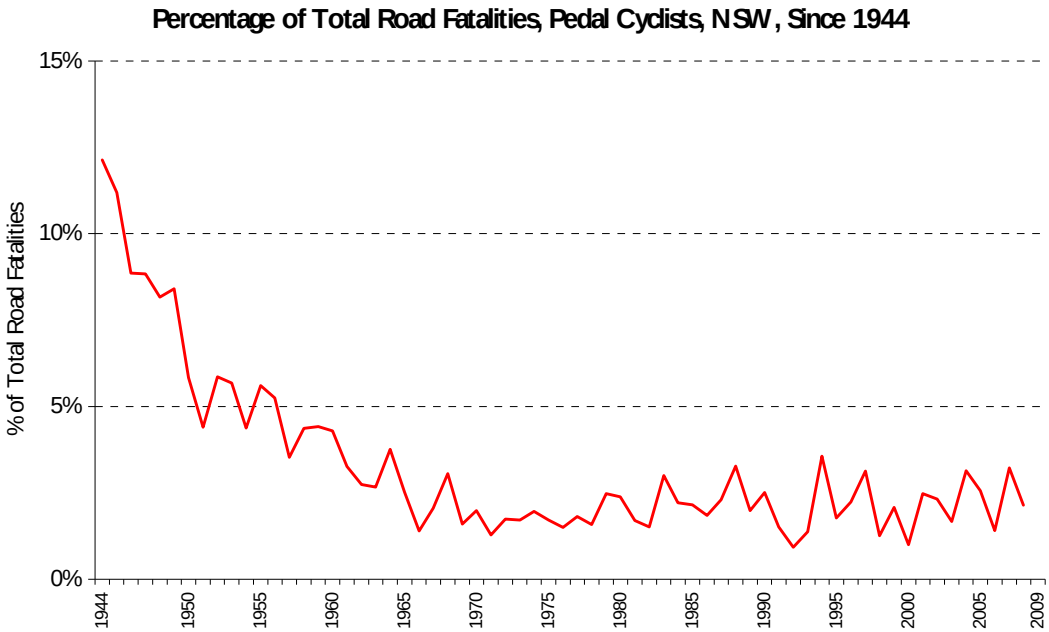
From a peak of 1,384 fatalities in 1978, the road toll had fallen by 67% by 2009.



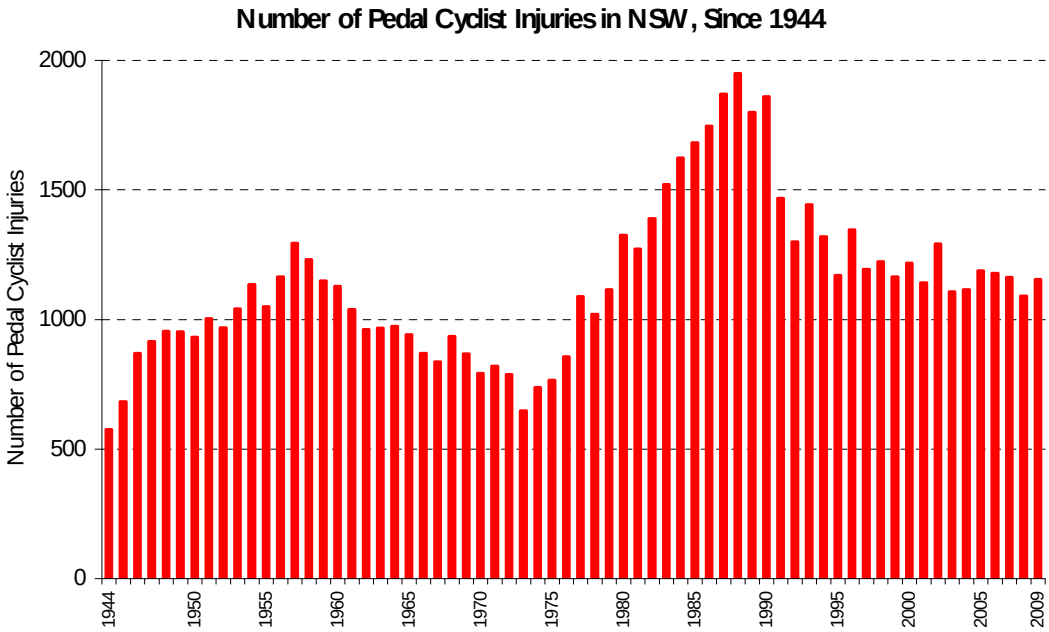
Historically, pedal cycle trauma has been a relatively small component of overall trauma levels in NSW. The reduction in pedal cyclist fatalities since the 1980s has been a major contributor to this overall reduction of the NSW road toll. In 2009 there were 13 pedal cyclists killed in NSW, five (63%) more fatalities than 2008. Since pedal cyclist fatality numbers are relatively small they are therefore subject to relatively high levels of statistical variability. The lowest number of pedal cyclist fatalities since at least 1944 occurred in 2000 and 1992 (both with six fatalities).


Number of Pedal Cyclist Fatalities in NSW, Since 1944
Number of Pedal Cyclist Fatalities
50
40
30
20
10
0
1944
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2009

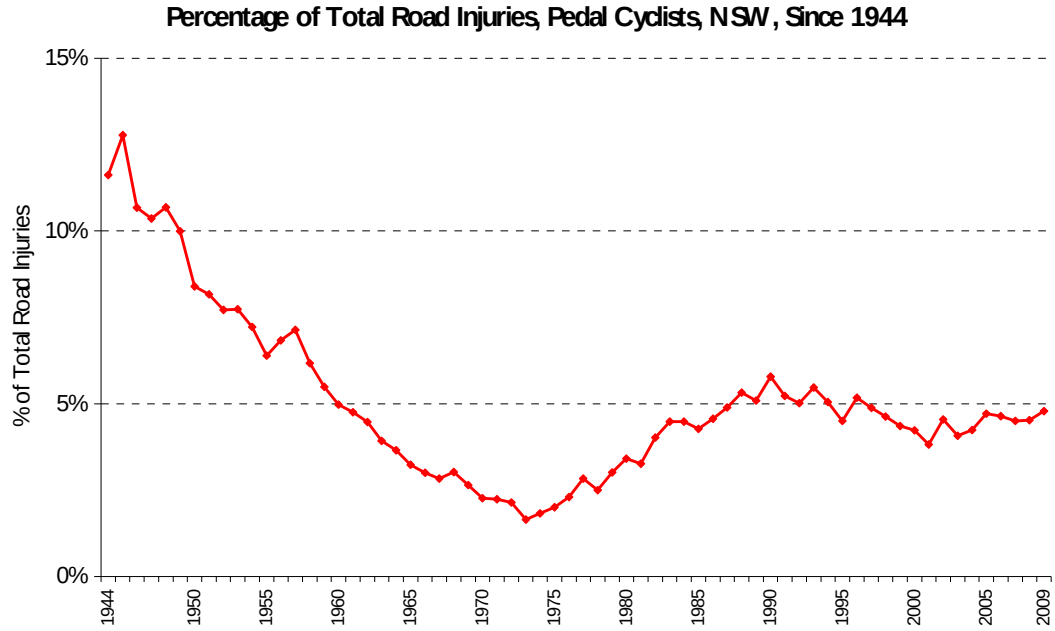
Consequently, the proportion of the road toll comprising pedal cyclists has declined over the same period, accounting for around one in ten road fatalities at the end of WWII, declining to around one in 50 road fatalities from the 1970s. Pedal cyclists accounted for less than 3% of all road fatalities in 2009.



The trends for pedal cyclist injuries have not been similar. Injuries rose after WWII, peaking in the mid 1950s before declining until the 1970s. Thereafter there was an increasing trend until the late 1980s, peaking at 1,949 injuries in 1988. There was a sudden drop in pedal cyclist injuries at the start over the 1990s followed by a gradual decreasing trend through to 2009.



Consequently, the proportion of total injuries comprising pedal cyclist has declined over the same period, accounting for around one in ten road injuries in the late 1940s, declining to around one in 50 road injuries in the early 1970s and then rising to one in 20 road injuries since the 1990s.

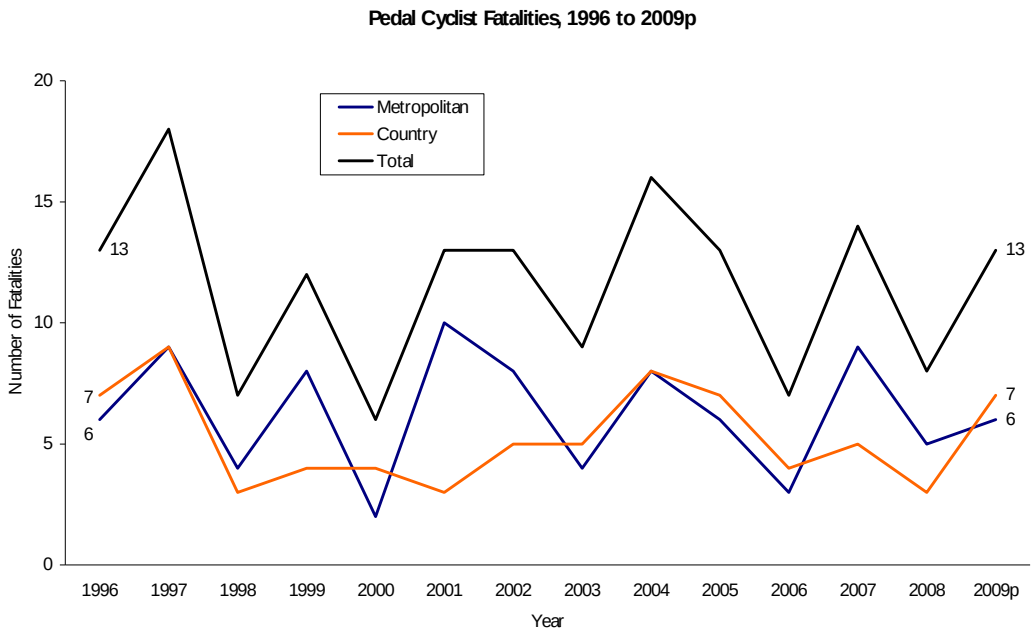


During the first seven months of 2010, there were 252 deaths on NSW roads (preliminary figure), the same number of fatalities as for the same period in 2009. Pedal cycle fatalities decreased during this seven month period, down by 30%, from 10 in 2009 to 7 in 2010.

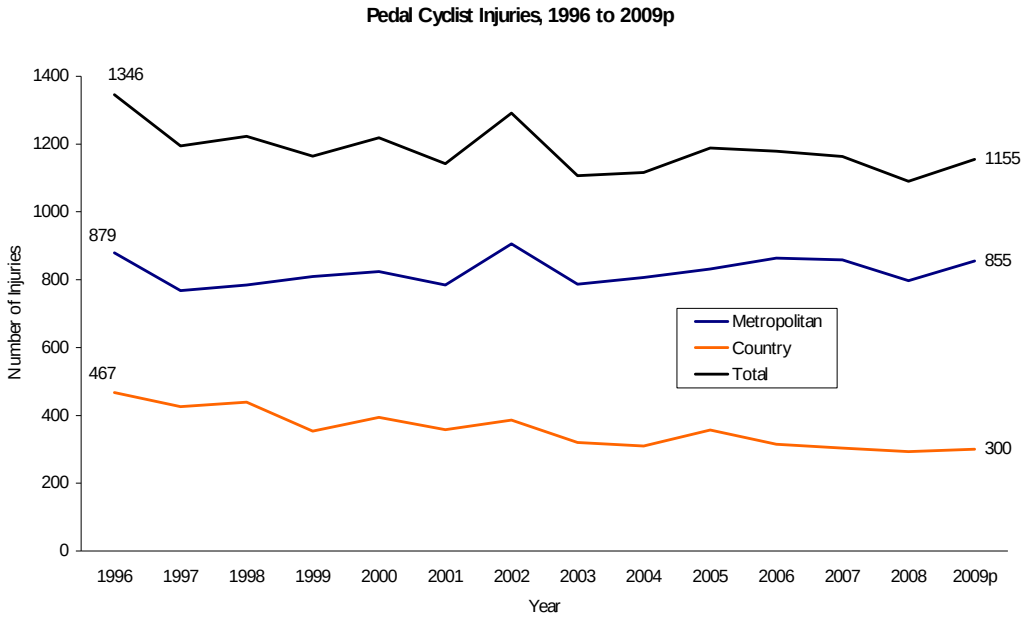
Trends in NSW Pedal Cyclist Casualties by Urbanisation Since 1996

Since 1996, the majority of pedal cyclist fatalities and pedal cyclist injuries have tended to occur in the metropolitan areas.

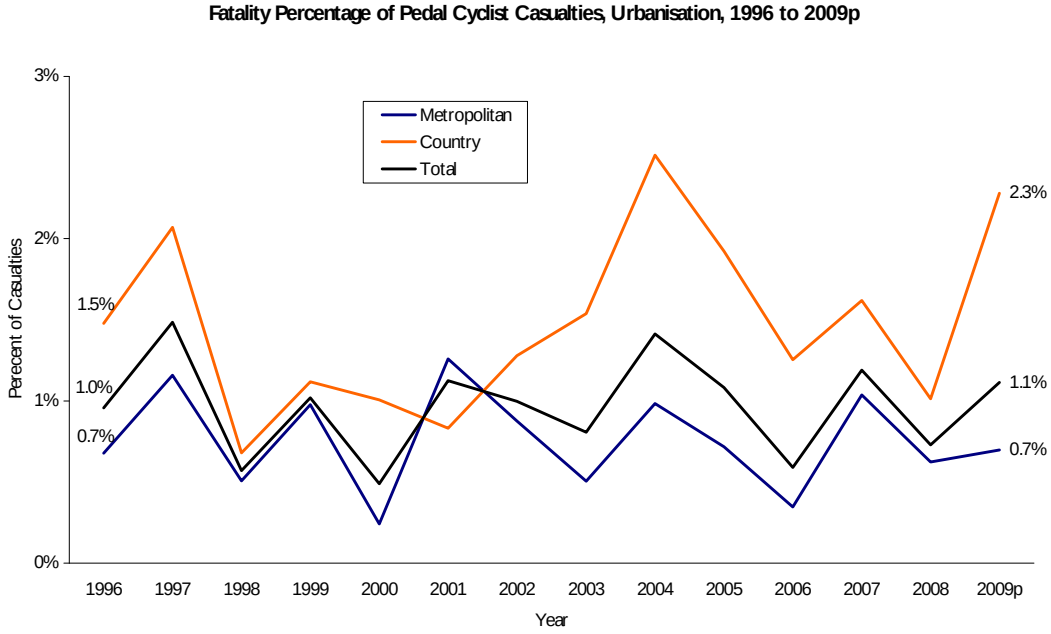
Over the period 1996 to 2009, just over half of all pedal cyclist fatalities (54%) occurred in the metropolitan areas, though in 2009 only six of the 13 fatalities occurred in these areas.


Pedal Cyclist Fatalities, 1996 to 2009p
Metropolitan
Country
Total
Number of Fatalities
Year
20
15
10
5
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009p
13
7
6
13
7
6

For pedal cycle injuries there was a higher representation in the metropolitan areas – almost 70% of injuries during the period 1996 to 2009 occurred in these areas. Furthermore, it is clear that it has been the country areas that have largely contributed to the reductions in pedal cyclist injuries over this period – injuries decreased from 467 to 300 in the country areas, but decreased only slightly from 879 to 855 in the metropolitan areas.



The severity of pedal cyclist trauma differs slightly across urbanisation, with around 1 in 130 metropolitan casualties resulting in a fatality during the period 1996 to 2009, compared with 1 in 70 non country casualties resulting in a fatality. With the country areas tending to have higher posted speed limits, as well as these areas perhaps having longer emergency service response times, a higher risk of a fatality outcome is not unexpected.



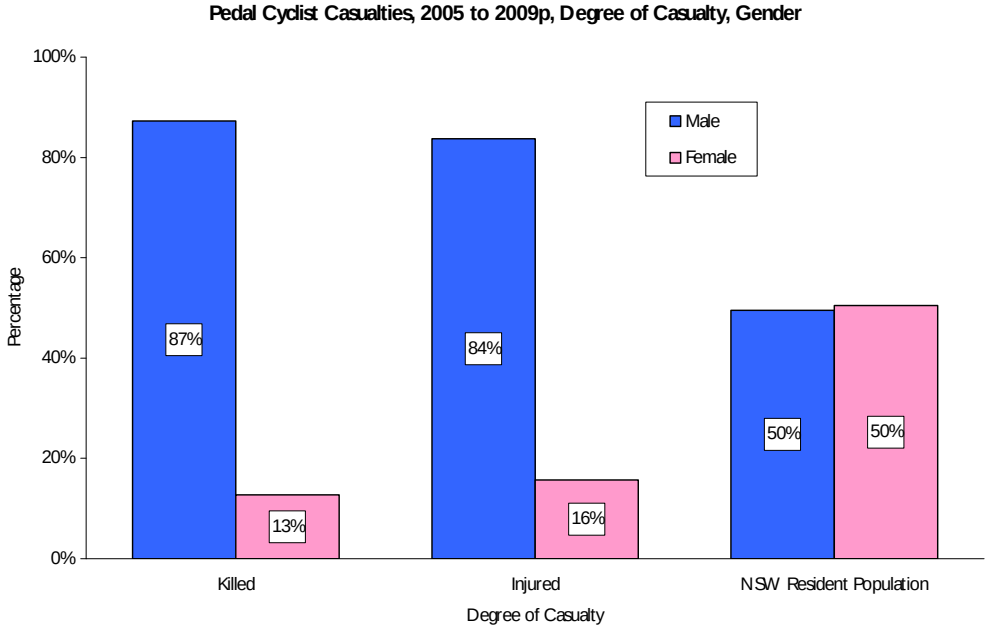
3.4 Bicycle Casualties – Underlying Factors / Characteristics of Pedal Cyclist Fatalities and Injuries, 2005 to 2009p

During the five year period 2004 to 2009p there were a total of 5,830 pedal cycle casualties, of which 55 were fatalities and 5,775 were injuries.

Tables detailing the characteristics of pedal cyclist fatalities and injuries for the most recent five year period (2005 to 2009p) are found in Appendix 3. These tables cover gender, age, location type, speed limit, road classification, pedal cyclist controls, day of week, time of day, Mclean period, natural lighting, weather, first impact, type of crash, pedal cyclist manoeuvre, pedal cyclist error and blood alcohol concentration.

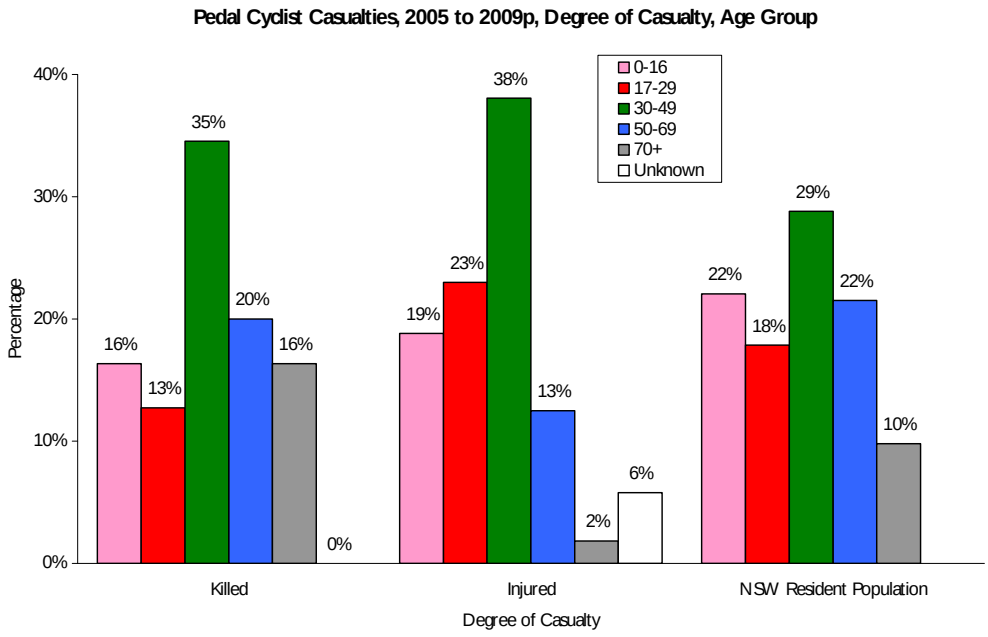
Gender

Despite comprising just under half of the NSW resident population, males account for the overwhelming majority of pedal cyclist fatalities (87%) and pedal cyclist injuries (84%).



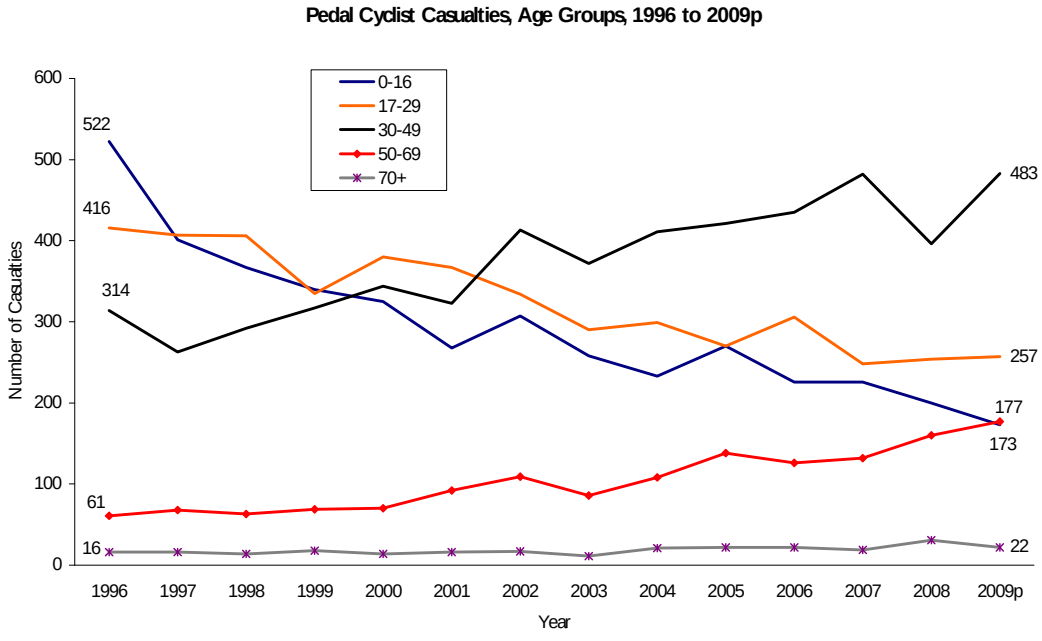
Age Group

The middle-aged are over-represented in pedal cyclist trauma. With around 29% of the NSW resident population, the 30 to 49 year old age group accounts for more than one-third (35%) of all pedal cyclist fatalities and more than one-third (38%) of all pedal cyclist injuries. The elderly are also over-represented amongst pedal cyclist fatalities – 16% of all fatalities are aged 70 years or more, compared with 10% of the population. However, this elderly age group accounts for only 2% of all pedal cycle injuries, suggesting that frailty is probably the factor accounting for the over-representation of elderly amongst pedal cycle fatalities.



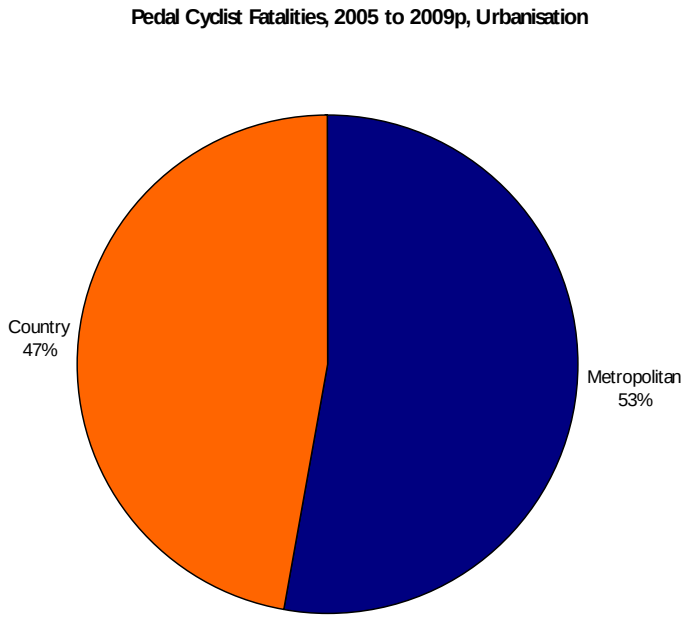
Surprisingly, children aged under 17 years are under-represented amongst pedal cycle casualties. This age group accounted for 16% of all fatalities and 19% of all injuries for the five year period 2005 to 2009 but represented 22% of the NSW resident population. As mentioned previously, this younger age group may be subject to high levels of under-reporting in the crash database.

Demographic shifts and changes in bicycle usage may partly explain this result. Since 1996, there has been a very strong downward trend amongst young pedal cycle casualties aged under 17 years and aged 17 to 29 years. Between 1996 and 2009, casualties in the youngest age group decreased by two-thirds whilst casualties aged 17 to 29 years decreased by more than one-third. Over the same period there have been significant increases in pedal cycle casualties amongst the middle-aged groups.

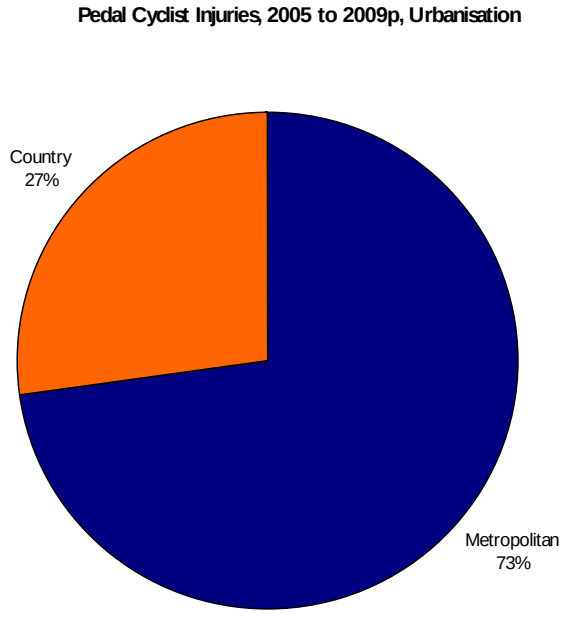


Urbanisation

Whilst the majority of all road deaths in NSW, around two-thirds of all deaths, occur on country roads, just over half (53%) of pedal cycle fatalities occurred on metropolitan roads.



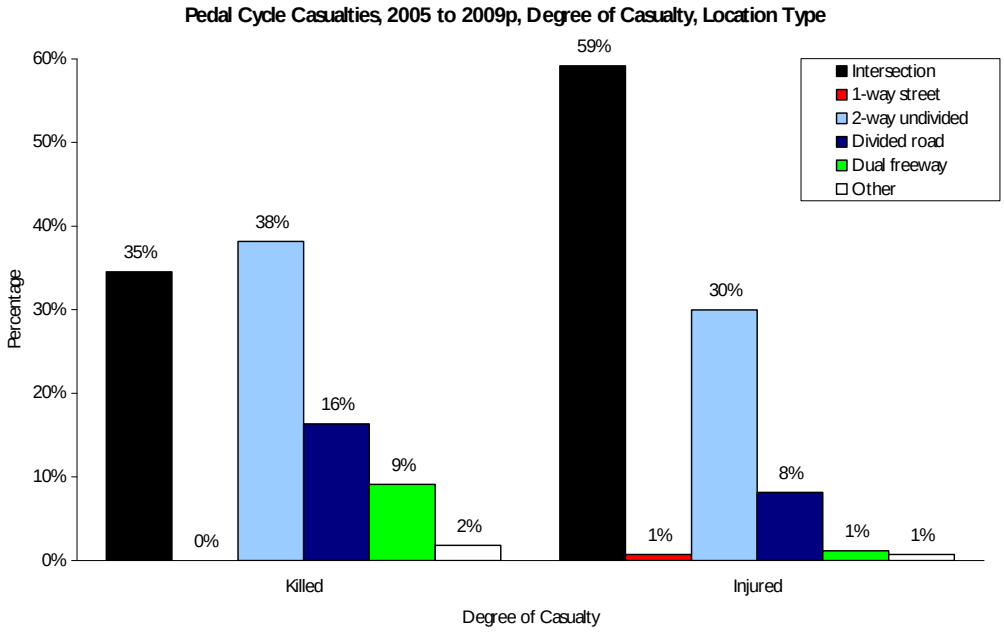
Almost three-quarters of all pedal cycle injuries occur on metropolitan roads.



Location Type

The majority of fatalities occur at mid-block locations, with 38% of all fatalities occurring at mid block locations on 2 way undivided roads and a further 25% of all fatalities occurring at mid block locations on divided roads or dual carriageway

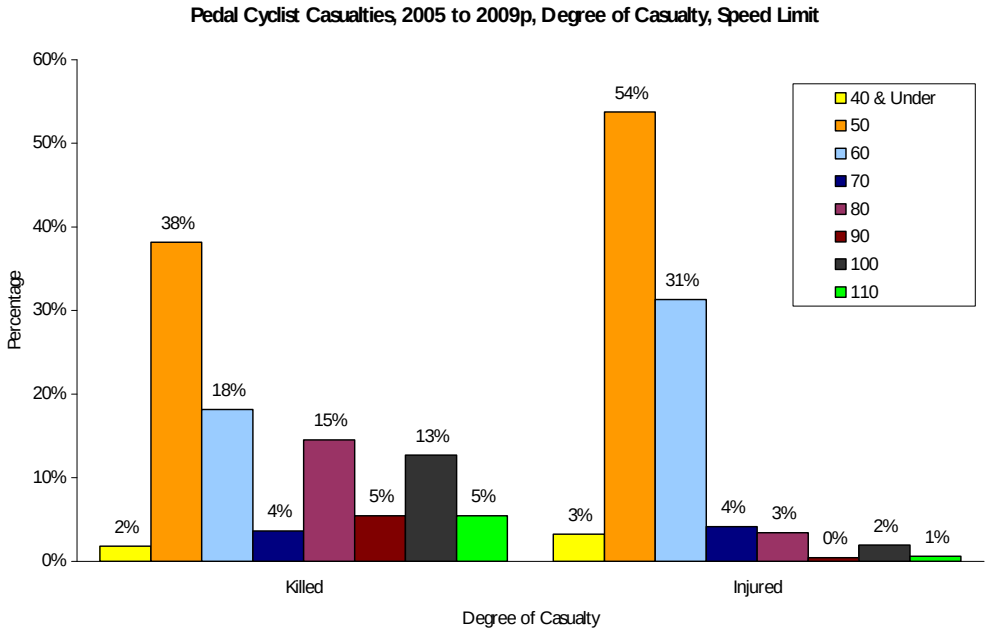
freeways. In contrast, nearly 60% of all injuries occur at intersections, whilst only 1% occur on dual carriageway freeways.



The high pedal cycle fatality rate on dual carriageway freeways (one in 15 casualties are fatalities compared with one in 106 on all roads) highlights the vulnerability of pedal cyclists in high speed environments.

Posted Speed Limit

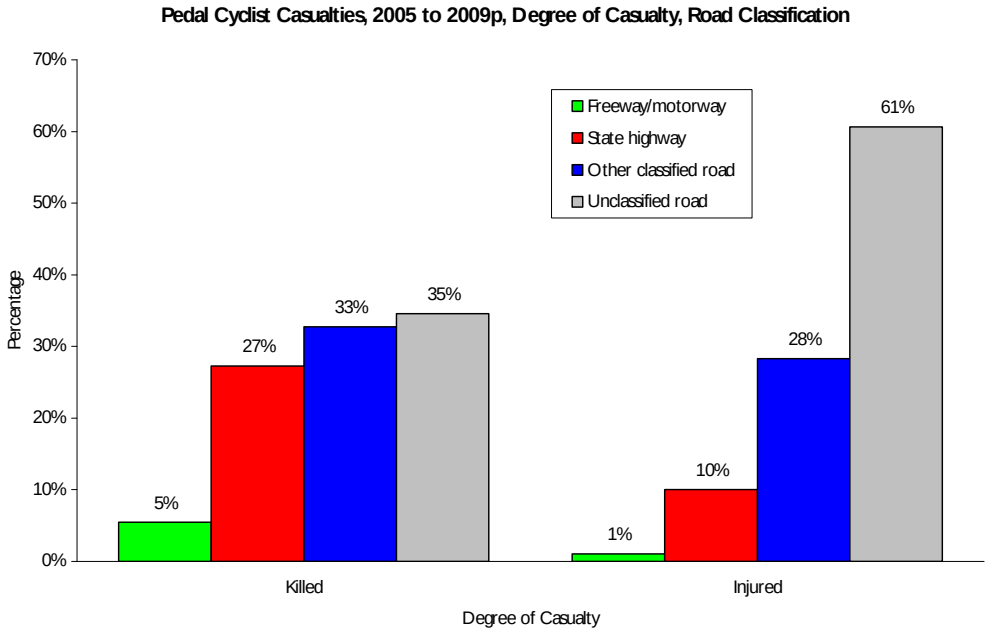
Most pedal cyclist casualties occur in 50 km/h or 60 km/h speed zones with the largest percentage of pedal cyclist injuries (54%) occur in 50 km/h speed zones. It should be noted that the general urban speed limit of 50 km/h was introduced in NSW in November 2003, though 50 km/h speed zones were quite widespread prior to this date.



Amongst pedal cyclist casualties, fatalities are over-represented in the higher posted speed zones. The proportion of fatalities in a 80 km/h zones or more (38%) is nearly six times that for pedal cyclist injuries (6%). For higher speed zones (100 km/h and 110 km/h) the disparity is even greater – 18% of all fatalities occur in 100 km/h zones compared with only 2.5% of all injuries.

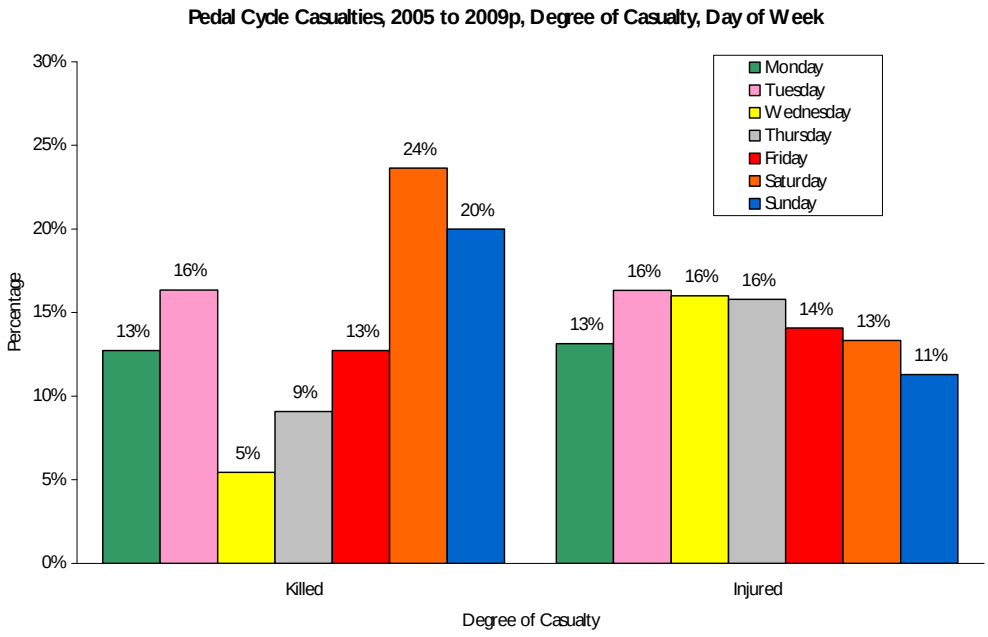
Road Classification

Local roads (unclassified roads) account for the largest percentage of pedal cyclist fatalities (35%) and the majority of injuries (61%). At the same time, one in three fatalities (32%) occur on Freeways/Motorways/State Highways but these high level roads account for only 11% of all injuries. This result is not surprising given that local roads tend to have lower posted speed limits and Freeways/Motorways/State Highways tend to have higher posted speed limits.



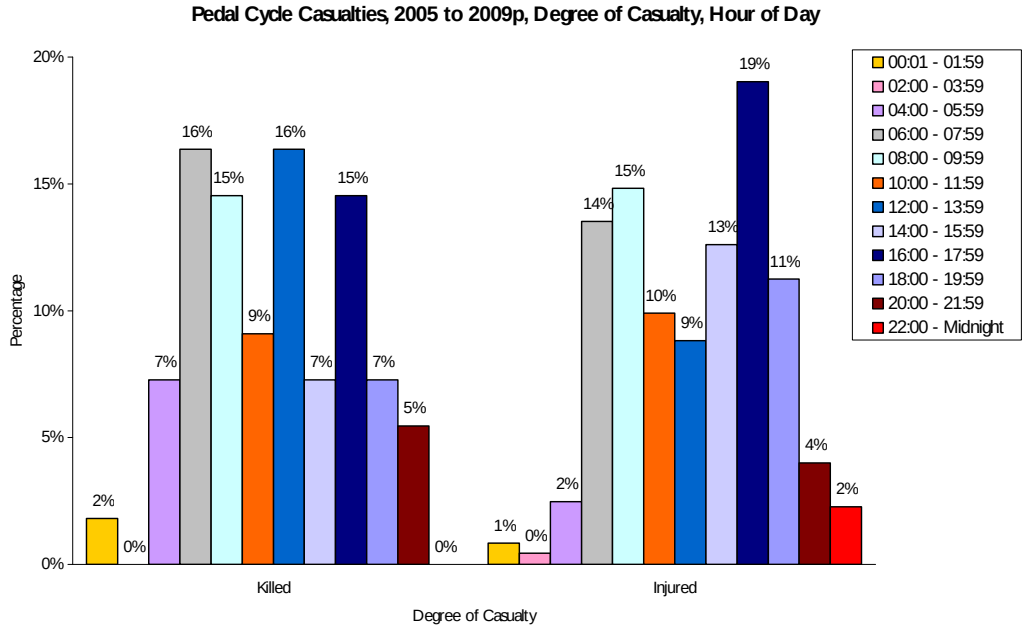
Day of Week

Fatalities are skewed towards Saturdays (24% of all fatalities) and Sundays (20% of all fatalities) whilst injuries are more prevalent during the weekdays, peaking on Tuesday through to Thursdays with around 16% of all injuries for each of these days of the week.



Time of Day (2 Hour Periods)

Compared to the distribution of pedal cyclist injuries, fatalities are over-represented during the early morning (4am to 8am) and middle of the day (noon to 2pm). Around 23% of fatalities occur between 4 am and 8 am whilst only 16% of injuries occur during this period. One in six fatalities occur between noon and 2 pm, compared with only 9% of injuries. In contrast 45% of injuries occur in the afternoon to early evening (2pm to 8pm), compared with 29% of fatalities during this period

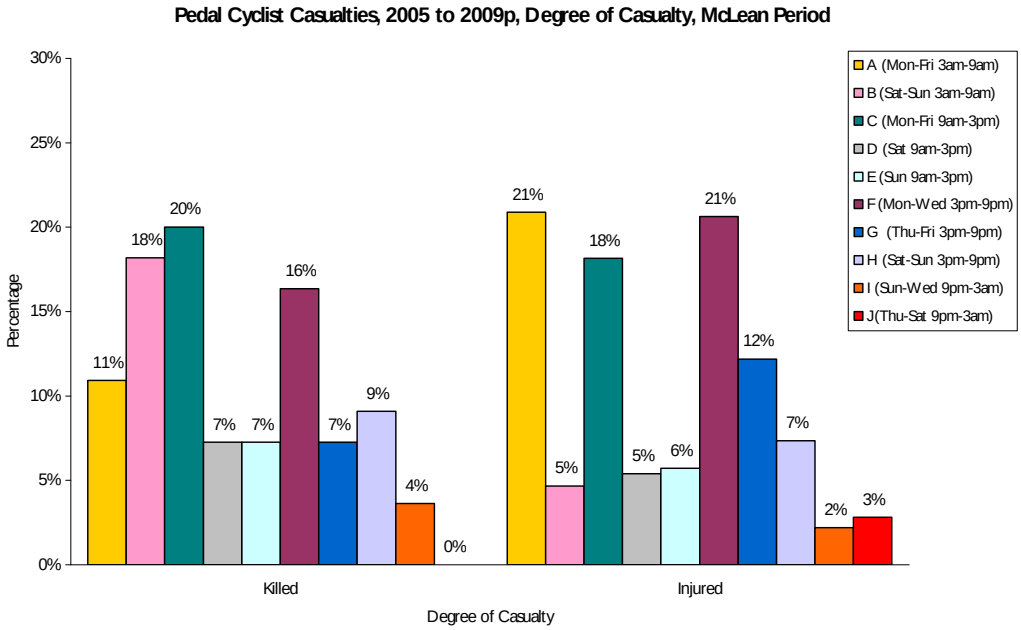


A large portion injuries occur in the afternoon to early evening from 2pm to 8pm (45%), compared with only 29% of fatalities occurring during this period.

McLean Periods

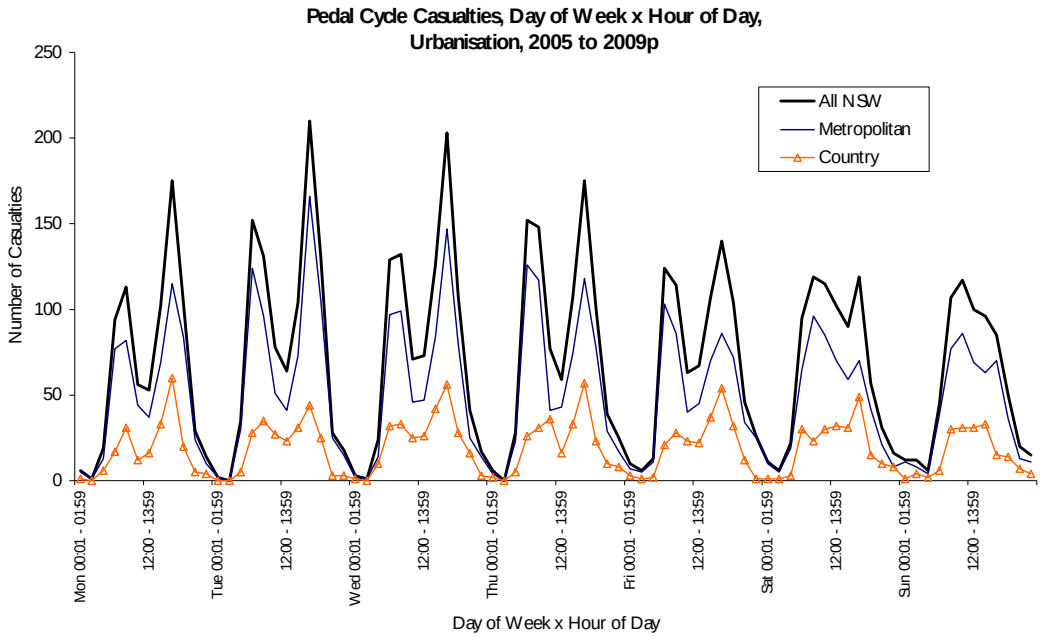
The previous two sections suggested a relationship between day of week / time of day and the severity of a pedal cyclist casualty. The following disaggregation of the pedal cyclist casualty data by McLean periods crystallises this relationship. The following McLean time periods were defined by A.J. McLean, O.T. Holubowycz and B.L. Sandow in their report Alcohol and Crashes: Identification of Relevant Factors in this Association, Department of Transport, Australia, 1980. The ten time periods, A to J, exhibit different characteristics of traffic conditions, driver/rider behaviour and trip purpose.

Compared with pedal cyclist injuries, fatalities are over-represented during McLean period A (early mornings on the weekend). Injuries are over-represented during McLean periods A, F and G (early mornings on weekdays and late afternoon / early evening through on weekdays).

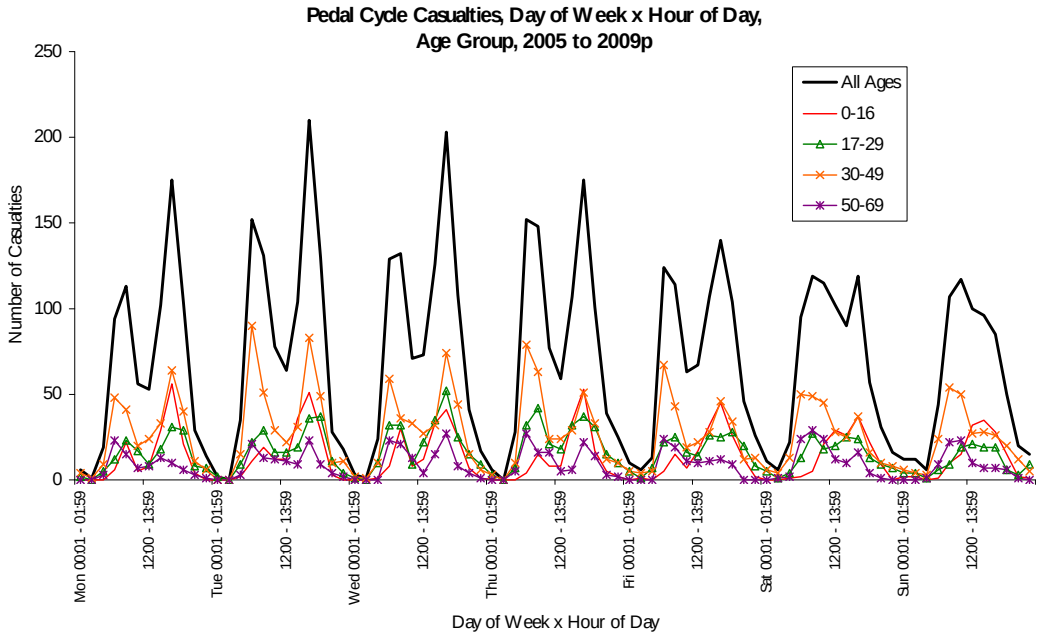


Day of Week x Time of Day by Urbanisation and Age Groups

Overall pedal cycle casualties peak during the morning and afternoon peak hours on weekdays, particularly in the metropolitan areas. In contrast, pedal cycle casualties are lower on the weekends and generally peak in the morning in the metropolitan areas.

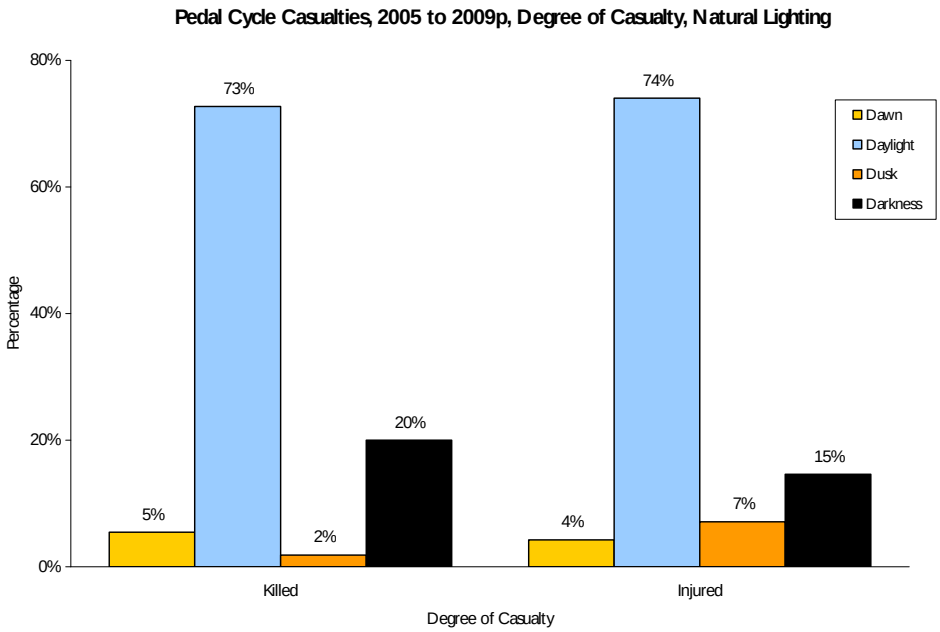


For the 30 to 49 year age group there is a strong pattern of pedal cycle casualties during the morning and afternoon peak hours during weekdays. In contrast, child aged pedal casualties peak in the afternoon throughout the week.



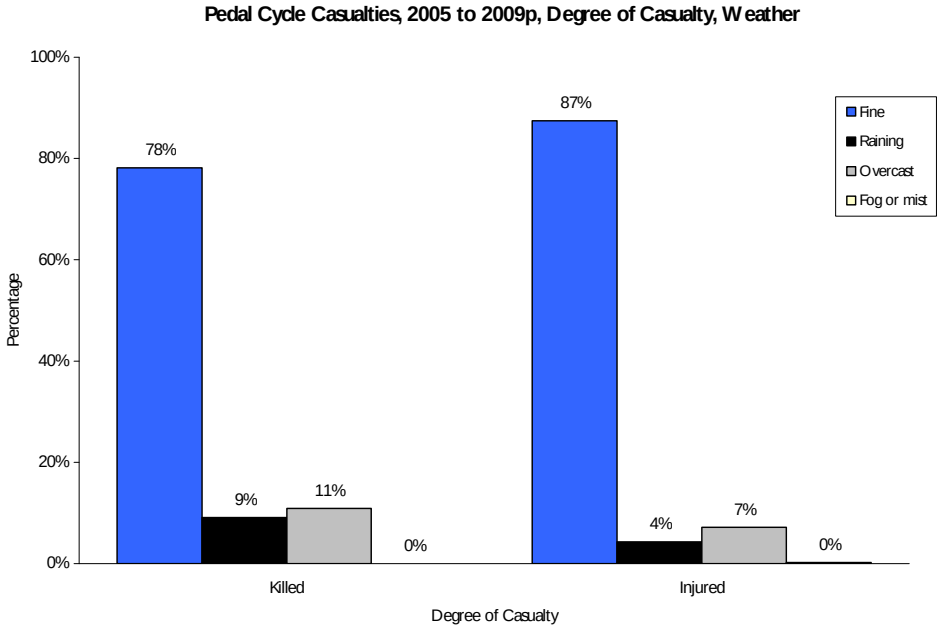
Natural Lighting

Around three quarters of all pedal cyclist fatalities (73%) and injuries (74%) occur where the natural lighting was daylight. Only 15% of all pedal cycle casualties occurred in darkness.


Pedal Cycle Casualties, 2005 to 2009p, Degree of Casualty, Natural Lighting
80%
60%
40%
20%
0%
Percentage
73%
74%
5%
2%
20%
4%
7%
15%
Dawn
Daylight
Dusk
Darkness
Killed
Injured
Degree of Casualty

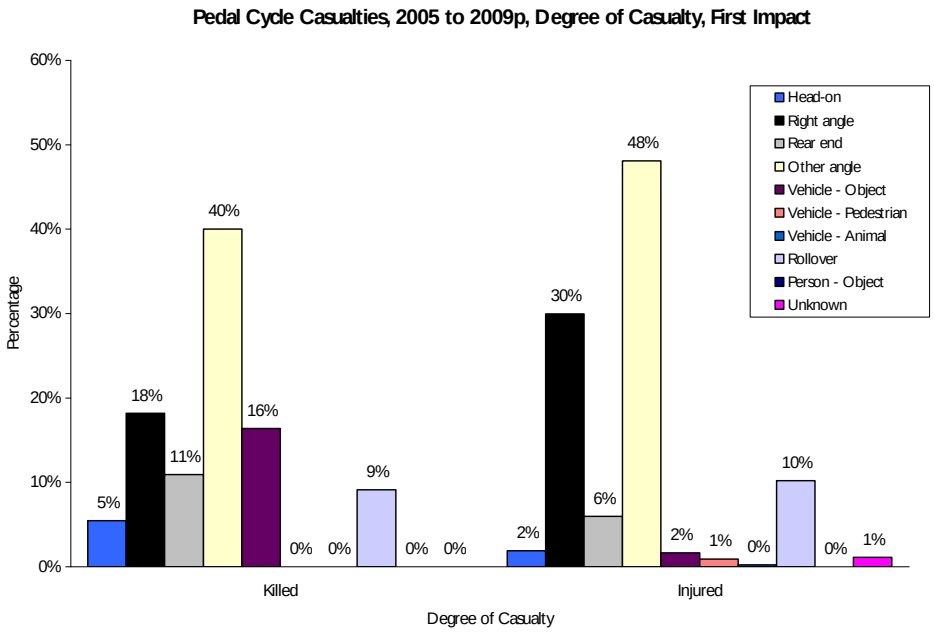
Weather

The overwhelming majority of pedal cyclist casualties (up to 87% for injuries) occur during fine weather. However, almost one in ten fatalities occur during rainy weather.



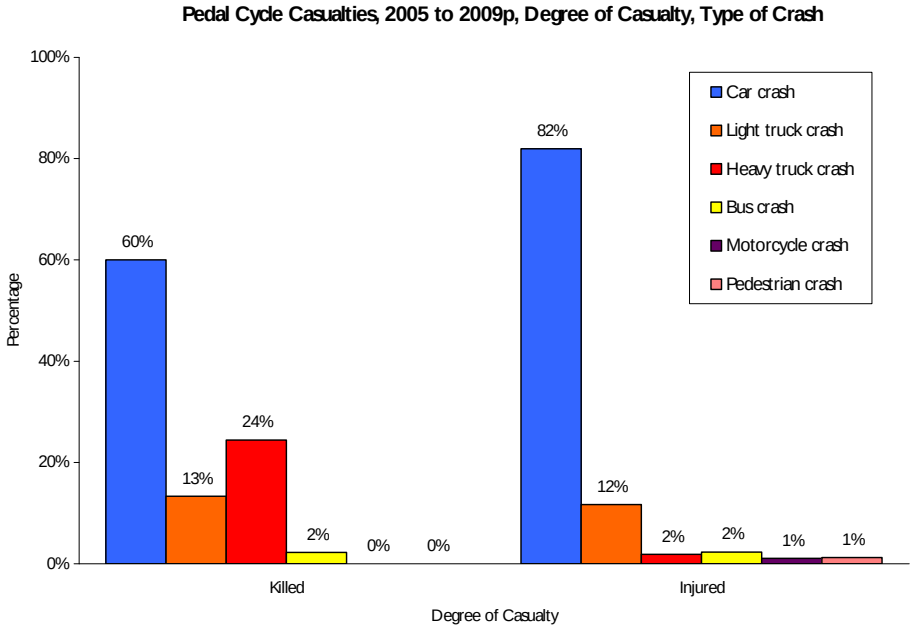
First Impact for Crash

The overwhelming majority of pedal cyclist casualties involve a pedal cyclist struck by another vehicle in the first impact – 86% of casualties. The most common crash types involve vehicle-vehicle other angle (48%) and vehicle-vehicle right angle (30%) first impacts. However, one in six fatalities involve the pedal cyclist colliding with an object, compared with only 2% of injuries. Of the nine fatalities impacting with an object, four collided with a fence or guardrail.


Pedal Cycle Casualties, 2005 to 2009p, Degree of Casualty, First Impact
60%
50%
40%
30%
20%
10%
0%
Percentage
Head-on
Right angle
Rear end
Other angle
Vehicle - Object
Vehicle - Pedestrian
Vehicle - Animal
Rollover
Person - Object
Unknown
5%
18%
11%
40%
16%
0%
0%
9%
0%
0%
2%
30%
6%
48%
2%
1%
0%
10%
0%
1%
Killed
Injured
Degree of Casualty

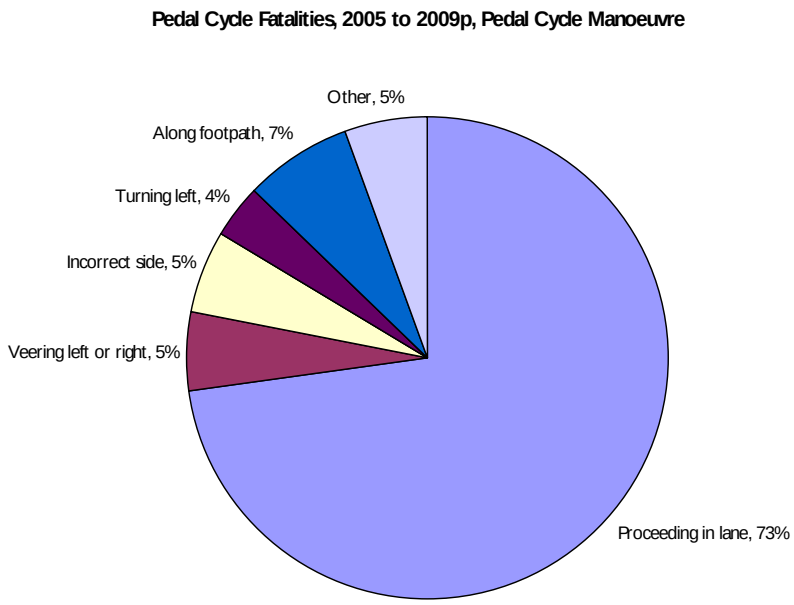
Crash Type (Type of Vehicle Involved)

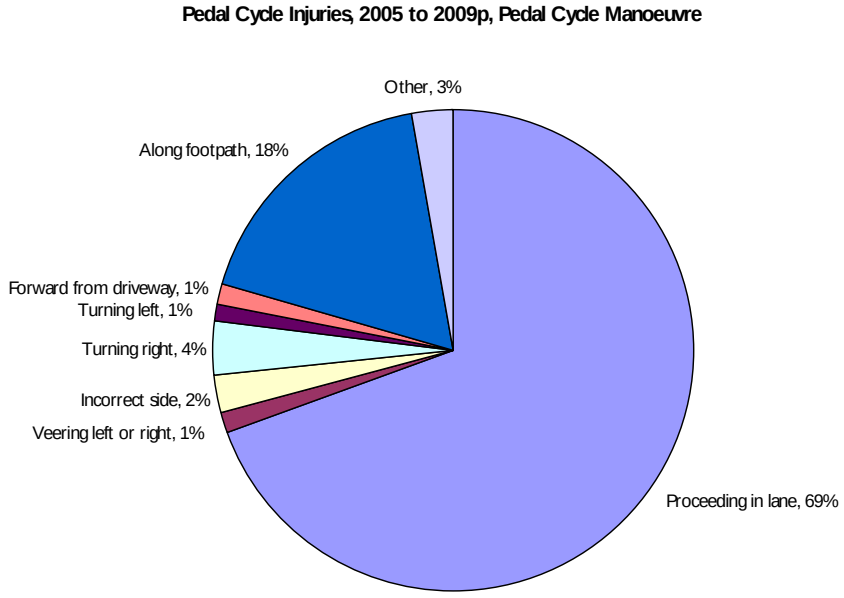
Most pedal cyclist casualties involve a car or car derivative. However, compared with pedal cyclist injuries, there is a strong over-representation of heavy trucks amongst fatalities. Heavy trucks are around 13 times more likely to be involved in a pedal cyclist fatality - involved in only 1.9% of all pedal cyclist injuries but accounted for 24% of all fatalities.



Pedal Cyclist Manoeuvre

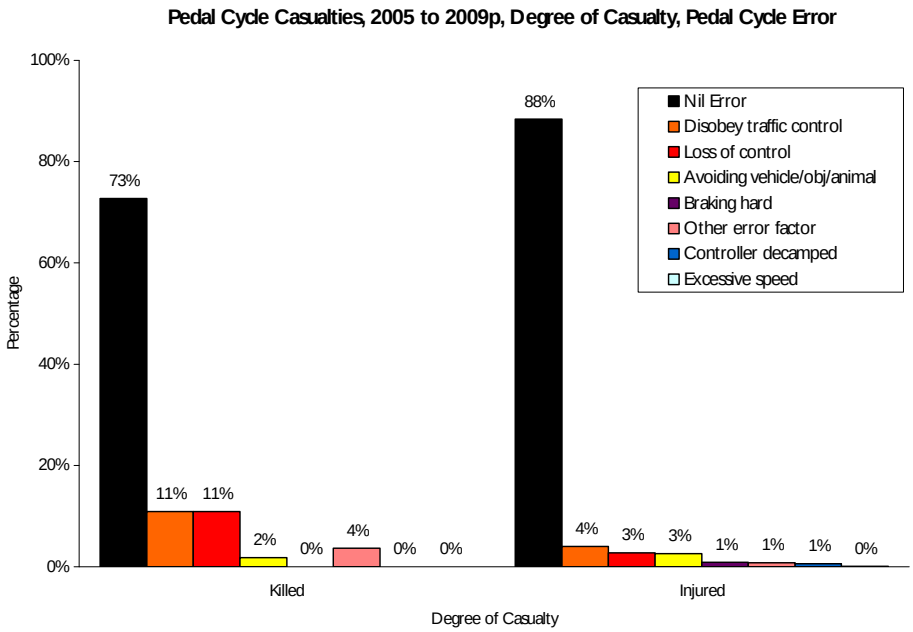
Most pedal cyclist casualties involve the pedal cyclist proceeding in the lane, accounting for 73% of all fatalities and 69% of all injuries. The next most common pedal cyclist manoeuvre involved the pedal cyclist travelling along the footpath, with one in five injuries and one in 14 fatalities involving this manoeuvre.





Pedal Cyclist Error

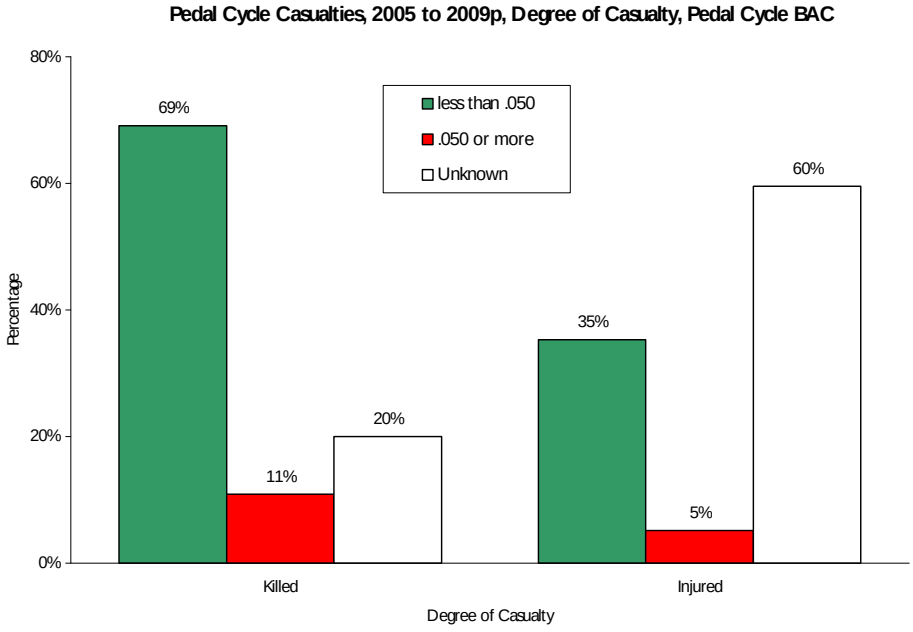
Most pedal cyclist casualties have no error coded for the pedal cyclist. However, around 11% of fatalities and 4% of injuries involve the pedal cyclist disobeying a traffic control. Around 11% of fatalities involve loss of control for the pedal cyclist.



Blood Alcohol Concentration

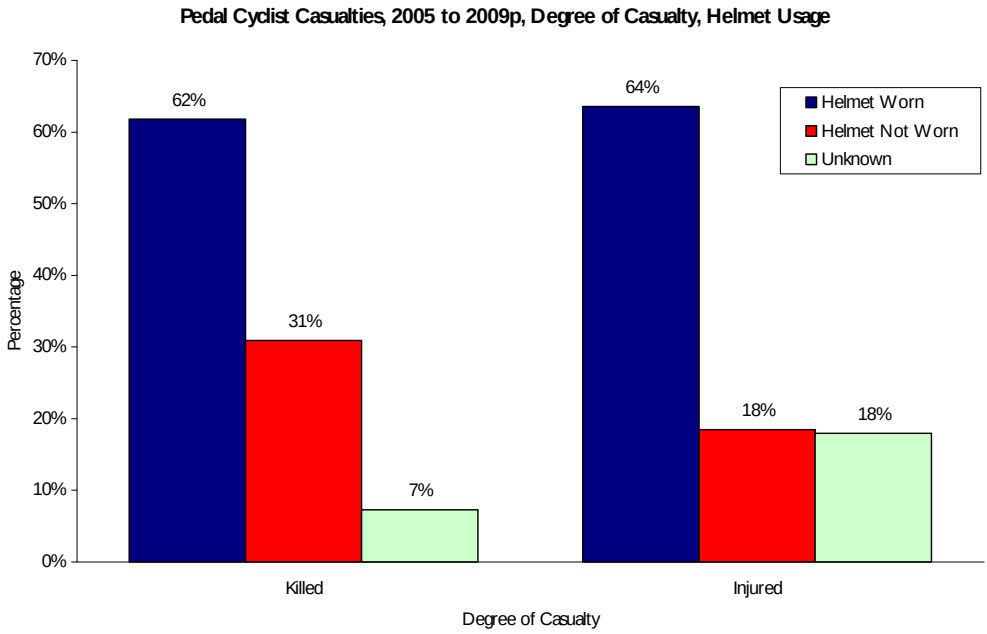
Alcohol results vary across pedal cyclist severity, with relatively low levels of unknowns for fatalities (20%) compared to the levels for injuries (60%). Alcohol samples for pedal cyclists are required for persons aged over 16 years and are usually taken for fatalities or where injuries are presented at a hospital within two hours of the crash.

Where alcohol results are known, around 14% of fatalities and 13% of injuries involve a pedal cyclist with a blood alcohol concentration of 0.05 or more.

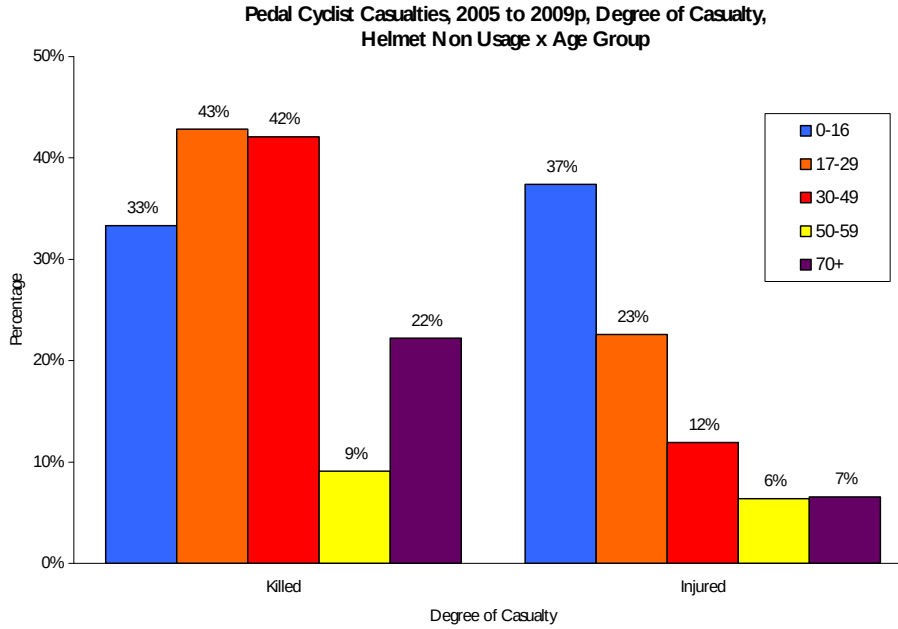


Helmet Usage

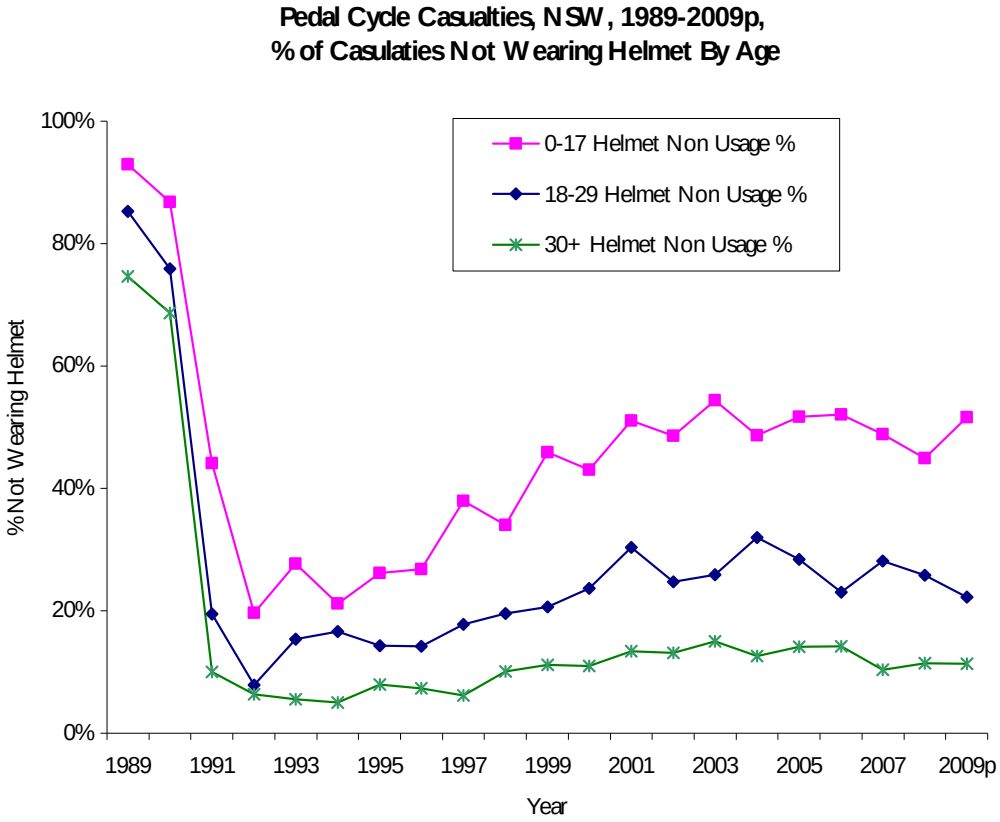
At least one-third of all pedal cycle fatalities and at least 18% of all pedal cycle injuries were not wearing a helmet.



For all pedal cycle casualties the highest levels of helmet non usage are amongst the younger age groups.



As the chart below shows, the levels of helmet non usage have levelled off in recent years, though they continue to greatly exceed the low levels experienced immediately after the introduction of the compulsory helmet wearing laws of the early 1990s.


Pedal Cycle Casualties, NSW, 1989-2009p,
% of Casulaties Not Wearing Helmet By Age
0-17 Helmet Non Usage %
18-29 Helmet Non Usage %
30+ Helmet Non Usage %
% Not Wearing Helmet
100%
80%
60%
40%
20%
0%
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009p
Year

Summary of Main Features

- Pedal cyclists account for only a small percentage of overall road trauma levels in NSW, although it should be acknowledged that there is under-reporting of pedal cycle injuries.
- Whilst there have been significant reductions in the long term trends for overall fatalities and injuries, the levels of pedal cycle fatalities and injuries have remained relatively unchanged in recent years.
- The majority of pedal cycle fatalities and injuries occur in the metropolitan areas.
- The majority of pedal cycle fatalities and injuries are males.
- Over the long term, child aged pedal cycle casualties have decreased but these have been offset by increases in the older age groups.
- The majority of injuries occur at intersections whilst the majority of fatalities occur away from intersections on single undivided carriageways, divided carriageways or dual carriageway freeways/motorways.
- Pedal cycle fatalities are more prevalent on high speed higher order RTA classified roads, whilst injuries are more prevalent on low speed unclassified (local) roads.
- There are peaks in pedal cycle casualties during the morning and afternoon peak hour periods on weekdays, and during the afternoon on weekends.
- The majority of pedal cyclist casualties involve an impact with another vehicle, with impacts involving heavy trucks over-represented amongst pedal cycle fatalities.
- The majority of pedal cycle casualties have no error coded for the pedal cyclist, but 11% of fatalities involved the pedal cyclists disobeying a traffic control.
- Around one in seven pedal cyclist casualties (with a recorded alcohol result) are 0.05 or more.
- Around one third of fatalities and 18% of injuries are not wearing a helmet.

PART 4 – Motorcycle Safety Countermeasures

On 29 March 2010, the NSW Government announced the NSW Road Toll Response Package including a range of road safety programs to be implemented in NSW. Many of the initiatives such as enhanced speed enforcement, more funding for wire-rope and other safety barriers, curve widening and highway safety route reviews will have a positive impact for motorcycle safety. Despite claims to the contrary in some quarters, wire rope barriers result in net safety gains for motorcyclists. Nonetheless, improvements (such as barrier skirts) may be possible and the CRS is investigating these (see section 4.1).

In developing the Road Toll Response Package, the Government considered that further measures should be investigated as part of the development of a NSW Motorcycle Safety Strategy. The RTA has been tasked with the development of a NSW Motorcycle Safety Strategy.

The RTA is analysing a range of crash data and reviewing a range of research papers, as well as action plans both interstate and internationally, to define the key strategies to improve the safety of motorcycle and scooter riders in NSW for possible inclusion in a future NSW strategy. The RTA will consult with key stakeholders in the development of the Strategy.

The information below details the existing motorcycle countermeasures.

4.1 SAFER ROADS – ENGINEERING AND TRAFFIC MEASURES

Motorcycle riders and their pillion passengers are particularly vulnerable to being seriously injured or being killed should they crash. The use of engineering solutions can prevent some motorcycle crashes and reduce the impact of any crashes on riders and pillion passengers.

The RTA has been implementing enhancements to safety barriers systems which reduce trauma for motorcyclists, including "boots" on guardrail terminal ends, guide posts that collapse or "lay over" when hit (spring mounted).

The RTA has improved road line marking along identified narrow roads with tight horizontal curves specifically for motorcyclists. Examples include the installation of centreline markings along the Illawarra Highway and Macquarie Pass to discourage motorcyclists from riding on the incorrect side of the road around tight curves.

Motorcycle routes – regional action

The six RTA regions regularly review motorcycle routes and implement countermeasures to improve the safety of those roads. Below are examples of action in the RTA Southern, Hunter and Sydney Regions.

Southern Region

On known motorcycle routes such as HW25 Macquarie Pass and MR261 Cambewarra and Barrengarry Mountains the RTA Southern Region:

- has installed motorcycle risk area identification signs;
- is upgrading delineation of all curves with curve alignment markers;
- is upgrading motorcycle risk location at the top of Macquarie Pass with widening and concrete jersey wall barriers; and
- providing vehicle turn out areas for slow vehicles on mountain pass motorcycle routes.

Hunter Region

The RTA has identified the Hunter Region's 10 most frequent motorcycle involved crash lengths, including a number of preferred routes and recreational routes. These routes are being progressively targeted as priority areas for road safety promotions and minor engineering interventions.

The 4 highest priority routes are, (Putty Road (07/08), Thunderbolts Way (08/09), Old Pacific Highway (09/10) and Wollombi Road (10/11)). These routes have been reviewed or are being reviewed, from a motorcycle perspective and have had some of the following treatments implemented:

- fluoro signage (reduce speed);
- line marking reviewed and upgraded;
- speed zone review undertaken;
- curve alignment markers installed;
- road surface improvements;
- road verge clearing; and
- police enforcement bays (7 on Putty Road).

Sydney Region

The RTA has improved delineation along the Putty Road, Bells Line of Road, Royal National Park and Old Northern Road, The RTA has also reviewed the off path crashes and undertaken works such as improved delineations with curve alignment markers, reflectors on safety fences, guideposts and raised reflective pavement markers.

The RTA has investigated, widened and improved the shoulders at critical bends along the routes in the Royal National Park. Pavement upgrades and curve widening is expected to be implemented along the Bells Line of Road in 2010/11.

The RTA has conducted the following Motorcycle Route Safety Reviews:

- Putty Road – Reviewed over a period of time and included motorcycle gateway signage, delineation improvements, behavioural education campaigns and a speed review.

- Royal National Park - Reviewed over a period of time and included motorcycle gateway signage, delineation improvements, pavement works, behavioural education campaigns and a speed review.

The RTA is also planning a Motorcycle Route Safety Review of the Old Pacific Highway in 2010/11. This would follow on from the work completed on this route in 2009/10 in the Hunter Region.

Road Signage

The RTA has produced motorcycle specific warning signs ('Hazardous Motorcycle curve' sign - W5-230) to be placed in areas which may be risky to motorcyclists. The technical direction guiding the use of the "Motorcyclist risk area identification signs" (Appendix 4) can be found online at:
http://www.rta.nsw.gov.au/roadsafety/downloads/technicaldirection_roadsafe_2002rs01.pdf

In addition, the RTA uses various forms of signs and roadside communications to provide safety messages to motorcycle riders these include:

- use of variable message signs (VMS), particularly on key motorcycling routes targeting motorist (blind spots) and motorcyclists (slow down, set up, drinking and riding don't mix etc.);
- delivery of Motorcycle Campaigns (messages and VMS) at times of peak demands associated with planned events, such the provision of messages in the Southern Region for those making the trip to the Phillip Island Moto GP;
- provision of road safety and police enforcement information at message boards at rest locations and known gathering points for motorcyclists;
- small and large billboards; and
- safety messages at roadside banner sites.

In February 2004, the RTA Sydney Region installed Motorbike Gateway Signage on Putty Road, which involved installation of the 'Hazardous Motorcycle curve' sign (W5-230) and a 'Next _km' plates before the start of winding sections of road. Within the curves, the RTA installed standard curve warning and speed advisory signs and curve alignment markers as required.

An evaluation has found that crashes involving motorcycles and all vehicles had reduced in the three year period after the installation of the signage, compared to the three years prior to the installation.

- Motorcycle crashes
  - Pre-signage ... 5 crashes (all injury crashes)
  - Post-signage ...2 crashes (all injury crashes)

- All crashes

- Pre-signage ... 17 crashes (9 injury crashes)
- Post-signage ... 11 crashes (3 injury crashes)

Speed Management

Managing speed is a key element in managing road safety. The fundamental principle in setting speed limits for a particular road is that the established speed limit should reflect the risk to the road users. The speed limit on the Old Pacific Highway, containing winding sections, was reduced especially to enhance motorcycle rider safety.

The RTA has conducted speed limit reviews on known motorcycle routes in Sydney Region and implemented signage changes including:

- Bells Line of Road (Completed October 2008);
- Putty Road (Completed October 2007);
- Old Northern Road (Completed November 2007);
- Wisemans Ferry Road (Completed November 2007);
- Royal National Park, Sutherland (Completed January 2007); and
- Galston Gorge (Currently underway).

The review of these routes resulted in the reduction of some speed limits and the installation of upgraded speed advisory and curve warning signage in accordance with the NSW Speed Zoning Guidelines.

Research

To develop a greater understanding of why motorcycles crash into roadside barriers and how the injuries are sustained, the NSW Centre for Road Safety is co-sponsoring the University of New South Wales' project on Motorcycle Crashes into Roadside Barriers. This study involved actually crashing motorcycles and crash test dummy riders into the barriers to evaluate crash outcomes.

Two progress reports have been drafted to date: 'Crash Characteristics and Causal Factors' and 'Progress Report of Crash Mechanics and Injuries' and are currently being reviewed.

A study of the Swedish 2 + 1 road system, incorporating wire rope barrier on medians and road edges, was undertaken recently using 5 years before and after crash data. The Swedish study showed that where wire rope safety barriers had been installed, there was a 40 to 50 per cent reduction in motorcycle fatality risk (Arne Carlsson 2009). The report also noted a reduction in motorcycle speeds through sections that had wire rope safety barrier installed.

4.2 SAFER PEOPLE – BEHAVIOURAL MEASURES

The RTA has a number of measures in place to address the issues of ensuring that motorcycle riders are properly trained and have the appropriate information to undertake safe riding behaviour and practices.

In NSW, a Graduated Licensing Scheme for motorcycle riders, together with a comprehensive licensing, training and testing scheme are in place to ensure riders are appropriately skilled.

The RTA seeks to increase motorcyclists' awareness of road safety through public education and advertising concerning:

- risks associated with speed/ riding too fast for the road conditions;
- risks and appropriate actions associated with riding in traffic;
- risks associated with drinking and riding; and
- safe practices concerning cornering, braking and road positioning.

Other drivers' awareness of the need to look out for motorcyclists is addressed through public education and advertising concerning:

- checking for blindspots, when changing lanes; and
- allowing motorcyclists more space in traffic when turning at intersections.

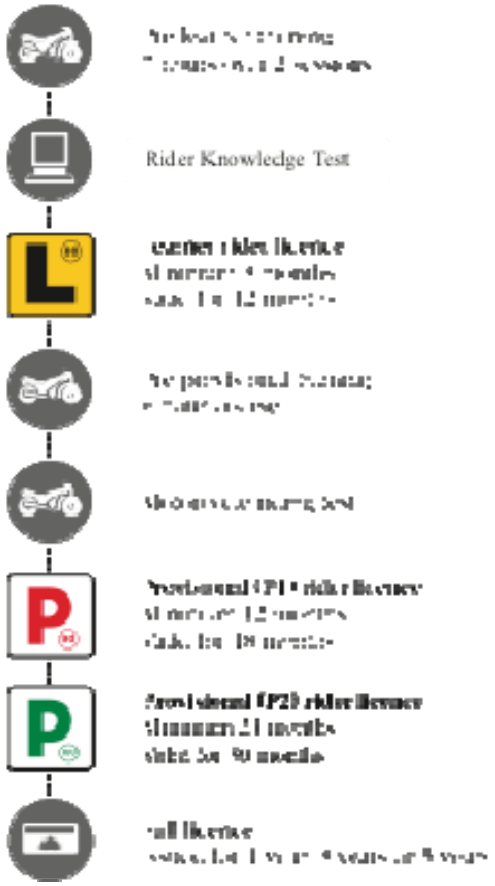
Further, these measures are supported by law enforcement to deter illegal riding practices such as drink driving and speeding.

Overview of the motorcycle Graduated Licensing Scheme

The Graduated Licensing Scheme for motorcycle rider licence applicants requires new riders to pass through three licensing stages before obtaining an unrestricted rider licence.

- Learner rider licence
- Provisional (P1) rider licence
- Provisional (P2) rider licence

The chart below shows how a new rider progresses through the licensing scheme.



Graduated Licensing Scheme (GLS) for motorcycle riders detailed

Compared with the crash rate for all riders, those aged 20 to 24 years are over two and half times more likely to crash and, most notably, riders under the age of 20 are almost five times more likely to crash.

The Graduated Licensing Scheme (GLS) for motorcycle riders commenced on 1 June 2009. Under the scheme rider licence applicants who are issued with their first NSW provisional rider licence from 1 June 2009 are required to hold a provisional P1 licence for a minimum of 12 months and a provisional P2 rider licence for a minimum

of 24 months before graduating to an unrestricted rider licence. The underpinning principle of a GLS is the gradual easing of restrictions as novice riders gain experience and skills.

Motorcycles account for less than three per cent of all motor vehicle registrations, yet account for 11 per cent (2009p) of all road injuries and 15 per cent (2009p) of road fatalities. The concept of graduated licensing is equally applicable to motorcycle licensing as it is to car licensing. For example the zero blood alcohol concentration (BAC) restriction on provisional drivers applies for a minimum of three years. As there exists an over-representation of alcohol related motorcycle crashes, it is critical that novice riders are also restricted to zero BAC for a similar period. Motorcycle riders are also over involved in speed related crashes, therefore similar comments apply to graduated licensing speed restrictions.

The new scheme addresses the over-representation of motorcyclists in crashes through restrictions that include alcohol, speed, demerit points and motorcycles that can be ridden. While it is appropriate that all new riders undertake the provisional P1 phase, an exemption from the provisional P2 phase is available for riders aged 25 and over who hold an unrestricted driver licence.

With the introduction of this scheme, novice riders will now be riding a moderately powered motorcycle for a minimum of three years, up from one year. The first cohort of riders moving from the provisional (P1) phase to the provisional (P2) phase commenced 1 June, 2010. This cohort will have a further two years experience riding a moderately powered motorcycle before they can opt to move to a motorcycle suitable for more experienced riders.

During development of the GLS reforms, a number of other initiatives were also considered. These included a learner rider log book and a supervised riding requirement. Although these elements have proven benefits in car novice driver licensing, there is no evidence to support their use in a rider GLS. Furthermore there is potential for them to have a negative effect. Whilst a rider hours log book was considered inappropriate, a novice rider learning journal is currently under consideration.

NSW Rider Licensing, Training and Testing Scheme detailed

To obtain a rider licence in NSW, applicants must first undertake rider training. The rider training scheme has been operating in NSW since 1990. The scheme is compulsory and covers key riding skills and low-risk road riding strategies required for safe riding. The training is comprised of two stages – pre-learner training and pre-provisional training.

The NSW rider training curriculum is widely considered to be best practice. The curriculum was originally based on the American Motorcycle Safety Foundation rider training curriculum. Over time, it has been redeveloped and adapted to local needs by the RTA in conjunction with the rider training industry. It is built upon a mix of theory and skills, and the practical application of these. The curriculum and training

activities are aligned to the most common crash types affecting riders. It guides applicants through the thinking and riding strategies that they can use to reduce their likelihood of crash involvement.

Applicants must be at aged least 16 years and nine months to be issued with a learner rider licence. Applicants can, however, attend training from the age of 16 years and six months.

Pre-learner course evaluation forms for customers

The RTA gains important feedback from customers through the distribution of this course evaluation form through the Rider Training Centres.

Learner rider licence

To obtain a learner rider licence, applicants must:

- be aged 16 years and nine months or older;
- successfully complete a pre-learner rider training course;
- satisfy normal learner rider licensing requirements; and
- obtain a learner rider licence (valid for 12 months) and accrue a minimum 3 month learner tenure.

The pre-learner rider training course is held over two sessions on separate days (3.5 hours each day). The pre-learner course is designed for people with no motorcycle riding experience. Applicants are provided with motorcycles, helmets, and gloves at the rider training centres.

The training is a competency based course with a pass or fail criteria. Riders are only permitted to continue riding if they have passed all competencies. Applicants who are unable to demonstrate the competencies at any stage of the training are offered remedial training at no additional cost.

On successful completion of the training, learner rider licence applicants must then successfully complete a rider Driver Knowledge Test (DKT). On passing the theory test, an applicant will be issued with a learner rider licence. Learner rider licence holders are subject to a number of licence conditions that are designed to reduce risk whilst gaining experience.

Learner riders must:

- Clearly display a black-on-yellow L plate at the rear of the motorcycle when riding. The letter L on the plate must not be hidden
- Not ride faster than 80km/h and must observe the speed limit where it is below 80km/h
- Not exceed zero blood alcohol concentration (this means you cannot drink before riding). It is also illegal to ride under the influence of drugs
- Not tow any trailer or vehicle
- Not ride within the boundaries of Centennial Park, Sydney
- Not carry passengers on a motorcycle
- Not ride motorcycles with an engine capacity over 660ml and a power-to-weight ratio over 150kw/tonne (and as shown on the Approved motorcycles for novice riders list)
- Not use any functions of a mobile phone, including hands-free devices while riding
- Wear an approved motorcycle helmet that has been properly fitted.

Provisional (P1) rider licence

In order to obtain a provisional (P1) rider licence, learner rider licence holders must attend the mandatory pre-provisional rider training course. The pre-provisional rider training course is a competency based course with a pass or fail criteria. Applicants must have held a learner rider licence for a minimum of three months before they are eligible to attend the pre-provisional course.

The duration of a pre-provisional course is six hours with a further one hour for the motorcycle riding test. The Motorcycle Operator Skill Test (MOST) consists of eight test segments, which measures applicant ability to handle a motorcycle, including starting, accelerating, turning and braking. The test is based on the American Motorcycle Safety Foundation Alternate MOST.

On successful completion of the pre-provisional course and MOST, applicants are eligible to upgrade their licence to provisional (P1), which is valid for 18 months, but which can be upgraded after 12 months. Provisional (P1) licence holders are subject to a number of restrictions that are designed to reduce risk whilst gaining further experience.

Provisional P1 riders must:

- Clearly display a red-on-white P plate at the rear of the motorcycle when riding. The letter P on the plate must not be hidden.
- Not exceed zero blood alcohol concentration (this means they cannot drink before riding). It is also illegal to ride under the influence of drugs.
- Not ride faster than 90km/h and must observe the speed limit where it is below 90km/h.
- Only ride automatic motorcycles unless a test is passed on a manual motorcycle.
- Not ride a motorcycle with an engine capacity exceeding 660ml and a power-to-weight ratio greater than 150kw/tonne. The motorcycle must be approved by the RTA and shown on the Approved motorcycles for novice riders list.
- Not carry a pillion passenger.
- Not instruct a learner driver or rider.
- Not tow any vehicle or trailer.
- Wear an approved motorcycle helmet properly fitted.
- Not use any functions of a mobile phone, including hands-free devices.

Provisional (P2) rider licence

After a minimum period of 12 months tenure on a provisional (P1) rider licence, applicants are eligible to upgrade to a provisional (P2) rider licence. Provisional (P2) licence holders are subject to a number of restrictions that are designed to reduce risk whilst gaining further experience.

Provisional (P2) riders must:

- Clearly display a green-on-white P plate at the rear of the motorcycle when riding. The letter P on the plate must not be hidden.

- Not exceed zero blood alcohol concentration (this means they cannot drink before riding). It is also illegal to ride under the influence of drugs.
- Not ride faster than 100km/h and must observe the speed limit where it is below 100km/h.
- Not ride a motorcycle with an engine capacity exceeding 660ml and a power-to-weight ratio greater than 150kw/tonne. The motorcycle must be approved by the RTA and shown on the Approved motorcycles for novice riders list.
- Wear an approved motorcycle helmet properly fitted.
- Not use any functions of a mobile phone, including hands-free devices.

Riders aged 25 and over

Riders over the age of 25 that meet RTA requirements may receive an exemption from the P2 phase. To be eligible for an exemption from the P2 phase, riders must:

- be 25 years of age or older when they apply for an unrestricted rider licence;
- hold a current Australian unrestricted driver licence;
- have completed a minimum of 12 months on a P1 licence; and
- meet all other licensing requirements.

Unrestricted rider licence

After completing a minimum 24 month tenure, provisional (P2) riders are eligible to upgrade to an unrestricted rider licence.

To further support all riders, the RTA publishes the Motorcycle riders' handbook and Braking Habits (which are explained further below) in hard copy and on the RTA web site.

Tough speeding laws for provisional riders

Any Provisional P1 rider caught speeding will lose their licence for at least three months. As of 1 July 2009, changes have also been made to the number of demerits for speeding offences committed by P2 licence holders. This means a P2 licence holder will have their licence suspended on their second speeding offence. Learner and provisional riders also face immediate suspension of their licence for speeding more than 30 km/h over the speed limit.

The Learner Approved Motorcycle Scheme (LAMS)

The Learner Approved Motorcycle Scheme (LAMS) was implemented in late 2002 and complements the RTA's approach to rider licensing and training. The LAM scheme allows learner and provisional riders to ride moderately powered motorcycles up to an engine capacity of 660ml and replaced the previous 250ml based restriction. The scheme has undergone independent evaluation, which included an analysis of motorcycle crash data and comment on the scheme from stakeholders such as police and motorcycle representative groups. The evaluation report found that LAMS has been widely accepted and is working well. In 2009, Austroads agreed to adopt the NSW LAMS model throughout Australia.

Educational material

In order to support all riders, the RTA has produced a comprehensive range of highly regarded educational material resources designed to reinforce and enhance motorcycle rider knowledge and understanding of safe riding practices. These are outlined below.

'Road Users' Handbook' (RUH)

The RUH is a plain English translation of the road rules that apply to all road users. It also contains information for other motorists on how to share the road with motorcyclists. The information is aimed at increasing motorist awareness of motorcyclists and helps to inform them of the special care that needs to be taken by them when in the proximity of motorcyclists.

'Motorcycle Riders' Handbook' (MRH)

The MRH is designed to support riders at any level of experience. It has been adapted by other jurisdictions including Tasmania, South Australian, Northern Territory and Western Australia.

It outlines a range of practical riding strategies that riders can utilise to minimise risk. The handbook addresses a range of issues including:

- Motorcycle licensing and licence types
- Rider management (concentration/protective clothing)
- Safe riding
  - Observation (scanning)
  - Speed management (maintaining space to the front, when stopped and space behind a rider, as well as speed reduction)
  - Road positioning (space, surface and sight, buffering, overtaking, blind crests, curves and bends)
  - Making decisions (gap selection)
  - Hazard perception (responding to hazards, examples of situations requiring a response)
  - Basic riding techniques (riding posture, braking, steering, leaning)
- Road rules for motorcycle riders
- Motorcycle roadworthiness
- Penalties (offences, demerit points, speeding, drink riding, riding without a licence)

This publication can be accessed from the RTA website (www.rta.nsw.gov.au) and is attached at Appendix 5.

'Braking Habits'

Braking habits is designed to support riders at any level of experience. It is available free of charge at registries and is also distributed to riders through all Rider Training Centres. Like the RTA's *Motorcycle riders' handbook*, it has been adapted by other jurisdictions.

Braking habits addresses:

- Gaining experience (importance and benefits of gaining experience)
- Control (scanning for hazards, if you can't see slow down)
- Speeding matters (ride at a speed to give you time to respond to hazards)
- Safe riding (scanning, setting up, buffering)
- Cornering (start wide, finish tight – avoid the head-on zone)
- Fatigue (stop, revive and survive every one and a half hours)
- Protective clothing (dress to be seen and to be safe)
- Educating drivers (check blind spots, look out for motorcyclists, provide them space)

- First aid (casualties wearing helmets, casualties in leathers, severe burns)

This publication is free and can be ordered on the RTA's community road safety information hotline or accessed on the RTA website. In addition,

RTA Website

The NSW Centre for Road Safety website was updated in March 2010 and provides a range of information on motorcycle safety. The website provides information on purchasing approved motorcycle helmets and a range of safe riding tips.
http://www.rta.nsw.gov.au/roadsafety/motorcyclesafety/index.html

In addition, the RTA has also developed a number of webpages to support motorcyclists. These are described below.

Information for learner riders:
http://www.rta.nsw.gov.au/licensing/gettingalicence/motorcycle/learner_rider_licence.html?llid=7

Information about 'Approved motorcycles for learner riders'
http://www.rta.nsw.gov.au/licensing/tests/motorcycleridertrainingscheme/motorcyclesnoviceriders.html

Information for provisional riders:
http://www.rta.nsw.gov.au/licensing/gettingalicence/motorcycle/provisional_rider_licence.html

Information for full licence holders:
http://www.rta.nsw.gov.au/licensing/gettingalicence/motorcycle/full_rider_licence.html

Information about the compulsory motorcycle training courses:
http://www.rta.nsw.gov.au/licensing/gettingalicence/motorcycle/about_motorcycle_courses.html

Information about the motorcycle rider training scheme:
http://www.rta.nsw.gov.au/licensing/tests/motorcycleridertrainingscheme/index.html

Information on the location of the Rider Training Centres:
http://www.rta.nsw.gov.au/licensing/tests/motorcycleridertrainingscheme/trainingcentres.html

Information about the Motorcycle Operator Skills Test (MOST)

http://www.rta.nsw.gov.au/licensing/tests/most/index.html

Frequently asked questions about rider licensing:
http://www.rta.nsw.gov.au/licensing/tests/motorcycleridertrainingscheme/faqs.html

Information about fees:
http://www.rta.nsw.gov.au/licensing/licensingfees.html

Posters

An A3 poster specifically targeting protective clothing was distributed to all rider training centres for use in all classrooms during mid 2009.

Specially enlarged and framed poster versions of the successful and popular RTA cornering and braking campaigns was distributed to all rider training centres for display in congregation areas.

Awareness campaigns

RTA has developed a range of public education campaigns that address motorcycle safety specifically targeted at motorcycle riders and drivers.

In 2010, the RTA state-wide campaigns and regional campaigns have aimed to address the issue of safe cornering and the visibility of motorcycle riders by drivers.

- **Cornering** is a campaign designed to educate riders about positioning, appropriate speed and gear adjustments. Posters are displayed in all rider training facilities to promote motorcyclists visibility and road positioning. A direct mailout explaining safe cornering was forwarded to owners of registered motorcycles. Another feature was double-page spreads in magazine advertising. In 2010, the campaign has been extended with an online component including banner advertising and an interactive activity.

- **Check twice for bikes** is a campaign designed to educate drivers to check twice for riders before they change lanes, or undertake any other on-road manoeuvres. This highlights that motorcyclists can often be riding in drivers' blind spots. The campaign is supported with bridge banners, bus backs and bus shelter advertising.

Other campaigns to address alcohol use among riders and safe rider road positioning have been developed and are currently being used to support RTA regional campaigns.

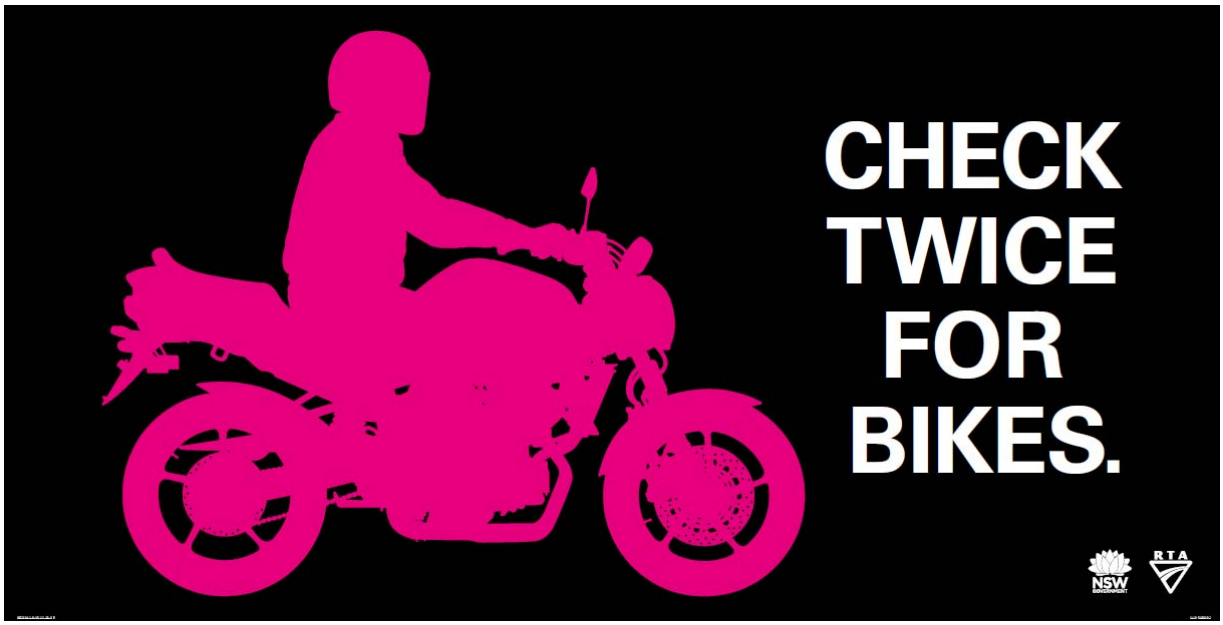
- **Drinking and driving doesn't mix** is a campaign designed to educate motorcyclists about the dangers of drinking and riding and the legal requirements they have with regard to blood alcohol content. This campaign consists of convenience advertising posters in key locations and the inclusion of advertisement in high quality motorcycle magazines.

- **Buffer** is a rider awareness campaign designed to educate riders on the need to allow a safe buffer between themselves and other road users, particularly motor vehicle drivers, when on the road. This campaign consists of outdoor advertising on bus and taxi backs and large posters at locations frequented by riders, including driver training centres.

In 2010, a new brochure entitled: 'Safer Motorbike Helmets: Your guide to choosing and buying a motorcycle helmet' was released to communicate advice concerning the safety and comfort of a range of motorcycle helmets tested through the RTA Motorcycle Helmet Program. This brochure also outlines other information about protective clothing to reduce severity of injuries.

Motorcycle Cornering Campaign Poster

Check Twice for Bikes Campaign



Motorcycle Awareness Week

Motorcycle Awareness Week is a road safety initiative of the Motorcycle Council of NSW Incorporated, usually scheduled in October each year. The aims of the event are to promote awareness of road safety issues amongst riders, and to raise awareness of motorcycles by other road users.

RTA provides annual funding grant of $20,000 to the Motorcycle Council of NSW Incorporated to highlight safety issues to riders.

Concurrently, RTA conducts a state-wide motorcycle safety advertising campaign that is delivered in conjunction with Motorcycle Awareness Week. This campaign highlights safety messages for riders and motorists. The current "Safe Cornering" campaign messages and the "Watch out for bikes" messages are scheduled to be used in October 2010.

RTA has allocated $543,000 for motorcycle safety awareness initiatives in the 2010-2011 financial year. In addition, many braider campaigns (e.g. on speed enforcement or RBT) include motorcyclists as part of the target audience.

RTA regional and local government road safety programs

In addition to the state-wide advertising campaign, RTA regions promote motorcycle safety during Motorcycle Awareness Week through:

- the use of banners, variable message signs (VMS) and bus-back advertising;
- public education to raise awareness of upcoming road safety events such as the Molong Motorcycle Awareness Ride;

- the distribution of motorcycle safety resources including 'Braking Habits' and 'The Good Gear Guide' to identified motorcycle retailers; and
- the promotion of breathalysers supported by convenience advertising promoting the RTA key message that "drinking and riding doesn't mix".

The RTA also funds through the Local Government Program, public awareness campaigns targeting motorcyclists. These campaigns are highly localised and generally timed to coincide with activities or events where high volumes of motorcyclists are expected, such as recreational motorcycling rides or Motorcycle Awareness Week activities.

Motorcycle Initiatives are only delivered as part of the Local Government Road Safety Program if local motorcycle safety issues has been identified as a road safety issue in a council area. Safety initiatives may be linked to the use of key motorcycle routes or locations such as Great Western Highway, Old Pacific Highway and Old Princes Highway and the Putty Road.

Enforcement programs

The Enhanced Enforcement Program (EPP) is a partnership between the NSW Police Force and the RTA with the objective of reducing road trauma. The RTA provides the NSW Police Force with additional funding in order to enhance the level of visible Police enforcement activity over and above normal operating requirements. Police enhanced enforcement activities target road user behaviour known to contribute to road trauma. Enhanced enforcement operations are also supported with public education campaigns, both locally and state-wide, that target key behaviours related to crashes in NSW. These operations target high risk road safety behaviours of riders and drivers such as speeding, drink riding and non-helmet use.

Motorcycles and alcohol

Because motorcycle riding involves additional skills, such as balance, it may be more prone to error from alcohol consumption even at low levels. The Centre for Road Safety has analysed fatal crashes and the presence of alcohol, even below legal levels. These analyses suggest a greater proportion of motorcycle fatalities occur with the presence of alcohol below .05 than for other vehicle drivers.

Safer Vehicles – Vehicle Safety Features

There are some features that can be provided on the motorcycle itself that can assist the rider to maintain control or to reduce the risk of being involved in a crash. Key safety items are:

Automatic headlamp on. Being seen early and clearly is one of the most important aspects of crash avoidance for motorcyclists. A simple feature that ensured

headlamps automatically came on when the engine was running and switched off when the ignition was turned off would ensure motorcycles had greater likelihood of being seen by other road users. Many motorcycles already have this feature and many riders already turn their headlamps on in daylight, but this is not universal and relies on the rider remembering to turn their headlamp on each time they start off.

Anti-skid Braking System (ABS) ABS has been demonstrated to reduce the likelihood of a motorbike going into a skid during severe brake force application and reduces the need for the rider to balance front and rear braking effort to maintain control. Because of the fear of losing control through skidding, a rider may not apply as much brake effort early in an emergency braking manoeuvre as they possibly could (especially to their front wheel). This results in the bike not slowing as fast as it otherwise might, which could help avoid a crash or lower speed sufficiently to reduce the severity of a crash.

Traction Control System (TCS). TCS monitors the rotation of the wheels and when it detects wheel spin in the driven wheel, it moderates the engine power to stop the bike from losing traction and skidding. TCS operates on motors with an electronic fuel injection system, as the TCS acts through the engine management computer to perform its functions. TCS also uses the wheel rotation sensor system fitted with ABS brakes. Most larger and more powerful motorbikes have electronic fuel injection systems and hence TCS would be an appropriate requirement on motorbikes of larger engine capacity (for example, those not included in the Learner Approved Motorcycle Scheme).

Personal Protection Equipment

By law, all motorcycle riders and their pillion passengers must wear a helmet.

The Helmet Evaluation Program (HEP) is a new RTA research and reporting program designed to assess the relative safety performance of motorcycle helmets available in Australia. The information helps motorcyclists purchase the safest motorcycle helmet. The assessment protocol compares helmets in impacts beyond the requirements of the Australian Standard and determines how well they will protect the wearer's head in a range of crash scenarios. It also assesses the level of rider comfort.

Similar to Child Restraint Evaluation Program which commenced in 1992, HEP is also an ongoing program that annually assesses new models of motorcycle helmets and the results are presented in a brochure titled *Safer Motorcycle Helmets: Your guide to choosing and buying motorcycle helmets*. In the 2009/10 program, 12 helmets (8 full face and 4 open face helmets) have been evaluated both in term of crash protection and comfort level performance as well as the likelihood for the helmets to fit a wide range of head sizes. The brochure was released publically by the RTA on 8 May 2010.

In developing the NSW Motorcycle Safety Strategy, the RTA will investigate further possible regulatory and non-regulatory measures to better ensure that motorcyclists wear the appropriate clothing and personal protection equipment for riding.

PART 5 – BICYCLE SAFETY COUNTERMEASURES

5.1 NSW GOVERNMENT COMMITMENT TO PROMOTE CYCLING (NSW BIKEPLAN)

The safety of cyclists is a key concern for the NSW Government.

On the 16 May 2010, the NSW Government launched the new NSW BikePlan, which outlines how the Government will work in partnership with local councils, communities and businesses to increase and promote safe cycling as a transport alternative, which will also provide environmental and health benefits for the community. A copy of the NSW BikePlan is attached (Appendix 6).

The NSW BikePlan outlines a ten-year bicycle infrastructure plan and will provide further information on the projects to benefit from the $158 million announced in the Metropolitan Transport Plan. Further information on the NSW BikePlan, including maps, can be found at www.pcal.nsw.gov.au.

The NSW BikePlan focuses on how cycling can help make the towns and cities of NSW more sustainable, easier to get around, safer and better connected. Purpose-built infrastructure has been identified as a key component of a safe and enjoyable cycling environment. Examples of work to be undertaken over the next 10 years under NSW Government leadership include:

- Completing missing links in Sydney's regional bike route network where strong growth in cycling is already being experienced, or where major construction works present an opportunity to improve cycling facilities.
- Completing bicycle networks in and around the 'River Cities' serving western Sydney's areas of high population growth, namely Parramatta, Liverpool and Penrith.
- Helping councils to provide facilities that extend across local council boundaries and which improve accessibility for short cycling trips to town centres, educational facilities, shops and regional services.
- Connecting and upgrading off-road cycle links in identified Aboriginal communities.
- Providing cycleways as part of all State Road projects in country NSW.
- Progressively completing the NSW Coastline Cycleway.
- Developing and installing standard bicycle route signage that indicates distance and anticipated trip duration to key destinations.
- Promoting end-of-trip facilities such as showers and bicycle parking facilities at major trip destinations, including secure cages or bicycle lockers at key transport hubs to encourage integrated transport use.

In addition to extending and improving cycling infrastructure, many of the activities in the NSW BikePlan focus on behaviour, and have been designed to promote greater awareness of bicycle safety among all road users. These activities include:

- Supporting cycling courses that enhance on-road bicycle riding confidence and courtesy.
- Promoting activities that motivate bicyclists to comply with the road rules.
- Promoting safe riding practices by training and racing cyclists.
- Conducting research into key cycling-related issues from which road safety messages and information can be developed.
- Promoting mutual respect among all road users via advertising campaigns, appropriate enforcement initiatives, and ongoing liaison with key road user industry associations and advocacy groups.
- Promoting the use of high visibility safety equipment and clothing by cyclists, including helmet-wearing.
- Working with local councils to introduce lower speed limits where appropriate.
- Providing school communities with road safety resources and guidance that will help to develop safe riding skills and habits among children and promote confidence in their carers.

The RTA is working towards upgrading all traffic signals with Bicycle lantern displays.

The RTA provides support to local councils for the development of local bike plans to assist in the planning for safe and connected network of cycle ways.

Also, the RTA is working with communities to develop regional strategies to support the NSW BikePlan.

For example, Southern Region is working on the development of a regional bike strategy that will identify key issues in the region and discuss strategies to improve safety for cyclists. In the previous three years RTA Southern Region in partnership with local councils has provided 19 off-road shared pathways totalling 13.5km of cycleway network.

5.2 CURRENT BICYCLE SAFETY COUNTERMEASURES IN DETAIL

The RTA utilises a range of programs to enhance bicycle safety throughout the State. These programs include in-school education and public awareness campaigns.

Bike Paths, Bike Lanes and Shared Paths

As mentioned above, under the NSW BikePlan, the Government is investing in off-road and on-road infrastructure to promote cycling and provide a safe and connected network for cyclists to use.

The NSW BikePlan will provide cyclists with more bike paths, linking with existing bike paths to enable more seamless movement. The BikePlan will also provide more bike lanes and shared paths that will provide cyclists with more space and reduce potential conflict between cyclists and motorists, and in turn making it safer for cyclists.

Further the RTA is taking into consideration bicycle riders when conducting road maintenance and upgrades such as:

- making on road cycle provisions, where possible, as part of road resurfacing projects through new line marking design;
- carrying out lane reconfiguration where feasible, with resurfacing, to provide wider shoulder provisions for cyclists; and
- including as part of major intersection upgrades, where practical, cycle facilities in accordance with relevant AUSTROADS standards.

School Education

NSW schools address road safety education in the NSW Board of Studies Personal Development, Health and Physical Education syllabus. As such it is a mandatory component of the curriculum in NSW schools.

The RTA's NSW School Road Safety Education Program supports schools in the delivery of road safety education. The RTA develops a range of curriculum-based resources to support school programs. These resources provide a range of teaching and learning experiences and activities for students on the broader issue of 'safety on wheels'. This approach ensures that students consider safety issues in the use of a range of wheeled recreational toys and vehicles, including bicycles.

'Safety on wheels materials' for Stages 1-4 are based on main messages that encourage students to wear a correctly-fitted Standards approved helmet when cycling (or riding on scooters, skateboards, rollerblades) and to ride in a safe place appropriate to each age-group. These messages directed at primary-school aged students build upon the safety messages delivered to parents and educators of the five years age group through the 'Kids and Traffic Early Childhood Road Safety Education Program' which is a joint program of the RTA and Macquarie University. The main messages focussing on safe places to ride, appropriate supervision and wearing a correctly-fitted Standards approved helmet.

The RTA supplies all NSW primary schools with *Move Ahead with Street Sense* road safety education resources. This resource consists of a kit of stage-appropriate materials for each of the three primary school stages (Stages 1-3). Safe car and bus

passenger behaviour, safe pedestrian behaviour and safety on wheels – including bicycles, scooters and skateboards are addressed. Schools can also order free safety on wheels support materials such as stickers, posters and activity sheets from the catalogue distributed frequently to NSW primary schools.

These promotional materials support the main 'safety on wheels' messages, which are:

- *Always wear a helmet when you ride or skate* (Stages 1 and 2).
- *Ride away from the road* (Stages 1 and 2).
- *Ride away from busy roads* (Stage 3).

Stage appropriate teaching and learning activities are supported by colour photographic packs, student worksheets, songs and story books (Stages 1 and 2), board games (Stage 2) and a video (Stage 3). All these resources support the delivery of safety messages through Personal Development, Health and Physical Education programs..

To support the delivery of road safety education in Years 7-10, the RTA in conjunction with the NSW education agencies developed *Road risks your choice,* for high school students (Stage 4 - High School Years 7 and 8). The resource addresses safe cycling behaviour and the importance of wearing a correctly-fitted helmet when cycling or riding on wheels. Specific messages in the *Road risks your choice* resource includes:

- Scan for moving vehicles near driveways and intersections.
- Keep your bike, scooter and skateboard in a safe condition.
- Choose to ride, scoot or skate where it is not busy.
- Scan all around for other people and road users.
- All road users need to obey the law.
- Breaking the law and crashing can keep you off the road for a long time.
- Wearing safety gear is smart and safe.
- When using the road, think ahead and let others know what you are doing.

The emphasis for school programs is in the development of attitudes and values to inform safe decisions and behaviours rather than cycling skills development. However, schools may elect to develop student cycling skills as part of school Sport or Physical Education Programs. In 2010, the RTA has re-developed a *Bicycle Education Activity Manual (BEAM)*. This resource outlines a range of teaching activities to develop cycling skills. This manual in draft form is currently being piloted in senior primary schools and high schools.

In addition to the school education programs above, the RTA provides financial support for the Community and Road Education Scheme (CARES). The CARES program focuses on road safety, bicycle skills and coping with traffic. It is presented as a combination of practical activities and classroom lessons aimed at children between the ages of four and ten years.

Bicycle Safety Awareness Campaigns

Each year the NSW Government, through the RTA, conducts the NSW Bike Week to raise the profile of bicycle use and to promote safe cycling. Local communities are encouraged to participate in NSW Bike Week events and consider the needs of cyclists as legitimate road users.

The RTA directs a promotional mail out annually to actively encouraged schools to address bicycle safety issues. A range of posters, stickers and information are available for ordering using an enclosed order form. Key publications of this campaign were: an information booklet entitled *The law and safety advice for bicycles, foot scooters, skateboards and rollerblades*; a poster on *Bicycle maintenance;* a fact sheet entitled *Heads up on helmets*; and brochures entitled *Share and be aware* and *A guide to safer cycling*.

To target teenagers, the RTA's NSW Centre for Road Safety funded Youthsafe research and information on the law and safety messages for teenage cyclists. A fact sheet was developed entitled *'Heads up on Helmets'* which was released in July 2008. The main aim of the fact sheet is to provide information supporting correct use of bicycle helmets amongst young bicycle riders in the 12 to 15 age group. The publication was targeted at:

- parents of young adolescents;
- others in a position to influence young adolescent bicyclists such as school education institutions, TAFE teachers and students and the cycling community in general; and
- Road Safety Officers (RSO's).

A range of other publications are available to the general public via the website or ordered at no cost through the RTA community road safety information hotline on 1800 06 06 07. This includes the *'Handbook for Bicycle Riders'*. This handbook provides a range of safety advice and is presented in Appendix 7.

In addition, the RTA has produced and distributed a community education brochure '*Share and be aware – travelling together safely'*, which includes information on the use of shared paths by both pedestrians and bicycle riders. The objective of producing the brochure was to increase awareness of the rights and responsibilities of all road users and the ways that they should interact with each other on the road network. The RTA has also produced a publication explaining how cyclists involved in on-road training can ride safely in groups. This was released in November 2009.

The NSW Road Rules states that the rider of a bicycle must wear an approved bicycle helmet. This applies to all cyclists, regardless of age, including children on bicycles with training wheels and any child being carried as a passenger on a bike or in a bicycle trailer.

The RTA approves the use of helmets that meet the Australian and New Zealand Standard (AS/NZ 2063).

In 2010, the NSW Centre for Road Safety's website on bicycle safety was updated. Information relating to cycling legislation, bicycle helmets, tips for driving near cyclists and tips for safe cycling can be found at www.rta.nsw.gov.au in the bicycle safety section through the Centre for Road Safety reference button.

Research

RTA's Research Report: "Study of Bicyclist and Pedestrian Safety on Shared Paths"

In 2009, the RTA engaged Taverner Research to conduct an observational study in New South Wales to explore the number and nature of conflicts that may be occurring between bicyclists and pedestrians on shared paths. Specifically the aims of the study were to determine the:

- Number of conflicts that occur between bicyclists and pedestrians at selected locations on shared paths
- Characteristics of any conflicts that may occur.

The RTA's research study involved 672 observation hours at 10 shared path locations in Sydney, Newcastle and Wollongong. The research was conducted between 12 July and 2 August 2009 from 6:00am to 10:00am and 2:00pm to 6:00pm. The observational results showed that only five actual conflicts occurred between pedestrians and bicyclists over the course of the study.

The research report concludes that although the actual risk of injury is quite small, there is still scope to improve safety and the perception of safety on shared paths and recommended:

1. Review of shared path standards in terms of minimum width, visual and physical obstructions, lane markings and signage followed by an audit of existing shared paths with the aim of bringing them up to standard, with high priority sites being addressed first.
2. Education of both pedestrians and bicyclist to inform people what a shared path is, educate the public about the rules and encourage courteous behaviour from all parties.

University of NSW (UNSW) Bicycle Cohort Study

The RTA is contributing to the Bicycle Cohort Study *Safer Cycling: A partnership project to better understand cycling patterns, hazards and incidents,* conducted by the University of New South Wales. Willoughby Council, Bicycle New South Wales Incorporated, Sydney South West Area Health Promotion are also contributing to the study.

This research project aims to increase the understanding of cyclist behaviours and risks under different conditions, and to provide exposure data using a series of questionnaires, self-reports and independent measurements.

The University of New South Wales School of Public Health and Community Medicine has received funding of $208,000 from the Australian Research Council for this three year research study.

The RTA's Traffic Management Branch, Environment Branch and the Centre for Road Safety have agreed to contribute to provide in-kind and financial support for the study over the three year period. The results obtained from the study will provide analysis and data which will inform road safety bicycle policy and planning.

Local Government Road Safety Program (LGRSP)

Bicycle safety issues may be addressed as part of the Local Government Road Safety Program through Bicycle Week community-based activities.

Aboriginal road safety

The RTA acknowledges the importance of road safety for Aboriginal people and has employed Aboriginal Policy Officers and Aboriginal Programs staff responsible for assisting in the development, implementation and delivery of road safety strategies and programs to reflect the needs of Aboriginal communities across NSW. The RTA has six regional offices across the State that deliver Aboriginal road safety programs.

RTA road safety programs address key road safety issues to influence safe road user behaviour in NSW Aboriginal communities. The RTA road safety tagline: *Bring the Mob Home Safely* promotes key road safety messages to Aboriginal people particularly bicycle safety messages about safe helmet use.

Bicycle safety education initiatives target teenagers and primary school-age children of the key safety messages about correct bicycle helmet use and safe places to ride.

There is Bicycle Safety Helmet Fitting and Exchange project under the RTA's Road Safety Aboriginal Program, aimed at increasing the knowledge and understanding of bicycle safety and the correct fitting of helmets. Bike safety and helmet exchange days are conducted with Aboriginal groups, where children are given bike safety presentations and can exchange their old helmet for a new one, which is correctly fitted. Helmets have Aboriginal artwork to give the children a sense of pride in culture and helmet-wearing. If children don't have an old helmet to exchange, they are still given a new one.

Enforcement

Enforcement is more challenging in the case of bicyclists due to the absence of a requirement for licensing or vehicle registration. However, it is not clear that effective gains would be made through these channels.

5.3 NEW TECHNOLOGIES AND BICYCLE SAFETY

The NSW Centre for Road Safety has been reviewing the benefits of several passive and active new technologies that could have a positive impact on bicycle safety in the future.

Road safety technologies are commonly classified as "active" or "passive" road safety systems. Although these terms are sometimes used in different ways, especially within the automobile industry, at a fundamental level the categories relate to the road user's involvement in the use of the safety device. With active safety systems the road user (generally a driver of a vehicle) must act in some way to make the safety device work. In passive systems, no action is required by the road user for the device to operate, for example a driver's air bag.

Recently a third category has been put forward by the German technology company Bosh, namely Combined Active and Passive Systems or CAPS. In CAPS technologies typically drivers are initially alerted to dangerous situations through and alarm, if they fail to act and a crash is inevitable the passive system takes over and automatically activates measures to minimise the severity of the impact and to protect all people involved in the crash. (Bosh 2008).

It is important to note that it may take five to ten years before many of the new safety technologies identified below to become widely available on roads or in vehicles in NSW. Supplementary Restraint System air bags for example, took over 30 years to appear in budget priced Australian vehicles.

Passive Safety Systems

Bicycle mounted systems

Lighting

Bicycle lighting serves to increase the visibility of the bicycle rider to others in low light conditions and to enhance the ability of the rider to see the roadway by illuminating the way forward. Both reflectors and active lights are used to make the rider more visible. Bicycle riders in NSW must not ride a bicycle at night or in hazardous weather conditions unless the bike displays a flashing or steady white light

from the front, and a flashing or steady red light from the rear. The bike also requires a red reflector which is visible from the rear.

The simplest bicycle headlights use a tungsten filament lamp. These have largely been replaced by High Intensity Discharge (HID) and Light-Emitting Diode (LED) headlights. The brightest headlight available today is a HID lamp which provides up to 1,400 lumens, but it is expected that these will soon be taken over by high efficiency white LED headlights, which combine lower expense, higher light output, and longer battery life. LED bicycle lamps with an output of 1,100 lumens are available on the Australian market from $850. There are also other less expensive options.

LED Bicycle Headlight

A number of manufacturers are marketing bicycle turn indicators that combine with the rear red lamp. The main advantage of these systems is that the rider does not have to take their hand off the handlebars to signal a turning movement. The size of these indicator lamps however may be too small to be easily seen by drivers of light and especially heavy vehicles.

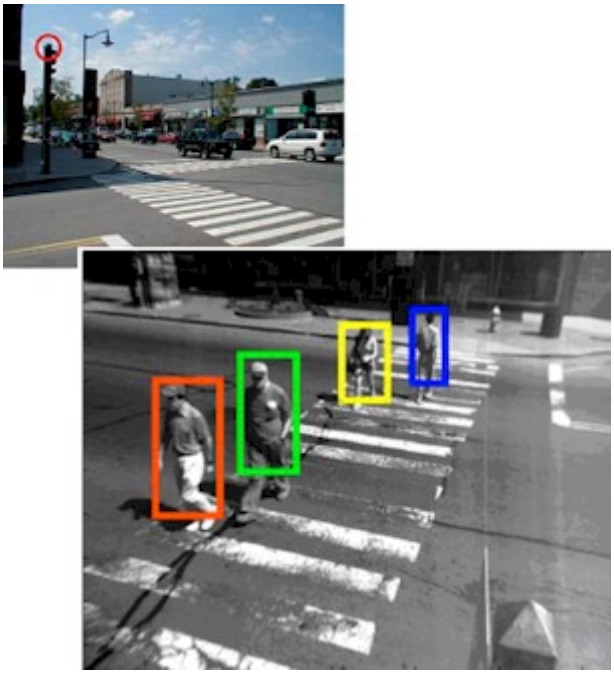
Retro-reflective materials

Retro-reflective materials, in the form of reflectors, reflective tape, and reflective clothing, are useful in making a cyclist more visible to other road users. Reflective materials can be applied to the bike, the rider and their luggage. Bicycle tyres are also available with reflective sidewalls.

Roadside systems

Roadside video detection systems

The NSW Centre for Road Safety is currently examining the potential of using automatic detection of pedestrians through intelligent object recognition systems. This technology was originally designed for military and security applications for detecting and tracking pedestrians as they approach a crossing point. The systems can then warn drivers of a potential collision with a pedestrian. Such systems could also be used to detect potential bicycle and vehicle collisions.



Video based pedestrian detection system tracking pedestrians across a marked crossing
Source: http://www.migmasys.com

Warning messages from this system could be displayed on roadside variable message signs located on the approach to the crossing point or inside the vehicle via Dedicated Short Range Communication (DSRC) systems.

Vehicle based systems

Advisory Intelligent Speed Adaptation

It is expected that the safety of bicycle riders would be substantially improved if speed limit compliance levels could be increased. Intelligent Speed Adaptation (ISA) is a vehicle based technology in which the vehicle knows the speed limit. There are different types of ISA systems. An Advisory ISA system alerts the driver when the speed limit is exceeded, usually with an audible alarm or message, as well as visual feedback.

The NSW Centre for Road Safety has conducted the largest, though not the first light vehicle trial of Intelligent Speed Adaptation technology in Australia throughout 2009 and 2010. More than 110 private vehicles had an ISA device installed as part of this trial carried out in the Illawarra region of NSW.

Early results from the project released in November 2009 have shown that Advisory ISA is effective in reducing the proportion of time drivers spend travelling over the speed limit. The results showed that the time spent travelling more than 5 km/h above the speed limit almost halved when the Advisory ISA system was installed into trial vehicles.

Advisory ISA System being tested by NSW Centre for Road Safety

In addition to the trial the NSW Centre for Road Safety is taking a leading role in the development of an Australia and New Zealand wide ISA system and leads a multi agency group of transport authorities examining the systems required to develop an Australia and New Zealand wide ISA system.

In vehicle bicycle detection systems

The NSW Centre for Road Safety is also examining the potential road safety benefits of infra red camera technology to detect pedestrians and bicycles in reduced visibility and low light situations. A 25Hz FLIR infra red camera system has been installed into the Centre's research vehicle. The system can detect a 1.8m tall pedestrian up to 310 metres in front of the vehicle, thus giving a driver extra time to avoid a potential collision. The system can operate in total darkness and can also detect cyclists and pedestrians through fog, rain and snow.

Two photos of the same scene at night of a cyclist. Standard driver view (left) and drivers view using infra red camera display (right).

BMW offers an infra red detection system marketed as BMW Night Vision on a number of its models currently available in Australia.

In October 2006, German car maker Opel launched a mid-class vehicle with an adaptive headlamp system. This technology is based on powerful bi-xenon headlamps with nine different lighting functions. At speeds below 50 km/h, ambient town light provides a wider light distribution at a reduced range, helping drivers to see bicycles on the edge of the roadway. A pedestrian area light, which is activated at speeds between 5 and 30 km/h, has been designed for zones where drivers must exercise extreme caution; this is expected to benefit bicycle riders as well as pedestrians. The dynamic bend lighting ensures curves are better illuminated. Depending on the vehicle's speed and steering angle, the movable bi-xenon headlamps swivel by up to 15 degrees into the curve, thereby making obstacles more visible (Autochannel 2008). This vehicle is not currently available in Australia, however BMW and Mercedes do offer this adaptive headlight technology in Australian models.

Integrated systems

Dedicated Short Range Communications

Dedicated short-range communications (DSRC) are one-way or two-way short-to medium-range wireless communication systems using radio frequency channels specifically designed for automotive use. These systems communicate between the

vehicle and roadside equipment. They are a sub-set of the RFID technology currently used for electronic tolling in NSW. This technology will provide the communications link for vehicle to vehicle (V2V), vehicle to roadside infrastructure (V2I) and potentially vehicle to bicycle active and passive systems.

The NSW Centre for Road Safety is currently working closely with the Australian Dedicated Short Range Communications Cluster (AusDSRC) to develop a national DSRC road safety trial. The AusDSRC consists of road authorities, vehicles manufacturers, universities and communication companies.

DSRC systems would enable drivers to be alerted to pedestrians and cyclists within the road environment at all times of the day.

Active Safety Systems

Vehicle based systems

Supportive and Limiting Intelligent Speed Adaptation (ISA)

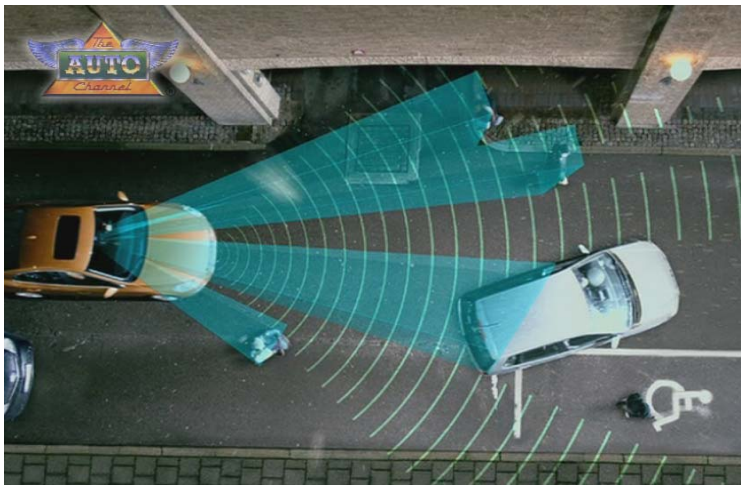
Supportive and limiting ISA systems prevent a vehicle from exceeding the legal speed limit by reducing the vehicle's power. The supportive ISA system can be overridden by the driver whereas the limiting system cannot. Research suggests that supportive and limiting ISA systems are more effective than advisory devices. Carsten et al (2008) suggests that the crash risk for a vehicle on major urban arterial roads (speed limit 30 mph) would be reduced by 10% if a supportive system was installed or by around 54% if a limiting ISA system was fitted.

Collision avoidance systems with brake support

A number of motor vehicle manufacturers' have introduced collision avoidance systems with automatic brake support to minimise the damage caused by frontal collisions. When a vehicle equipped with one of these systems detects an impending collision it automatically applies the brakes to reduce the impact speed. Reduced impact speeds would have a significant positive effect on pedestrian and bicycle related crash outcomes.

European vehicle manufacturer Volvo introduced a low speed collision avoidance system known as City safety in 2008, which uses radar detectors and video cameras to detect the presence of pedestrians up to 150 m in front of the vehicle. In February 2010 Volvo enhanced the City safety system to include pedestrian detection with automatic braking. The company claims that pedestrian detection with full auto brake can avoid collisions with pedestrians at speeds up to 35 kilometres per hour, even if the driver does not personally react in time.

At higher speeds, it is a matter of reducing the car's speed as much as possible prior to colliding. It is expected that this technology will in the near future will be capable of detecting bicycle riders.



Volvo Motors Pedestrian Detection with Autobrake.System
Source: Source: www.volvomotors.com.au

Shape shifting cars

In April 2009, New Scientist magazine published an article on the potential for vehicles to change their shape to better protect pedestrians after an impact. The article did not specifically address cyclists, however this technology may be also benefit this group of road users.

Researchers from Cranfield University in the United Kingdom have developed an energy absorbing system that reduces the stiffness of a vehicle's windscreen, thereby reducing the severity of head injuries suffered by pedestrians impacting with a vehicle's windscreen (New Scientist 2009).

Autoliv, a Swedish vehicle safety system manufacturer has developed two passive protection systems recently for pedestrians (Autoliv 2008). It is expected that these systems may also benefit cyclists.

Active bonnet lift system

The Active Hood raises the vehicle's bonnet instantly when a pedestrian is hit. A sensor system in the vehicle's front bumper sends an electrical impulse to two small airbags which lift the rear part of the hood, making the pedestrian's head contact a deformable and flexible surface instead of a hard and rigid one. The manufacturer claims the sensor is so accurate that it can differentiate between a lamp post and a human leg. Again, this technology may also assist cyclists.

With the Active Hood

Without the Active Hood

Autoliv Active Hood Pedestrian Protection System

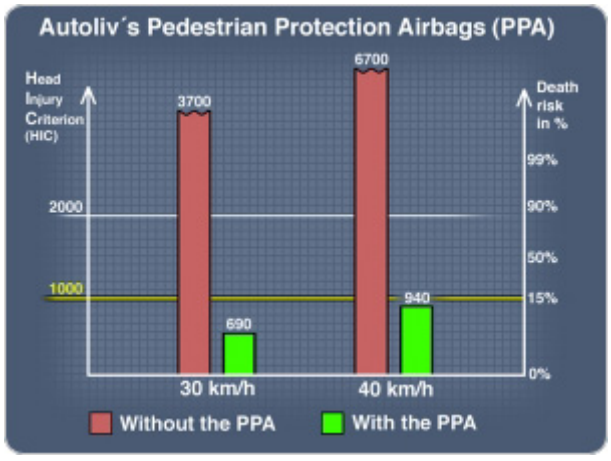
Source: www.autoliv.com

Pedestrian Protection Airbag (PPA)

Autoliv has also developed a pedestrian air bag protection system incorporating a pair of airbags - one at each windshield pillar. As vehicle hoods tend to become shorter with every new model change, the risk for pedestrians or cyclists hitting the hard structures around the windshield increases, but this can be prevented by the Pedestrian Protection Airbag system.

Autoliv Pedestrian Protection Airbag
Source: www.autoliv.com

The windshield itself is a deformable surface and this, in combination with a deformable hood and energy absorbing airbags at the side pillars, result in a combination that is both very efficient and comprehensive in terms of addressing the vehicle areas that are most dangerous for the pedestrian and cyclist. The graph below whilst not independently evaluated indicates the potential effectiveness of the system.



Autoliv Pedestrian Protection Airbag Effectiveness
Source: ***www.autoliv.com***

Combined Active and Passive Systems (CAPS)

The combination of active and passive safety systems offers further potential to reduce the level and incidence road trauma to vehicle occupants as well as other road users, including cyclists.

Combined Active and Passive Safety (CAPS) systems require a close network of active and passive safety systems with predictive driver assistance systems. German company Bosh is currently working on the development of systems that can cross link electronic stability control (ESC), hydraulic brake assist and the airbag control unit (Bosh 2009). In many cases, potential crash situations can be detected early by picking up excessive oversteering or understeering or by the onset of panic braking. ESC or hydraulic brake assist systems can also detect potential critical driving situations and in turn send a signal to a control unit which can initialise passive safety systems. For example, seat belts will be tightened to position the driver and passengers optimally in their seats and minimise the risk of injury. These systems could also be used in the future to initialise cyclist protection systems such as Autoliv's protection airbag.

PART 6 – Impact of Urban Planning and Urban Design on Motorcycle and Bicycle Safety

Land use policies and the planning and management of the road system need to fully consider the needs of all road users.

Motorcycle Safety

Compared to bicycle riders, the issue of urban planning and urban design is probably less of an issue for motorcycle riders. However, as mentioned above in Part 4, taking motorcycle rider safety into consideration in the design of roads and the road environments, including separation of traffic flows and roadside furniture will improve motorcycle safety.

Bicycle Safety

The NSW Government is very keen to get more people riding bicycles in this State. Bike riding is promoted as a sustainable means of transport, and to encourage people to move to a healthier, more active lifestyle.

RTA data shows that the number of people riding bicycles continues to grow. Average weekday cyclist numbers using the Sydney Harbour Bridge Cycleway rose by 30 per cent between 2008 and 2009, and by 25 per cent for the Anzac Bridge cycleway.

The NSW State Plan has set an ambitious target of 5 per cent travel by bike across Sydney, for trips up to 10 km long, by 2016. The NSW BikePlan will deliver cycleways throughout urban and regional NSW, progressively completing many of the high priority missing links within our current network.

The NSW cycleway network stretches through metropolitan Sydney and regional NSW. The RTA is committed to ensuring provisions are made for bicycles in all new major infrastructure and maintenance works.

In view of the preference of many cyclists to ride away from busy traffic, cycleways that are 100 per cent funded by the NSW Government – such as the Metro Sydney Bike Network – are delivered as off-road shared paths.

To enable this growth in infrastructure for cyclists and ensure that the developments will be done with the safety of bicycle riders and other road users in mind, good urban planning will be critical.

In July 2009, the RTA released an update of the urban design policy for roads that is used as a guide in land use planning and road development.

A copy of the RTA urban design policy *Beyond the Pavement Urban Design Policy Procedures and Design Principles* ("Beyond Pavement") is attached at Appendix 8.

The policy contains the following objective under Section 1.3:

> 'Road planning and design must contribute to the accessibility and connectivity of communities and a general permeability of movement through all areas by all modes of movement including walking and cycling'

The policy also requires that these objectives are achieved in a safe, cost effective and sustainable manner (Section 1.4).

Section 3 of the *Beyond Pavement* provides further details as to how these objectives may be achieved by a case study about the Liverpool to Parramatta Transitway at Bonnyrigg and through more detailed guidelines including:

- Considering connectivity into and through surrounding urban environments
  - The needs of pedestrians and cyclists are different to those of motorised road users. Short cuts, laneways and contra-flows are highly desirable to encourage walking and cycling and make places accessible.
  - Footpaths, bicycle paths and shared paths should be integrated into the existing local pedestrian and cyclist network and can be used to connect communities.
  - Cycle facilities should be designed to fit with the local character, have a human scale and be neat in appearance.
  - The design and provision of footpaths, bicycle paths and shared paths by the RTA should link with similar facilities for which councils are responsible.

- Consider connectivity between modes
  - Rail stations and bus stops should, wherever possible, be accessible for cyclists and pedestrians as well as vehicles.

- Consider where people want to cross and the quality of crossing points along a busy road
  - Adequate crossing points for cyclists and pedestrians should be provided along all roads and at regular intervals where possible.
  - The design of bicycle routes along a corridor and at intersections should reflect the network functions for both the road and the cycleway, and also the built and community environmental context.
  - On more transit orientated arterials (those with higher densities that can support road based public transport), crossing points for cyclists and

pedestrians should connect with bus stops, and be provided at signalised intersections.

Section 3.3 'Principle 3 - Connecting modes and communities' also provides examples of how to integrate provisions for cycling into road design including Bourke Street Sydney, the City West Link in Five Dock and the Fernleigh Track in Newcastle.

PART 7 – EMERGING RISKS AND EXPOSURE

As highlighted in the Parts above, motorcycle and bicycle use has been increasing and the trends are expected to continue.

The increased volumes of these vulnerable user groups will require attention from the RTA and other road authorities to best ensure the safety of these groups and all other road users.

An increased demand for these two-wheeled vehicles, coupled with issues relating to congestion and increasing community interests for low-emissions transport options may lead to increased demand for new technologies.

A trend that the RTA has identified is apparent increased interest in power-assisted pedal cycles. Identifying this emerging issue, the RTA has conducted a review of the existing Australian Design Rule (ADR) definition of power-assisted pedal cycle.

In 2008 and 2009, the RTA conducted a review that included extensive consultation with key stakeholders including all road traffic authorities in Australia and New Zealand; the NSW Police; federal Department of Infrastructure, Transport, Regional Development and Local Government (DITRDLG); the National Transport Commission (NTC); Australia Post; some local councils; Retail Cycle Traders Australia and a number of power assisted pedal cycles suppliers and manufacturers; Bicycling NSW and other user interest groups; and the Pedestrian Council of Australia.

Two papers were produced and submitted for public comment, the second in May 2009. All comments were reviewed by a working party comprising representatives from most of the stakeholders outlined above. In addition, the RTA undertook a series of practical trials with some power assisted pedal cycles donated for the purpose.

Based on the research and consultation undertaken, the RTA has finalised a paper that recommends revising the ADR definition to allow for more powerful models that incorporate specific features that will help maintain road safety.

The proposed amendment is to alter the definition of *power assisted pedal cycle* in the Australian Design Rules to:

> A pedal cycle which is equipped with one or more auxiliary propulsion motors having a combined maximum continuous rated power not exceeding 250 watts, measured at the wheel, of which

the output cuts off at a speed no greater than 25 km/h or sooner if the cyclist stops pedalling.

Note: The motor may operate without the rider pedalling up to a speed of 6km/h.

The current definition is:

> A pedal cycle to which is attached one or more auxiliary propulsion motors having a combined maximum power output not exceeding 200 watts

while *pedal cycle* is defined as:

> A vehicle designed to be propelled through a mechanism solely by human power.

The proposed revised definition aligns with that used in the European Community and Japan (there is a high usage of power assisted pedal cycles in these regions), and the technical specifications within the European Standard EN 15194. Under European legislation, an item supplied for sale within the Community must comply with certain specified standards, must undergo conformity assessment and be certified accordingly.

The RTA views that the proposed revised definition reinforces the intent of the current definition, which is so open to misinterpretation it has enabled quite a number of non-bona fide power assisted pedal cycles to be supplied for sale in Australia, with associated enforcement problems experienced by the States and Territories.

The RTA has identified a number of additional benefits in allowing power assisted pedal cycles that align with its proposed revised definition to be introduced including:

- It would encourage the uptake of cycling by some through removing some of the physical effort needed to cycle, especially in hilly cities such as Sydney.

- It would encourage a greater use of power assisted pedal cycles in response to the demand for smaller, more environmentally-friendly vehicles for commuters and people undertaking local trips both in major metropolitan areas and regional centres.

- Both of the above will assist the NSW Government in meeting its commitment to increase the number of cyclists under the NSW BikePlan.

- Local manufacturers will be able to export to a wider market, including the European Community and Japan.

The Australian Road Rules Maintenance Group supported the new definition in principle at its meeting in April, but it will only implement the proposed changes once DITRDLG have made the necessary amendments to the ADR. This process may take 18 months or longer once resources are allocated to the project.

The increased use of recumbent cycles is of concern in road safety terms due to their poor visibility on NSW roads. In January this year, South Australia's Department of Transport, Energy and Infrastructure put forward a proposal to amend the Australian Road Rules to include a requirement that the riders of recumbent cycles must display a red flag above the height of the cycle to improve their visibility to other road users. This was not strongly supported by other jurisdictions. Most recumbent cyclists display a safety flag of their own accord and mandating this was not seen necessary.

Riders on recumbent cycles are significantly lower to the ground than a standard bicycle rider's helmet position. This makes the rider and their bicycle very difficult to see in normal traffic conditions. Drivers of vehicles on multi lane roads, for example, would not be able to see a recumbent bicycle travelling on another side of, or at the other end of a vehicle in their lane or the lane immediately next to them, making lane change manoeuvring and overtaking particularly risky. This poor visibility increases the risk of injury or death to the recumbent cyclist compared to other bicycle riders.

Although there may be limited crash data to suggest a problem exists, with the rapidly increasing uptake of bicycles for both commuting and leisure, it is a safety issue worthy of reconsideration.

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