2010-2014 ROAD SAFETY DATA REPORT

HIGHLANDS HIGHWAY PROVINCES

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Prepared by: .....
Tim Selby
Road Safety Specialist to the RTA

.....
Wilson Wariaka
Manager Road Safety
Road Traffic Authority

Approved by .....
Nelson Terema
Chief Executive Officer
Road Traffic Authority

Road Traffic Authority
PO Box 8560
Boroko
National Capital District
PNG

Tel: + (675) 325 0722
Fax: + (675) 311 3290
Website: www.rta.gov.pg

Contents

Executive Summary

The Road Traffic Authority (RTA) has a responsibility to '*monitor the road safety performance of the public road network'* (Section 5(2)(d) of the Road Traffic Act) as well as maintaining and preserving records in order to assist, advise and work cooperatively with its stakeholders in relation to land transport regulatory matters, road safety and the efficient use of land transport (Sections 5(2)(c) and (e) of the Road Traffic Act). One way that it can achieve the above is by collating and analysing the crash data that is reported to and recorded by the Police and subsequently sharing this information to its partner agencies and the public. This Road Safety Data Report is just one example of information provided by the RTA.

Specifically, this Data Report helps identify road safety issues in PNG by presenting local facts and figures related to those provinces that are primarily immediately impacted upon by the Highlands Highway. As such, it has been specifically prepared to support work being funded by the Asian Development Bank (ADB) with regards to the Sustainable Highlands Highway Investment Program (SHHIP) as well as to provide a baseline for the ADB from which to monitor road safety performance in the future with regards to the impact on road safety that SHHIP has had. Those Provinces highlighted by the ADB as being most affected by SHHIP for consideration and inclusion in this data report are:

- Western Highlands;
- Jiwaka[1];
- Chimbu;
- Eastern Highlands; and
- Morobe.

It is acknowledged and highlighted that despite this Data Report being prepared in 2019, the most recently available information in the crash database is for a period up to 2014[2]. As such, the five-year period between 2010 and 2014 has been used for the analysis of the crash data. A five-year period (rather than a single year) has been used given that reported crash and casualty data can fluctuate from year to year, with a five-year average providing a reasonably sound statistical basis to identify common road safety issues.

The information contained in this specific Data Report is primarily intended to assist the ADB, PNG Government, road controlling authorities (such as the Department of Works – DoW, the National Roads Authority – NRA, and other regional Provincial and Local Level Governments), the Royal PNG Constabulary (Police) and the RTA (for instance when undertaking awareness/education campaigns) with understanding road safety issues in parts of the Highlands and Momase Regions of PNG. Researchers, consultants, students and other organisations with an interest in road safety (such as Motor Vehicle Insurance Limited - MVIL) will also find the information useful.

[1] It should be noted that the crash database is currently configured such that Jiwaka is not split out into a separate Province, but is incorporated into the Western Highlands data given that it was split from Western Highlands in 2012 (i.e. after the database was originally set-up).

[2] The database is consistently being updated with more recent crash information from 2015 onwards.

This Road Safety Data Report primarily contains information relating to fatal and injury road crashes/casualties that have been reported to the Police. As part of this, it sets out common contributory factors identified by the Police associated with the road environment, road user behaviour and vehicles. Whilst it is focussed on those crashes that have occurred in the identified provinces, it also provides base national data to put the crash and casualty numbers into context. As part of this, it is acknowledged that actual number of road crashes, deaths and injuries is likely to be much greater than the reported amount. Modelling work set out in the World Health Organisation (WHO) Global Status Report on Road Safety 2018 estimates that due to under-reporting, the actual number of road deaths in PNG could be three times greater than the number reported. The under-reporting of less severe crashes can be expected to be even greater.

Overall, there were 4,269 reported crashes in total in the five Provinces during the five-year period between 2010 to 2014, resulting in 7,439 known deaths and/or injuries. This can be broken down into 610 fatalities, 4,350 serious injures involving hospitalisation and 2,454 minor injuries (as well as 25 injuries with unknown severity). In terms of injury crashes (i.e. excluding damage only crashes), on average, 3.1 people were killed or injured in each crash – slightly above the national average. Overall, the Provinces make up 41% of all casualty crashes (37% of fatal crashes) and 47% of all casualties (40% of fatal casualties) in PNG.

Whilst the most crashes occur in Morobe (due to the larger number of damage only reported crashes), Western and Eastern Highlands have the highest number of reported casualties. The most fatalities occurred in Western Highlands (274 over the five-year period) whilst the largest number of seriously injured casualties occurred in Eastern Highlands (2,050 reported serious injury casualties between 2010 and 2014).

In line with the original ADB performance measures and indicators for the future upgrade to the Highlands Highway, a breakdown of the reported road fatality data by Province and road user type (as well as the length of the Highlands Highway) is provided below as an initial road safety baseline for the SHHIP project.

Table 1. Provincial Fatal Casualty Data

Province	2010-2014 Fatalities			Annual Average Fatalities			Length (km)	Annual Road Fatalities per km
	Driver	Passenger	Ped	Driver	Passenger	Ped		
Morobe	18	73	62	3.6	14.6	12.4	159.7	0.19
EHP	13	61	54	2.6	12.2	10.8	187.7	0.14
Chimbu	5	20	30	1	4	6	46.8	0.24
WHP	18	121	135	3.6	24.2	27	102.8	0.53
Total	54	275	281	10.8	55	56.2	497.0	0.25

Accordingly, a baseline of 0.25 reported fatalities (i.e. fatal casualties, not fatal crashes) per km per year exists using the 2010-2014 average for the combined identified Provinces. As indicated, Western Highlands Province is a particular road safety risk with double the annual road fatality rate compared to the region as a whole. As part of this, pedestrians were particularly at risk compared to other road users in Western Highlands Province.

A further breakdown of the fatal casualties for the Highlands Highway Provinces by known age and gender is shown in Table 2 overleaf. As indicated, over 70% of reported fatal casualties

are male. It is noted however that females aged 10 years and below are over-represented in fatal casualty data compared to other ages.

Table 2. Provincial Fatal Casualties - Age and Gender Split

Age	Gender		Total
	Male	Female	
0-10	9%	8%	17%
11-20	13%	3%	17%
21-30	17%	5%	23%
31-40	15%	5%	20%
41-50	10%	4%	14%
51-60	5%	2%	7%
61-70	1%	1%	2%
Total	71%	29%	100%

The crash data indicates that overall for the specific provinces:

- Collisions with pedestrians along with single vehicle overturn/run-off road crashes are the most common type of crash –
  - Whilst 17% of crashes were 'overturn' type collisions, they resulted in 29% of all fatalities and casualties.
  - Utility vehicles (utes/pick-ups) were the main type of reported vehicle in overturn crashes.
- Speed/loss of control and inattention along with drink-driving are major contributory factors to crashes in terms of road user behaviour –
  - 11% of all crashes were reported as 'alcohol suspected' or tested positive. On Saturdays however, this increases to approximately 20% (i.e. almost double).
- Pedestrians along with passengers in the back of trucks, utes and PMVs/buses are those road users that are most commonly killed and/or injured in a road crash –
  - 70% of casualties outside in the rear of a utility vehicle were killed or seriously injured, compared with 62% of casualties sitting inside the vehicle (as a passenger or driver).
  - 40% of all pedestrians killed and/or injured were aged 15 years or less.

1. Introduction and General Information

1.1 Background

To put road safety issues into perspective on a global scale, the World Health Organisation (WHO) forecasts that road traffic deaths will rise to become the fifth leading cause of death by 2030 (ranked as ninth in 2004), ahead of issues such as HIV/AIDS[3]. Furthermore, for the Western Pacific Region (which includes Papua New Guinea), the WHO *Global Burden of Disease – 2004 Update* project indicates that injuries sustained as a result of a road traffic crash are the primary cause of death for people between 15 and 44 years of age, and the second main cause of death for children between 5 and 14 years of age in the Region.

Whilst reported crash data has been collated by the Police for a number of years in Papua New Guinea (PNG), very little formal review, analysis and dissemination of the information has occurred. As such, in 2009, the National Road Safety Council (NRSC) – which subsequently became the Road Traffic Authority (RTA), received Government funding to set up a database utilising crash reports prepared by the Police to try and better understand the extent of the road safety problem in PNG, along with identifying the main contributory factors and crash locations. Whilst the NRSC/RTA has endeavoured to use the database to guide its road safety activities, formal national reporting was restricted to a single year - 2007 (given that more recent data was still being entered into the crash database with a time lag existing between a crash occurring and the report reaching the NRSC/RTA to enter it into the database). More recent crash data however has now been entered into the database allowing a larger and more detailed analysis to occur.

Strategic Framework

It is acknowledged that the Government's Vision 2050 and the PNG Development Strategic Plan 2010-2030 do not specifically highlight road safety as an issue. This, however, is perhaps unsurprising given the lack of quality information made available to politicians and the public over recent years concerning the scale of the problem.

Notwithstanding the above, targets relating to health (e.g. life expectancy), disability and standards of living (e.g. economic impacts) are set out in these strategic documents, which in turn are particularly relevant to road safety given that road deaths and injuries are a major contributor to the shortening of people's lives and/or the cause of disability. Furthermore, research has shown that those people that are involved in a road crash are usually in the age range that can be considered the most economically active. Reducing the number of people being killed and/or injured in PNG can therefore strongly contribute to meeting the Government's strategic objectives.

Following the preparation of the above guiding national plans, the National Transport Strategy (NTS) developed in 2013 set out the transport sector's overall policy principles and the approach to be adopted across all three modes of transport. As part of this, the Strategy specifically highlights that safety "continues to be a concern" and will "be an

[3] World Health Organisation. Road Safety in the Western Pacific Region – Call for Action (2008)

area of high priority." Amongst a range of policies aimed at road safety (along with identified safety initiatives) includes the "development of safety action plans in each transport mode backed by improved databases of accidents and incidents with monitorable targets and reporting of achievement".

In addition to the above, the NTS provides guidance with respect to expected transport demand and future growth in terms of the population, the economy and increasing road transport usage. Whilst not explicitly stated, these elements in turn will have a major impact on road safety without any action being taken to address it given the increase in exposure to risk as a result of additional traffic on the road.

Furthermore, the Medium Term Development Plan (MTDP) III (2018-2022) highlights that an indicator of the Land Transport Infrastructure Goal to "establish a resilient and effective land transportation network that links all of PNG and provides access to flow of goods and services" is the number of road transport fatalities[4].

Legislation

Section 5 (2)(d) of the Road Traffic Act (the Act) notes that one of the functions of the RTA is to '*monitor the road safety performance of the public road network*' and to subsequently '*develop and implement action plans for improvements*' based on this data. Furthermore, the Act states that the RTA has a responsibility to maintain and preserve records in order to assist, advise and work cooperatively with its stakeholders in relation to land transport regulatory matters, road safety and the efficient use of land transport (Sections 5(2)(c) and (e) of the Road Traffic Act) as well as to 'promote and conduct research into land transport regulatory matters and road safety' (Section 5(2)(g) of the Act).

1.2 Purpose

One way that the RTA can help achieve the above legal functions is by collating and analysing the crash data that is reported to and recorded by the Police and subsequently sharing this information to its partner agencies and the public. This Road Safety Data Report is just one example of information prepared by the RTA.

Without such information to assist with understanding where, when and how crashes occur, detailed action plans focussed on addressing specific locations and/or behaviours cannot be prepared in a meaningful way. Furthermore, the reporting of such data allows the RTA to transparently measure progress (or otherwise) towards the intended overall outcomes implied by the various guiding strategies and plans relating to a reduction in the number of people killed or injured in a road crash.

Specifically, this Data Report helps identify road safety issues related to those provinces through which the Highlands (Okuk) Highway passes through. As such, it has been specifically prepared to support work being funded by the Asian Development Bank (ADB) through the Department of Works (DoW) with regards to the

[4] Note: this is erroneously referred to as 'casualties' in the MTDP III given the 276 average annual baseline figure referenced in the document.

Sustainable Highlands Highway Investment Program (SHHIP) and the proposed upgrade of the Highlands Highway. Those Provinces highlighted as being most affected by SHHIP for consideration and inclusion in this Data Report are:

- Western Highlands;
- Jiwaka;
- Chimbu;
- Eastern Highlands; and
- Morobe.

It should be noted that the crash database is currently configured such that Jiwaka is not split out into a separate Province, but is incorporated into the Western Highlands data given that it was split from Western Highlands in 2012 (i.e. after the database was originally set-up).

It is acknowledged and highlighted that despite this Data Report being prepared in 2019, the most recently available information in the crash database to date is 2014. As such, a five-year period between 2010 and 2014 (rather than a single year) has been used for the detailed analysis. A five-year period has been used given that crash and casualty data can fluctuate from year to year with a five-year average providing a reasonably sound statistical basis to determine common contributory factors associated with crashes in the provinces.

The information contained in this Data Report is primarily intended to assist the ADB, PNG Government, road controlling authorities (such as the Department of Works – DoW, the National Roads Authority – NRA, and other regional Provincial and Local Level Governments), the Royal PNG Constabulary (Police) and the RTA with understanding road safety issues in parts of the Highlands and Momase Regions of PNG. It has been specially prepared in support of future monitoring and evaluating requirements associated with the ADB funded SHHIP road improvements as well as to guide enforcement and education/awareness campaigns with respect to localised road safety issues (given that these may potentially be different from the national road safety issues). Researchers, consultants, students and other organisations with an interest in road safety (such as Motor Vehicle Insurance Limited - MVIL) may also find the information useful.

1.3 Crash Data

Crash Reporting

Section 33 of the Road User Rules 2017 states that '*where injury or damage is caused to a person or to an animal or vehicle in the charge of a person because of an accident in which a motor vehicle is concerned*', the driver must report the crash to a Traffic Enforcement Officer or the officer in charge of the nearest police station as soon as practicable and within a maximum of 24 hours if a member of the Police is not called out to the scene of the crash to carry out an investigation.

Accordingly, in theory, every motor traffic crash in PNG should be reported to the Police, who in turn should complete a Road Accident Report Form (see Appendix A). Unfortunately, for a number of reasons, actual crash numbers can be expected to be

under-reported, with the Asian Development Bank (ADB) Guidelines[5] acknowledging that the '*under-reporting of road crashes is a particularly serious problem in many developing countries'*. The full extent of under reporting in PNG is not yet known. However, modelling work carried out as by the World Health Organisation[6] has estimated that the actual number of road traffic deaths in PNG could be over 3 times higher than the number actually reported. The under-reporting of less severe crashes can be expected to be even greater. Further comment on levels of under-reporting at a national level are provided in Section 2.3.

As part of the above, it should be noted that in some instances, as well as crashes not being reported to the Police, many Police Accident Report Forms are not sent through to Police HQ and/or are perhaps mistakenly sent to the wrong location/mis-placed. The RTA have recently completed additional training with the Police on this matter as well as provided greater clarity regarding the questions on the Police Road Accident Report Form.

MAAP Crash Database

The RTA manages the national road traffic crash database (using the MAAP[7] system procured from the UK's *Transport Research Laboratory - TRL*) and is currently in the process of updating it with more recent crash reports that have been sent through to Police HQ. This work updates the previous Department of Transport (DoT) maintained database that was destroyed in a fire (but never re-instated) up the present day and into the future. Fortunately, as part of their previous work with the crash database, TRL had maintained a copy of previously entered crash data for 1987 to 1994 (see Section 2.1). This previous information now forms part of the basis of the current database with subsequent work having been carried out to enter all data between 2002 and 2014. Unfortunately, Police Road Accident Report Forms between 1995 and 2001 which would have allowed a complete record of reported crashes have been destroyed.

Accordingly, this report uses data from the RTAs crash database for 2010-2014. This database includes all crashes involving injury and non–injury for which Police Road Accident Report Forms have been completed and forwarded to the Police HQ.

Data Accuracy

A high-level review of the crash data provided on the Police Accident Report Forms indicated that in some instances, inconsistencies and inaccuracies in the reported information exist. This is perhaps unsurprising given the limited training that Police receive in filling out the Forms and/or in crash investigation as well as the fact that in many instances, the Police did not attend the crash scene, thereby making accurate crash reporting difficult. Overall, for the five-year period between 2010 and 2014, the Police in the five Provinces under consideration actually attended 50% (compared with 43% nationally) of the total reported crashes received at Police HQ (rising to 68% of reported fatal crashes in the five provinces and 61% nationally) - see Figure 1.1 overleaf.

[5] ADB Road Safety Guidelines for the Asian and Pacific Region.
[6] World Health Organisation. Global Status Report on Road Safety 2018.
[7] Microcomputer Accident Analysis Package.

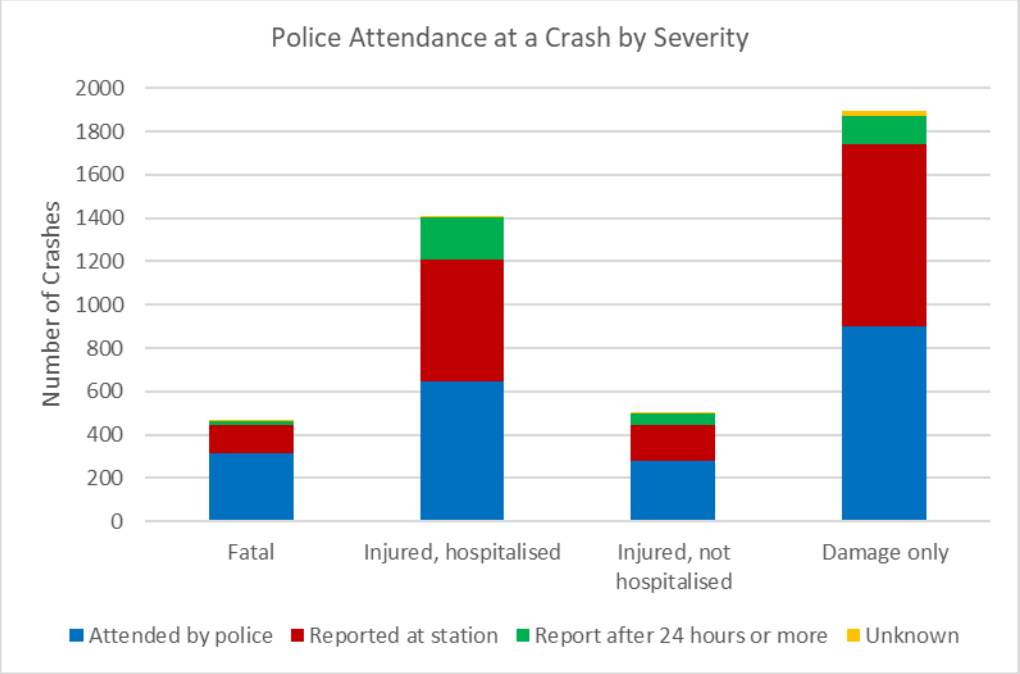


Figure 1.1 Police Attendance at Reported Crashes by Severity in Highlands Highway Provinces (2010-2014)

In addition, the Police Accident Report Form (which was last modified/created in approximately 1986) is not overly clear in many instances and does not always reflect current trends – for instance, there is no specific category for '4-wheel sport utility vehicles' when identifying the vehicle type – with such vehicles often identified as being either a 'car', 'utility vehicle' (i.e. a ute/pick-up) or 'other' by reporting officers.

As part of the work carried out by the RTA in entering and reviewing the data, a number of logic and sanity checks have been carried out, and where appropriate, based on the police crash reports, changes have been made to the entered data to better reflect the intent of the question in the Police Accident Report Form. Despite these checks and balances, it is acknowledged that some anomalies may well still exist with the data and where these are known to be potentially problematical (for instance road and/or shoulder width), reporting on those specific issues has not been carried out. As part of this, where appropriate, comment on data validity has been made in the following Report Sections.

Given there are major concerns relating to both the accuracy and reported numbers of crashes at present, a high level of care and caution is required when interpreting the data.

1.4 Explanatory Note

Data

This Road Safety Data Report contains information relating to:

- crashes - i.e. the actual crash event itself;
- vehicles involved in the crash and their driver; and
- casualties - i.e. the injured persons including fatalities which may include:
  - vehicle occupants i.e. drivers and passengers; and
  - pedestrians.

As such, one crash may involve two vehicles (with two drivers) and result in three casualties (e.g. both drivers and a passenger); or alternatively, one crash may involve a single vehicle (with one driver) and result in five casualties (e.g. four passengers and one pedestrian). Due to the different elements that make up the crash data, great care is needed when analysing the database and/or using the enclosed data to ensure that outputs/information is correctly understood and referenced as such. Accordingly, to assist users of this Report, at the start of each Section, a short analysis and summation of the data has been provided.

Crash and Casualty Injury Severity

As part of the process of filling in the Accident Report Form, the Police classify road crashes by the severity of injuries suffered by road users in the crash using the following levels:

- Fatal[8].
- Injured and hospitalised (Serious injury).
- Injured but not hospitalised (Minor injury).
- Damage only to vehicles/property.

Crash severity is classed by the most severe injury sustained in the incident i.e. a crash involving a hospitalised person and two injured but not hospitalised people is classed as a 'hospitalised' crash for official statistics – although in some instances due to errors in the completion of the Accident Form, the information provided doesn't always follow this convention (and hence has been subsequently 'cleaned' or rectified as part of the logic mapping process).

Unless specifically noted, the information provided in this Data Report is for casualty crashes only (i.e. only those involving a fatal or injured person) and typically excludes 'damage only' crashes. This is due to an initial focus being on seeking to reduce the number of deaths and injuries (in particular serious injuries) on our roads (rather than

[8] At present, no formal agreement and definition exists with respect to a 'fatal crash' in terms of the time period over which a person is assumed to have died as a result of suffering an injury in a road crash. Typically, deaths within 24 hours of the crash are reported as such. Deaths beyond this period can be included within Police records subject to appropriate paperwork; however, it is suspected that such updates to records are rarely carried out. Whilst the recently enacted Road Traffic Act 2014 provides a definition of a fatal injury with respect to timeframes for certain offences, this Act has only recently come into use with the data contained in this report prior to its enactment. Elsewhere overseas, road deaths are typically defined as those occurring as a result of injuries received in a motor vehicle accident within 30 days of the crash occurring.

non-injury crashes). In addition, a slightly higher proportion of casualty crashes are attended by police compared to damage only crashes, and it is assumed that the details provided on Police Accident Report Forms from attended crashes are more accurate than self-reported crashes.

2. National Overview - Context

2.1 Historical Trends

As highlighted previously, the RTA continually updates the MAAP crash database with reports that have been sent to Police HQ in Port Moresby.

Figures 2.1 and 2.2 overleaf show the crash and casualty data that currently exists in the system for 1987 to 1994 and 2002 to 2014. Of particular note is the difference in the number of crashes reported in 2002 to 2014 compared to those in the late 1980s and early 1990s. Given the large increase in population and number of motor vehicles in PNG since the original 1980s/1990s data, coupled with no significant intervention to reduce road crashes, it is strongly suggested that the lower number of recorded crashes in the 21st Century is due primarily to increased levels of under-reporting, particularly of minor and damage only crashes, rather than any improvement in road safety. Notwithstanding the above, overall total casualty numbers from 2002 onwards are in line with previous deaths and injuries suggesting the number of people killed or injured per crash has increased. Figure 2.3 shows the casualty data for fatal and serious injuries only combined with the trend line for the 21st century (from 2002) through to 2014 in PNG.

To put the historical crash data into perspective for PNG, Figures 2.4 and 2.5 show population growth as well as the number of registered (and/or MVIL third party insured) motor vehicles obtained from a number of sources[9] for those years where data is available (as well as the trend over the identified time period) noting that prior to 1987, the number of registered motor vehicles per year was relatively steady in the order of 43,000 - 47,000, less than half the current estimate.

Figure 2.6 shows the number of fatal and serious casualties (as indicated in Figure 2.3) relative to the increase in population between 2002 to 2014 in PNG.

A separate detailed assessment of the national crash and casualty data (in the form of a 2010-2014 Road Safety Data Report for PNG) is currently being prepared by the RTA.

[9] Motor vehicles volumes for the 1980s and 1990s have been obtained from Appendix D of the Road Safety Guides for the Asia-Pacific Region prepared by the Asian Development Bank (undated). Subsequent motor vehicle data has been obtained from the 2009, 2015 and 2018 WHO Global Status on Road Safety reports – with this data originally sourced by NRSC/RTA from MVIL and understood to be based primarily on records associated with owners of vehicles obtaining mandatory Third Party MVIL insurance (rather than simply on registered vehicles in those Provinces that MVIL operates in).

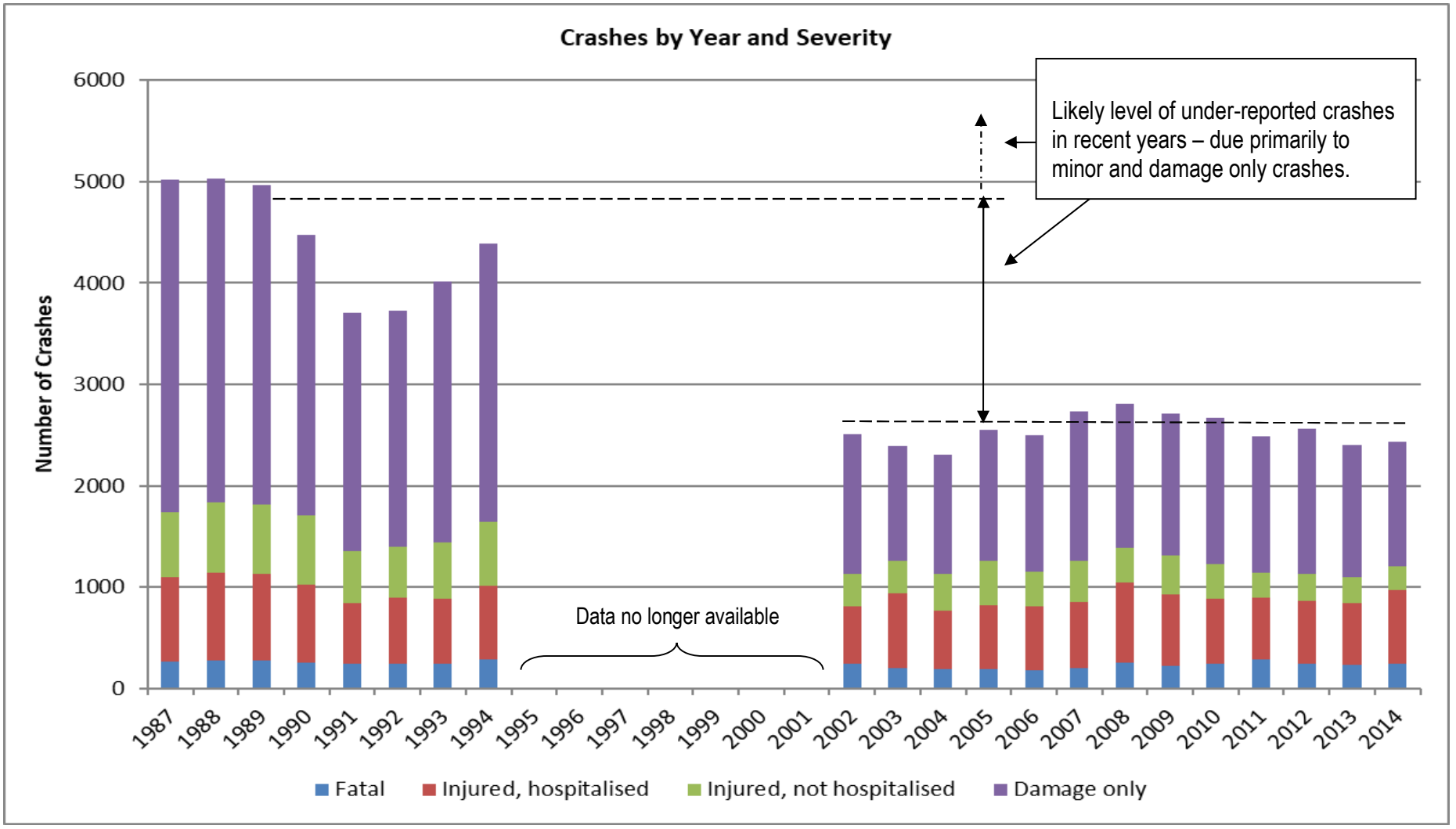


Figure 2.1 Annual Crash Numbers by Severity - PNG

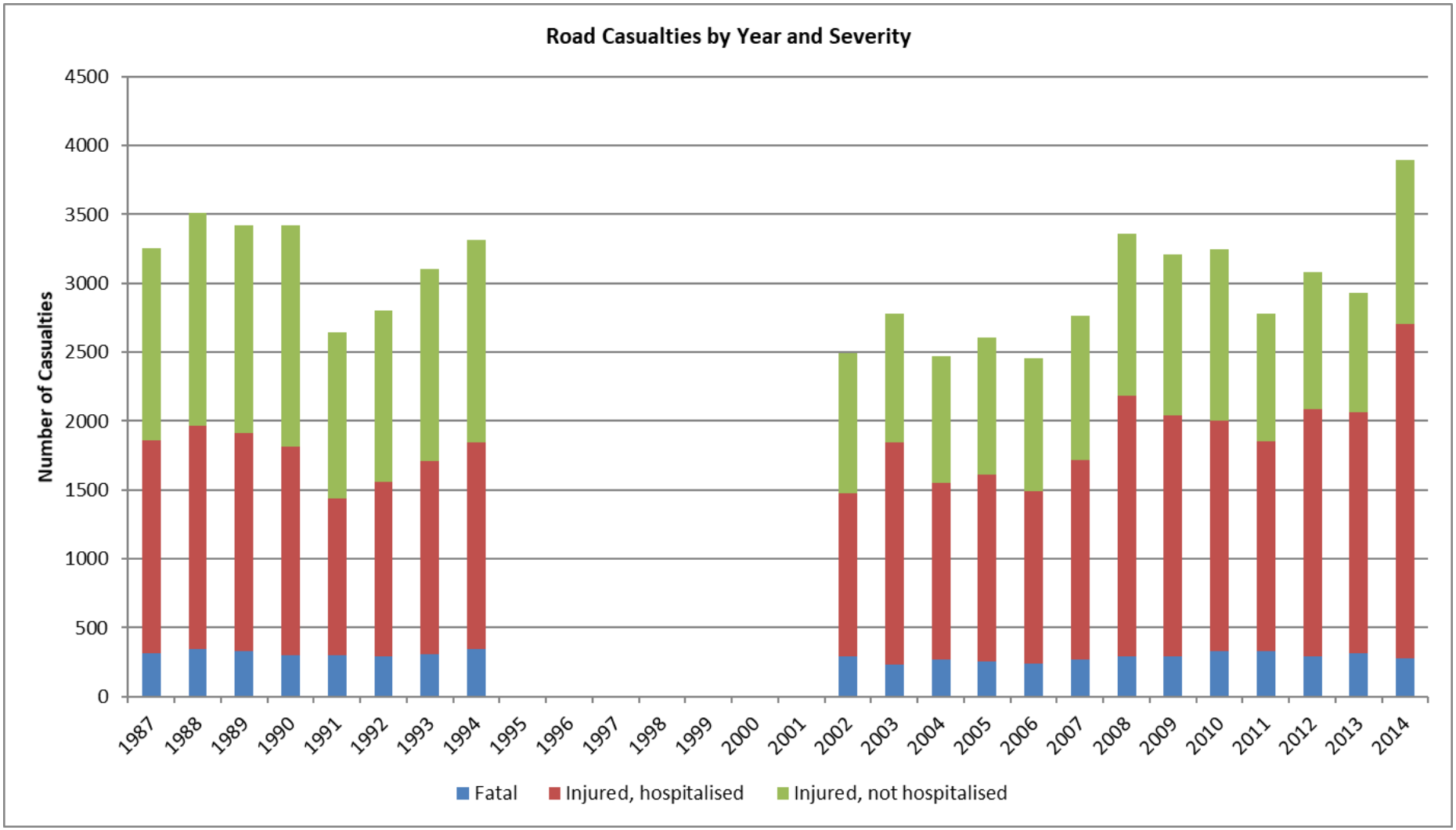


Figure 2.2 Annual Casualty Numbers by Severity - PNG

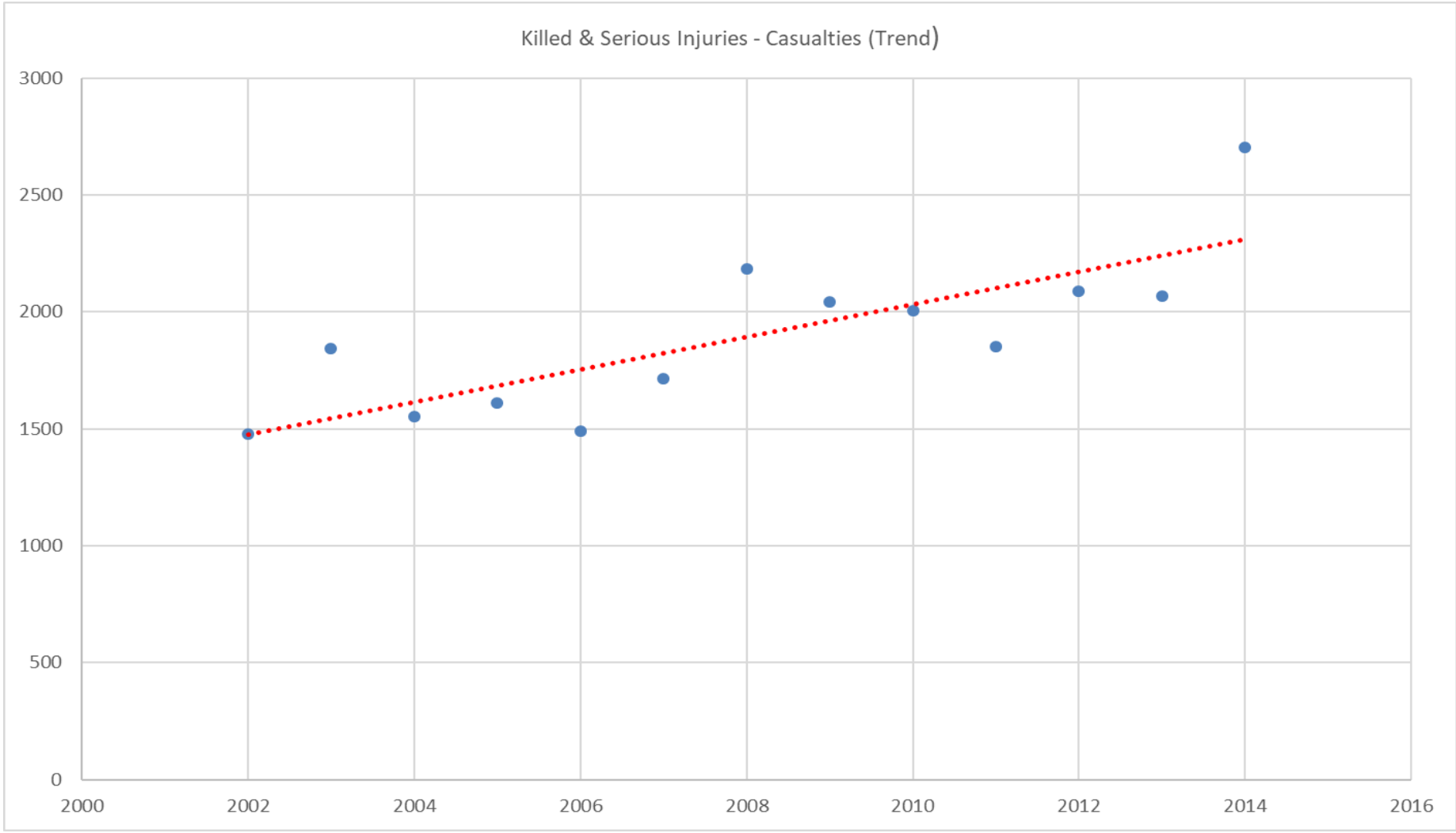


Figure 2.3 21st Century Annual Number of Reported Fatal and Serious Injury Casualties (with trend line) - PNG

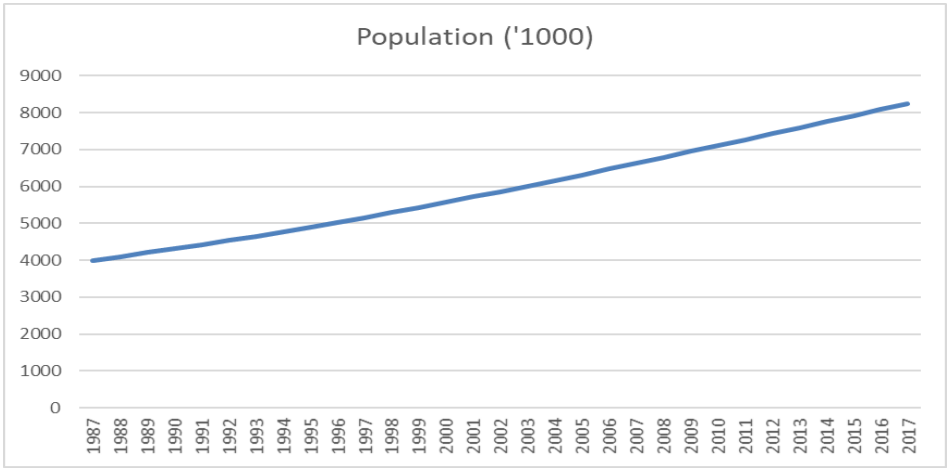


Figure 2.4 PNG Population by Year (1987 – 2017)

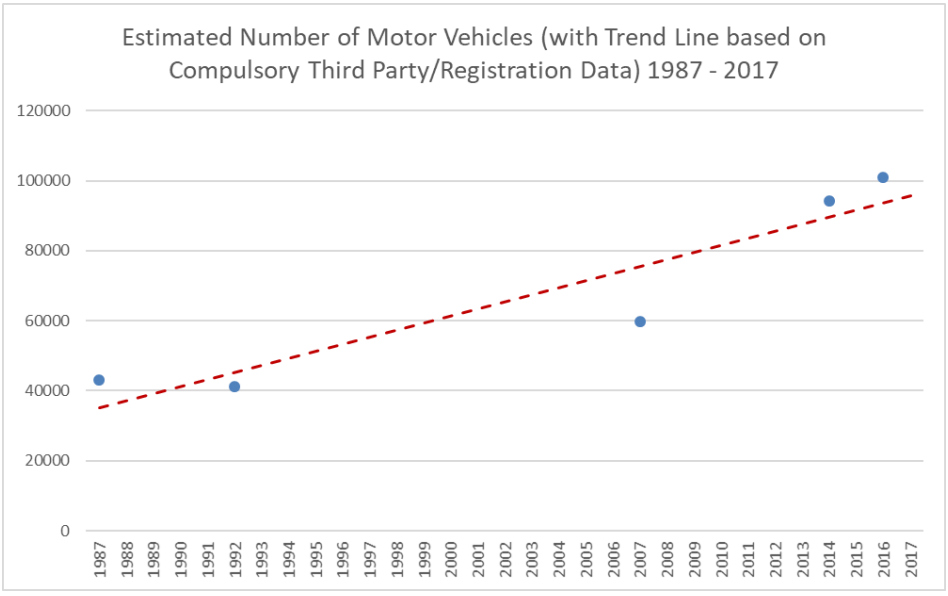


Figure 2.5 Estimated Number of Vehicles (Registered and/or Compulsory Third Party Insured) by Year (1987 – 2017) including Trend Line

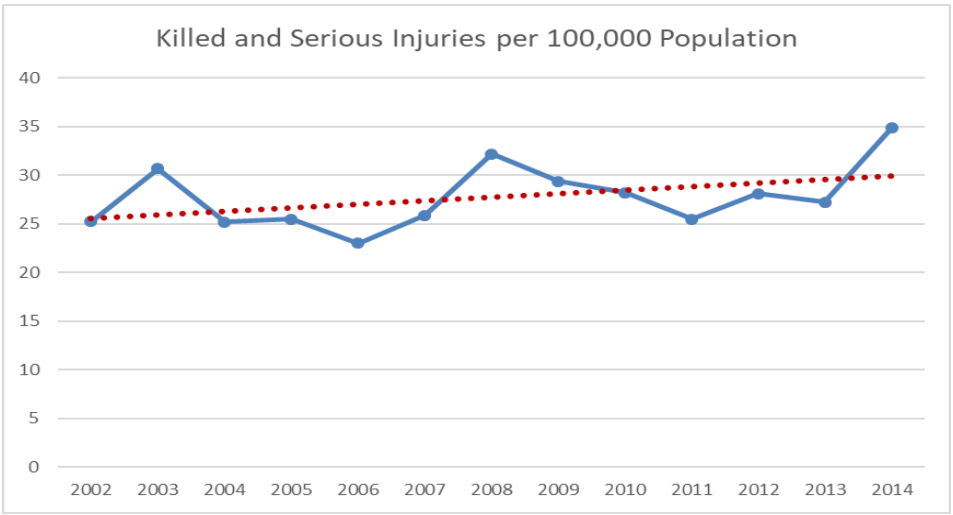


Figure 2.6 Fatal and Serious Casualty Risk (2002 – 2014) including Trend Line

2.2 2010-2014 Crash and Casualty Numbers

The annual average number of reported crashes and casualties by severity for 2010-2014 for PNG are shown in Table 2.1. (Summation of columns may not add up to the total due to rounding errors and/or unknown severity crashes/casualties not being shown.)

Table 2.1 Annual Average (2010-2014) Crash and Casualty Data (PNG)

Severity	Annual Average Crashes		Annual Average Casualties		Casualties per Crash
	Av. No.	%	Av. No.	%	
Fatal	249	21	307	10	-
Serious	641	55	1837	57	-
Minor	271	23	1043	33	-
Total Injury	1161	100	3198	100	2.8
Damage Only	1350				
TOTAL	2512				

There was a total of 12,558 reported crashes in PNG during the five-year period between 2010 to 2014, resulting in 15,992 known deaths and/or injuries. In terms of injury crashes (i.e. excluding damage only crashes), on average, 2.8 people were killed or injured in each crash. Whilst the vast majority (60%) of fatal and casualty crashes involved only a single death or injury, there were 44 reported instances where 20 or more people were injured and/or killed in each of the crashes over this five-year period.

Overall, for each reported/recorded death, there were six serious injuries reported to occur. It is noted and acknowledged that this is much lower than the ratio of 10 serious injuries per road death used by the International Road Assessment (iRAP) methodology[10].

Of interest to note is the higher number of serious crashes and casualties when compared to minor crashes and casualties. Elsewhere in developed countries, there are a greater number of minor crashes/casualties than serious – which may either reflect under-reporting of minor crashes (see Figure 2.1), an unclear definition/understanding of what constitutes a serious injury by the reporting Police and/or that crashes in PNG typically result in more serious injuries than minor injuries due to, for instance, poor 'in-crash' safety elements such as a lack of seat belt wearing, passengers sitting in the rear tray of a ute, or the lack of effective road safety barriers.

2.3 Estimated Fatal Crashes

The World Health Organisation (WHO) Global Status Report on Road Safety (2018) estimates the annual number of road deaths in PNG to be in the order of 1145 (based on a 95th percentile confidence interval of a range of 991 to 1298 deaths). Using the previously indicated iRAP expected ratio of 10 serious injuries for every fatality, this equates to 11,450 serious injuries per year. This compares with the average annual reported record between 2010 and 2014 of 307 deaths and 1,837 serious injuries.

[10] McMahon K and Dahdah S. The True Cost of Road Crashes: Valuing life and the cost of a serious injury. iRAP. 2008

3. Highlands Highway Provincial Data Breakdown

3.1 2010-2014 Crash and Casualty Numbers - Overview

The annual average number of reported crashes and casualties by severity for 2010-2014 for the five Provinces[11] under consideration are shown in Table 3.1. (Summation of columns may not add up to the total due to rounding errors and/or unknown severity crashes/casualties not being shown.)

Table 3.1 Annual Average Crash and Casualty Data (Highlands Hwy Provinces)

Severity	Crashes		Casualties		Casualties per Crash
	Av. No.	%	Av. No.	%	
Fatal	93	20	122	8	-
Serious	282	59	870	59	-
Minor	100	21	491	33	-
Total Injury	475	100	1488	100	3.1
Damage Only	378				
TOTAL	854				

There was a total of 4,269 reported crashes in the five Provinces during the five-year period between 2010 to 2014, resulting in 7,439 known deaths and/or injuries. This can be broken down into 610 fatalities, 4,350 serious injures involving hospitalisation and 2,454 minor injuries (plus 25 injuries of unknown/unreported severity). In terms of injury crashes (i.e. excluding damage only crashes), on average, 3.1 people were killed or injured in each crash – slightly above the national average. Over the period, there were 21 instances where 20 or more people were injured and/or killed in each crash.

Figure 3.1 to 3.3 show the breakdown for the five Provinces combined for the five years under consideration by crash and casualty severity.

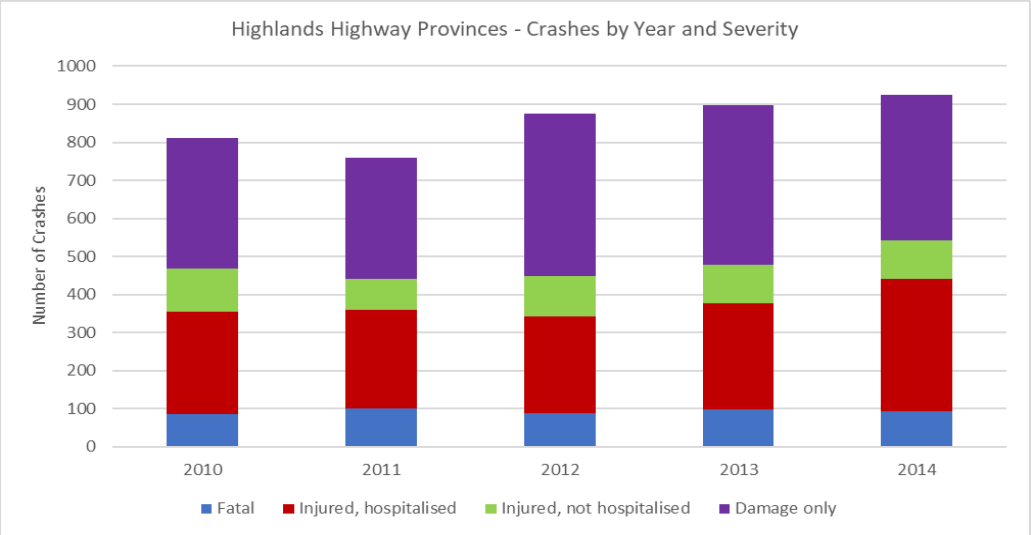


Figure 3.1 Reported Crashes by Year and Severity in Highlands Hwy Provinces

[11] Western Highlands includes data for Jiwaka

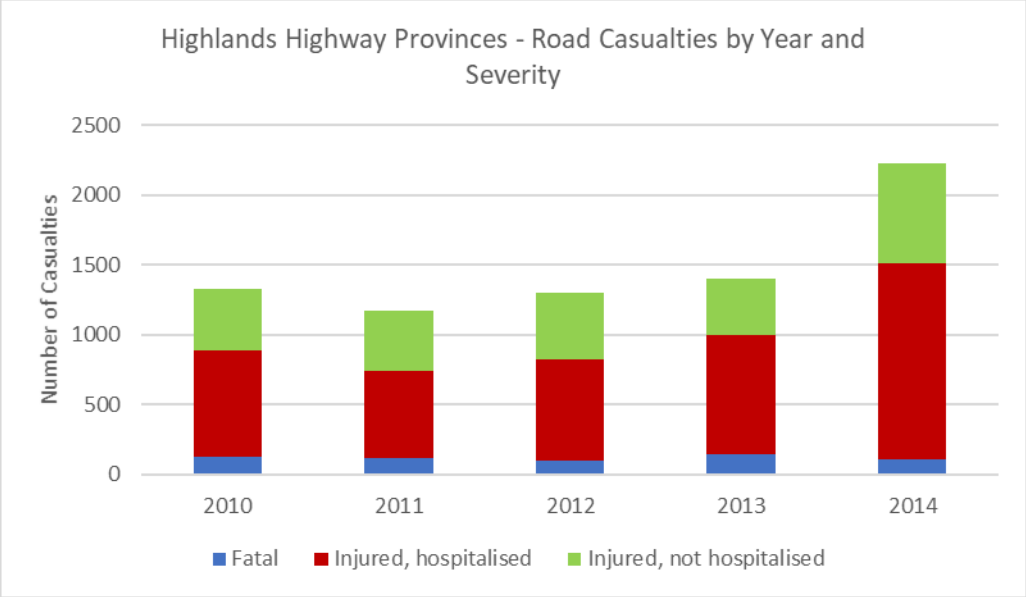


Figure 3.2 Reported Annual Casualty Numbers by Severity – Highlands Hwy Provinces

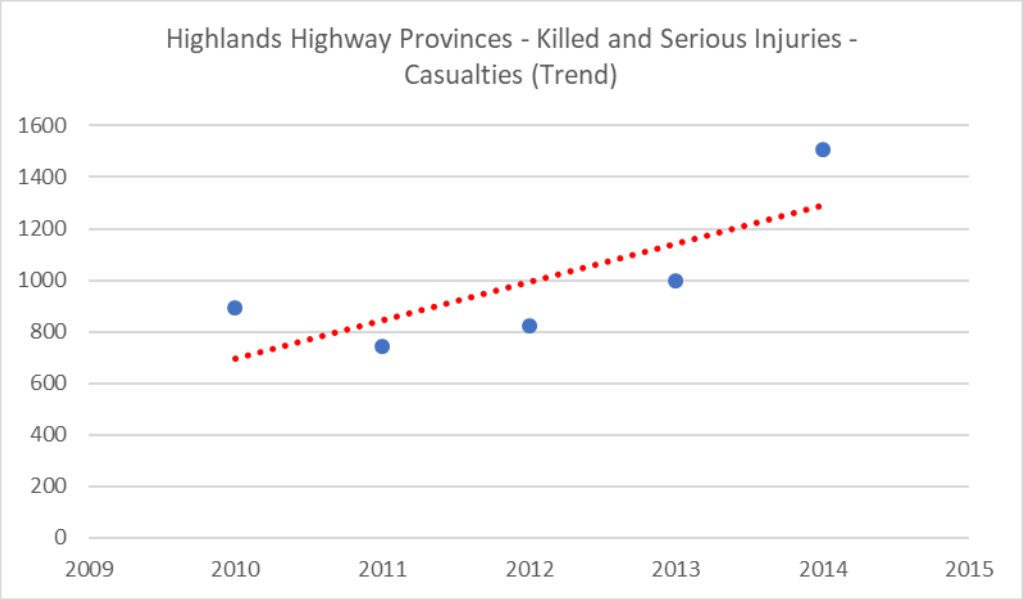


Figure 3.3 21st Century Annual Number of Fatal and Serious Injury Casualties (with 5-year trend line) – Highlands Hwy Provinces

3.2 2010-2014 Crash and Casualty Numbers – By Province

Figures 3.4 and 3.5 provide a breakdown of road safety performance by individual Province for the five Provinces[12] under consideration for 2010 to 2014 combined. Overall, these Provinces make up 41% of all casualty crashes (37% of fatal crashes) and 47% of all casualties (40% of fatal casualties) in PNG.

[12] Western Highlands includes data for Jiwaka

As shown in Figures 3.4 and 3.5, whilst the most crashes occur in Morobe (due to the larger number of damage only reported crashes), Western and Eastern Highlands have the highest number of reported casualties. Whilst the most fatalities occurred in Western Highlands (274 over the five-year period), the largest number of serious injured casualties occurred in Eastern Highlands (2,050 reported serious injury casualties between 2010 and 2014).

In addition, Appendix B also contains lists of the most hazardous roads (in terms of reported crash numbers) in each Province broken down by urban/rural locations and types of casualties – for instance with respect to the Highlands (Okuk) Highway.

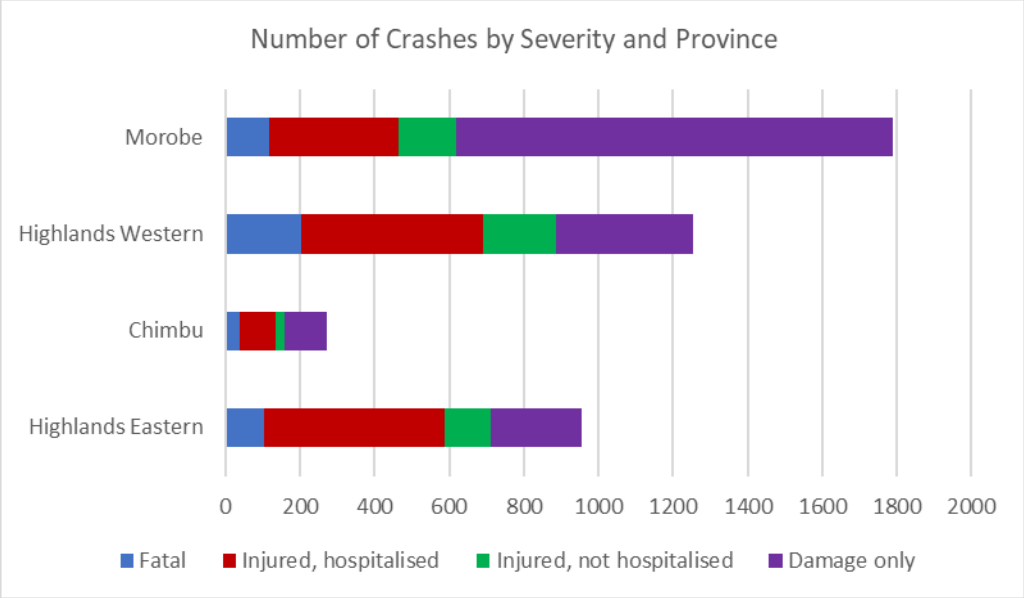


Figure 3.4 Crash Severity by Province (2010-2014)

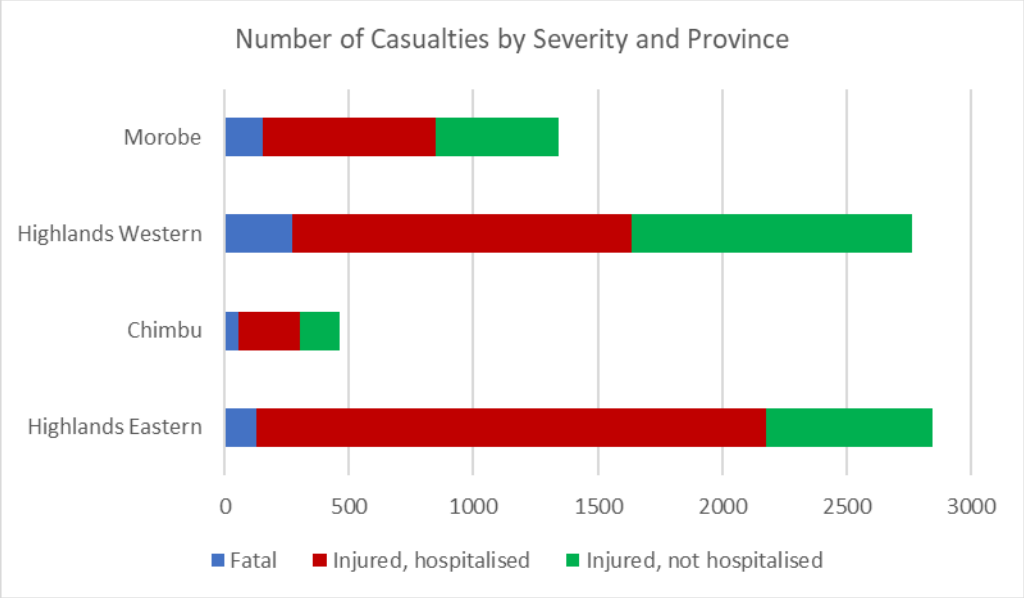


Figure 3.5 Casualty Severity by Province (2010-2014)

3.3 Base Line Data for SHHIP

As indicated in Section 1.2, the purpose of this Data Report is to assist DoW, the ADB and others (including the RTA) to better understand the extent and type of road safety issues in those Provinces directly served by the Highlands (Okuk) Highway.

It is understood that one of the targets for the Highlands Highway upgrade is a 25% reduction in the number of road fatalities on the project highway from a 2016 baseline of 0.38 fatalities per km, with data broken down by age and sex. It is understood that the baseline data has been derived using data (Table 6) from the Highlands Highway iRAP Technical Report prepared by Road Assessment Services Limited (2015). This in turn used data supplied by the NRSC for each relevant province (rather than for the Highlands Highway alone) for the three-year period between 2009-2011. A review of this data has indicated inaccuracies, and hence the opportunity to provide more up to date, accurate provincial fatal casualty data to establish a correct baseline for the SHHIP project.

As such, Table 3.2 sets out the reported Provincial road fatality data (as well as the length of the Highlands Highway using distances extracted from the iRAP report). In the future, it is hoped to be able to provide additional baseline and monitoring data specifically for the Highlands Highway (rather than the Provinces as a whole) – see Appendix B whilst noting concerns regarding the breakdown of the data by road name.

Table 3.2 Fatal Casualty Data for 2010-2014 (Highlands Hwy Provinces)

Province	2010-2014 Fatalities			Annual Average Fatalities			Length (km)	Annual Road Fatalities per km
	Driver	Pass	Ped	Driver	Pass	Ped		
Morobe	18	73	62	3.6	14.6	12.4	159.7	0.19
EHP	13	61	54	2.6	12.2	10.8	187.7	0.14
Chimbu	5	20	30	1	4	6	46.8	0.24
WHP	18	121	135	3.6	24.2	27	102.8	0.53
Total	54	275	281	10.8	55	56.2	497.0	0.25

Given the above, the baseline data for future reporting against will be 0.25 fatalities per km per year based on the 2010-2014 average for the stated Provinces. As indicated, Western Highlands Province has a particularly high number of fatalities compared to the other Provinces, with double the average annual road fatality rate for the region as a whole. As part of this, pedestrians were particularly at risk compared to other road users in Western Highlands Province. This would suggest that potential large road safety benefits for the project as a whole could be achieved by focussing road safety activities on Western Highlands Province, and in particular on improving pedestrian safety in this Province. As indicated, in total, pedestrians made up 46% of the total road deaths – somewhat higher than the 34-36% suggested as being a typical percentage as part of the iRAP report, albeit with this percentage being based on historical PNG data[13].

[13] J.Herman et al. Burden of road traffic injuries and related risk factors in low and middle-income Pacific Island countries and territories, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3490885/

A further breakdown of the fatal casualties for the Highlands Highway provinces by known age and gender is shown in Table 3.3. As indicated, over 70% of reported fatal casualties are male. It is noted however that females aged 10 years and below are over-represented in fatal casualty data compared to other ages.

Table 3.3 Fatal Casualty Age and Gender Data for 2010-2014 (Highlands Hwy Provinces)

Age	Gender		Total
	Male	Female	
0-10	9%	8%	17%
11-20	13%	3%	17%
21-30	17%	5%	23%
31-40	15%	5%	20%
41-50	10%	4%	14%
51-60	5%	2%	7%
61-70	1%	1%	2%
Total	71%	29%	100%

4. Crash Date, Time and Location

Figures 4.1 and 4.2 show reported crash numbers (broken down by severity) by the day of the week and the month of year respectively. Whilst no particular trend exists throughout the year in terms of monthly crash numbers, it is clear that crash numbers increase on Friday and Saturday. Unfortunately, no traffic flow data exists to better understand the risk of travelling on either a Friday or Saturday compared to other days of the week. However, as shown in Figure 4.3, both Friday and Saturday have a higher number of crashes occurring outside of daytime hours (i.e. at night-time, dawn or dusk) compared with any other day of the week. Figure 4.4 shows crash times by time of day and indicates most casualty crashes occur during the evening peak period.

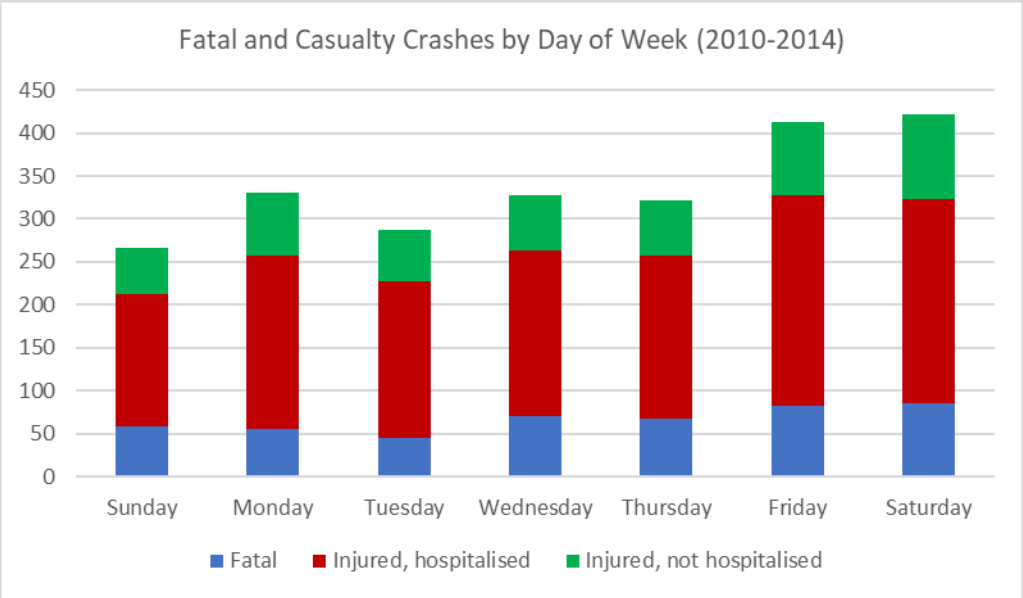


Figure 4.1 Crash Severity by Day – Highlands Hwy Provinces

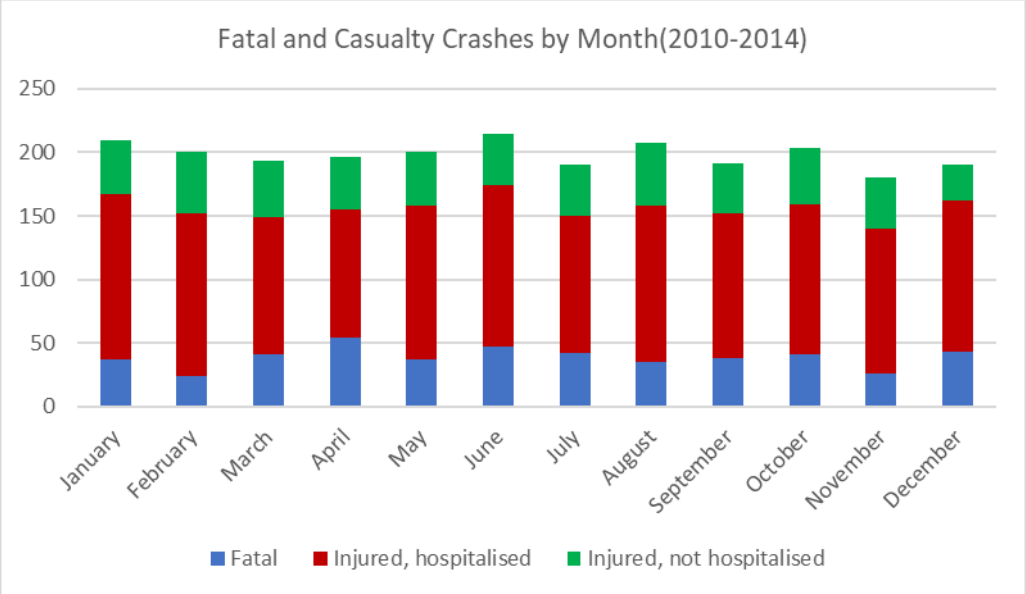


Figure 4.2 Crash Severity by Month – Highlands Hwy Provinces

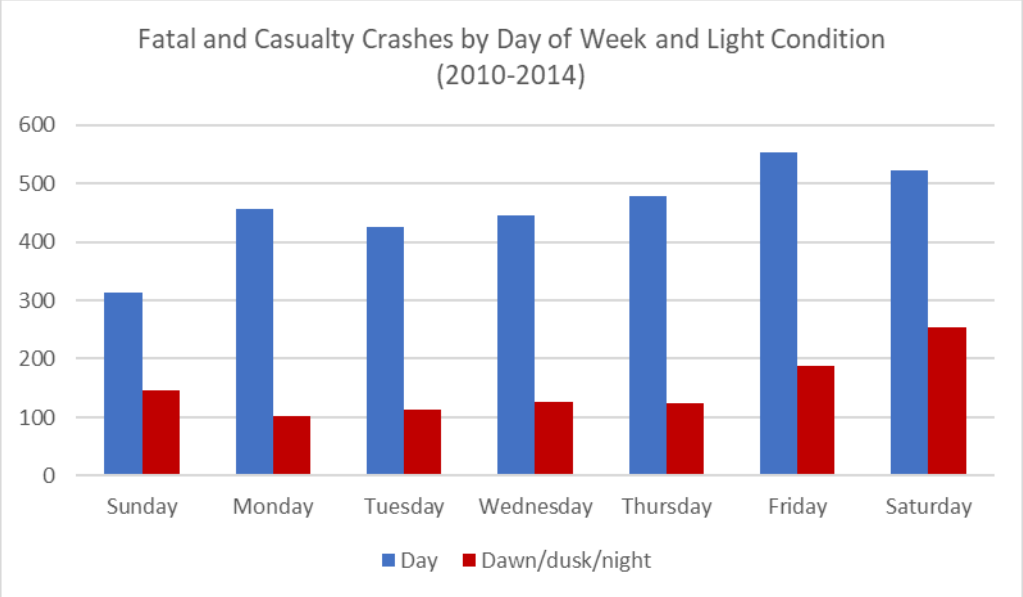


Figure 4.3 Daily Crashes by Light Condition – Highlands Hwy Provinces

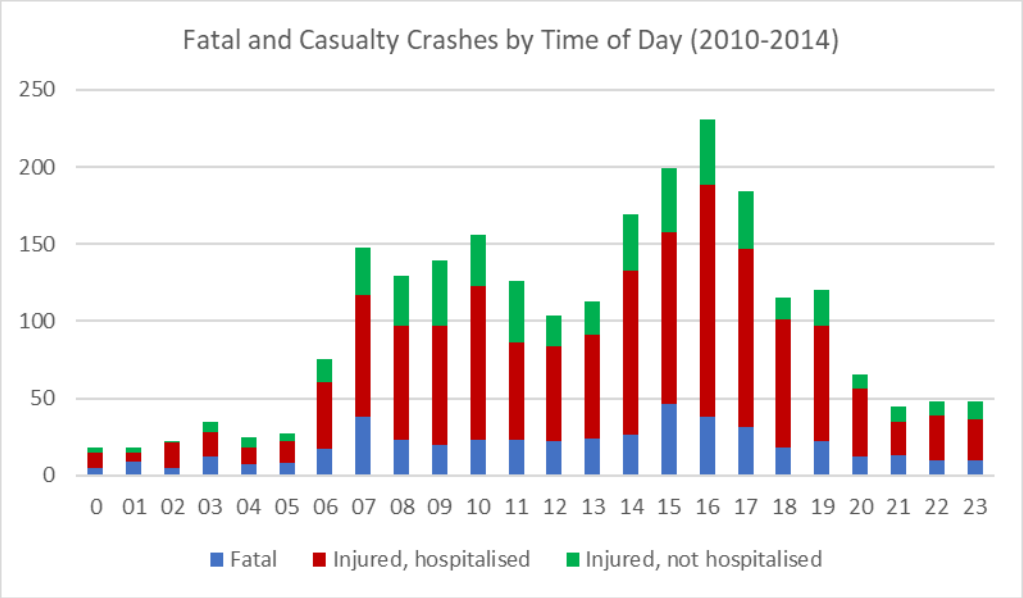


Figure 4.4 Crash Severity by Time of Day – Highlands Hwy Provinces

4.1 Urban/Rural Split

Crash and casualty data have been split down by urban (city) and rural areas, as shown in Figures 4.5 and 4.6. For the purposes of this analysis, it is assumed that an urban area has a 60km/h speed limit and rural areas typically have a 75km/h (recently changed to 100km/h as part of the Road User Rule 2017) speed limit - regardless of actual operating speeds.

As indicated in Figures 4.5 and 4.6, rural areas have a much higher number of both fatal and injury crashes along with a higher number of fatalities and casualties. This may well be due to higher operating speeds in rural areas compared to urban areas where a higher proportion of crashes result in damage only.

It should also be noted that whilst only 13%[14] of PNGs population live in urban areas, the proportion of crashes (37% of casualty crashes and 48% of all crashes including damage only) and casualties (26%) occurring in such areas is much greater. This can be attributed to the higher number of motor vehicles in urban areas compared to rural locations and hence an increase in the associated exposure to risk.

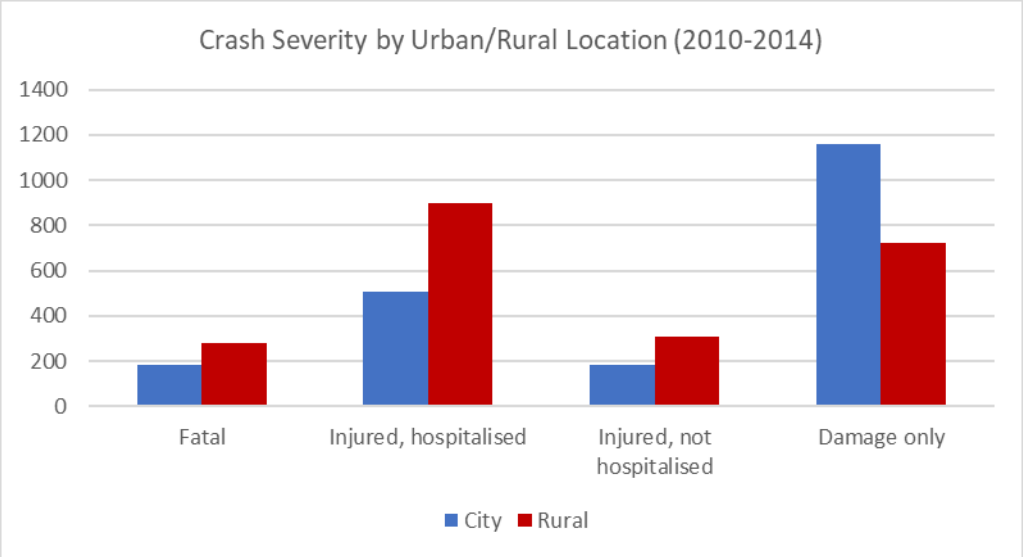


Figure 4.5 Crash Severity by Location – Highlands Hwy Provinces

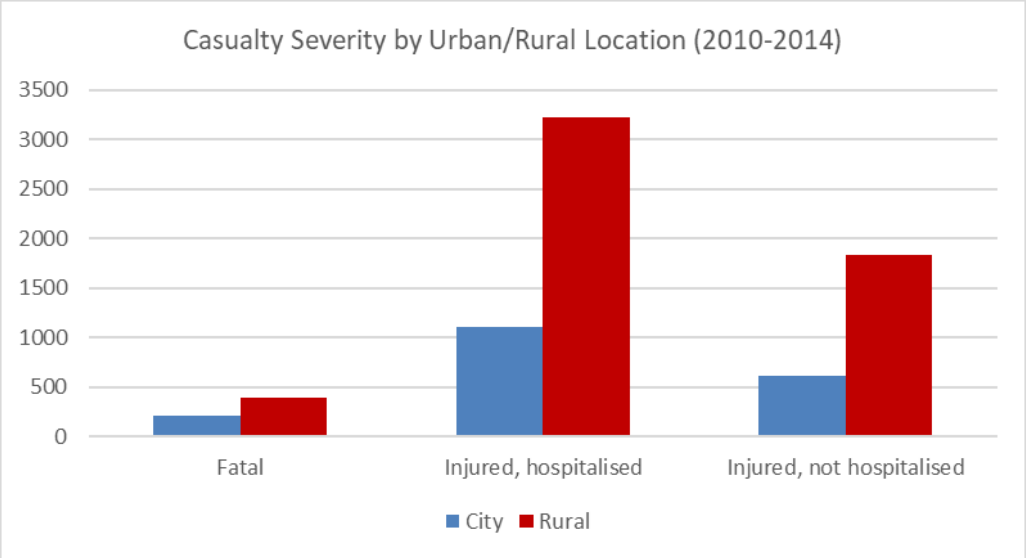


Figure 4.6 Casualty Severity by Location – Highlands Hwy Provinces

[14] https://www.macrotrends.net/countries/PNG/papua-new-guinea/urban-population

5. Crash Types

Figure 5.1 sets out the number of fatal and casualty crashes by the reported type of collision for both urban and rural roads. (It is noted that care should be taken with respect to the accuracy of some of this data in terms of the Police Officer's stated collision type.) In both urban and rural areas, the most common crash type involved collisions with pedestrians in the five Provinces, whilst (single vehicle) overturned and/or run-off road (hit object off road) crashes are also common types of crashes on rural roads.

Almost 80% of all reported fatal and casualty crashes are noted as involving only one vehicle.

It should be noted however that whilst pedestrian collisions are the most common, crash type (and involved the highest number of fatalities), 'overturn' types of crashes resulted in the highest number of casualties – see Figure 5.2. Indeed, whilst 17% of crashes were 'overturn' type collisions, they resulted in 29% of the total casualties. This compares with pedestrian collisions which made up 38% of crash types but 18% of all casualties. Collisions involving a vehicle over-turning typically involved utility vehicles/utes (pick-ups) – 33% of all vehicles involved in such a collision type, followed by trucks (26%) and buses (24%).

Figure 5.3 also presents a breakdown of crash type by road geometry. Whilst most crashes (57%) are reported to occur on 'straight and flat' sections of road, unsurprisingly, this overall percentage reduces for overturned (37%) and run-off road hitting an object (29%) type of crashes, with such crashes typically occurring on curved roads.

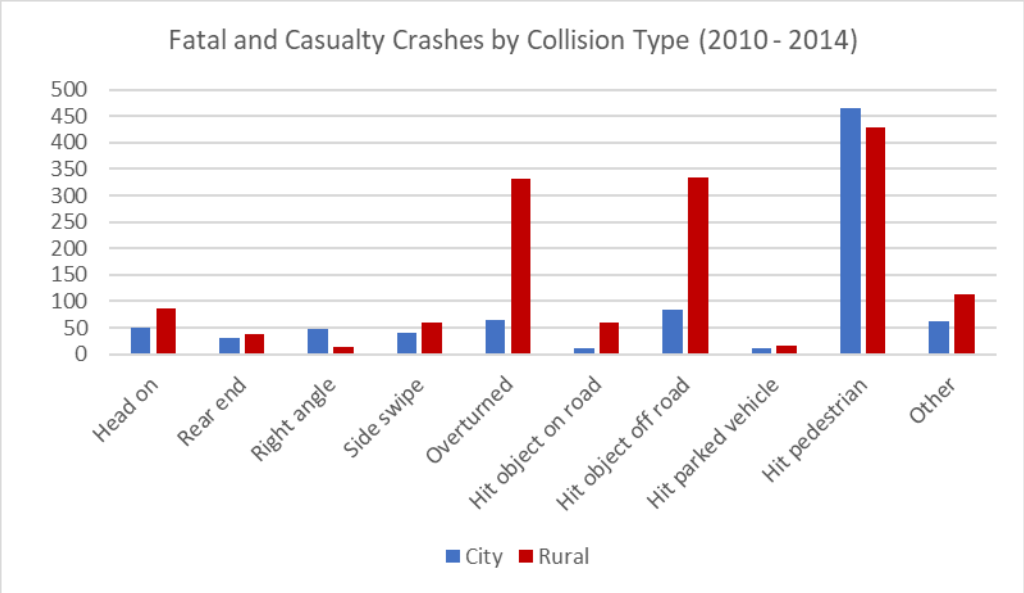


Figure 5.1 Fatal and Casualty Crash Types by Location – Highlands Hwy Provinces

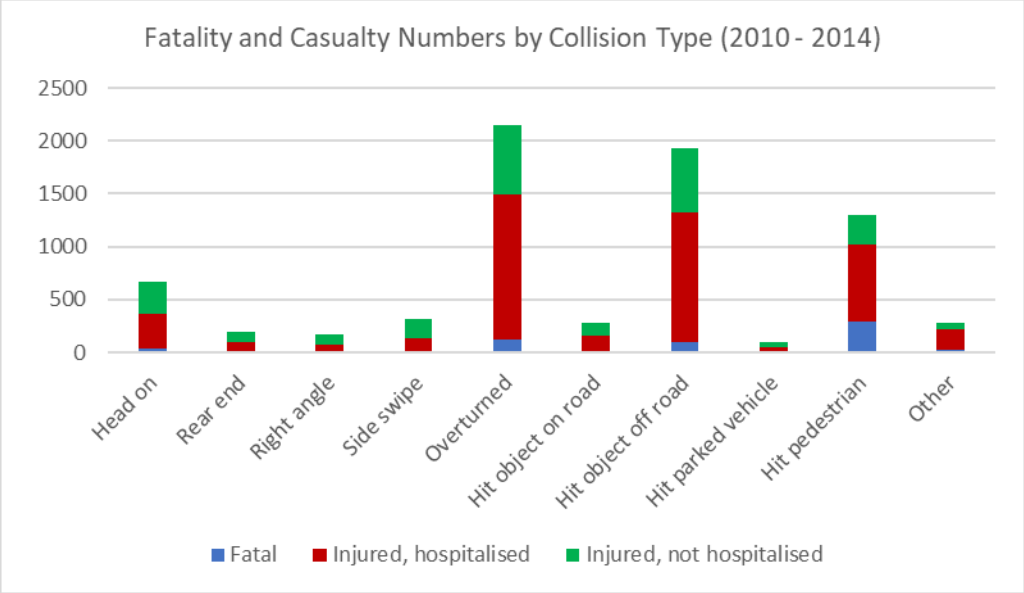


Figure 5.2 Casualty Severity by Collision Type – Highlands Hwy Provinces

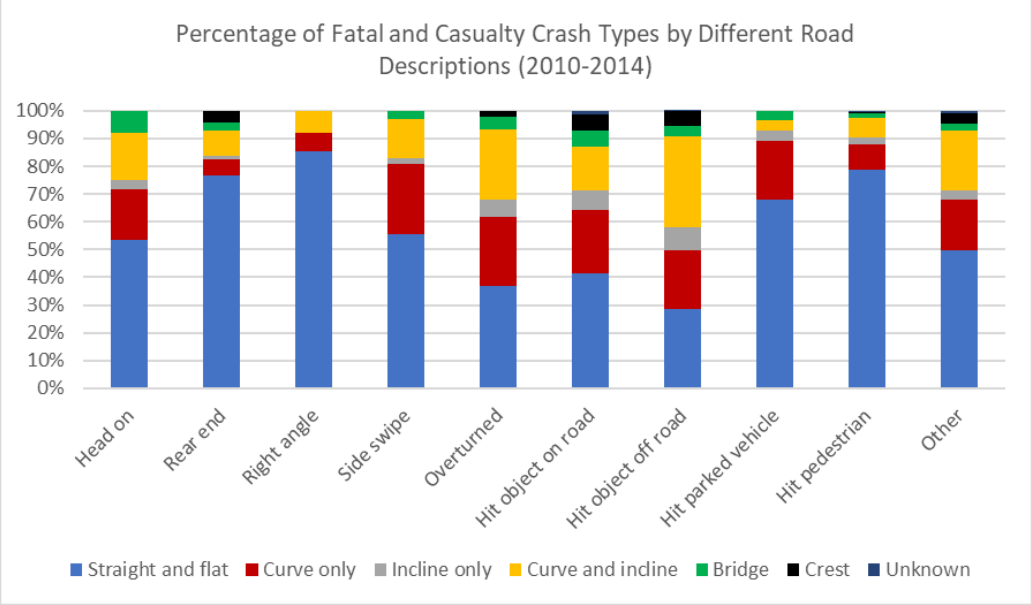


Figure 5.3 Fatal and Casualty Crashes by Collision Type and Road Geometry – Highlands Hwy Provinces

6. Road User Factors

Figure 6.1 shows the percentage split in the types of fatal and injured road user casualties whilst Figure 6.2 shows the types of vehicles involved in fatal and injury crashes. Vehicle passengers on a bus (28%) or in the back of a truck or utility vehicle (30%) make up more than half of all killed and injured road users. It should be noted that 70% of passenger casualties sitting (or standing) outside in the rear of a utility vehicle that was involved in a crash were killed or seriously injured. This is compared with 62% of casualties sitting inside the utility vehicle (as a passenger or a driver) who were killed or seriously injured. Whilst it could have been expected that an even greater percentage of casualties in the rear tray of a utility vehicle would be killed or seriously injured given the lack of restraints, it still demonstrates the greater risks associated with travelling in such a manner. It is calculated that approximately 50 people/year may have been less severely injured had the occupants in the rear tray been in an enclosed vehicle.

Figures 6.3 and 6.4 show similar information to that contained in Figures 6.1 and 6.2 except the data relates to fatal casualties only. As indicated, the proportion of pedestrians killed increases compared to those 'killed and injured' (from 15% to 46%), reflecting the vulnerability of such road users.

The age and gender of fatal and injured road user casualties are shown in Figure 6.5 whilst the details for fatal casualties only are shown in Figure 6.6. Approximately 70% of all road user casualties are male, with the majority (55%) involving people aged between 21 and 40 years of age regardless of gender. Whilst acknowledging that the overall number of injured female road users is relatively small, it is noted that over a quarter (28%) of all female road deaths involve children aged 10 years or younger (this compares to 13% for males), with a higher proportion of females being killed/injured when young compared to their male counterparts. Twenty five percent of all road deaths involved children aged 15 years or younger.

Figures 6.7 to 6.11 provide the details of those drivers involved in a crash. It should be noted that the information relates to all drivers involved in a crash – rather than for instance just the driver deemed at fault.

As shown in Figure 6.7, 99% of drivers involved in a fatal or injury crash are male (i.e. 1% are female). Care should be taken however with simply suggesting females are safer drivers than men, as observations would suggest that the vast majority of drivers are male. As such, gender issues associated driver involvement in crashes needs to be carefully considered in terms of exposure to risk – i.e. if, for instance, 99% of all drivers are typically male, then their 99% involvement in crashes is perhaps unsurprising. Unfortunately, general surveys of driver gender have not yet been carried out to date to help to better understand this risk.

Figure 6.8 highlights the age of killed or injured pedestrians by the time of day of the collision. As indicated, school aged children (up to 15 years) are involved in more collisions throughout the day compared to other age ranges, with increased numbers during the morning peak and afternoon/evening peak (3pm to 5pm), typically coinciding

with the start and end of the school day (with higher numbers on a weekday compared to a weekend), albeit with child pedestrian fatal and casualty numbers increasing throughout the entire afternoon from 10am onwards. The number of killed and injured pedestrians in older age ranges also peak at similar times to match the start/end of the working day, albeit with the main peak being in the afternoon between4pm to 5pm. It is also noted that pedestrian casualties in the 16 to 30 year age range increase between 7pm and 8pm.

Figures 6.9 and 6.10 show the number and percentage of drivers reported by the police as having committed a driver error, for instance travelling too fast or being inattentive. Of particular note is the number of drivers reported as not having committed an error – which may in turn reflect the level of non-attendance at a crash site and/or self-reporting at a Police Station with drivers unlikely to admit their fault or blame. It is also acknowledged that the data includes those drivers that may not have been at fault – for instance in a two car collision where only 1 driver has committed an error. Research from elsewhere in the world however suggests that road users (either as a single contributory factor, or as one of multiple factors) are at fault in 95% of fatal crashes. This would suggest that the Police are perhaps currently unable to best determine driver error, perhaps as a result of the lack of attended and fully investigated crashes.

Notwithstanding the above concerns, a review of driver error figures excluding those reported as being 'unknown' or 'none' indicates that speed, along with loss of control and inattention are the main driver errors reported by the police.

Figure 6.11 provides details relating to drink-driving, with police either being suspicious of the driver having been drinking or the driver testing positive in 11% of drivers involved in fatal and injury crashes (including those rated as 'unknown'). For Saturdays however, this percentage increases to 19% - see Figure 6.12 for numbers of drivers by day of week.

When excluding those Police Road Accident reports indicating 'unknown' with respect to drink-driving and reviewing crash severity, Figure 6.13 shows that for fatal crashes, 21% of drivers involved were suspected or tested positive for alcohol compared to 10% and 9% respectively for serious and minor severity crashes. This suggests that over a fifth of all drivers involved in fatal crashes were suspected or proven to be under the influence of alcohol. Twenty seven percent of fatal casualties had a driver involved that was suspected or tested positive for alcohol. This compares with 17% of road deaths involving alcohol in Australia[15].

With respect to pedestrian road user casualties, Figure 6.14 provides details concerning age and gender. Forty percent of all pedestrians killed and/or injured were aged 15 years or younger. It should also be noted that a relatively even 50-50 split in urban or rural locations were reported, even though urban locations could be expected to have a higher level of exposure to risk in terms of increased numbers of pedestrians.This in turn highlights the high level of risk for pedestrians in rural areas –

[15] WHO Global Status Report on Road Safety 2018

typically when walking alongside the road – see below. In addition, Figure 6.15 shows the actions of pedestrians when they were involved in a crash. Pedestrians crossing the road account for 34% of all pedestrian casualties. However, of particular interest is that pedestrians walking along the road, walking along the edge of the road or on a footpath account for 7%, 25% and 19% respectively of all pedestrian casualties. As such, over 50% of pedestrian casualties occur whilst travelling along a road rather than crossing it. In terms of such crashes, a higher proportion of pedestrian casualties in urban areas are injured on footpaths, whilst in rural areas, unsurprisingly given the lack of pedestrian facilities such as footpaths, a higher prortion of pedestrian casualties occur whilst walking along the road/at the edge of the road.

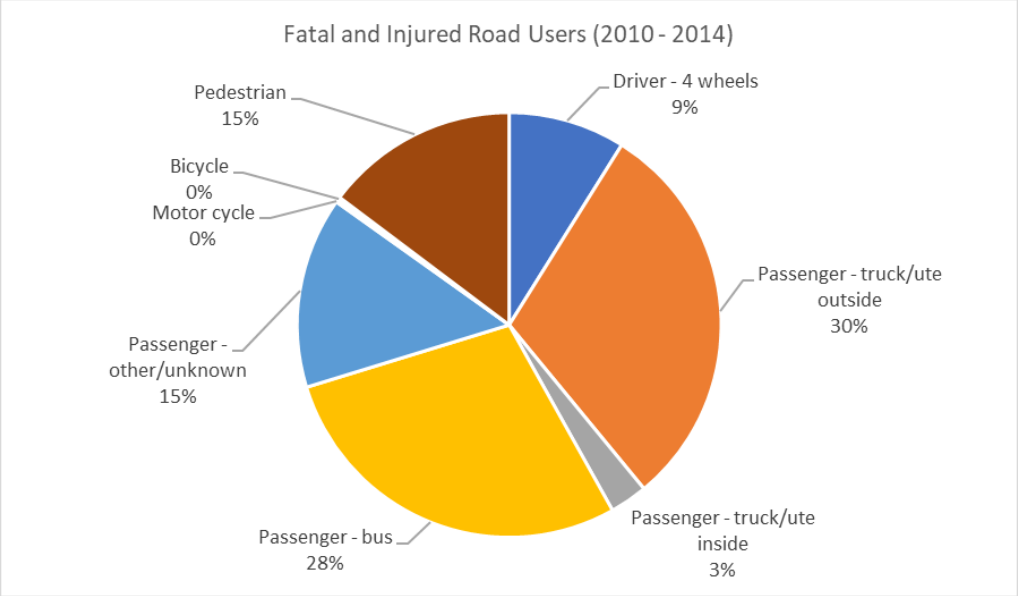


Figure 6.1 Fatal and Injured Casualty Road User Types – Highlands Hwy Provinces

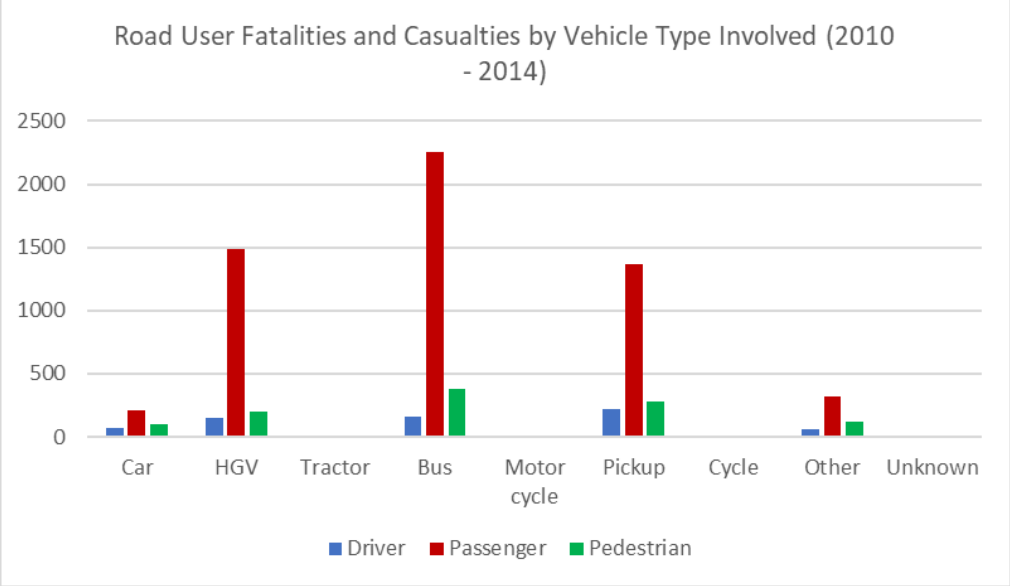


Figure 6.2 Fatal and Injured Casualties by Vehicle Type Involvement – Highlands Hwy Provinces

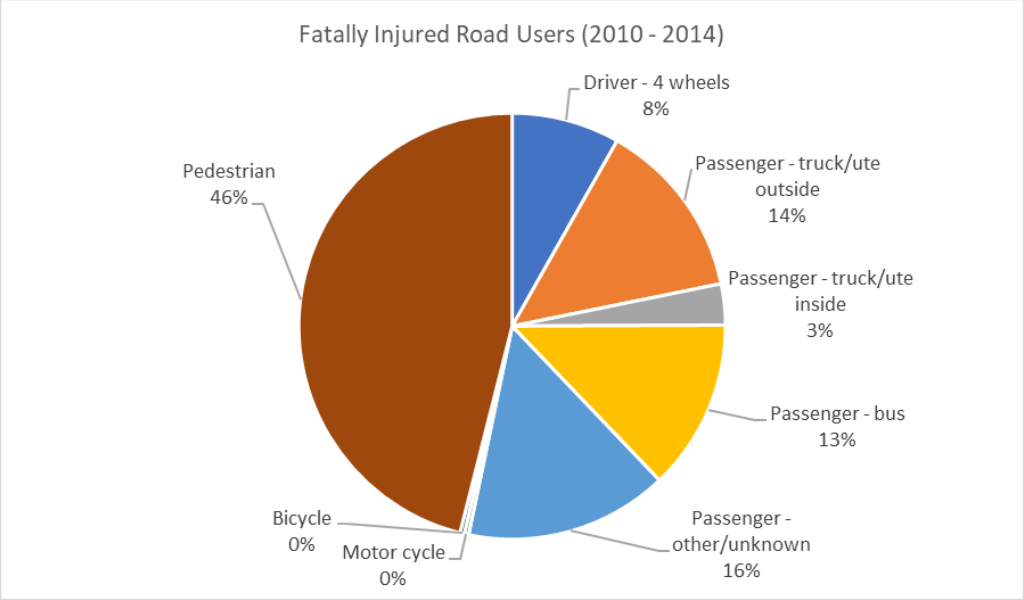


Figure 6.3 Fatally Injured Road User Types – Highlands Hwy Provinces

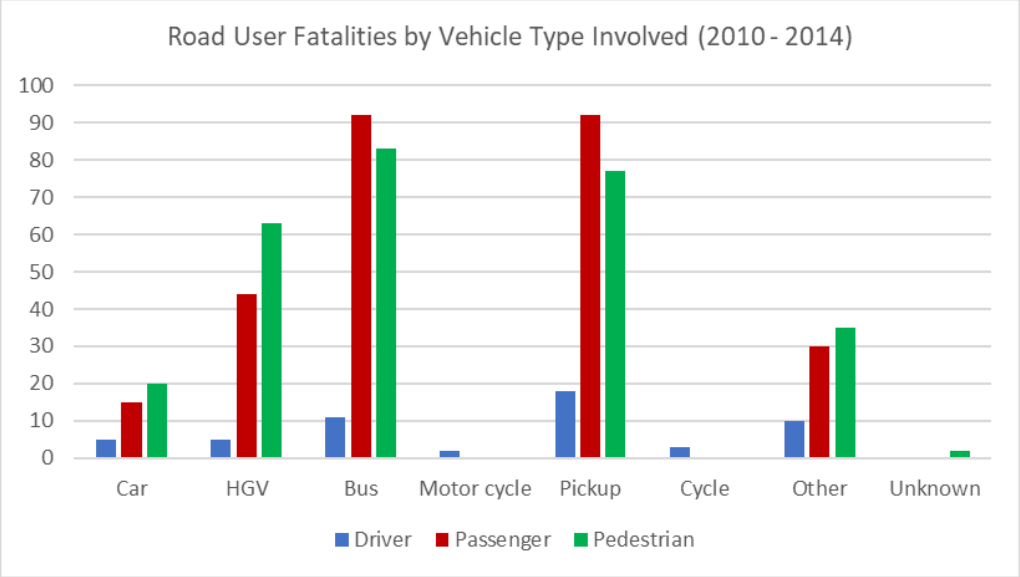


Figure 6.4 Vehicles Involved in Fatal Crashes by User Type – Highlands Hwy Provinces

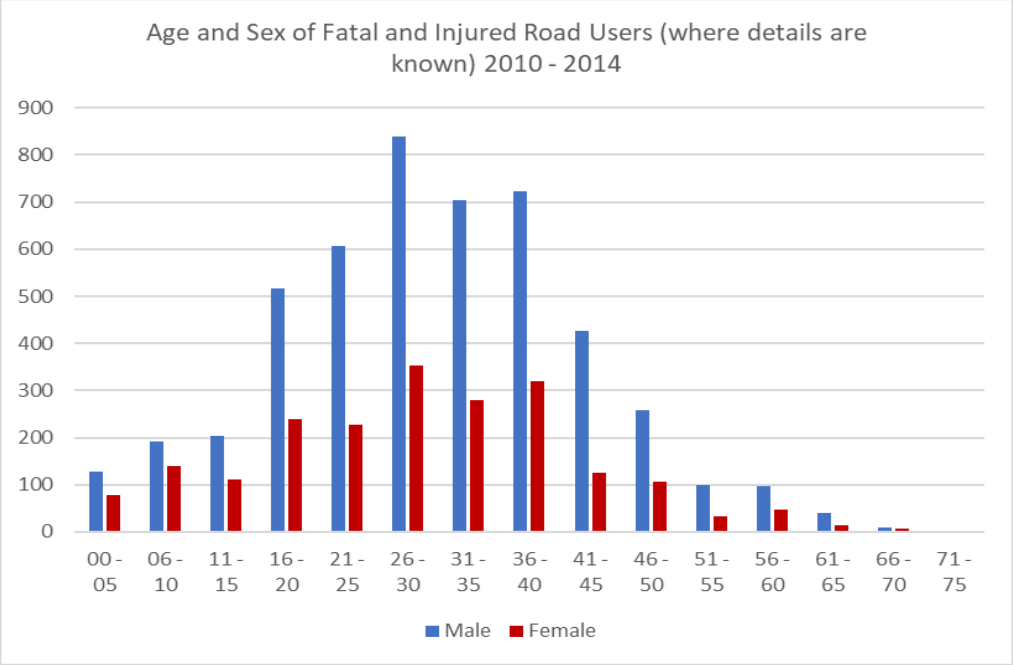


Figure 6.5 Fatal and Injured Casualties by Age and Gender – Highlands Hwy Provinces

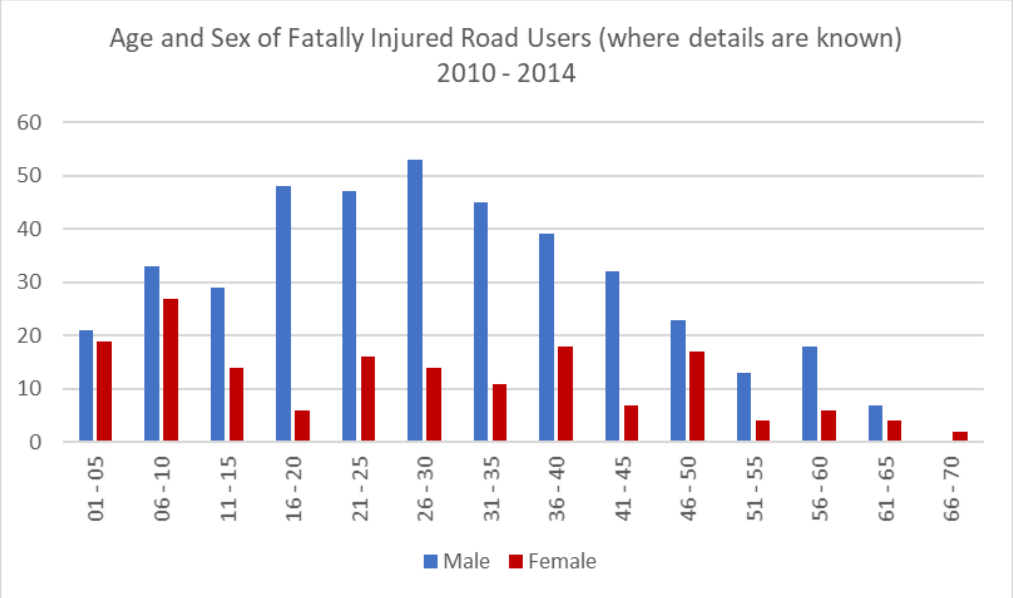


Figure 6.6 Fatal Casualties by Age and Gender – Highlands Hwy Provinces

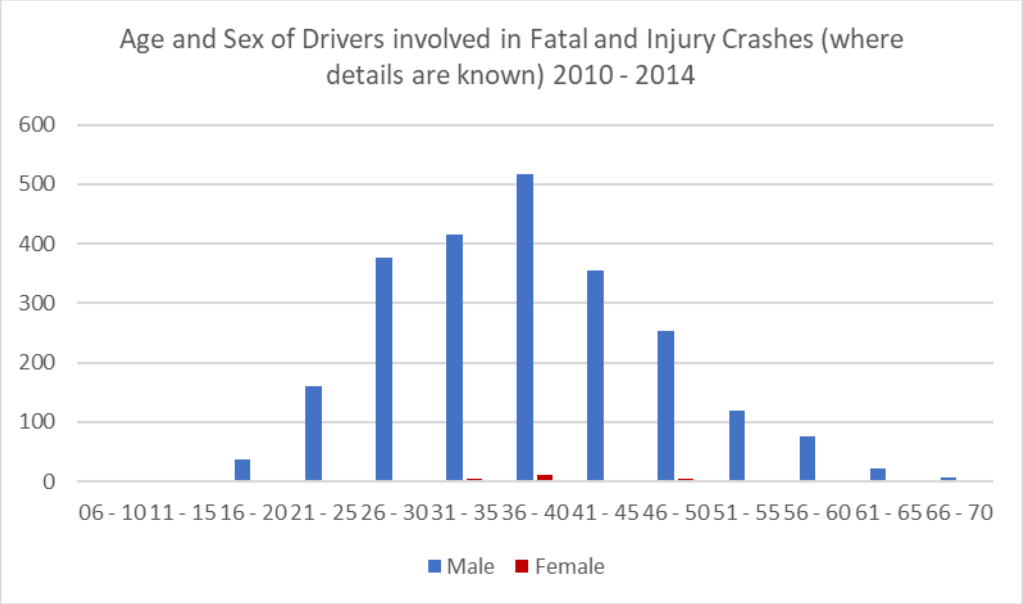


Figure 6.7 Age and Gender of Drivers involved in Fatal and Injury Crashes – Highlands Hwy Provinces

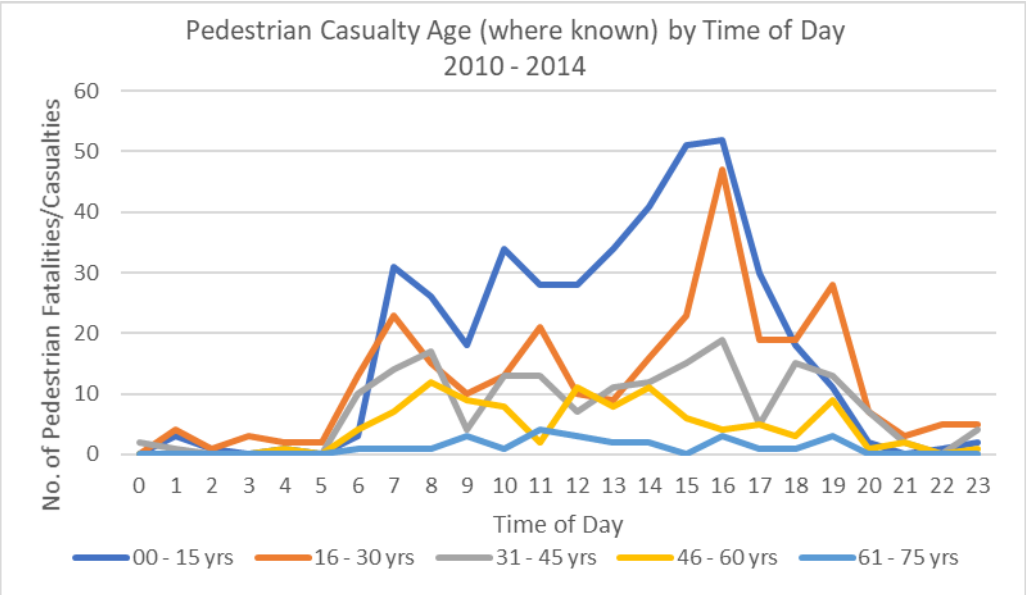


Figure 6.8 Age of Fatal and Injured Pedestrian Casualties by Crash Time of Day - Highlands Hwy Provinces

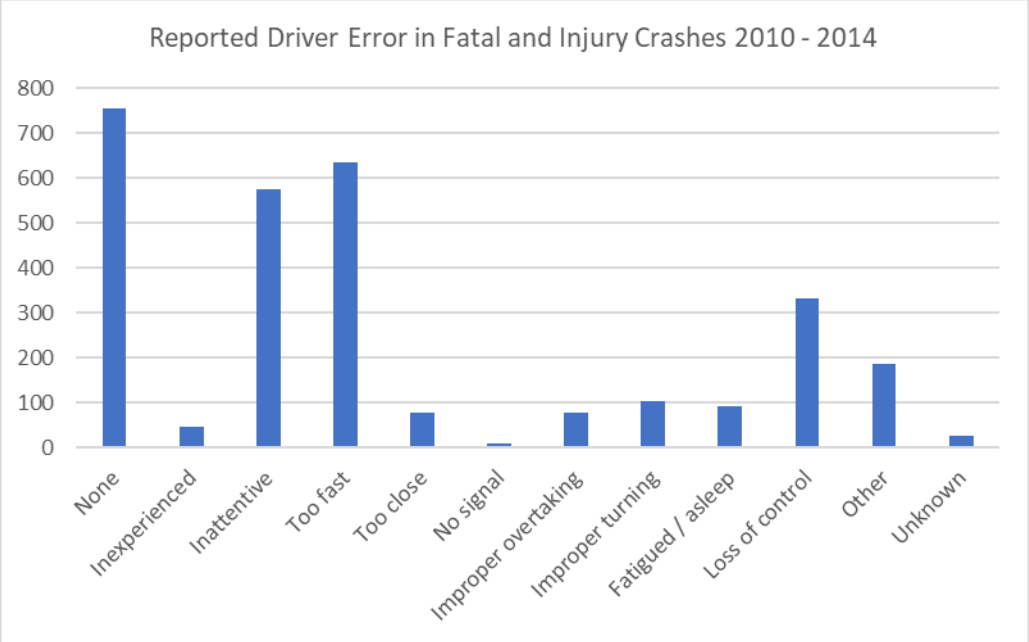


Figure 6.9 Number of Reported Driver Errors in Fatal and Injury Crashes – Highlands Hwy Provinces

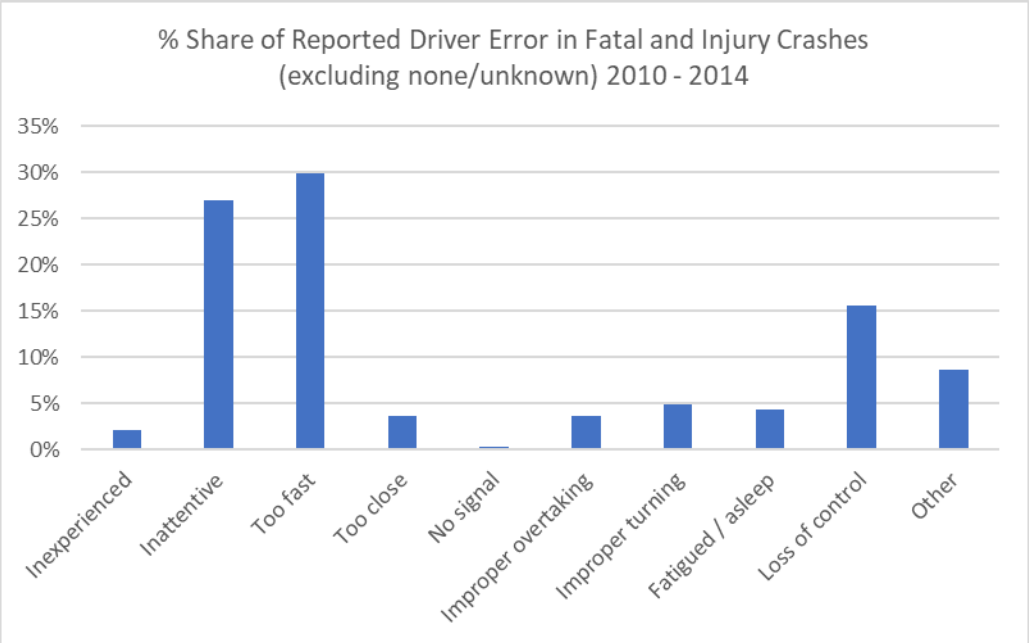


Figure 6.10 Percentage of Types of Reported Driver Error (excluding none/ unknown) – Highlands Hwy Provinces

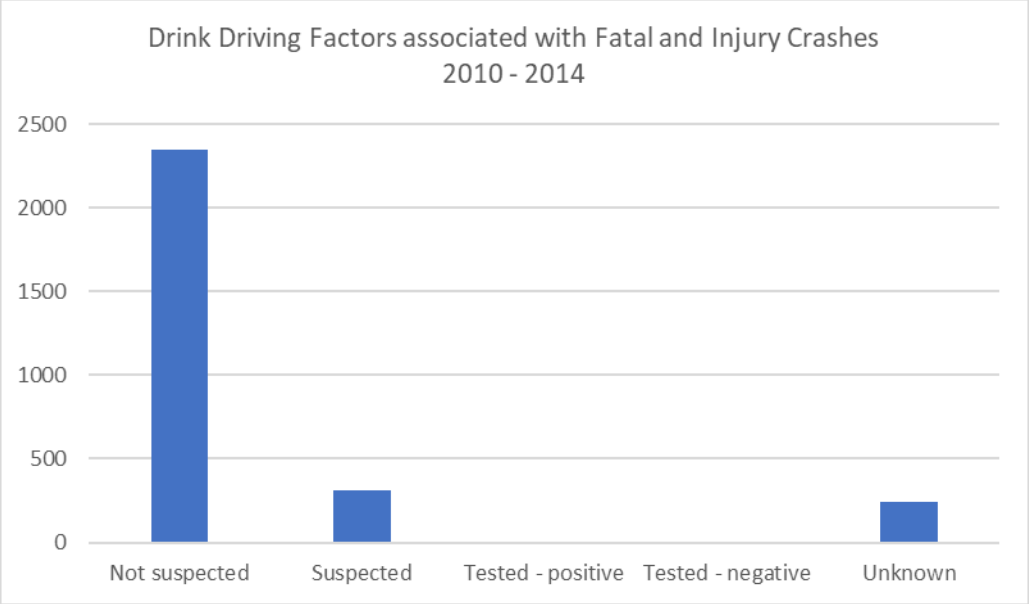


Figure 6.11 Number of Fatal and Injury Crashes by Reported Drink-Driving Factor – Highlands Hwy Provinces

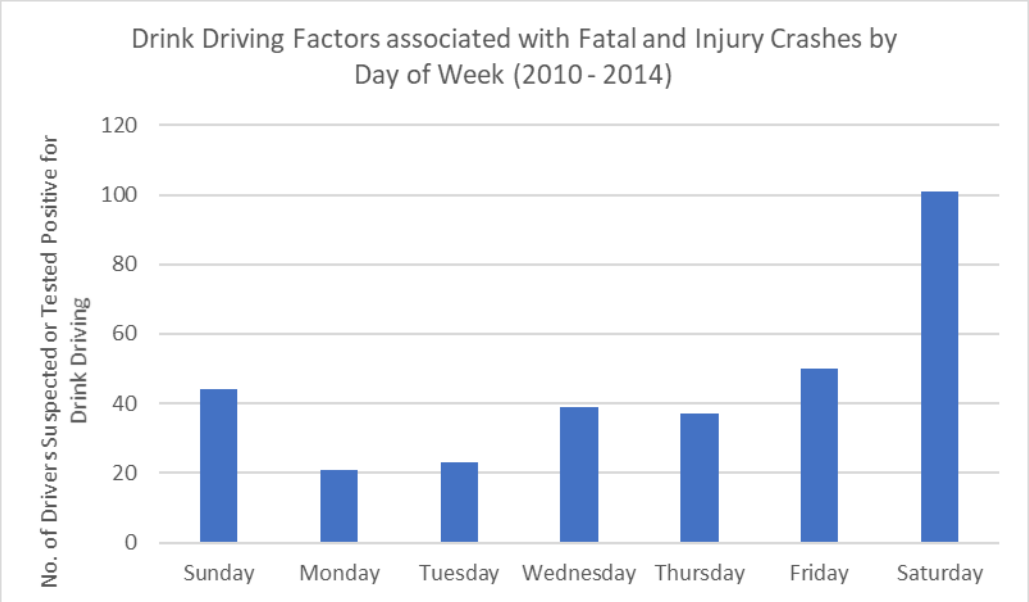


Figure 6.12 Number of Drivers Suspected of and/or Tested Positive for Drink Driving involved in Fatal and Injury Crashes – Highlands Hwy Provinces

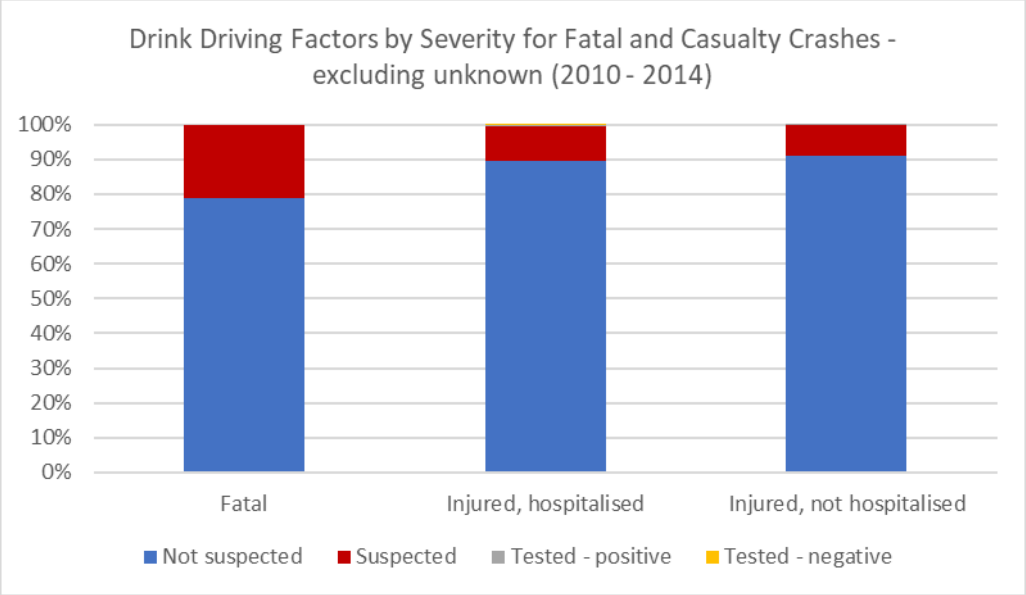


Figure 6.13 Percentage of Drivers involved in Fatal and Injury Crashes by Drink-Drive Factor– Highlands Hwy Provinces

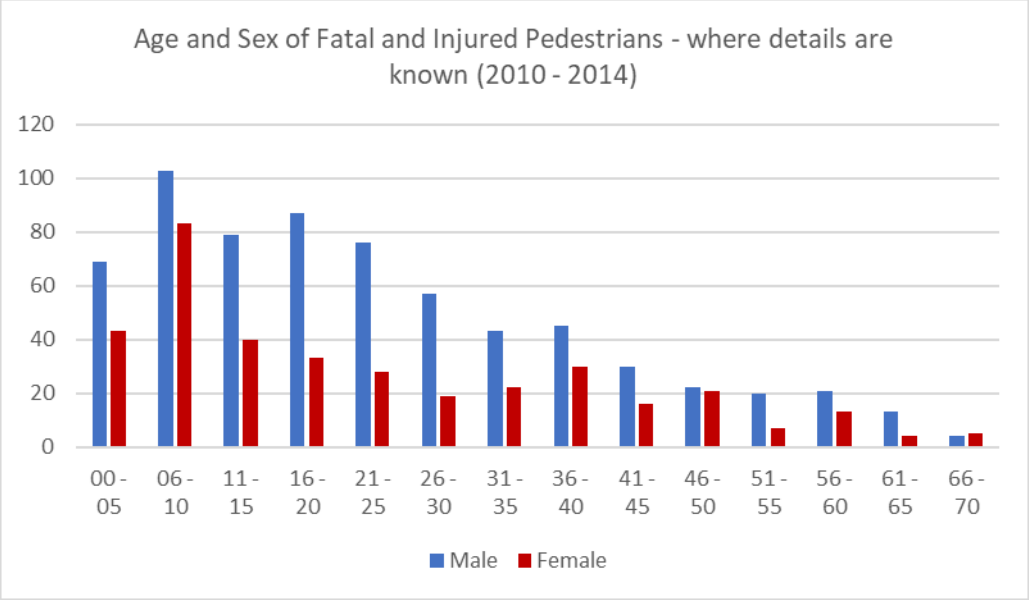


Figure 6.14 Known Age and Gender of Pedestrians involved in Fatal and Injury Crashes – Highlands Hwy Provinces

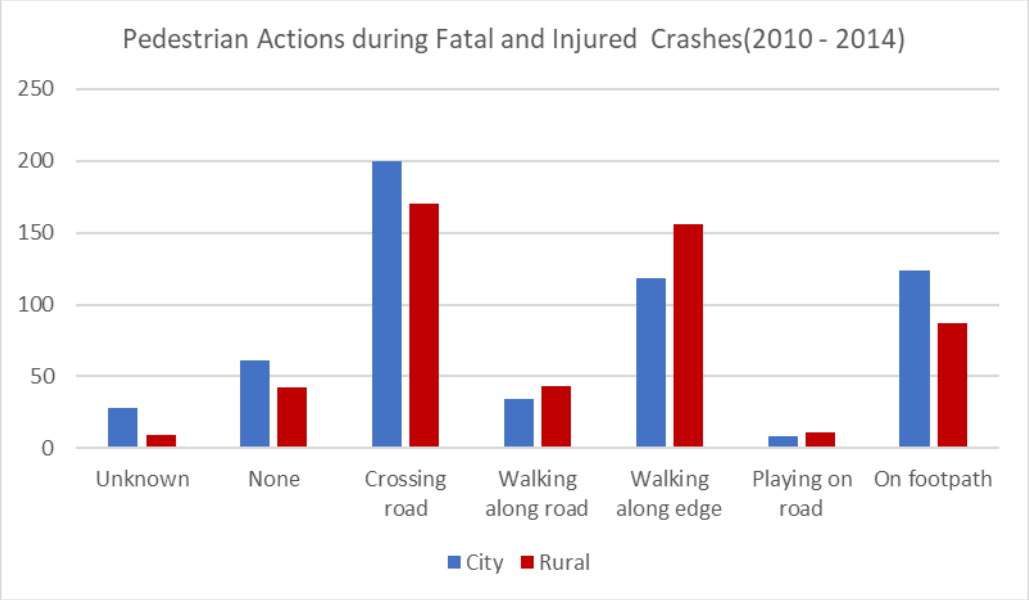


Figure 6.15 Pedestrian Actions during Fatal and Injury Crashes involving Pedestrians – Highlands Hwy Provinces

7. Vehicle Factors

Figure 7.1 identifies the types of vehicles involved in a fatal or casualty crash. As indicated, heavy goods vehicles (HGVs - i.e. trucks), buses (PMVs) and pick-ups/utes are the major types involved in crashes. This however, for instance in the case of pick-ups/utes may simply reflect the high numbers of such vehicles (and hence increased exposure to risk) along with the lack of protection/restraints when sitting in the rear of such vehicles with respect to casualty numbers/severity. Vehicle fleet data for PNG set out in the World Health Organisation (WHO) Global Status Report (2018) does not break down vehicle types into those shown in Figure 7.1. However, it indicates that in 2016, buses accounted for 12% of the vehicle fleet and trucks 22%. In comparison, 30% of vehicles involved in fatal and casualty crashes were buses, and 25% of vehicles were trucks.

It should be noted that a review of crash reports also indicated that Officers typically indicated the presence of a 4-wheel drive Sport Utility Vehicles (SUVs) and/or other similar types of vehicles (in particular Toyota Land Cruisers) in the crash as being 'other', but in some instances, also recorded them as being 'cars' and/or 'pick-ups'. In addition, HGVs can act as buses and as such, care should be taken when interpreting this data. Furthermore, whilst the Police Road Accident Report Forms indicate the reported vehicle manoeuvres, a review of the data shows a significant number of suspicious responses when compared to other information on the Forms. As such, vehicle manoeuvre data is not considered reliable enough to report back on at this stage.

Figures 7.2 and 7.3 show the types of vehicle faults that have been reported as being factors in fatal and casualty crashes. Such faults include lighting problems and 'other' faults such as brake failure or bald tyres. Thirteen percent of vehicles involved in a fatal or injury crash were reported as having a known defect, with brake failure being the most common problem, especially for trucks and buses.

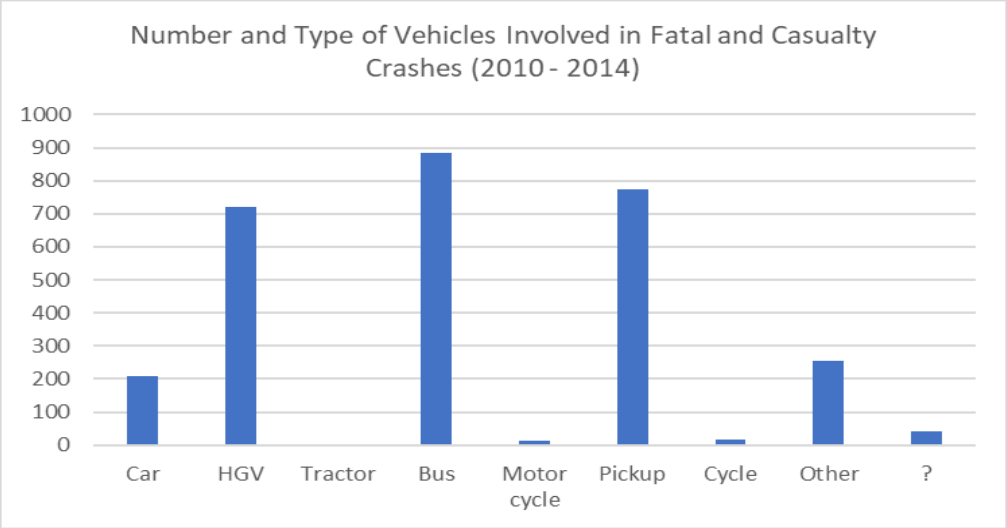


Figure 7.1 Types of Vehicles involved in Fatal and Injury Crashes – Highlands Hwy Provinces

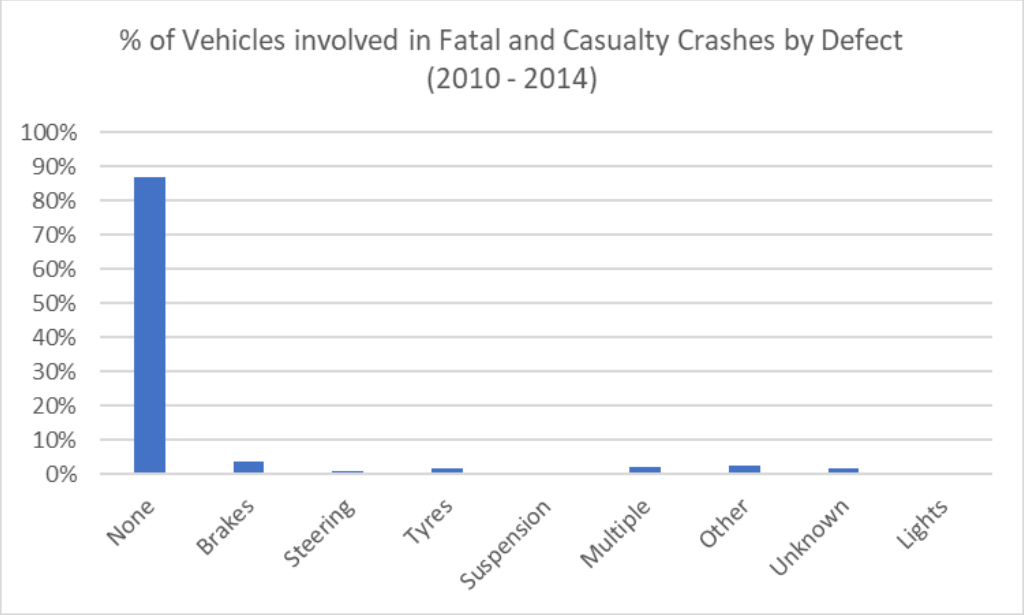


Figure 7.2 Reported Vehicle Defects/Factors involved in Fatal and Injury Crashes – Highlands Hwy Provinces

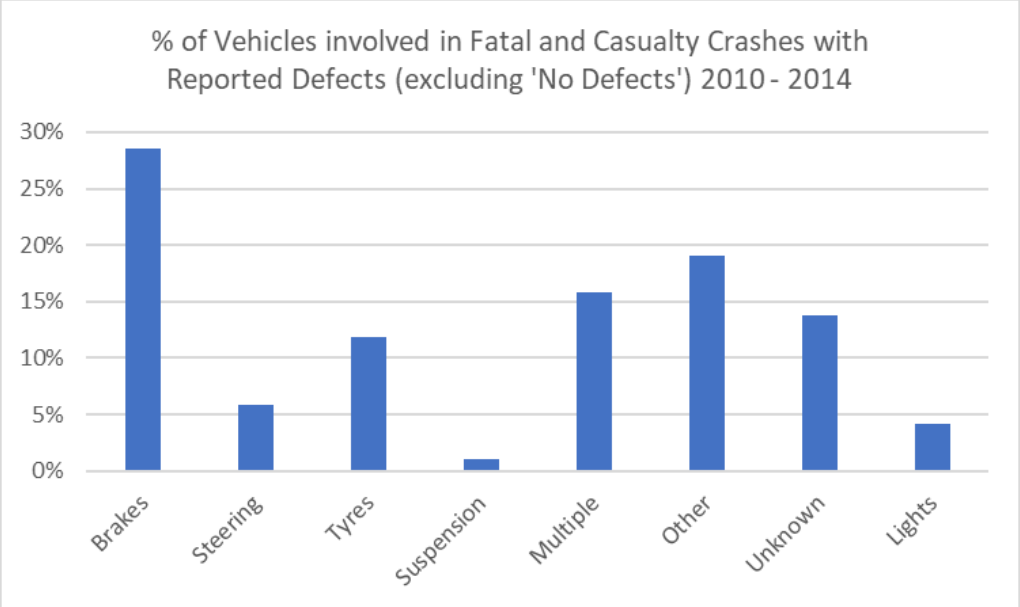


Figure 7.3 Percentage of Vehicles involved in Fatal and Injury Crashes with Reported Defects (excluding 'no defects') – Highlands Hwy Provinces

8. Road Environment Factors

The road environment such as alignment/geometry, surface condition and visibility can all contribute to a crash. Figures 8.1 to 8.7 set out the general road environment for reported fatal and casualty crashes – whilst noting that these are the prevailing elements only and may not have specifically contributed to an individual crash. As with other elements of the crash data reported upon, caution should be taken with respect to the accuracy of the information provided.

Figure 8.1 shows that approximately 90% of crashes occur at mid-block locations (i.e. away from intersections), albeit with a slightly lower proportion in urban areas due to the increased number of intersections in towns and cities. For those that did occur at intersections, as indicated in Figure 8.2, the most common type involved were T-intersections. It should be noted that 'other' intersection type typically includes driveways/accesses.

Figure 8.3 indicates that well over half (57%) occurred on flat, straight sections of road, albeit with crashes on curves and/or inclines being much more prevalent in rural areas. Whilst the total number of crashes at bridges is relatively low compared to other road locations, it should be noted that 31% of injury crashes that occur at bridges results in one or more fatalities. This compares with 20% of injury crashes resulting in one or more fatalities at all locations/road type descriptions. Additional details relating to crashes at road bridges are contained in Appendix C.

Figures 8.4 and 8.5 provide information related to road surface. Three-quarters of crashes occurred on sealed roads reported as being with or without a 'few' potholes – this percentage decreases however for rural roads compared to urban roads with almost 10% of the crashes on rural roads reported as occurring on sealed roads with 'many' potholes and 16% on earth/gravel roads. Similarly, approximately three-quarters of crashes occurred on dry roads – albeit with crashes on rural roads having a lower proportion of crashes on dry roads. As part of this, as indicated in Figure 8.6, almost 80% of crashes were reported as occurring in fine weather.

Figure 8.7 indicates that three quarters of fatal and casualty crashes occurred during daylight hours – with similar proportions for both urban and rural roads. Whilst this crash data also provides information regarding whether street lights were present and/or switched on for crashes during dawn/dusk/night, a review of the information indicates concerns with regards to the accuracy of the reports. For example, a review of the data indicates a number of Accident Reports indicating crashes occurring in rural areas with gravel roads which have been reported as being at 'night with lights on'. It seems highly unlikely that street lights would be provided in such instances, and it is presumed that mis-understandings may exist with respect to this particular question on the Police Accident Report Form – for instance, some Police Officers may interpret the 'lights on' aspect as relating to the vehicle lights rather than street lights.

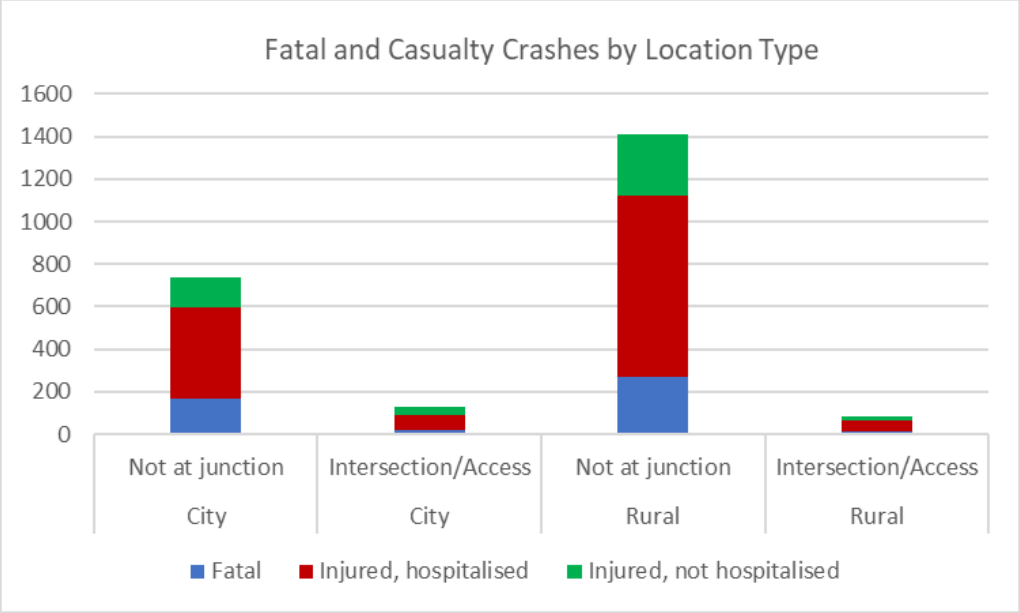


Figure 8.1 Fatal and Injury Crashes by Location – Highlands Hwy Provinces

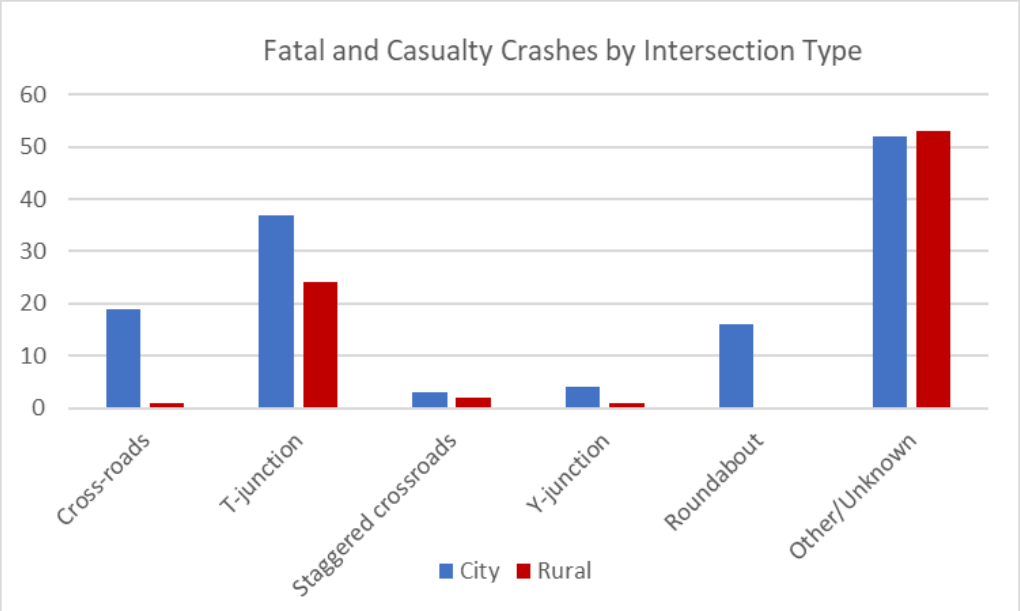


Figure 8.2 Fatal and Injury Crashes by Intersection Type – Highlands Hwy Provinces

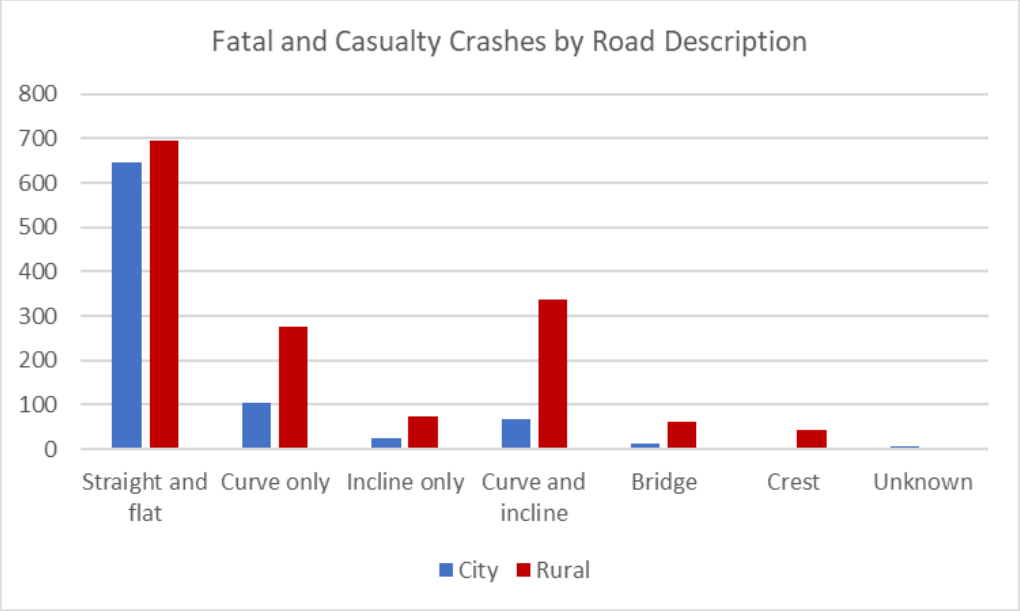


Figure 8.3 Fatal and Injury Crashes by Road Geometry and Alignment – Highlands Hwy Provinces

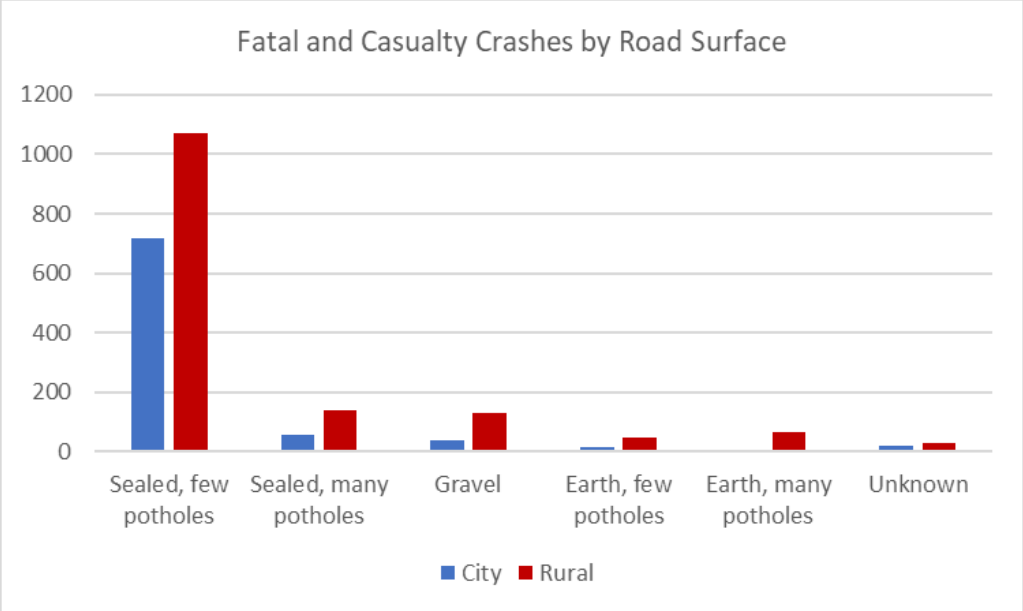


Figure 8.4 Fatal and Injury Crashes by Road Condition/Surface Type – Highlands Hwy Provinces

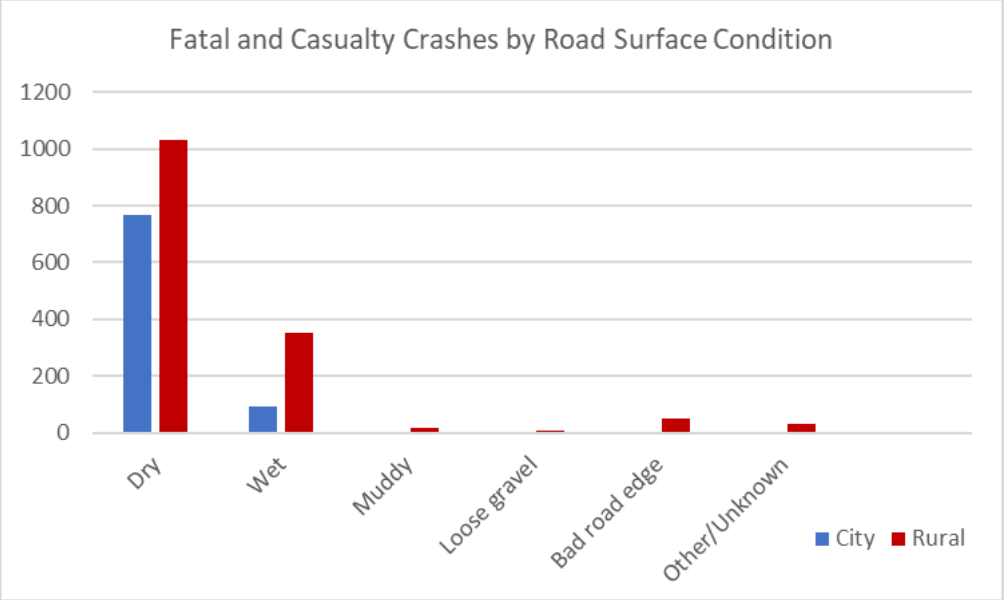


Figure 8.5 Fatal and Injury Crashes by Road Surface Condition – Highlands Hwy Provinces

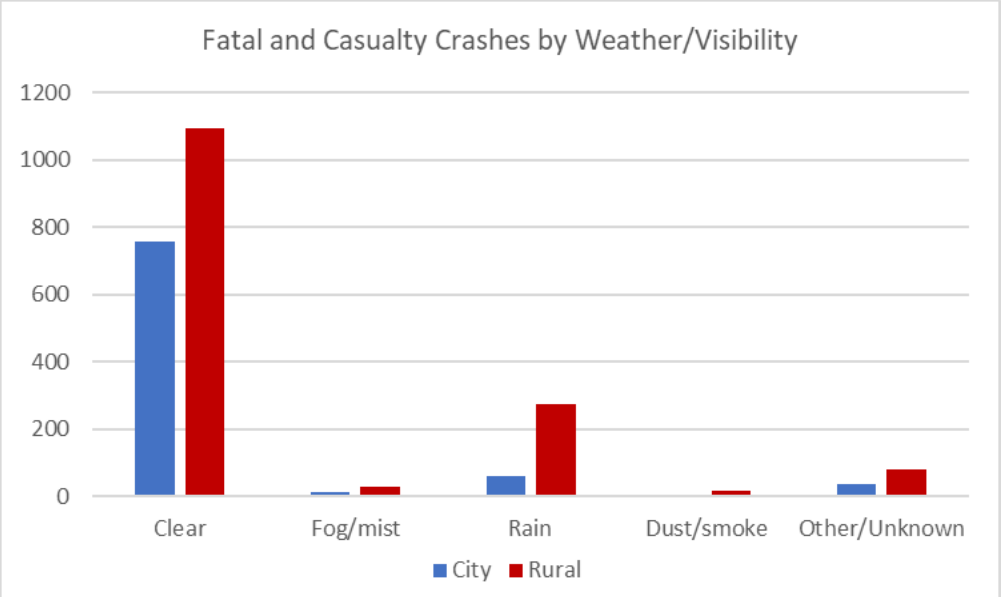


Figure 8.6 Fatal and Injury Crashes by Weather/Visibility – Highlands Hwy Provinces

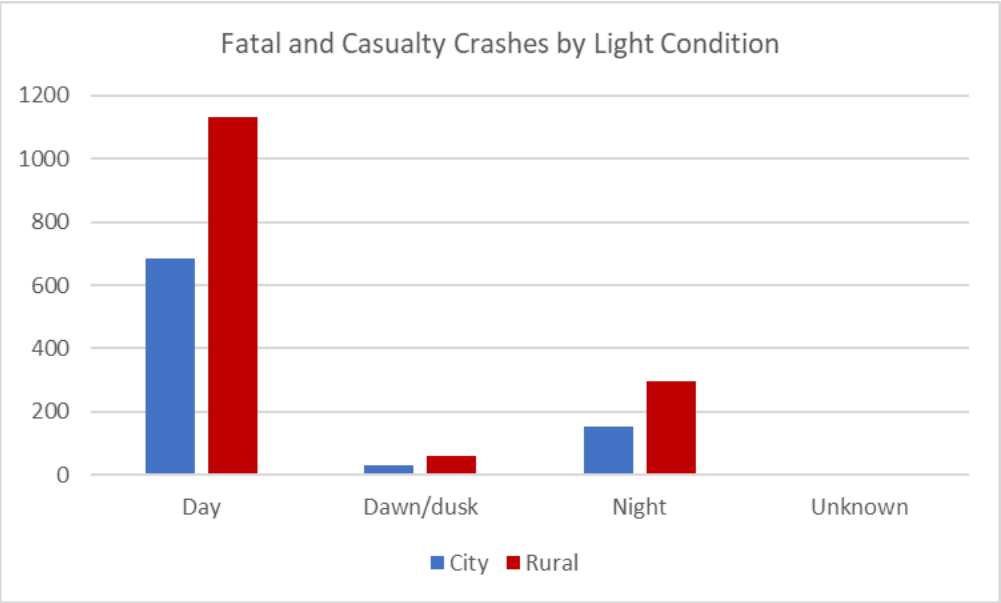
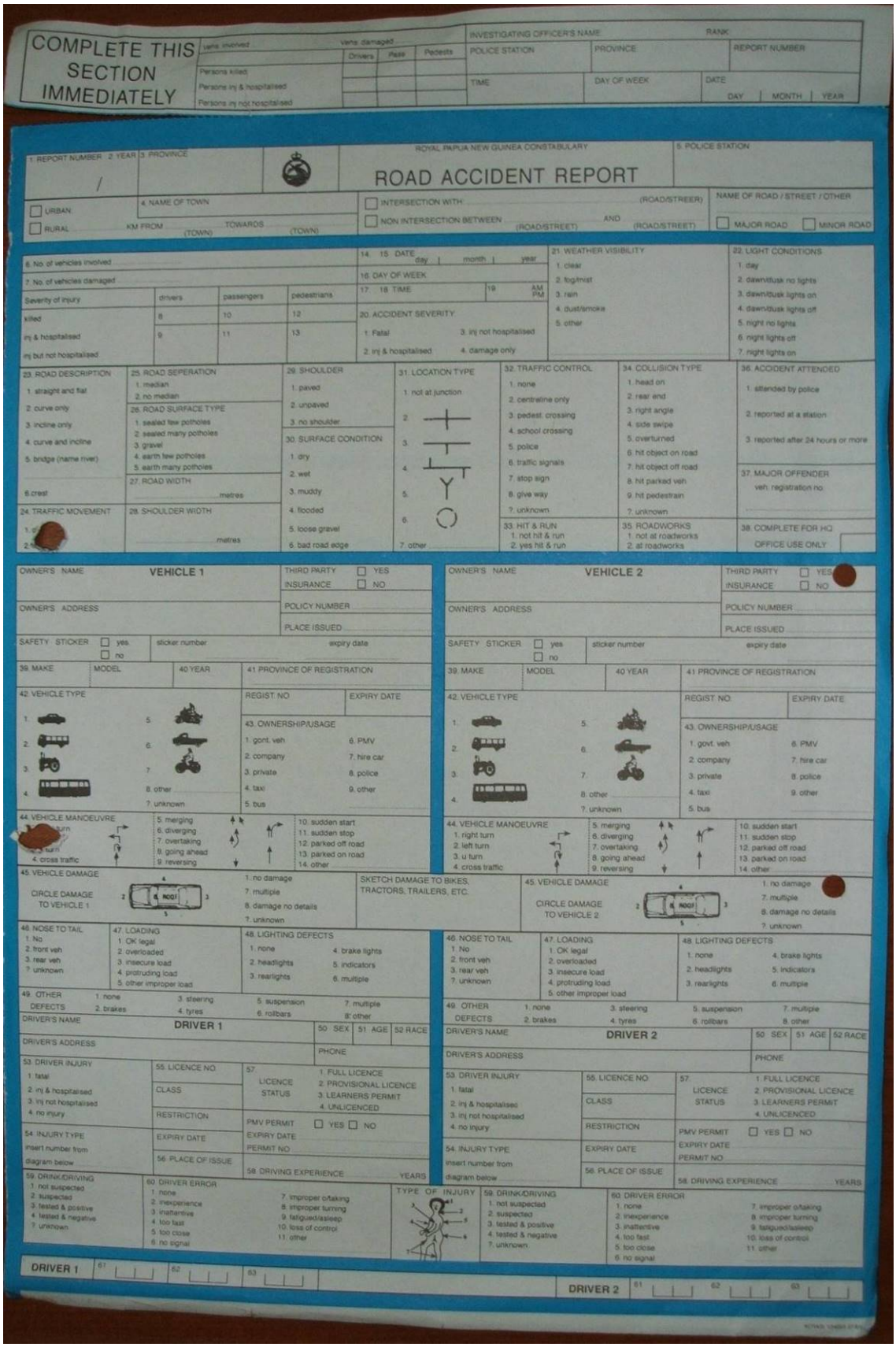


Figure 8.7 Fatal and Injury Crashes by Light Conditions – Highlands Hwy Provinces

Appendix A Police Road Accident Report Form



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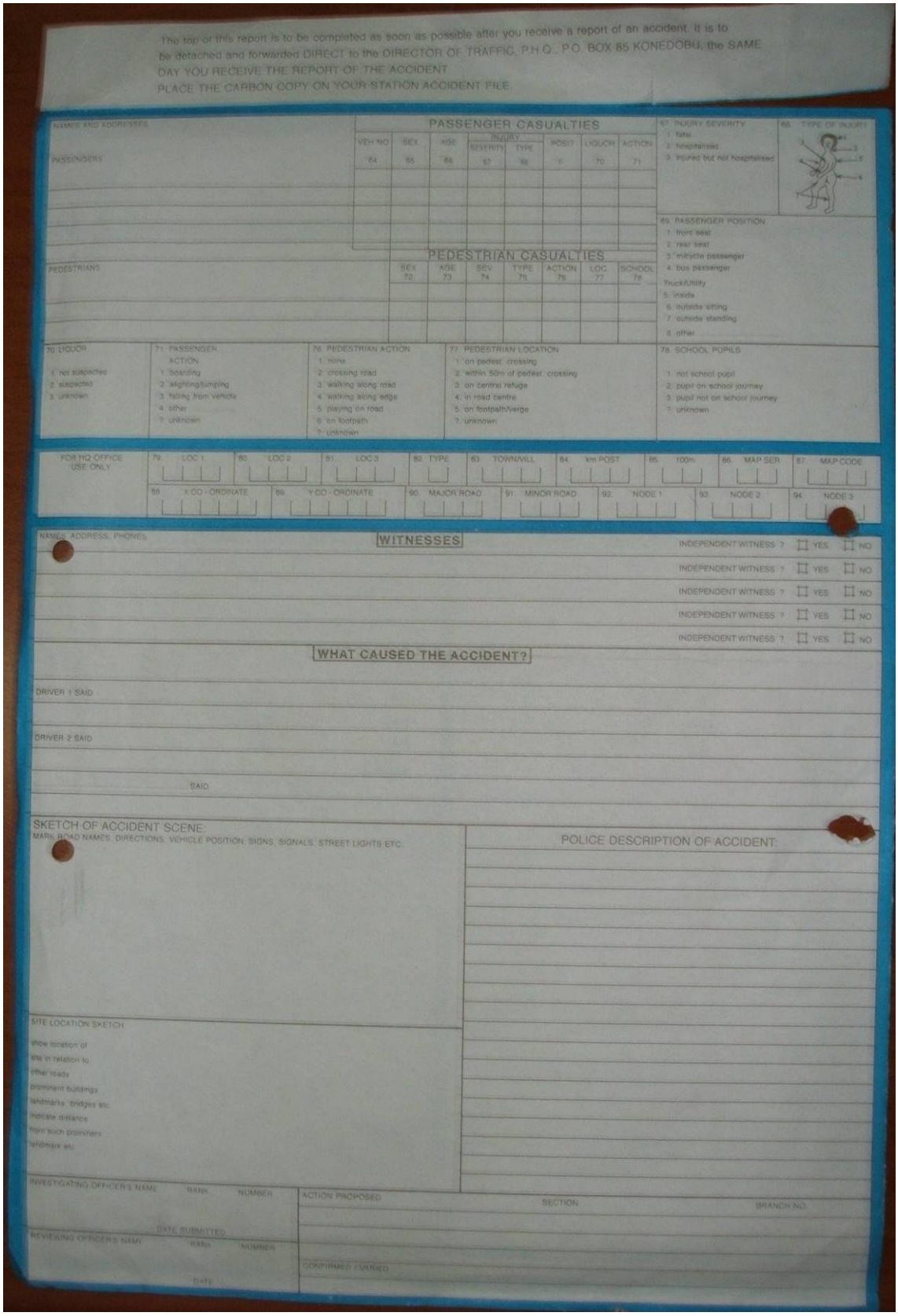

The top of this report is to be completed as soon as possible after you receive a report of an accident. It is to be detached and forwarded DIRECT to the DIRECTOR OF TRAFFIC, P.H.Q., P.O. BOX 85 KONEDOBU, the SAME DAY YOU RECEIVE THE REPORT OF THE ACCIDENT.
PLACE THE CARBON COPY ON YOUR STATION ACCIDENT FILE.

NAMES AND ADDRESSES

PASSENGER CASUALTIES

	VEH NO	SEX	AGE	INJURY SEVERITY	INJURY TYPE	POSIT	LIQUOR	ACTION
PASSENGERS	64	65	66	67	68		70	71

67. INJURY SEVERITY
1. fatal
2. hospitalised
3. injured but not hospitalised

68. TYPE OF INJURY

69. PASSENGER POSITION
1. front seat
2. rear seat
3. motorcycle passenger
4. bus passenger
Truck/Utility
5. inside
6. outside sitting
7. outside standing
8. other

PEDESTRIAN CASUALTIES

	SEX	AGE	SEV	TYPE	ACTION	LOC	SCHOOL
PEDESTRIANS	72	73	74	75	76	77	78

70. LIQUOR
1. not suspected
2. suspected
3. unknown

71. PASSENGER ACTION
1. boarding
2. alighting/jumping
3. falling from vehicle
4. other
?. unknown

76. PEDESTRIAN ACTION
1. none
2. crossing road
3. walking along road
4. walking along edge
5. playing on road
6. on footpath
?. unknown

77. PEDESTRIAN LOCATION
1. on pedest. crossing
2. within 50m of pedest. crossing
3. on central refuge
4. in road centre
5. on footpath/verge
?. unknown

78. SCHOOL PUPILS
1. not school pupil
2. pupil on school journey
3. pupil not on school journey
?. unknown

FOR HQ OFFICE USE ONLY

79. LOC 1	80. LOC 2	81. LOC 3	82. TYPE	83. TOWN/VILL	84. km POST	85. 100m	86. MAP SER	87. MAP CODE

88. X CO-ORDINATE	89. Y CO-ORDINATE	90. MAJOR ROAD	91. MINOR ROAD	92. NODE 1	93. NODE 2	94. NODE 3

NAMES, ADDRESS, PHONES

WITNESSES

INDEPENDENT WITNESS ? ☐ YES ☐ NO
INDEPENDENT WITNESS ? ☐ YES ☐ NO
INDEPENDENT WITNESS ? ☐ YES ☐ NO
INDEPENDENT WITNESS ? ☐ YES ☐ NO
INDEPENDENT WITNESS ? ☐ YES ☐ NO

WHAT CAUSED THE ACCIDENT?

DRIVER 1 SAID

DRIVER 2 SAID

SAID

SKETCH OF ACCIDENT SCENE:
MARK ROAD NAMES, DIRECTIONS, VEHICLE POSITION, SIGNS, SIGNALS, STREET LIGHTS ETC.

POLICE DESCRIPTION OF ACCIDENT:

SITE LOCATION SKETCH
show location of
site in relation to
other roads
prominent buildings
landmarks, bridges etc.
indicate distance
from such prominent
landmark etc.

INVESTIGATING OFFICER'S NAME RANK NUMBER
DATE SUBMITTED
REVIEWING OFFICER'S NAME RANK NUMBER
Date

ACTION PROPOSED SECTION BRANCH NO.
CONFIRMED / VARIED

Appendix B Hazardous Roads

Tables B1, B3, B5 and B7 set out the number of crashes between 2010 and 2014, broken down by severity, for various roads in each province (for which data has been sent to Police HQ). The data makes no attempt to rationalise crash numbers relative to the amount of traffic using those roads (due to a lack of data), nor does it make any allowance for length of road. As such, the exposure to risk is unfortunately unable to be considered at present. Crash numbers however typically reflect, as expected, those roads that can be expected to be the busiest. In addition, for the identified roads, a breakdown of casualty type with the urban/rural split has been provided Tables B2, B4, B6 and B8 for each province.

In due course, as the crash database develops, it will be able to identify specific hazardous locations (black spots) to allow targeting of remedial treatments. At present however, the naming of roads only allows us to narrow down investigations into the general whereabouts of hazardous locations. Furthermore, road names are based on those provided on the Police Accident Report forms. In some instances therefore, depending upon the local naming convention as reported by the Police Officer, the same road may have been listed twice, albeit with different names. Alternatively, where the Highlands (Okuk) Highway passes through a town or city, it may have a different local road name (e.g. Edwards Street in Goroka or Wahgi Parade in Mt Hagen). In such instances where this is known, the road has been defined as the Highlands (Okuk) Highway – however, it is unlikely that this has been fully captured. Feedback to the RTA on the above and/or any incorrect naming convention is welcomed, as is feedback with respect to the helpfulness or otherwise of these Tables and the other information set out in the Data Report.

As highlighted in the main report, the high level of under-reporting can be expected to have an impact on the number and location of crashes able to be reported upon. The roads shown in each list also simply reflects the main reported fatal and injury crash roads/locations for 2010 to 2014, not all of the roads with crashes reported as occurring in that particular province.

Table B1 Roads in Chimbu with Largest Number of Fatal and Injury Crashes (2010-2014)

Road Name	Fatal	Injured, hospitalised	Injured, not hospitalised	Total
Highlands (Okuk) Highway	17	46	18	81
Gumine Rd	3	10	1	14
Siane Rd	0	4	0	4
Kerowagi Rd	1	2	0	3

Table B2 Urban/Rural Roads in Chimbu with Casualty Type (2010-2014)

Road Name	Urban				Rural				Overall Total
	Driver	Pass	Ped	Total	Driver	Pass	Ped	Total	
Highlands (Okuk) Highway	10	50	33	93	22	118	13	153	246
Gumine Rd	1	15	0	16	6	29	2	37	53
Siane Rd	0	2	1	3	1	10	0	11	14
Kerowagi Rd	0	0	1	1	0	1	1	2	3

Table B3 Roads in Eastern Highlands with Largest Number of Fatal and Injury Crashes (2010-2014)

Road Name	Fatal	Injured, hospitalised	Injured, not hospitalised	Total
Highlands (Okuk) Highway	71	250	80	401
Okapa Rd	3	32	4	39
Lufa Rd	0	26	5	31
Bena Rd	3	14	2	19
Unggai Rd	4	9	0	13
Greathead Dr	0	10	1	11

Table B4 Urban/Rural Roads in Eastern Highlands with Casualty Type (2010-2014)

Road Name	Urban				Rural				Overall Total
	Driver	Pass	Ped	Total	Driver	Pass	Ped	Total	
Highlands (Okuk) Highway	42	268	77	387	91	1029	99	1219	1606
Okapa Rd	1	5	0	6	10	158	5	173	179
Lufa Rd	0	0	0	0	6	123	2	131	131
Bena Rd	0	4	0	4	2	94	3	99	103
Unggai Rd	0	0	0	0	7	33	0	40	40
Greathead Dr	5	26	5	36	0	0	0	0	36

Table B5 Roads in Morobe with Largest Number of Fatal and Injury Crashes (2010-2014)

Road Name	Fatal	Injured, hospitalised	Injured, not hospitalised	Total
Highlands (Okuk) Highway	62	125	52	239
Independence Drive	12	25	7	44
Busu Rd	8	24	10	42
Butibum Rd	4	17	11	32
Wau/Bulolo Rd	3	17	12	32
Bumbu Rd	2	15	6	23
Markham Rd	3	7	11	21
Huon Rd	0	10	5	15

Table B6 Urban/Rural Roads in Morobe with Casualty Type (2010-2014)

Road Name	Urban				Rural				Overall Total
	Driver	Pass	Ped	Total	Driver	Pass	Ped	Total	
Highlands (Okuk) Highway	25	87	28	140	84	388	45	517	657
Independence Drive	10	36	20	66	2	6	1	9	75
Busu Rd	7	23	16	46	4	9	7	20	66
Butibum Rd	8	9	21	38	0	0	1	1	39
Wau/Bulolo Rd	0	0	0	0	13	37	6	56	56
Bumbu Rd	2	11	13	26	0	0	0	0	26
Markham Rd	13	16	7	36	0	0	0	0	36
Huon Rd	10	8	4	22	0	0	0	0	22

Table B7 Roads in Western Highlands (including Jiwaka) with Largest Number of Fatal and Injury Crashes (2010-2014)

Road Name	Fatal	Injured, hospitalised	Injured, not hospitalised	Total
Highlands (Okuk) Highway	122	282	95	499
Baiyer Rd	14	35	21	70
Tomba/Wabag Rd	6	23	0	29
Kum Rd	1	14	4	19
Dei Rd	2	9	5	16

Table B8 Urban/Rural Roads in Western Highlands (including Jiwaka) with Casualty Type (2010-2014)

Road Name	Urban				Rural				Overall Total
	Driver	Pass	Ped	Total	Driver	Pass	Ped	Total	
Highlands (Okuk) Highway	23	145	90	258	104	1011	152	1267	1525
Baiyer Rd	3	67	4	74	7	205	24	236	310
Tomba/Wabag Rd	1	8	1	10	16	101	5	122	132
Kum Rd	3	11	13	27	0	0	1	1	28
Dei Rd	0	0	0	0	1	34	7	42	42

Appendix C Road Safety at Bridges

In total within the Provinces examined as part of this Data Report, 112 crashes (22 fatal, 41 serious, 12 minor and 37 damage only) were recorded resulting in 31 fatalities, 182 serious injuries and 80 minor injuries (a total of 329 fatalities or injured road users). Table C1 provides a breakdown of the crash severity and the route/road that the crashes recorded/reported as occurring at a bridge occurred along.

Table C1 Roads with Bridge Crashes Reported in Nominated Provinces (2010-2014)

Province	Road Name	Accident Severity				Total
		Fatal	Serious Injury	Minor Injury	Damage Only	
Highlands Eastern	Bena Rd	0	1	0	0	1
	Ehi Bridge	0	1	0	0	1
	Elliot Street	0	1	0	0	1
	Jompinka/Sonofi Bridge	0	0	0	1	1
	Kamaliki Rd	0	0	1	0	1
	Keneba Bridge	0	1	0	0	1
	Lafeigu Road	0	1	0	0	1
	Lufa Rd	0	0	0	1	1
	Highlands (Okuk) Hwy	6	9	4	4	23
	Onerunka Rd	0	1	0	0	1
	Tirokave Road	0	1	0	0	1
	Unggai Rd	0	2	0	0	2
	Armed Hold Up Area?	0	1	0	0	1
	Total	5	19	5	6	35
Chimbu	Highlands (Okuk) Hwy	0	1	0	4	5
	Ganige Rd	0	0	0	2	2
	Koronige Rd	0	0	1	0	1
	Minima Rd	0	1	0	0	1
	Total	0	2	1	6	9
Highlands Western	Baiyer Rd	1	4	1	1	7
	Highlands (Okuk) Hwy	6	9	1	6	22
	? (Miltsip Bridge)	0	1	0	0	1
	Dei Council Rd	1	0	0	0	1
	Dei Rd	0	0	2	0	2
	Kuip Road	1	0	0	0	1
	Ogelbeng - Baiyer Rd	0	0	0	1	1
	Ramba Rd	1	0	0	0	1
	Tapugla Bridge	0	1	0	0	1
	Tomba/Wabag Rd	0	1	0	0	1
	Tuman Bridge	0	1	0	0	1
	Wurup Rd	1	0	0	0	1
	Total	11	17	4	8	40

Morobe	Highlands (Okuk) Hwy	4	2	1	5	12
	Bumbu Rd - At Bumbu Bridge	0	0	0	7	7
	Busu Bridge	1	0	0	1	2
	Butibum Rd	0	0	1	0	1
	Gurney Street	0	0	0	1	1
	Macdhui St	0	1	0	0	1
	Wau/Bulolo Rd	1	0	0	3	4
	Total	6	3	2	17	28
Total		22	41	12	37	112

Figure C1 sets out the types of reported collisions for all crashes (regardless of severity) against permitted traffic movements in terms of one or two-way traffic (as a proxy for single and two-lane bridges). It should be noted however that the one or two-way traffic movement data should be treated with caution due to known issues associated with inconsistent Police Officer interpretation of this aspect of the Accident Report Form.

As indicated, 'hit object off road' (e.g. a bridge crash barrier) and over-turned have the highest number of reported crashes, with an equal number of crashes involving head-on collisions, collisions with pedestrians and sideswipes. Of particular note however is the number of head-on collisions at bridges with one-way traffic (assumed to be one-lane bridges).

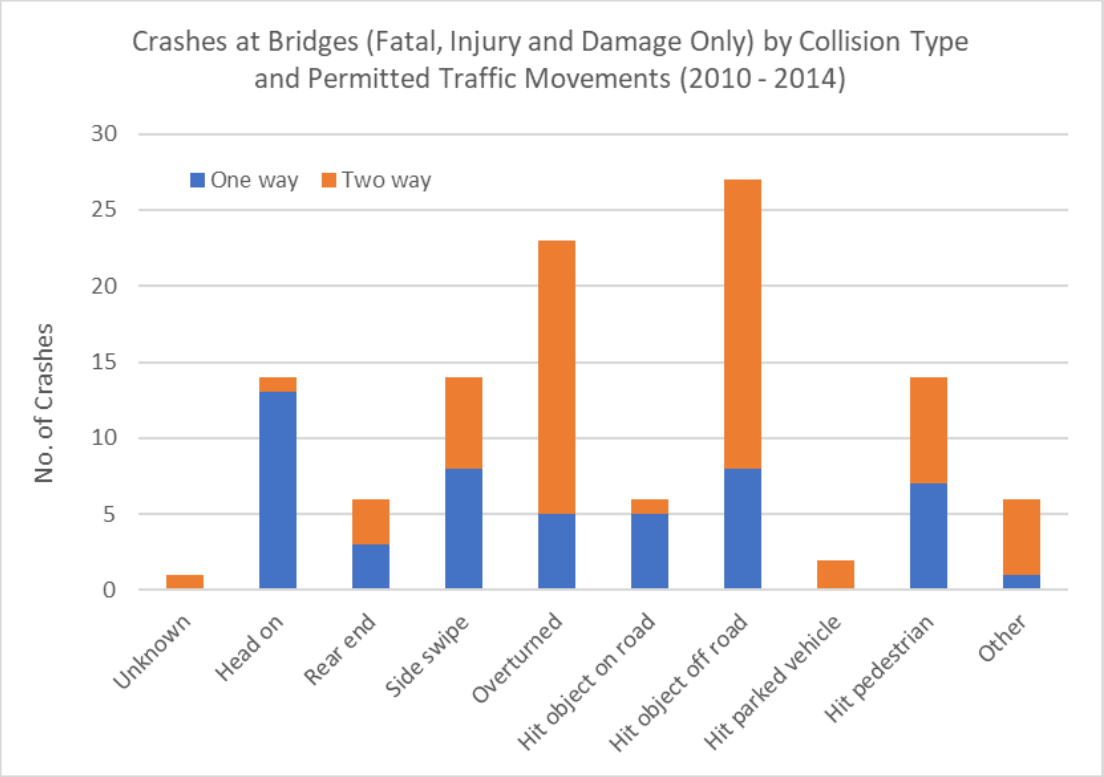

Figure C1 Crash Type by Permitted Traffic Movement

With regards to those crashes specifically recorded as occurring along the Highlands (Okuk) Highway), Table C2 provides a more detailed breakdown on their location.

Table C2 Highlands (Okuk) Highway Bridge Crash Locations

Province	At	Between		Comment	Crash Severity	Crash Type	Traffic Movement
		A	B				
Eastern Highlands		Goroka	Korefegu		Fatal	Overturned	Two-way
	Dirty Wara Br				Damage only	Sideswipe	One-way
		Kainantu	Yonki		Minor	Sideswipe	Two-way
	?				Unknown	Hit Object on Road	Two-way
	?				Serious	Head-on	One-way
	Kundiawa Rd				Serious	Pedestrian	Two-way
	?				Damage only	Overturned	Two-way
		Bane Bridge	Kainantu Town		Minor	Hit Object off Road	One-way
	Kinigito Bridge	Goroka	Lae		Minor	Pedestrian	One-way
		Goroka Town	Asaro		Serious	Pedestrian	Two-way
	Heganofi Station	Henganofi	Goroka		Serious	Pedestrian	One-way
	Bena Bridge	Bena	Goroka		Serious	Head-on	One-way
	Kawaka Road	Ebc Road	Kassam Top		Damage only	Hit Parked Vehicle	Two-way
	?				Damage only	Hit Object off Road	Two-way
		Kassam Pass	Yonki		Minor	Hit Object off Road	Two-way
	?				Fatal	Pedestrian	Two-way
		Henganofi	Goroka		Serious	Head-on	One-way
	Bena Bridge	Goroka	Lufa Turnoff		Fatal	Rear-end	One-way
	Zoigozo Bridge	Kundiawa	Goroka		Serious	Pedestrian	Two-way
	Zokozoi Bridge	Asroyufa	Okiufa		Fatal	Overturned	Two-way
	Bara Creek	Goroka	Henganofi		Serious	Overturned	Two-way
	4 Mile	Kainantu	Yonki		Fatal	Pedestrian	One-way
		Goroka	Okuk Hwy		Fatal	Pedestrian	Two-way
Chimbu		Mingendi	Wandi		Damage only	Hit Object off Road	Two-way
		Waghi Br	Kundiawa		Damage only	Sideswipe	One-way
	Koronigl Bridge	Kundiawa	Hagen		Damage only	Hit Object off Road	One-way
	Koronigl Bridge	Kundiawa	Hagen		Serious	Hit Object off Road	One-way
		Barawagi	Minj		Damage only	Sideswipe	Two-way
Western Highlands		Kudjip	Minj		Serious	Head-on	One-way
		Wara Kane	Kudjip		Damage only	Hit Object off Road	One-way

		Duna	Minj Rd		Damage only	Rear end	One-way
	Warwar				Damage only	Sideswipe	One-way
		Hagen	Togoba		Fatal	Hit Object off Road	Two-way
		Kudjip	Waghi Bridge		Fatal	Head-on	One-way
		Kudjip	Kurumul		Serious	Head-on	One-way
	Waral Bridge	Minj	Kundiawa		Minor	Head-on	One-way
		Wara Kupa	Kudjip		Serious	Overturned	One-way
		Konfam	Kuligap		Serious	Overturned	Two-way
		Kaupena	Mt Hagen		Serious	Overturned	Two-way
		Kurumul	Kudjip		Serious	Sideswipe	One-way
	Wara Al Bridge				Fatal	Hit Object off Road	One-way
		Togoba	Mt Hagen		Fatal	Hit Pedestrian	Two-way
		Togoba	Malda		Fatal	Hit Object off Road	Two-way
	Waghi Bridge	Minz Town	Kundiawa Town		Damage only	Sideswipe	One-way
	Waghi Bridge	Panga	Hati		Damage only	Head-on	One-way
		Mt Hagen	Tomba		Serious	Head-on	One-way
		Hagen	Togoba		Serious	Hit Object off Road	Two-way
	Kurumula Bridge				Damage only	Overturned	One-way
		Mt Hagen	Wabag		Serious	Overturned	Two-way
		Mt Hagen	Togoba		Fatal	Other	Two-way
Morobe	?				Damage only	Hit Object off Road	Two-way
		Lae	Goroka		Serious	Other	Two-way
	?				Fatal	Overturned	Two-way
		6 Mile	Wau/Bulolo Rd		Fatal	Hit Object off Road	Two-way
	Zumin Bridge	Mutzing Station	Umi Village		Damage only	Overturned	Two-way
		Mutzing	Umi	Potentially Zumin Bridge	Damage only	Sideswipe	Two-way
	?				Minor	Hit Object off Road	Two-way
		Lae	Goroka		Fatal	Hit Object off Road	Two-way
		Mutzing	Umi	Potentially Zumin Bridge	Damage only	Other	Two-way
	Erap Road	Nadzab	40 Mile	Erap Bridge?	Damage only	Hit Object off Road	Two-way
	?				Serious	Unknown	Two-way
	Zumin Bridge	Mutzing	Umi		Fatal	Overturned	Two-way