

Road Environment Safety Update



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Rural road crash rates by road stereotype

Introduction

Crash rates have proven to be a useful performance indicator for a wide range of road and traffic engineering projects. In a route development program, crash rates can be used to determine relative priorities for projects such as re-alignment works, duplications and by-passes. Similarly, crash rates can be used for the prioritisation and programming of road safety improvement works, such as accident blackspot and mass action treatments. Road maintenance programs can also use historic crash performance in the planning and funding process.

In 1993, the Road Safety Bureau of the Roads and Traffic Authority (RTA) completed a study that determined average crash rates for a selection of different rural road stereotypes. The crash rates were calculated using a three year dataset from 1988 to 1990. Each road stereotype was defined by a combination of road attributes such as shoulder and lane width, and clear zone provision. The study showed the relative differences in crash performance as the road attributes changed. By providing crash rates for each road stereotype, it is also possible to identify the road attributes that have exhibited a better crash performance and ensure that these attributes are designed into new projects.

In order to account for more recent network conditions since the 1993 study, a project was undertaken to update the stereotypical crash rates for rural roads. A database model has also been developed to derive crash rates for additional road stereotypes (ie. incorporating more attributes).

The purpose of this Road Environment Safety Update is to provide more up to date crash rates for each of the road stereotypes as identified in the 1993 study. A separate Road Environment Safety Update will be developed upon finalisation of the database model and will detail its application with respects to road safety and road network infrastructure planning.

Definitions

- Crash rate:** The number of crashes per 100 million vehicle kilometres travelled (MVKT).
- Road attributes:** Design elements of the roadway such as median width, shoulder width, number of lanes, speed limits etc.
- Road stereotype:** A combination of road attributes and their varying dimensions.

Rural road crash rates by road stereotype

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VKT: Vehicle Kilometres Travelled. This is a measure of exposure to a crash event. One VKT is equivalent to one vehicle travelling a distance of one kilometre or alternatively, two vehicles travelling for a distance of half a kilometre. In this study, crash rates have been expressed per 100 million vehicle kilometres travelled.

Background

As a part of the 1993 study, a report entitled *Rural Crash Rates – Road Stereotypes Summary Report* (Johansen, 1993) was published and should be referenced as background information. In updating the stereotypical crash rates, a similar approach as undertaken in the 1993 study was used.

The updated crash rates are attached in Appendix A. The crash rates were calculated using the five year crash dataset between 1/1/1997 and 31/12/2001 for a sample of 10,000km of main roads across NSW. These sample roads were considered to be an adequate representation of all rural roads in NSW. A road attribute data logging exercise was undertaken using AssetLoc – a Windows based program for measuring and recording road attributes using Gipsicam¹ images. The collected data included shoulder, lane and median widths, speed limits, edge and centreline types, number of lanes, accesses, horizontal and vertical alignment and clear zone objects. The surveyed routes are listed in Appendix B.

The collected data allowed for the identification of discrete road segments which all had different combinations of road attribute measurements. Once the road segments were identified, the number of crashes (using the five year crash dataset from 1/1/1997 to 31/12/2001) could be determined for each segment. Traffic volume data and road segment lengths were used to determine the million-vehicle-kilometres-travelled (MVKT) to enable the crash rates to be expressed per 100 MVKT.

The road attribute, crash and traffic data were all combined in a database model, which enabled the derivation of crash rates for any defined road stereotype (defined by a combination of the available attribute data). Only segments greater than 2km in length were included in the analysis to avoid inclusion of localised changes to road conditions, eg. the reduction in shoulder widths at cross carriageway culverts for short lengths of road.

Summary of results

In Johansen's (1993) report, the following output tables were provided:

- Table 1: Crash rates for all road design elements combined
- Table 2: Crash rates for each road stereotype where the shoulder widths were less than 1.0m
- Table 3: Crash rates for each road stereotype where the shoulder widths were greater than 1.0m
- Table 4: Crash rates for each road stereotype with a hazardous clear zone
- Table 5: Crash rates for each road stereotype with a non-hazardous clear zone
- Table 6: Crash rates for each road stereotype with lane widths less than 3.0m
- Table 7: Crash rates for each road stereotype with lane widths between 3.0-3.5m
- Table 8: Crash rates for each road stereotype with lane widths greater than 3.5m

For comparative purposes, the revised crash rates have also been shown in similar output tables in Appendix A. Appendix A also includes footnotes regarding the assumptions used in the determination of road attributes. When using the results provided, the length of road (sample size) should be taken into account. Results based on sample lengths less than 10km may not accurately reflect the average state-wide crash rate for the road stereotype.

As expected, the average crash rates for road types decreased as the level of interaction between vehicles reduced. Figure 1 shows crash rates for single carriageway road types. There is a substantial reduction in crash rate with the addition of auxiliary lanes. There is also a noticeable reduction in crash rates as opposing flows are separated.

¹ Gipsicam is the Global/Inertial Positioning Systems Image Capture for Asset Mapping. This is a special-purpose vehicle-mounted image capture survey system devised, owned and operated by the Roads and Traffic Authority of NSW.

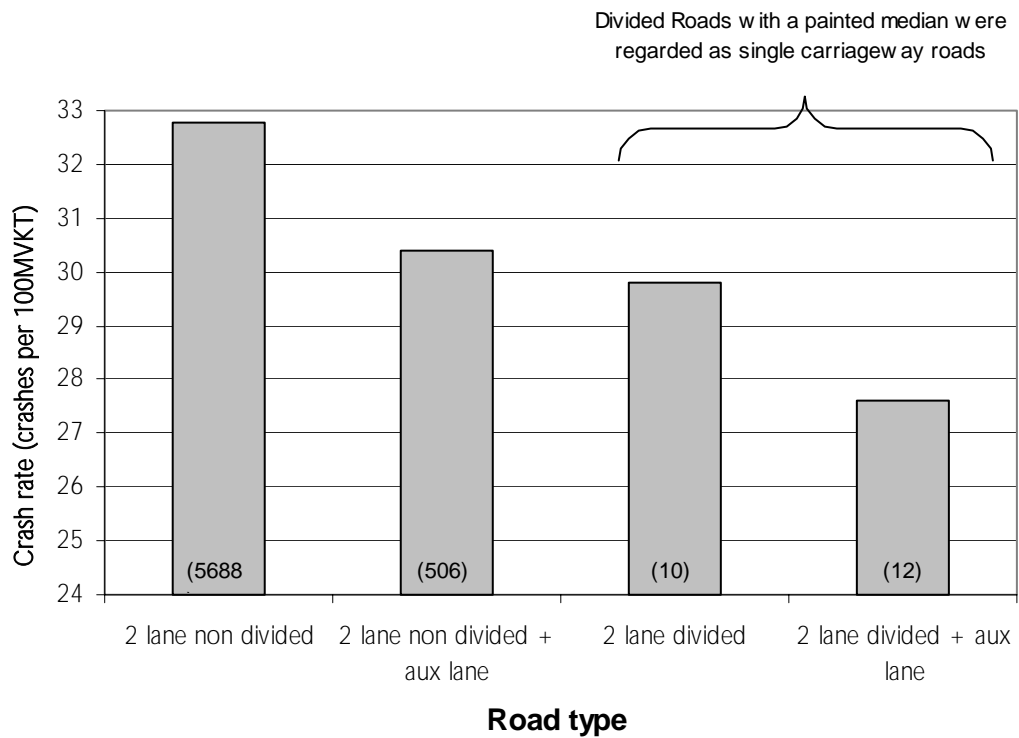


Figure 1: Average Crash Rates for Single Carriageway Roads. NB. Sample length (km) of road shown in brackets.

Similarly, the crash rates for dual carriageway roads also reduced as the level of interaction between vehicles reduced. Figure 2 shows the reduction in crash rates between a four-lane divided road and a four-lane divided road built to freeway standards. A single direction crash rate was calculated for these road types as crash events could be exclusively assigned to a specific direction (ie. there was no interaction between vehicles of opposing directions). As such, the roads were referred to as divided roads with two lanes per direction and freeways with two lanes per direction respectively.

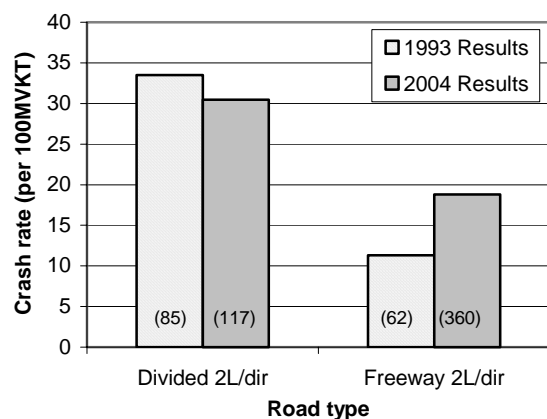


Figure 2: Average Crash Rates for Dual Carriageway Roads. NB. Sample length (km) of road shown in brackets.

As seen in Figure 3, the 1993 study, which used three years of crash data and a sample of approximately 2,200km of road, showed that roads with sealed shoulders greater than 1.0m had 42% less crashes per 100MVKT than roads with shoulders less than 1.0m. Similarly, the 2004 study, which used five years of crash data and a sample of 6,700km of road, showed a 33% reduction in crashes per 100MVKT. The graph also highlights the overall improvement in road safety performance between the two periods.

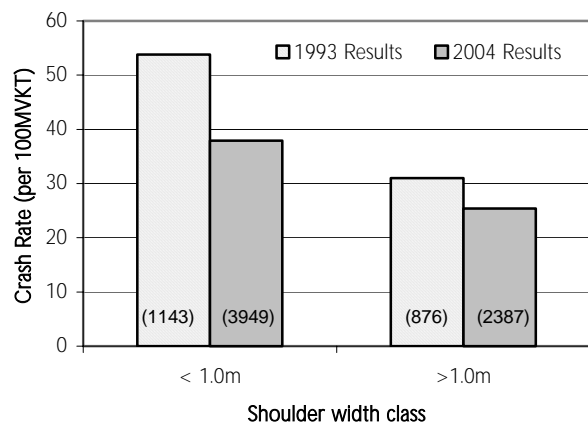


Figure 3: Crash Rates for all roads by shoulder width class. NB. Sample length (km) of road shown in brackets.

Figure 4 shows the relative changes in road safety performance as the lane widths increase from less than 3.0m to greater than 3.5m. The 1993 results have also been displayed to allow comparison in the crash trends.

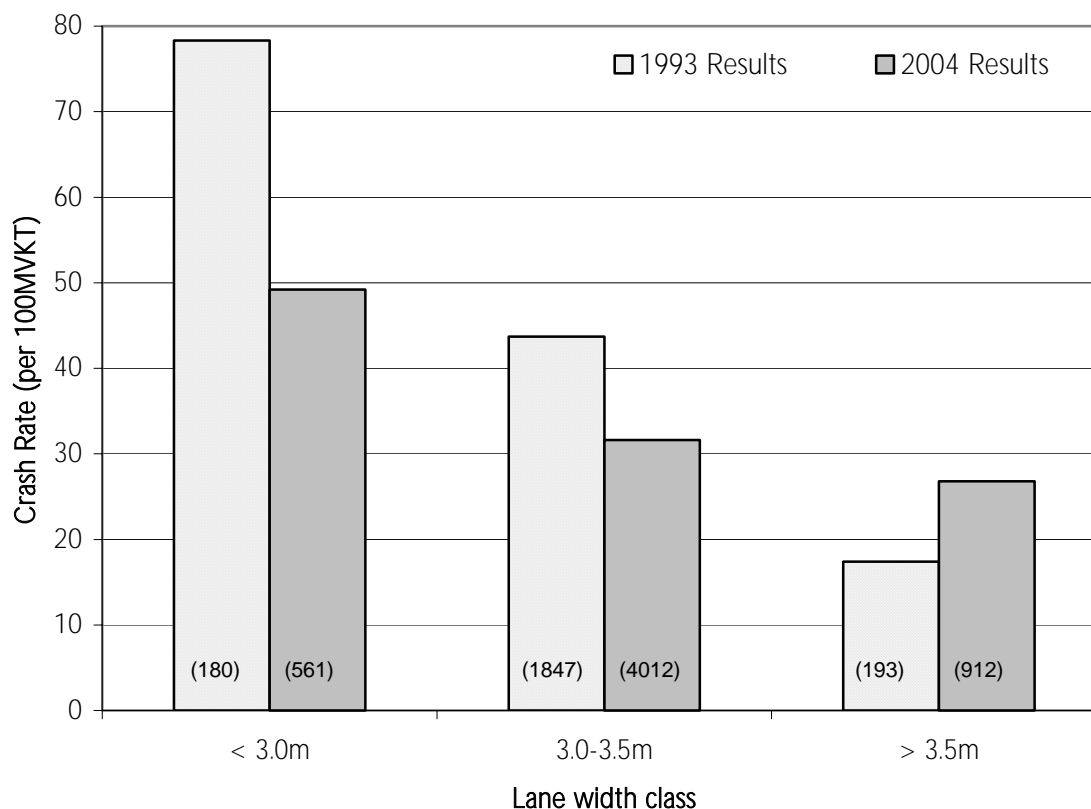


Figure 4: Crash Rates for all roads by lane width class NB. Sample length (km) of road shown in brackets.

As seen in Figure 4, both the 1993 study and 2004 study showed a decrease in crash rates as the lane widths increased. However, in the 2004 study, the relative reduction in crash rates between roads with lane widths between 3.0-3.5m and greater than 3.5m differed significantly from the 1993 trend. Both studies had reasonable sample sizes addressing any potential bias of data due to isolated stretches of poor performing roads. No attempt has been made to justify this apparent discrepancy.

References

Johansen, P. (1993) *Rural Crash Rates – Road Stereotypes: Summary Report*, RTA, NSW



Further information:



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www.rta.nsw.gov.au

Appendix A: Rural road crash rates by road stereotypes – Table of results

Important notes on tables

- Roads that were classified as urban sections were not included in the analysis. Urban sections were defined as those with a speed limit of 60km/h or less, or where the surrounding environment was built up. All other sections not exhibiting these characteristics were classified as rural sections and were included in the analysis.
- The crash rates provided in this Appendix were calculated using the five-year crash dataset from 1/1/1997 to 31/12/2001.
- Crash rates were provided as either a uni-direction or a bi-direction crash rate depending on the road type. A bi-direction crash rate was provided for any road type where there is a potential interaction between vehicles travelling in opposite directions. This interaction may include head-on crash potential, vehicle-vehicle friction from right turn movements and side swipe friction between opposing flows. Divided roads where the median separation is painted, paved and fully traversable by road vehicles were assigned a bi-direction crash rate due to vehicle-vehicle interaction caused by right turn movements and head-on/side swipe crash potential involving vehicles travelling in opposite directions.
- Divided roads with 2 lanes per direction include all sections of divided roads with 1 lane per direction and an auxiliary lane. Similarly, divided roads with 3 lanes per direction include all sections of divided roads with 2 lanes per direction and an auxiliary lane. Freeways with 3 lanes per direction include sections of Freeways with 2 lanes per direction and an auxiliary lane.
- An auxiliary lane was defined as an extra lane longer than 400m in length, which is not provided in the opposing direction.
- **When using the results provided, the length of road (sample size) should be taken into account. Results based on relatively small sample lengths (ie. less than 50km) may not be an accurate reflection of the average crash rates for that road stereotype.**

Table 1: Crash rates by major road types - All design elements combined

ALL ROAD DESIGN ELEMENTS COMBINED	Bi-directional crash rate						Uni-directional crash rate					
	2L non DVD	2L non DVD + aux lane	2L non DVD unsealed	2L DVD (painted median)	2L DVD (painted median) + aux lane	4L non DVD	DVD 1L/dir	DVD 2L/dir	DVD 3L/dir	FWY 2L/dir	FWY 3L/dir	All road types
All Crashes	32.8	30.4	No data	29.8	27.6	No data	24.0	30.5	16.0	18.8	31.0	30.0
Fatal Crashes	1.4	1.3	No data	3.3	1.5	No data	0.0	0.7	1.5	0.3	0.3	1.1
Injury Crashes	14.2	12.2	No data	12.5	10.5	No data	9.4	11.9	4.4	5.9	8.0	12.2
Non Injury Crashes	17.2	16.9	No data	14.1	15.6	No data	14.7	17.8	10.2	12.7	22.8	16.6
Non Intersection Crashes	28.6	27.6	No data	24.4	27.1	No data	22.7	21.3	16.0	18.4	30.9	26.6
Intersection Crashes	4.2	2.8	No data	5.4	0.5	No data	1.3	9.1	0.0	0.4	0.1	3.4
Length of road (km)	5688.2	506.3	No data	10.6	11.9	No data	7.5	117.1	2.9	360.3	29.7	6734.3
Total no. of Crashes	6718	1477	No data	55	55	No data	18	451	11	984	376	10145

Table 2: Crash rates by major road types – Sealed shoulder widths less than 1.0m

SHOULDER WIDTH < 1 METRE SEALED	Bi-directional crash rate						Uni-directional crash rate					
	2L non DVD	2L non DVD + aux lane	2L non DVD unsealed	2L DVD (painted median)	2L DVD (painted median) + aux lane	4L non DVD	DVD 1L/dir	DVD 2L/dir	DVD 3L/dir	FWY 2L/dir	FWY 3L/dir	All road types
All Crashes	38.1	36.2	No data	No data	32.1	No data	No data	65.9	No data	27.9	No data	37.9
Fatal Crashes	1.4	1.2	No data	No data	1.2	No data	No data	2.6	No data	0	No data	1.3
Injury Crashes	17.0	14.5	No data	No data	12.6	No data	No data	25.5	No data	13.2	No data	16.5
Non Injury Crashes	19.7	20.5	No data	No data	18.4	No data	No data	37.8	No data	14.7	No data	20.0
Non Intersection Crashes	33.7	32.7	No data	No data	32.1	No data	No data	42.2	No data	27.9	No data	33.5
Intersection Crashes	4.4	3.5	No data	No data	0	No data	No data	23.7	No data	0	No data	4.4
Length of road (km)	3668.1	261.9	No data	No data	5.7	No data	No data	8.5	No data	4.2	No data	3948.5
Total no. of Crashes	3632	844	No data	No data	28	No data	No data	75	No data	19	No data	4598

Notes:

- For roads where a bi-directional crash rate was provided, sealed shoulder width classification was based on the side of the road with the narrowest sealed shoulder. For example, if a section of road had a 1.2m sealed shoulder on one side and a 0.8m sealed shoulder on the other, then the road was classified as having shoulders less than 1.0m.
- For roads where a uni-directional crash rate was provided, sealed shoulder width classification was based on the left side shoulder only. The right side shoulder was considered to be part of the median. The left side shoulder on the opposing carriageway was not relevant as it only governed what shoulder class the opposing carriageway was placed in.

Table 3: Crash rates by major road types – Sealed shoulder widths greater than 1.0m

SHOULDER WIDTH > 1 METRE SEALED	Bi-directional crash rate						Uni-directional crash rate					
	2L non DVD	2L non DVD + aux lane	2L non DVD unsealed	2L DVD (painted median)	2L DVD (painted median) + aux lane	4L non DVD	DVD 1L/dir	DVD 2L/dir	DVD 3L/dir	FWY 2L/dir	FWY 3L/dir	All road types
All Crashes	28.5	24	No data	29	24.8	No data	18.5	27.4	16	18.7	30.5	25.4
Fatal Crashes	1.5	1.2	No data	2.8	2	No data	0	0.6	1.5	0.3	0.3	1
Injury Crashes	11.9	9.9	No data	12.3	8.9	No data	5.7	10.6	4.4	5.8	7.6	9.7
Non Injury Crashes	15.2	12.8	No data	13.9	13.9	No data	12.8	16.3	10.2	12.6	22.7	14.7
Non Intersection Crashes	24.5	21.8	No data	23.4	23.8	No data	17.1	19.7	16	18.3	30.4	22.6
Intersection Crashes	4	2.1	No data	5.6	1	No data	1.4	7.8	0	0.4	0.1	2.8
Length of road (km)	1682	191.8	No data	10.3	5.6	No data	6.1	103	2,863	355.9	29.1	2386.5
Total no. of Crashes	2739	492	No data	52	25	No data	13	356	11	965	363	5016

Notes:

- For roads where a bi-directional crash rate was provided, sealed shoulder width classification was based on the side of the road with the narrowest sealed shoulder. For example, if a section of road had a 1.2m sealed shoulder on one side and a 0.8m sealed shoulder on the other, then the road was classified as having shoulders less than 1.0m.
- For roads where a uni-directional crash rate was provided, sealed shoulder width classification was based on the left side shoulder only. The right side shoulder was considered to be part of the median. The left side shoulder on the opposing carriageway was not relevant as it only governed what shoulder class the opposing carriageway was placed in.

Table 4: Crash rates by major road types – Hazardous clear zone

HAZARDOUS CLEAR ZONE	Bi-directional crash rate						Uni-directional crash rate					
	2L non DVD	2L non DVD + aux lane	2L non DVD unsealed	2L DVD (painted median)	2L DVD (painted median) + aux lane	4L non DVD	DVD 1L/dir	DVD 2L/dir (total)	DVD 3L/dir	FWY 2L/dir	FWY 3L/dir	All road types
All Crashes	33.4	41.1	No data	No data	No data	No data	No data	No data	No data	No data	No data	34.2
Fatal Crashes	0.6	0	No data	No data	No data	No data	No data	No data	No data	No data	No data	0.6
Injury Crashes	12.8	10.3	No data	No data	No data	No data	No data	No data	No data	No data	No data	12.6
Non Injury Crashes	19.9	30.8	No data	No data	No data	No data	No data	No data	No data	No data	No data	21.1
Non Intersection Crashes	32.7	41.1	No data	No data	No data	No data	No data	No data	No data	No data	No data	33.7
Intersection Crashes	0.6	0	No data	No data	No data	No data	No data	No data	No data	No data	No data	0.6
Length of road (km)	44.7	3	No data	No data	No data	No data	No data	No data	No data	No data	No data	47.7
Total no. of Crashes	52	8	No data	No data	No data	No data	No data	No data	No data	No data	No data	60

Notes:

- Roads were subjectively classified as having hazardous or non-hazardous clear zones. A “hazardous” clear zone is one where the risk and severity of a run-off-road crash into a road side hazard would be high. A non-hazardous clear zone is one where the risk and severity of impacting a road side hazard would be low.
- For roads where a bi-directional crash rate was provided, the clear zone was regarded as being “hazardous” if one or both sides of the road had a hazardous clear zone by the above definition. For roads where a uni-directional crash rate was provided, only the left side clear zone was used in the classification of road by clear zones. The right side of the road was considered to be part of the median. The left side clear zone of the opposing direction was not relevant as it only governed what clear zone class the opposing carriageway was placed in.

Table 5: Crash rates by major road types – Non-hazardous clear zone

NON HAZARDOUS CLEAR ZONE	Bi-directional crash rate						Uni-directional crash rate					
	2L non DVD	2L non DVD + aux lane	2L non DVD unsealed	2L DVD (painted median)	2L DVD (painted median) + aux lane	4L non DVD	DVD 1L/dir	DVD 2L/dir	DVD 3L/dir	FWY 2L/dir	FWY 3L/dir	All road types
All Crashes	28.4	23.8	No data	35.0	19.9	No data	18.9	27.3	16.0	18.7	30.5	25.3
Fatal Crashes	1.5	1.2	No data	3.6	1.1	No data	0.0	0.6	1.5	0.3	0.3	1.0
Injury Crashes	11.8	9.9	No data	15.0	8.8	No data	5.8	10.5	4.4	5.8	7.6	9.6
Non Injury Crashes	15.1	12.6	No data	16.4	9.9	No data	13.1	16.2	10.2	12.6	22.7	14.7
Non Intersection Crashes	24.4	21.7	No data	27.8	18.8	No data	17.5	19.5	16.0	18.3	30.4	22.5
Intersection Crashes	4.1	2.20	No data	7.1	1.1	No data	1.5	7.8	0.0	0.4	0.1	2.9
Length of road (km)	1637.3	188.8	No data	8.5	5.0	No data	5.9	102.7	2.9	355.9	29.1	2336.0
Total no. of Crashes	2687	484	No data	49	18	No data	13	353	11	965	363	4943

Notes:

- Roads were subjectively classified as having hazardous or non-hazardous clear zones. A “hazardous” clear zone is one where the risk and severity of a run-off-road crash into a road side hazard would be high. A non-hazardous clear zone is one where the risk and severity of impacting a road side hazard would be low.
- For roads where a bi-directional crash rate was provided, the clear zone was regarded as being “hazardous” if one or both sides of the road had a hazardous clear zone by the above definition. For roads where a uni-directional crash rate was provided, only the left side clear zone was used in the classification of road by clear zones. The right side of the road was considered to be part of the median. The left side clear zone of the opposing direction was not relevant as it only governed what clear zone class the opposing carriageway was placed in.

Table 6: Crash rates by major road types – Lane widths less than 3.0m

LANE WIDTHS LESS THAN 3 METRES	Bi-directional crash rate						Uni-directional crash rate					
	2L non DVD	2L non DVD + aux lane	2L non DVD unsealed	2L DVD (painted median)	2L DVD (painted median) + aux lane	4L non DVD	DVD 1L/dir	DVD 2L/dir	DVD 3L/dir	FWY 2L/dir	FWY 3L/dir	All road types
All crashes	50.7	34	No data	24.5	No data	No data	No data	No data	No data	No data	No data	49.2
Fatal Crashes	1.5	0	No data	3	No data	No data	No data	No data	No data	No data	No data	1.5
Injury Crashes	21.5	18.3	No data	6.1	No data	No data	No data	No data	No data	No data	No data	20.9
Non Injury Crashes	27.7	15.6	No data	15.3	No data	No data	No data	No data	No data	No data	No data	26.8
Non Intersection Crashes	47.9	31.3	No data	21.4	No data	No data	No data	No data	No data	No data	No data	46.3
Intersection crashes	2.84	2.6	No data	3	No data	No data	No data	No data	No data	No data	No data	2.8
Length of road (km)	550.8	7.9	No data	2	No data	No data	No data	No data	No data	No data	No data	560.8
Total no. of crashes	464	13	No data	8	No data	No data	No data	No data	No data	No data	No data	485

Notes:

- For roads where a bi-directional crash rate was provided, lane width classification was based on the width of the narrowest lane (irrespective of the direction of travel). For example, if a 2 lane undivided section of road one lane 3.2m wide and the other lane 2.9m, then it was classified as a road with lane widths less than 3.0m.
- For roads where a uni-directional crash rate was provided, lane width classification was based on the width of the narrowest lane within that carriageway. For example, if one carriageway of a 6 lane divided road had 3 lanes with widths measurements at 2.9m, 3.2m and 3.1m, then it was classified as a road with lane widths less than 3.0m.

Table 7: Crash rates by major road types – Lane widths between 3.0m and 3.5m

LANE WIDTHS 3.0-3.5 METRES	Bi-directional crash rate						Uni-directional crash rate					
	2L non DVD	2L non DVD + aux lane	2L non DVD unsealed	2L DVD (painted median)	2L DVD (painted median) + aux lane	4L non DVD	DVD 1L/dir	DVD 2L/dir	DVD 3L/dir	FWY 2L/dir	FWY 3L/dir	All road types
All Crashes	32.2	30.2	No data	20.3	25.5	No data	18	24.5	No data	23.2	No data	31.6
Fatal Crashes	1.4	1.4	No data	0	1.6	No data	0	0	No data	0	No data	1.4
Injury Crashes	14	11.6	No data	15.2	9.6	No data	3	10.2	No data	9.5	No data	13.4
Non Injury Crashes	16.8	17.2	No data	5.1	14.4	No data	15	14.3	No data	13.7	No data	16.8
Non Intersection Crashes	28.4	27.6	No data	18.6	25.5	No data	15	21.5	No data	21.1	No data	28
Intersection Crashes	3.8	2.6	No data	1.7	0	No data	3	3.1	No data	2.1	No data	3.5
Length of Road (km)	3658.9	306.9	No data	3.4	8.4	No data	3.6	17.3	No data	13.6	No data	4011.9
Total no. of Crashes	4280	887	No data	12	32	No data	6	48	No data	22	No data	5287

Notes:

- For roads where a bi-directional crash rate was provided, lane width classification was based on the width of the narrowest lane (irrespective of the direction of travel). For example, if a 2 lane undivided section of road one lane 3.4m wide and the other lane 3.6m, then it was classified as a road with lane widths between 3.0m and 3.5m.
- For roads where a uni-directional crash rate was provided, lane width classification was based on the width of the narrowest lane within that carriageway. For example, if one carriageway of a 6 lane divided road had 3 lanes with widths measurements at 3.4m, 3.6m and 3.3m, then it was classified as a road with lane widths between 3.0m and 3.5m.

Table 8: Crash rates by major road types – Lane widths greater than 3.5m

LANE WIDTHS GREATER THAN 3.5M	Bi-directional crash rate						Uni-directional crash rate					
	2L non DVD	2L non DVD + aux lane	2L non DVD unsealed	2L DVD (painted median)	2L DVD (painted median) + aux lane	4L non DVD	DVD 1L/dir	DVD 2L/dir	DVD 3L/dir	FWY 2L/dir	FWY 3L/dir	All road types
All Crashes	36.1	34.1	No data	36.2	No data	No data	No data	28.3	No data	18.9	32.2	26.8
Fatal Crashes	1.2	2.0	No data	8.5	No data	No data	No data	1.1	No data	0.2	0.3	0.7
Injury Crashes	15.2	13.0	No data	19.2	No data	No data	No data	11.3	No data	6.0	8.1	9.6
Non Injury Crashes	19.6	19.1	No data	8.5	No data	No data	No data	16.0	No data	12.7	23.9	16.5
Non Intersection Crashes	30.1	31.4	No data	19.2	No data	No data	No data	18.8	No data	18.7	32.1	24.0
Intersection Crashes	6.0	2.7	No data	17.0	No data	No data	No data	9.5	No data	0.2	0.1	2.8
Length of road (km)	467.3	81.0	No data	2.4	No data	No data	No data	80.1	No data	255.0	26.2	912.0
Total no. of crashes	790	277	No data	17	No data	No data	No data	294	No data	827	363	2588

Notes:

- For roads where a bi-directional crash rate was provided, lane width classification was based on the width of the narrowest lane (irrespective of the direction of travel). For example, for a 2 lane undivided section of road to be classified as a road with lanes greater than 3.5m, all travel lanes must be greater than 3.5m.
- For roads where a uni-directional crash rate was provided, lane width classification was based on the width of the narrowest lane within that carriageway. For example, for one carriageway of a divided road to be classified as having lanes greater than 3.5m, then all lanes within that carriageway must have lane widths greater than 3.5m.

Appendix B: Surveyed routes

Route no.	Route name	Distance (km)
1	Princes Hwy	522
10	Pacific Hwy, north of Hexham	692
12	Gwyder Highway (east of Moree)	365
18	Castlereagh Highway (Lithgow to Newell)	320
19	Monaro Highway	206
25	Illawarra Highway	62
27	Golden Highway	313
83	Summerland Way	197
503	Windsor – Mt. Thorley (The Putty Road – Singleton Road)	156
6003	Sydney-Newcastle Freeway	127
2	Hume Highway	547
3	Federal Highway	66
4	Snowy Mountains Highway	287
5	Great Western Highway	83
6	Mid Western Highway	227
7	Mitchell Highway	481
9	New England Highway	583
11	Oxley Highway	621
14	Sturt Highway	591
15	Barton Highway	41
16	Bruxner Highway	273
17	Newell Highway	1059
20	Riverina Highway	215
29	Kamilaroi Highway	185
56	Yass-Cawra-Forbes Road	159
63	Tamworth-Yetman Road	189
73	Walcha-Inverell Road	157
76	Waterfall Way	170
78	Olympic Highway	315
80	Irrigation Way	197
108	Nelson Bay Road	50
245	Blayney-Orange Road	39
261	Cambewarra Road	57
286	Kosciuszko Road	96
310	Cowra-Cudal Road	67
677	Alpine Way	103
	Total	9818