University of Southern Queensland

Faculty of Health, Engineering and Sciences

Evaluation of Road Safety Processes Currently used in Queensland

A dissertation submitted by

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In fulfilment of the requirements of

Courses ENG4111 and 4112 Research Project

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Abstract

The aim of this project is to evaluate the road safety processes currently used in Queensland. This project focus on the study of the current road safety processes used in Queensland to eliminate fatalities and serious injuries and how effective these programs and initiatives have been in reducing the number of serious injuries and fatalities.The areas covered include; general road safety worldwide and in Australia;Road safety statistics in Queensland and analyses; Safety initiatives used in Queensland;Camera Detected Offence Program (CDOP);Black Spot Program (BSP);Heavy Vehicle Safety and Productivity Program (HVSPP);Toowoomba Regional Council Road Safety Initiatives;. Older Driver Safety Programs and Initiatives;Young Driver Road Safety Programs and initiatives; Motorcycle Safety Initiatives;Anti Drink Driving Safety Initiatives;Older driver (OD) safety initiatives ; Designated Driver Program;School Road Safety Initiatives; Australia wide Road Safety Statistics;overview of Canada and England road fatality rates; Global Road Safety; 5E's of road safety and Geometric Design .

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ENG4111 Research Project Part 1 &

ENG4112 Research Project Part 2

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CERTIFICATION

I certify that the ideas, designs and experimental work, results, analyses and conclusions set out in this dissertation are entirely my own effort, except where otherwise indicated and acknowledged.

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Nomenclature

The following abbreviations are used throughout this dissertation.

ABS	Australian Bureau of Statistics
BAC	Blood Alcohol Concentration
BSP	Black Spot Program
BITRE	Bureau of Infrastructure, Transport and Regional Economics
CARRS	Centre for Accident Research and Road Safety Queensland
CDOP	Camera Detected Offence Program
DIRD	Department of Infrastructure and Regional
DIT	Department of Infrastructure and Transport
DITRDL	Department of Infrastructure, Transport, Regional development and local Government
GLS	Graduated Licensing System
HVSPP	Heavy Vehicle Safety and Productivity Program
IRTAD	International Expert Network and Database on Road Safety Data
LAM	Scheme Learner Approved Motorcycle Scheme
RACQ	Royal Automobile Club of Queensland
RTA	Roads and Traffic Authority
SafeST	Safe school travel
THLGC	Transport, Housing and Local Government Committee
TMR	Transport and Main Roads
WHO	World Health Organization

1.0 INTRODUCTION

Road safety is of utmost importance to every road user and people close to that individual. It is very important that our roads are safe to aid continuity and success in our society. Road users include but not limited to only drivers, passengers, bikers and pedestrians. It is evident from road safety studies and safety records that road safety continues to be one of the Australia's most serious public health issues. DIRD (2013) reports that the economic cost of road crashes in Australia is approximately $27 billion per year. Therefore, by improving road safety it is obvious that the economic costs of road crashes as well as the social impact on road users will be reduced. Records kept since 1925 show that there have been over 180,000 road fatalities on roads in Australia (DIRD 2013). However, road deaths per year have fallen from 3,798 deaths since 1970 to 1,306 fatalities in 2012.This shows that in 42 years 2492 lives have been saved on Australian roads and that approximates 59 lives saved per year since 1970.The reduction in fatalities since 1970 has been attributed to road safety initiatives and programs introduced by road safety authorities (TMR 2013).

1.1 *Background*

The Government of Queensland is committed to eliminating fatalities and serious injuries caused by road crashes in Queensland. Several actions have been tried in the past, and current remedial actions are also building a foundation for longer term improvements. The best practice safe system approach currently used aims to achieve safe road users traveling at safe speeds in safe vehicles on safe roads and roadsides. The aim of this research is to evaluate the road safety initiatives and programs used in Queensland. By evaluating the road safety initiatives and programs used in Queensland we will be able to learn about the effectiveness of these programs. After completing evaluating road safety initiatives and programs, recommendations for future road safety initiatives and programs will be provided.

1.2 *Objectives*

Upon completion of this project (ENG4111, ENG4112) it is expected that I will:

- Have a broad understanding of road safety in Queensland
- Have understanding of road safety crash data from Queensland, New South Wales, Western Australia, Tasmania, Victoria, Australian Capital territories and Northern Territory
- Have a broad understanding of the road safety initiative and programs used in Queensland
- Be able to evaluate the road safety initiatives and programs used in Queensland
- Provide support for future road safety initiatives
- Provide recommendation for future road safety initiatives

1.3 *Scope*

The scope for this project will involve;

1. General road safety worldwide and in Australia

2. Road safety statistics in Queensland and analyses

3. Safety initiatives and programs used in Queensland

4. Camera Detected Offence Program (CDOP)

5. Black Spot Program (BSP)

6. Heavy Vehicle Safety and Productivity Program (HVSPP)

7. Toowoomba Regional Council Road Safety Initiatives

8. Older Driver Safety Programs and Initiatives

9. Young Driver Road Safety Programs and initiatives

10. Motorcycle Safety Initiatives

11. Anti Drink Driving Safety Initiatives

13. Designated Driver Program

14. School Road Safety Initiatives

15. Australia wide Road Safety Statistics

16. Canada and England road fatality rates

17. Global Road Safety

18. 5E's of Road Safety

19. Geometric Design

20.Conclusion and future work

By evaluating and analyzing the road safety initiatives and programs used in Queensland it will be easy to measure how effective the programs have been in reducing fatalities and serious injuries on Queensland roads.Thereafter, sound recommendations regarding road safety programs and initiatives will be provided.

2.0 LITERATURE REVIEW

I conducted a search of websites that contained literature on road safety, traffic crashes, fatalities, road safety initiatives and programs used in Queensland ,Australia and internationally. In addition I was in constant communication with the roads safety officer and roads design engineer from Department of transport and main roads Toowoomba branch and Warwick branch respectively regarding practical and recent issues relating to road safety in the Darling downs and Queensland.Additional information regarding road safety was acquired from Toowoomba regional council.

The databases and websites below were accessed as part of the search using key words such as "Queensland road safety programs", "road safety initiatives Queensland", "road safety program evaluation" and "Australia crash statistical data":

Association for Safe International Road Travel - www.asirt.org

Australia Federal police -www.police.act.gov.au

Australian Road Council

Bureau of Infrastructure Transport and Regional Economics - www.bitre.gov.au.

Department of Infrastructure and Transport-www.infrastructure.gov.au

Department of Planning Transport and Infrastructure -www.dpti.sa.gov.au

Department of Transport and main roads - www.qld.gov.au

Google search engine – www.google.com

Infrastructure Australia- www.infrastructureaustralia.gov.au

Monash University Accident Research Centre

Northern Territory Government of Australia Department of Transport - www.transport.nt.gov.au

Road safety Victoria - www.roadsafety.vic.gov.au

The Department of Infrastructure, Energy and Resources Tasmania- www.transport.tas.gov.au

Transport Canada-www.tc.gc.ca

Transport Road and Maritime Services -www.rta.nsw.gov.au

Western Australia Police- www.police.wa.gov.au

The literature review focused on the following areas:

- Evaluation of road safety programs and initiatives used in Queensland
- Queensland Crash statistical data and analysis
- Australia wide crash statistical data and analysis
- Overview of programs used in England and Canada

3.0 ROAD SAFETY

The World Health Organization (2010) estimates that approximately 1.3 million people die every year in road crashes and 20- 50 million people are injured or disabled due to road crashes. World health Organization (2010) estimates that approximately 90% of traffic related deaths take place in low and middle income countries. WHO (2010) predicts that road traffic fatalities will increase and become the fifth leading cause of death in the in world by 2030, with an estimated 2.4 million loss of life per year if no immediate action is taken. Therefore, immediate proactive radical reforms and interventions are necessary in preserving lives in the future . Table 1 below illustrates

the changes in ranking of the World Global Epidemic factors from 2004 to 2030, in which deaths from road traffic crashes will move from number 9 (2004) to number 5 by 2030 as one of the leading cause of death in the world (WHO 2010).

Table 1: Road Traffic Deaths and injuries: A fast growing Global Epidemic (WHO 2010)

Total 2004	**Total 2030**
1. Ischaemic Heart Disease	Ischaemic Heart Disease
2. Cerebrovascular disease	Cerebrovascular disease
3. Lower Respiratory Infections	Chronic obstructive pulmonary
4. Chronic obstructive pulmonary disease	Lower Respiratory Infections
5. Diarrhoeal disease	Road traffic crashes
6. HIV/AIDS	Trachea, bronchus
7. Tuberculosis	Diabetes mellitus
8. Trachea, bronchus, lung cancers	Hypertensive heart disease
9. Road traffic crashes	Stomach cancer
10. Prematurity and low birth weights	HIV /AIDS
11. Neonatal Infections and other	Nephritis and nephrosis
12. Diabetes mellitus	Suicide
13. Malaria	Liver Cancer
14. Hypertensive heart disease	Colon and rectal cancer
15. Birth asphyxia and birth trauma	Oesophagus cancer
16. Suicide	Homicide

As can be seen from table 1 above, road traffic crashes in 2004 were ranked number 9 but it is predicted that by 2030 it will be the fifth leading cause of death in the world.

3.1 *Bodies responsible for Road Safety in Australia*

Table 2 below shows areas of Australian Federal Government that are responsible for road safety.

Table 2: Government responsibilities for road safety
DIRD (2013)

Jurisdictions	Responsibilities
Australian Government	Regulating safety standards for new vehicles Allocation of infrastructure resources for road safety Allocation of infrastructure resources for national highway Allocation of infrastructure resources for local road networks
State and territory governments	Funding, planning, designing and operating the road network Managing vehicle registration and driver licensing systems Regulating and enforcing road user behaviour.
Local governments	Funding the road networks in their local areas. Planning the road networks in their local areas. Designing the road networks in their local areas. Operation of the road networks in their local areas.
Department of Infrastructure and Regional Development	Administering vehicle safety standards for new vehicles Administering the National Black Spot Program and other road funding Administering the keys2drive and Seatbelts for Regional School Buses programs Producing national road safety statistics, and coordinating the National Road Safety Strategy 2011–2020.

4.0 ROAD STATISTICS QUEENSLAND

In Queensland people are killed or seriously injured on the road every day and this has a dilapidating effect on their families, friends and the community at large (TMR 2013). In order to improve road safety, minimize the number of crashes, prevent road caused injuries and save lives in Australia. All the states and territories in Australia have adopted a safe systems approach to road safety (TMR 2013). Roads and Traffic Authority of New South Wales (2011) states that the safe systems approach to road safety identifies the need for responsible road user behaviour and also agrees to the fact that human error is inevitable when a person is driving or on the road. Therefore, the main objective of the safe systems approach is to create a road transport system that makes allowance for errors and minimizes the risk of death or serious injury.

RTA (2011) claims that safe systems approach is based on the international best practice and is composed of four main elements namely;

- Safe roads and roadsides- This system is aimed at designing and maintenance of roads and roadside in order to increase the chances of road user survival after collision.
- Safe vehicles – This systems ensures that cars on the roads are designed with safety related features or safety equipment to aid the road user and passenger. Some of the vehicles safety features may include ;Active braking systems, airbags ,electronic Stability Control, intelligent Speed Assist ISA, Antilock Braking System, Reversing Camera and Seatbelt Pre tensioners
- Safe speeds –The focus is to ensure that the speed limit reflect the road safety risk to the road users.
- Safe road users- Ensuring drivers are qualified to use the roads and adhere to road rules.

Table 3 displays the years and the number of fatalities in Queensland from 1986 to 2012 . The highest road toll is highlighted in red whilst the lowest road toll is highlighted in green. The highest number of fatalities in this period took place in 1988 claiming 539 lives whilst the lowest road toll was in 2010 recording 249 fatalities (TMR 2012) .In Queensland 2010 recorded the lowest road toll since 1952 . TMR (2012) claims that despite the lowest road toll in 2010 in Queensland, there has not been a consistent downward trend over the last decade except an increase in the road toll.

Table 3: Road traffic fatal crashes and fatalities, Queensland, 1986–2012p

Year	Fatal crashes (a)	Fatalities (b)
	— number —	
1986	421	481
1987	400	442
1988	483	539
1989	376	428
1990	347	399
1991	359	395
1992	363	416
1993	357	396
1994	368	422
1995	408	456
1996	338	385
1997	321	360
1998	257	279
1999	273	314
2000	275	317
2001	296	324
2002	283	322
2003	284	310
2004	289	311
2005	296	330
2006	313	335
2007	338	360
2008	294	328
2009	296	331
2010	236	249
2011	227	269
2012p	254	279
p = preliminary		
(a) A road traffic crash is a crash that occurred on a public road.		
(b) Killed instantly or died within 30 days of receiving injuries.		

4.1 *Queensland road safety analysis 2008-2012*

4.1.1 Fatalities and Hospitalization 2008 to 2012

Table 4 below shows the number of fatalities and hospitalizations in Queensland between 2008 to 2012. As can be seen from table 4 below , 2010 had the lowest number of fatalities accounting for 249 deaths whilst in this 5 year period, 2009 had the highest number of fatalities claiming 381 lives. The highest number of Hospitalization in the five year period from 2008 to 2012 was in 2008 accounting for 6838 hospitalized people due to road traffic accidents whilst the lowest number of Hospitalization was in

2011 accounting for 6305 hospital cases. The number of Hospitalization in Queensland from 2008 to 2012 period started to decrease steadily from 2008 to 2011 then in 2012 the number of Hospitalization increased

Table 4: Number of fatalities and hospitalizations between 2008 and 2012 (TMR 2013)

Year	Number of fatalities	Number of hospitalisations
2008	328	6838
2009	331	6674
2010	249	6497
2011	269	6305
2012	280	6328

4.1.2 **Cumulative Weekly Queensland Road Toll for 2012 and 2013**

TMR (2013) provides the Cumulative Weekly Queensland Road Toll for 2012 and 2013 (table 5) as from 8 October 2013. The first week of January 2013 had 100% increase in road toll compared to 2012 and the second week of January 2013 had the second highest number of road toll with 77.8% increase .The second week of October 2013 had the lowest percentage increase in road toll of 3.3% compared to 2012.

Table 5: Cumulative Weekly Queensland Road Toll, year to date 2013 compared with 2012

Date	2012	2013	Difference	Percent Difference
6 January	3	6	3	100.0%
13 January	9	16	7	77.8%
20 January	17	23	6	35.3%
27 January	23	30	7	30.4%
3 February	28	34	6	21.4%
10 February	30	39	9	30.0%
17 February	36	45	9	25.0%
24 February	39	53	14	35.9%
3 March	43	58	15	34.9%
10 March	49	65	16	32.7%
17 March	52	66	14	26.9%
24 March	53	71	18	34.0%
31 March	57	75	18	31.6%
7 April	61	78	17	27.9%
14 April	68	84	16	23.5%
21 April	76	89	13	17.1%
28 April	81	96	15	18.5%
5 May	89	103	14	15.7%
12 May	95	109	14	14.7%
19 May	101	116	15	14.9%
26 May	108	126	18	16.7%
2 June	116	134	18	15.5%
9 June	119	138	19	16.0%
16 June	122	138	16	13.1%
23 June	126	141	15	11.9%
30 June	130	147	17	13.1%
7 July	134	154	20	14.9%
14 July	142	160	18	12.7%
21 July	145	162	17	11.7%
28 July	146	163	17	11.6%
4 August	152	167	15	9.9%
11 August	162	171	9	5.6%
18 August	168	181	13	7.7%
25 August	176	182	6	3.4%
1 September	184	191	7	3.8%
8 September	188	199	11	5.9%
15 September	192	200	8	4.2%
22 September	200	208	8	4.0%
29 September	205	214	9	4.4%
6 October	212	219	7	3.3%

4.1.3 **Casualties by roads and roadsides 2008-2012**

TMR Queensland road safety action plan 2013–2015 report indicates that from 2008 to 2012 most of serious casualties involving fatalities and hospitalizations resulted from three types of crashes namely; Intersection crashes, head-on crashes and run-off-the-road crashes. Figure 1 below shows the percentages of serious casualties as a result of crashes by crash type from 2008 to 2012.

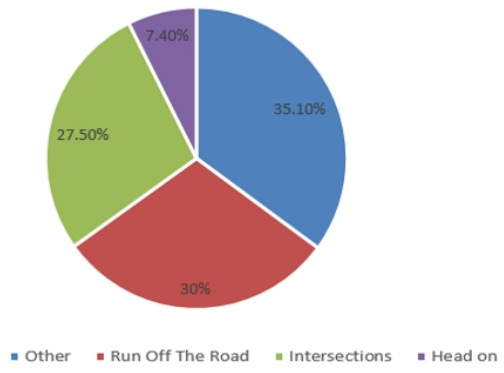

Figure 1: Serious casualties as a result of crashes by crash type, 2008 to 2012.

(TMR 2012)

Table 6 below shows the number of casualties by crash type from 2008 to 2012 indicating the type of crash and the number of fatalities.

Table 6: Number of casualties by crash type 2008 to 2012.

Type of Crash	Number Casualties	Comments
Intersection crashes	9394	The crashes involves different road users such as pedestrians, cyclists ,motor bicycles and motor vehicles
Head on crashes	2512	Vehicles traveling at high speeds and in opposite directions on two-way undivided roads are at greater risk of head on crashes.
Run-off-the-road crashes	10,233	Occurs when vehicle leaves the road and hits into roadside object (sign post or pole)

(TMR Queensland Road Safety Action Plan 2013–2015)

4.1.4 **Serious casualties by age**

TMR Queensland Road Safety Action Plan 2013–2015 report presents an analysis of casualties by age group in figure 2 shown below and presented that the highest number of casualties in the period 2008 to 2012 was in the age group of 17 to 24.TMR (2012) revealed that despite the small percentage (11.4%) in population of the age group 17 to 24 in Queensland this group constituted 24.5% of all serious casualties. TMR (2012) indicates that from period of 2008 to 2012, 4.7% of casualties were aged 75 years and over, this age group comprised 5.5% of the population. Children aged 0 to 16 years comprised 8.1% of the serious casualty tally and made up of 22.7% of Queensland's

population at the time. From the analysis taken it was suggested that there was need to formulate road safety actions plans that would target Queensland's young novice drivers (TMR 2012)

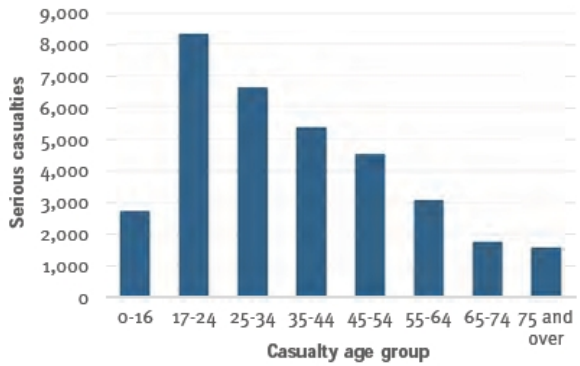

Figure 2: Serious casualties as a result of crashes by age group, 2008 to 2012. (TMR 2012)

4.1.5 **Serious casualties by road user type**

TMR Queensland Road Safety Action Plan 2013–2015 presented a pie chart shown in figure 3 below showing the casualties by road user type and stated that from the period 2008 to 2012 more than half of all serious casualties by road user type involved drivers whilst motorcyclists, pedestrians and cyclists comprised 25.4% of all serious casualties and 20.3% casualties were passengers.

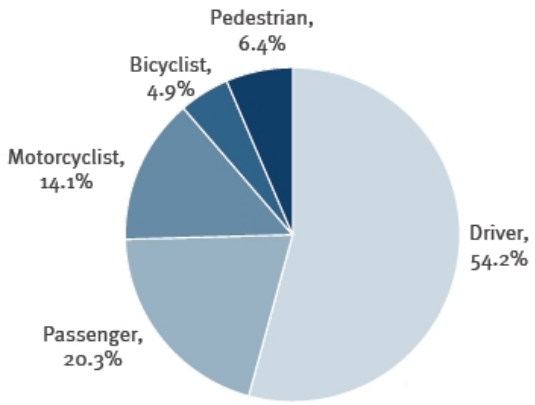

Figure 3: Serious casualties as a result of crashes by road user type, 2008 to 2012. (TMR 2012)

4.1.6 **Serious casualties by speed zone**

TMR (2012) reported that there were 2176 serious casualties in road crashes involving speeding drivers and riders between 2008 and 2012, furthermore it is reported that the highest number of serious casualties by speed zone occurred in 60km/h speed zones contributing 44.5% of the total in this category. Figure 4 below extracted from (TMR Queensland Road Safety Action Plan 2013–2015) shows the number of serious casualties by speed zone from 2008 to 2012.

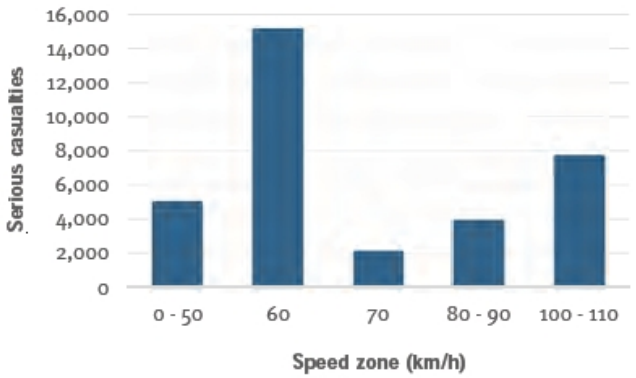

Figure 4: Serious casualties as a result of crashes by speed zone, 2008 to 2012.
(TMR 2012)

4.1.7 **Serious casualties by behaviour**

TMR (2013) records that, there were 3625 serious casualties from 2008 to 2012 due to drink driving/riding crashes. Figure 5 below shows the number of serious casualties by behaviour from 2008 to 2012 and indicates that the largest proportion of casualties by behaviour was as a result of drink driving or riding whilst the lowest number of victims involved road users that were unrestrained whilst on the roads. In addition fatigue related and over speeding by drivers also contributed significantly to the number of serious casualties from 2008 to 2012 (TMR 2012).

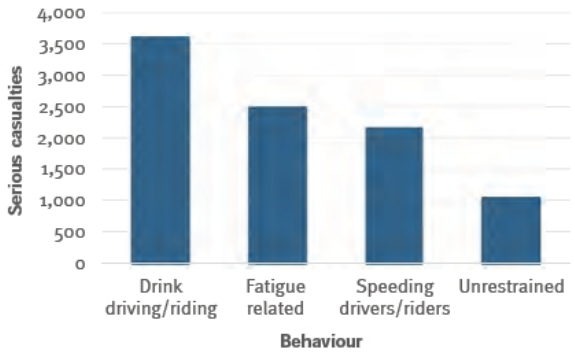

Figure 5: Serious casualties as a result of crashes by high risk behavior, 2008 to 2012. (TMR 2013)

TMR (2013) provides an analysis of road toll as a result of road behaviour/ characteristics for a 12 month period August to July from 2007 to 2013.

Table 7: Behaviors and Characteristics, Queensland Road Toll from 2007 to 2013

Behaviour / Characteristic: Fatalities as a result of crashes 12 Months August to July	2007 / 2008	2008 / 2009	2009 / 2010	2010 / 2011	2011 / 2012	2012 / 2013	% of 2012 / 2013 road toll	Variation in 2012 / 2013 from 2011 / 2012		Variation in 2012 / 2013 from 2007 / 2008 to 2011 / 2012 Average	
								n	%	n^	%
Fatalities - All	**334**	**351**	**260**	**253**	**270**	**298**	-	**28**	**10.4%**	**4**	**1.5%**
Human Behavioural Factors	318	331	240	244	261	280	94.0%	19	7.3%	1	0.4%
Road Factors	30	38	29	28	24	35	11.7%	11	45.8%	5	17.4%
Vehicle Factors	6	3	7	6	5	11	3.7%	6	120.0%	6	103.7%
Atmospheric / Lighting Conditions	19	35	16	11	21	19	6.4%	-2	-9.5%	-1	-6.9%
Road and Roadside**	122	132	116	97	99	120	40.3%	21	21.2%	7	6.0%
Involving Speeding Drivers/Riders	82	89	55	46	60	50	16.8%	-10	-16.7%	-16	-24.7%
Involving Drink Drivers/Riders	84	81	54	50	50	61	20.5%	11	22.0%	-3	-4.4%
Involving Drivers/Riders - Fatigue related crashes	60	36	40	30	40	59	19.8%	19	47.5%	18	43.2%
Unrestrained Vehicle Occupants***	26	39	45	27	26	32	25.2%	6	23.1%	-1	-1.8%
Involving Young Adult Drivers/Riders (16-24)	102	99	62	69	89	84	28.2%	-5	-5.6%	0	-0.2%
Involving Senior Adult Drivers/Riders (60+)	69	81	58	57	61	75	25.2%	14	23.0%	10	15.0%
Involving Heavy Freight Vehicles	73	64	53	54	55	64	21.5%	9	16.4%	4	7.0%
Involving Motorcycles	75	77	39	51	56	51	17.1%	-5	-8.9%	-9	-14.4%
Involving Mopeds	0	1	1	4	1	3	1.0%	2	200.0%	2	114.3%
Involving Buses	9	11	3	9	3	10	3.4%	7	233.3%	3	42.9%
Involving Drivers/Riders - Fail to Give Way or Stop	27	26	20	22	16	22	7.4%	6	37.5%	0	-0.9%
Involving Drivers/Riders - Disobey Traffic Light/Sign	15	9	4	3	10	13	4.4%	3	30.0%	5	58.5%
Involving Drivers/Riders - Illegal Manoeuvre	64	63	47	54	79	68	22.8%	-11	-13.9%	7	10.7%
Involving Drivers/Riders - Dangerous Driving	12	18	5	6	3	10	3.4%	7	233.3%	1	13.6%
Involving Drivers/Riders - Disobey Road Rules - Other	1	0	0	0	0	2	0.7%	2	N/A	2	900.0%
Involving Drivers/Riders - Distracted	0	2	1	0	2	1	0.3%	-1	-50.0%	0	0.0%
Involving Drivers/Riders - Rain/wet road	23	30	18	23	25	26	8.7%	1	4.0%	2	9.2%
Involving Drivers/Riders - Road Conditions	6	5	10	4	2	4	1.3%	2	100.0%	-1	-25.9%
Involving Drivers/Riders - Roadworks	0	0	0	0	0	1	0.3%	1	N/A	1	N/A
Child Road User Fatalities (0-16)****	21	27	14	18	28	18	6.0%	-10	-35.7%	-4	-16.7%
Young Adult Road User Fatalities (17-24)****	75	71	55	58	49	69	23.2%	20	40.8%	7	12.0%
Mature Adult Road User Fatalities (25-59)****	180	191	145	128	139	149	50.0%	10	7.2%	-8	-4.9%
Senior Adult Road User Fatalities (60+)****	58	62	46	49	54	62	20.8%	8	14.8%	8	15.2%

^ This column is rounded to the nearest whole number.
*** The road and roadside characteristic is attributed to crashes where roadside features or road surface conditions may have contributed to the crash. This includes all crashes where unfavourable road conditions have contributed to a crash, or where the crash nature was hit fixed obstruction or temporary object.*
**** Where restraint use was known.*
***** Where age was known.*

From table 7, analyzing the highest number of fatalities by behaviour/characteristics, roads and roadside category had 99 fatalities in the periods 2011/2012 and in 2012/2013 had 120 fatalities giving an increase of 21 fatalities with a 42.2% variation in 2012 / 2013 compared to 2011 / 2012. The young adult category periods 2011/2012 had 49 deaths and in 2012/2013 had 69 fatalities giving an increase of 20 fatalities accounting for 40.8% variation in 2012 / 2013 in comparison to data from 2011 / 2012.

Fatalities involving drivers/riders due to fatigue related crashes accounted for 40 fatalities in the period 2011/2012 whilst periods 2012/2013 there were 59 deaths in the same category giving an increase of 19 lives lost in this category with a 47.5% variation compared to 2012/2013 and 2011/2012 periods. Human behavioral factors category in the year 2011/2012 there were 261 lives lost and in 2012/2013 claimed 280 lives in the same category which showed an extra 19 deaths during the periods with a 7.3% variation compared to 2013/2012 and 2012/2011 periods.

Table 7 showed a down ward trend in the number of fatalities involving speeding drivers/riders with a reduction of 10 fatalities compared for periods 2013/2012 compared to 2012/2011.fatalities involving drivers/riders who practiced illegal man-oeuvres in 2013/2012 reduced by 11 compared to 2011/2012 duration. The number of child road user fatalities as well reduced by 10 in the 2013/2012 period compared to 2011/2012 period.

5.0 Road Safety Initiatives presently used in Queensland

The safety initiatives and programs used in Queensland include; Camera Detected offence program (CDOP), Black spot program (BSP),Heavy Vehicle Safety and Productivity Program (HVSPP),Older driver safety program,Young driver safety initiatives and programs ,Anti-drink driving programs,Queensland motorcycle safety scheme,Driver reviver, School crossing supervisor scheme, Community Road Safety Grants program and Transport Inspectors programs

5.1 *Camera Detected Offence Program (CDOP)*

5.1.1 Define CDOP

The camera detected offence program is a very significant element of the Queensland speed management strategy used to improve road safety on Queensland roads and is managed by the Queensland Police Service and the department of transport and main roads (TMR 2013). TMR (2013) reported that in 2011, a survey was conducted regarding speeding in Queensland and it was concluded that 1 in every 3 motorists almost (33.06%) of the motorists did not obey or conform to the posted speed limits on roads.

5.1.2 Composition of CDOP

The Queensland Camera Detected Offence Program (CDOP) is composed of the mobile speed cameras, fixed speed cameras, red light cameras, combined red light/speed cameras and point-to-point speed camera systems. Table 8 below shows the elements of the camera detected offense program -operation,locations and speed camera enforcement.

Table 8: Camera detected offence program
(TMR 2013)

Program	Operation	Locations	Speed camera enforcement
Mobile Speed Camera (Portable and Vehicle fitted speed cameras)	Commenced May 1997. Emits radar beam and vehicles exceeding pre-set limit are photographed. Operates day and night at designated camera sites.	Location selected is based on crash site data history. There are about 4000 mobile speed camera sites Queensland.	Covert: Use of non-police vehicles to catch offenders. Overt: Use of police vehicles to deter offenders

Fixed speed cameras	Activated in December 2007 and February 2008 at Burpengary, Kangaroo Point and Tarragindi Operate 24 hours every day. Vehicle image taken including time, date and location as evidence. Are constantly inspected and tested and annually calibrated to ensure correct reading of vehicle speed.	Permanently fixed at approved sites. Selected based on crash history and crash potential. Must be 5 or more speed-related crashes in past 5 years.	After speeding offence a fine is sent to the registered vehicle owner.
Red light camera	Connected to traffic lights and captures images of vehicles passing through when red lights are turned on. Operates 24 hours a day, 7 days a week.	Selected by numbers of crashes at intersections and severity in previous 5 year ranked by Queensland Police. Selected site due to crash history, physical constraints and geographical distribution.	
Combined red light & speed camera	Operate by detecting motorists' failure to stop at red lights and speeding. Tested and calibrated annually for accuracy.	Deployed at traffic intersections. 5 year crash data considered and potential for crashes at intersections with traffic lights.	
Point-to-point speed camera	Operates by measuring average speed of vehicle between two points. Operating time is 24 hours a day, 7 days a week.	Selected by analyzing lengths of road with crash history or crash potential	Enforcement takes place when vehicles average speed exceeds speed limit.

5.1.3 **Speed Camera infringements**

TMR (2013) recorded that 29131 red light camera infringement notices were issued in 2012 calendar year. This number of infringement notices included red light camera notices detected by combined red light/speed cameras.

Table 9 below shows the penalty bracket data for mobile speed camera for 2012 calendar year. The penalty bracket represented vehicles exceeding the speed limit by this amount (TMR 2013).

Table 9: Mobile speed camera penalty brackets for 2012

Penalty bracket	Less than 13 km/h	13–20 km/h	21–30 Km/h	31–40 Km/h	40 km/h	Total
Number of mobile speed camera infringements	201010	133985	17469	1923	585	354972
Percentage	56.63%	37.75%	4.92%	0.54%	0.16%	100.00%

(Department of Transport and Main Roads 2012).

The total number of mobile speed camera infringements issued to motorists in 2012 calendar year were 354972 .Infringements issued to motorists that exceeded the speed limit by less than 13 km/h in 2012 calendar year was 201010 which was the highest percentage of infringements in this category. Whilst the lowest number of infringements issued to motorists who exceeded the speed limit by 40km/h in this category was 585 and accounted for 0.16% of the total (TMR 2013).

Table 10: Fixed speed cameras penalty brackets for 2012
(TMR 2013)

Penalty bracket	Less than 13 km/h	13–20 km/h	21–30 Km/h	31–40 Km/h	40 km/h	Total
Number of mobile speed camera infringements	83794	46440	4845	549	251	135879
Percentage	61.67%	34.18%	3.57%	0.40%	0.18%	100.00%

The total number of fixed speed camera infringements (In addition combined red light/ speed cameras) issued to motorists in 2012 calendar year were 135879. Infringements issued to motorists that exceeded the speed limit by less than 13 km/h in 2012 calendar year were 283794 which was the highest percentage of infringements in this category. Whilst the lowest number of infringements issued to motorists who exceeded the speed

limit by 40km/h in this category was 251 accounting for 0.18% of the total in this category.

Table 11: Point-to-point speed camera penalty brackets for 2012
(TMR 2013)

Penalty bracket	Less than 13 km/h	13–20 km/h	21–30 Km/h	31–40 Km/h	40 km/h	Total
Number of mobile speed camera infringements	393	355	51	9	1	809
Percentage	48.58%	43.88%	6.30%	1.11%	0.12%	100.00%

The total number of point to point speed camera infringement notices sent out to motorists in 2012 calendar year was 809. Infringements issued to motorists that exceeded the speed limit by less than 13 km/h in 2012 calendar year was 393.This was the highest percentage of infringements in this category. Whilst the lowest number of infringements issued to motorists who exceeded the speed limit by 40km/h in this category was 1 accounting for 0.12% of the total in this category (TMR 2013).

5.1.4 Conclusion of camera speed infringements

From the data given in table 9 to table 11 regarding mobile speed camera, Fixed speed cameras and Point-to-point speed camera .It can be concluded that in 2012 calendar year the highest number of infringements took place when motorists exceeded the speed limit by less than 13 km/h and the least number of infringements occurred when the motorists exceeded the speed limit by 40km/h. This study shows that a large number of motorists exceeded the speed limit by less than 13km/h compared to other higher speeds.

5.1.5 Evaluation of Camera Detected program

Newstead & Cameron (2012) published that the Queensland red light camera program in 2006 prevented 41 serious casualty crashes which amounted to a total cost saving of $24.2.In 2007 it was estimated that mobile speed camera program in Queensland prevented 2863 serious casualty crashes within two kilometers of the centre of speed camera zones and contributed $1.691 billion total social cost saving (Newstead & Cameron 2012). In 2008 the camera detected offence program was responsible for 23% total reduction in the number of police reported crashes and 24% reduction in the number of fatalities and Hospitalization crashes (Newstead & Cameron 2012).The

camera detected offense program in 2008 prevented almost 5700 severe crashes and more than 1100 fatal and serious injury crashes (Newstead & Cameron 2012).The reduction on crash victims in 2008 saved the community almost $600M,whilst the reduction in the number of fatal and serious injuries crashes saved the community $450M (Newstead & Cameron 2012) .TMR (2013) states that Camera detected offence program was responsible for a 34% reduction in the number fatal crashes in Queensland. The camera detected offence program was attributed to a 30% reduction of crashes on urban arterial in Victoria and a 22% reduction of crashes in New South Wales from 2012 -2013.

5.1.6 **Conclusion CDOP**

Road safety council (n.d) theorized that when the amount of enforcement is increased this enhances compliance and reduces severe injuries and fatalities. In addition Road safety council report revealed that the effectiveness of enforcement can be improved by making enforcement times and locations more unpredictable in regard to using covert and overt camera enforcement.

Australian Transport Council (2012) indicated that reducing the vehicle speed by 5km/h and 10 km/h in a 60km/h speed limit would result in 11.9% and 17.3% serious crashes reduction respectively.

Monetary wise Camera Detected offenses Program generates a lot of money. TMR (2013) financial figures shows that in 2010-2011 Camera detected offence program generated almost $70Million and during 2012-2013 financial year projections show that an expected amount of $116million will be made.

Goldenbeld (2003) highlighted the controversies associated with speed camera use and claimed that speed cameras were perceived as a revenue raising scheme and that the revenue from speed camera programs were excessive.

5.2 *Black spot program (BSP)*

5.2.1 **Define BSP**

Black spot program is a national road safety initiative used to reduce the number of crashes and fatalities on Australian roads (TMR 2013). The black spot program is part of the National Road Safety Strategy and Action Plan used to combat road toll on Australian roads (DIRD 2013). The first Australian Government black spot program was

operated from 1 July 1990 to 30 June 1993 but was stopped and later re-introduced in July 1996 and operates to present day (Bitre 2012) . TMR (2013) defines a black spot as a road segment with a high number of crashes. The aim of the black spot program is to improve road sections with reoccurring record crashes thereby reducing the risk of crashes in that location (TMR 2013).

5.2.2 Criteria for Selecting Black spot site

DIRD (2013) gives the parameters required for a black spot to qualify for funding.

- Demonstration of crash history for the road segment.
- Project proposal demonstrate benefit to cost ratio of at least 2:1
- Records of intersections, mid-block or short road sections should demonstrate at least three casualty crashes over a five-year period
- Selected road length should have an average of 0.2 casualties per kilometer per year within a five year period.
- Site should have the highest crash rate and fall among the top 10% crash sites in the region.
- Sites recommended for treatment by traffic engineers upon completion of road safety audits should qualify

5.2.3 Funding of BSP

DIRD (2013) indicated that funding for the Black spot program in Australia had tripled from $50 million in 2008/2009 to $144.7 million. Road safety programs under the black Spot program will be funded an amount of $59.5 million per year in the 2013-14 period and $60 million per year will be provided by the government for five year period from 2014-15 to 2018-19 for the extension of the black spot program (DIRD 2013).

5.2.4 Black Spot project Toowoomba

In Toowoomba there have been several black spot funded projects and below are some of the programs.

5.2.4.1 Gipps and Ball Street, Toowoomba

Gipps and Ball Street is a good example of a black spot that was identified and treated and the results of crash reductions are evident. It is very easy to evaluate engineering

initiatives, because a well-designed crash reduction treatment should show benefit immediately once the road environment is improved.

At the intersection of Gipps and Ball Street in 2008, some advanced warning pavement markings were implemented to warn road users of the stop sign ahead, this had a decreasing effect on the crashes at this location, but the results were not very impressive. In July 2011 a roundabout was constructed, and this has had a very good crash reduction outcome. Records indicate that only 1 injury crash took place over the past 2 years. Figure 6 below shows a picture of a four way intersection of Gipps and Ball Street in Toowoomba before treatment or improvement of the section was conducted.

Figure 6: Gipps and Ball Street, Toowoomba Pre 2008 4 way intersection (TRC 2013)

Figure 7 below shows an image of an improved intersection of Gipps and Ball Street after the advanced warning pavement markings were implemented to warn road users of the stop sign ahead

Figure 7: Improved intersection 2010

Figure 8 shows construction of roundabout at intersection Gipps and Ball Street.

Figure 8: Roundabout construction July 2011

Figure 9 shows a completed roundabout of Gipps and Ball Street

Figure 9: Present day-Current Gipps and Ball Street

5.2.4.2 Evaluation of Gipps and Ball Street BSP

Gipps and Ball Street was part of the black spot project. Results in table 12 show that after the intersection was treated, in this case construction of the roundabout in 2011, there has not been any recorded crash since 2011 to date. This shows the effectiveness of the black spot program in reducing crashes and fatalities on Queensland roads.

Table 12: Ball Street results

Row Label	2007	2008	2009	2010	Grand Total
Ball Street	4	4	3	3	**14**
Fatal			1		**1**
Hospitalisation					
Medical Treatment	1	1	1	1	**4**
Minor Injury		1	1		**2**
Property Damage	3	2		2	**7**
Gipps Street			1		**1**
Grand Total	**4**	**4**	**4**	**3**	**15**

(TRC 2013)

5.2.5 Funded and Completed black spot projects Toowoomba

5.2.5.1 Gore Highway (Anzac Ave) - Canning Street – TOOWOOMBA

Work on the Gore Highway and Canning Street Toowoomba was part of the nation building program black spot .The Australian Government funded the project an amount of $657,646.

5.2.5.1.1 Action Taken

Issue identified: Large volumes of traffic made it unsafe for traffic to turn from Canning St onto Anzac Avenue (Gore Hwy).

Treatment: Traffic signals were installed at the intersection to provide a safer turning environment for traffic turning from Canning St.

Figure 10: Gore Highway (Anzac Ave) - Canning Street Toowoomba

5.2.5.2 Gore Highway - South Street, Toowoomba

Gore Highway-South Street Toowoomba project was part of the Nation Building Program Black Spot - ESP .The Australian Government contributed an amount of $31,216 to this project.

5.2.5.2.1 Action Taken

Issue Identified: There was poor gap selection in traffic leading to crashes.

Treatment: Rephasing lights into a split phase on South St to make it safer for traffic to turn.

Figure 11: Gore Highway - South Street Toowoomba

5.2.5.3Hursley Road - Warrego Highway, Toowoomba

Hursley Road - Warrego Highway, Toowoomba road project was part of the Nation Building Program Black Spot - ESP .The Australian Government contributed an amount of $30,000 to this project

5.2.5.3.1 Action Taken

Issue Identified: because of restricted right hand turns out of Wyalla St, the volume of larger vehicles using Hursley Road/Tor Road intersection is likely to increase along with crash rates.

Treatment: Rephase signals to split phasing on Hursley Road to allow for safe turning of vehicles.

Figure 12: Warrego Hwy & Hursley Rd Newtown QLD 4350

5.2.5.4 Taylor Street - Wyalla Street, Toowoomba

This road project was part of the Nation Building Program Black Spot - ESP .The Australian Government contributed an amount of $252,004 to this project

5.2.5.4.1 Action Taken

Issue Identified: gap selection due to volume and size of vehicle entering Taylor St.

Treatment: install Concrete Island to restrict movements to left turn only out of Wyalla St

Figure 13: Taylor Street - Wyalla Street, Toowoomba

5.2.5.5 Warrego Highway - Near Brimblecombe Road – OAKEY

This road project was part of the Nation Building Program Black Spot .The Australian Government contributed an amount of $1,999,511 towards the project.

5.2.5.5.1 Action Taken

Issue Identified: Poor overtaking gap availability due to traffic volume thereby risk to drivers when overtaking.

Treatment: install a westbound overtaking lane, install passing lane location signage and provide a painted median to provide separation of vehicles. Project to address overtaking-type crashes

5.2.5.6 Warrego Highway - Neil Street, Toowoomba

The project was part of the Nation Building Program Black Spot-ESP .The Australian Government contributed an amount of $51,691 towards the project.

5.2.5.6.1 Action Taken

Issue identified: Proximity of intersection with James/Hume and James/Ruthven may be making it difficult for drivers identify correct set of signals. Crashes occurring indicate that vehicles are disobeying red signal.

Treatment: Upgrade signals to LEDs, refresh all line marking, and trim back trees to improve signal visibility

Figure 14: Aerial View Neil Street and Warrego Highway

5.2.6 **Evaluation of Black spot program**

BTE (1995) reported an evaluation of 254 black spot sites from 1988-1990 and 1992. Records show that from 1988-1990 the sites had on average 25 people killed, 291 hospitalized and 881 requiring medical treatment, after the sites were treated under the black spot program in 1992 the same sites reported 17 fatalities, 105 hospitalizations and 447 casualties requiring medical treatment . The results demonstrated one third reduction in the number of fatalities, two-thirds reduction in the number of hospitalizations and almost one-half reduction in the total number of crash victims requiring medical attention (BTE 1995).

Meuleners (2008) stated that an evaluation of 51 motorcycle black spot projects in Victoria showed a 38% reduction in the number of casualty crashes.

Evaluation of treated black spot projects in Western Australia between 2000 and 2002 showed that the black spot program effectively reduced the overall crash frequencies by 20% and casualty crash frequencies by 36%.

DIRD (2011) media release claimed that the black spot program prevented at least 32 fatalities and more than 1,500 serious injuries in the first three years after completion of the treated location. DIRD 2011 conveys that the black spot program returns almost $14 for every $1 invested by reducing the number and cost of crashes.

BITRE (2012) an evaluation of 1599 black spot projects in a seven year period from 1996-1997 to 2002-2003.It was estimated that National Black Spot Program (NBSP)

was contributed to a 30% reduction in fatal and casualty crashes and a 26% reduction in (PDO)property damage only (Bitre 2012).

BITRE (2012) claimed that the black spot program which was composed of 2578 approved projects in a seven year period between 1996-97 and 2002-2003 once completed was preventing over 4000 crashes annually, this number of crashes included 1550 casualty crashes and about 30 fatal crashes

BITRE (2012) asserts that the National Black Spot Program economic performance is productive. The program had an estimated benefit–cost ratio (BCR) of 7.7 at a 3% discount rate and 4.7 at a 7% discount rate based on estimated casualty crashes avoided and project costs (BITRE 2012).

BITRE (2012) projected that treated roundabouts yielded a 70% reduction in casualty crashes and a 50% reduction to property damage only. The results after treatment or improvement on roundabout black spots was the highest and was considered to be the most effective treatment plan (BITRE 2012).

5.2.6.1 Conclusion of Black spot program

It is evident from the crash data before and after treatment of road sections that the black spot program is effective in reducing crashes on Queensland roads and nationally. The black spot program is not heavily funded and the amount allocated to each project is set by the Australian Government not to exceed $2,000,000 (DITRDL 2009). Minor changes and improvements to a road section have a positive long term impact to motorists and the community in preventing accidents and financial costs.

It is recommended that the federal government fund more black spot projects because black spots can easily be identified by local people and the benefit to the community is evident. The process of nominating and approving a black spot project is lengthy therefore, an element of the government should be nominated within the local council to easily assess and fund projects within by setting emergency funding for local black spot projects.

5.3 *Heavy Vehicle Safety and Productivity Program (HVSPP)*

5.3.1 **Define HVSPP**

The Heavy Vehicle Safety and Productivity Program (HVSPP) is an Australian Government initiative established under the Nation Building (National Land Transport) Act 2009 (the Act) to improve safety and productivity outcomes of heavy vehicle operations across Australia (DIRD 2013).

5.3.2 **Statistical Data HVSPP**

DIRD (2013) records that there were 230 fatalities from 204 fatal crashes involving heavy vehicles or buses during the 12 months to September 2011. The Australian Transport Council (2011) reported that the main cause of crashes in this category is due to driver fatigue and estimated that driver fatigue contributes 20-30 % fatal crashes on Australian roads. National Transport Commission (2012) stated that fatigue and inappropriate speed were evident in nearly one in every two serious truck-related accidents. A study conducted in 2009 revealed that inappropriate speeds were the predominant cause of crashes.

National Transport commission (2012) predicts that in the next 20 years the freight tasks in Australia will triple over the next twenty years from 503 billion tonne kilometers in 2008 to 1,540 billion tonne kilometers in 2050. Furthermore, National Transport commission (2012) forecasts that by 2030 an estimated amount of $1.1 billion (Net Present Value) in savings will be made by operating modular B-triples in Australia.

National Transport commission (2012) claims that the cardinal component in reducing the impact of the expanding freight task on road safety, the environment and the community is by improved productivity.

5.3.3 **Funding HVSPP**

Funding is critical in reducing the number of crashes, fatalities and costs associated road traffic accidents. Therefore, funding the HVSPP projects has a direct bearing on improving heavy vehicle drivers' safety.

5.3.3.1Round One Projects

The first round of funding projects under the HVSPP from 2008-09 and 2009-10 was $30 million (DIT 2012). Table 14 below shows the national status of projects funded in the first round period under the HVSPP.

Table 14: Round 1 project status by state (as at February 2012)
(DIT 2012)

Status	ACT	NSW	NT	QLD	SA	TAS	VIC	WA	Total
Completed	67	53	3	7	13	3	1	19	166
In Planning	-	3	-	-	-	-	-	-	3
Under Construction	-	1	-	-	9	-	-	-	10
Total	67	57	3	7	22	3	1	19	179
Share completed	*100%*	*93%*	*100%*	*100%*	*59%*	*100%*	*100%*	*100%*	*93%*

Table 14 shows that the first round projects under the HVSPP have been completed in Australian Capital Territory, Northern territory, Queensland, Tasmania, Victoria and Western Australia whilst New South Wales and South Australia have 1 and 9 projects respectively remaining.

5.3.3.2 Round Two Projects

The second round of funding of projects under the HVSPP from 2010-11 and 2011-12 was estimated to be $40 million (Department of Infrastructure and Transport 2012). Table 15 shows the status of projects in Australia under the second round funding of HVSPP.

Table 15: Round 2 project status by state (as at February 2012)

Status	ACT	NSW	NT	QLD	SA	TAS	VIC	WA	Total
Completed	3	1	1	1	1	-	-	17	24
In Planning	-	5	-	1	-	7	2	1	16
Under Construction	1	9		1	1	-	1	4	17
Total	4	15	1	3	2	7	3	22	57
Share completed	*75%*	*7%*	*100%*	*33%*	*50%*	*0%*	*0%*	*77%*	*42%*

(Department of Infrastructure and Transport 2012)

It is evident from table 15 that only Northern Territory had completed round 2 project whilst Western Australia and Australian Capital Territories had covered three quarters of the projects. Queensland and South Australia have completed 33% and 50% the projects respectively. Tasmania and Victoria are yet to complete projects in the second round funding segment.

5.3.3.3 Approved funding for round 1 and 2

The total funding under the HVSPP for round one and two was $70 million.43% of the funding was allocated in the first round whilst 57% was allocated in the second round (DIT 2012). Table 16 below shows a breakdown of approved funding allocated to the various road jurisdictions.

Table 16: Approved funding ($ millions) round 1 and 2
(DIT2012)

Status	NSW	VIC	QLD	NT	WA	SA	TAS	ACT	Total
Round 1	8.1	5.7	6.4	1.0	2.7	4.5	1.5	0.6	30.4
Round 2	9.8	8.2	8.9	1.3	3.6	5.8	1.5	0.5	39.5
Total	17.8	13.9	15.3	2.3	6.3	10.3	3.0	1.1	69.9
Share of total	*25%*	*20%*	*22%*	*3%*	*9%*	*15%*	*4%*	*2%*	*100%*

In the first and second round New South Wales received the highest share of funding equating to 25% of the total funding whilst Australian Capital Territory received the lowest share of funding of 2% of the total funding share.

DIT (2012) theorized that the highest number of fatal accidents in the heavy vehicle category occur in the east coast states due to the fact that almost three quarters of interstate freights tasks in Australia take place between Queensland, NSW and Victoria.

Records show that a total of 236 projects were funded in the first and second rounds under the HVSPP (DIT2012). Table 17 below shows a breakdown of the projects conducted in this round by jurisdiction.

Table 17: Projects funded by HVSPP
(DIT 2012)

State	Round 1	Round 2
Australia Capital Territory	67 road network enhancements	4 road network enhancements
New South Wales	52 driver rest areas 5 planning / pre construction activities	14 driver rest area 1 road network enhancement
Northern Territory	3 driver rest areas	1 road network enhancements

Queensland	7 driver rest areas	3 road network enhancements
South Australia	22 driver rest areas & decoupling bays	2 driver rest areas
Western Australia	19 decoupling bays & driver rest areas	18 driver rest areas 4 technology trials
Victoria	1 decoupling bay	2 drivers rest areas 1 road network enhancements
Tasmania	3 road network enhancements	7 technology trials
Total	179	57

5.3.3.4 Round Three Projects

DIT (2012) reported that the third round of funding under the HVSPP of 50 million for 2012-12 and 2013-14 has been allocated.

DIRD (2013) gives the six categories that HSVPP funds to states and territories under round three stages (2012-13 and 2013-14):

1. Provides funding to develop heavy vehicle rest areas on major interstate routes.
2. Provides funding for developing parking /decoupling bays and amenities for heavy vehicles in exterior urban or regional areas
3. Provides funding for undertaking trial technologies that would perfect heavy vehicle road safety and productivity.
4. Provides funding projects that would enhance the conditions of roads- allow heavy vehicles accessibility and safety
5. Provides funding for demonstration projects that facilitate innovation in improving heavy vehicle safety and productivity.
6. Provides funding to projects that support livestock transport operations.

Table 18 shows the details of projects funded in Toowoomba, Chinchilla and Warwick under HVSPP round three stages.

Table 18: HVSPP round three projects Toowoomba, Chinchilla and Warwick. (DIT 2012)

Proponent	Project Name	Project Category	Project Description	Federal Contributions	Other Contributions
Queensland Government	Heavy Vehicle Rest Area - Cunningham's Gap	Road – rest area	The project proposes to build a new rest area at an informal rest stop. Works include paving and sealing of ingress and egress, extending existing culverts to accommodate hardstand parking area, provide toilets and facilities.	$1,150,025	$1150025 State
Queensland Government	Warrego Highway - Cemetery Road (east of Chinchilla)	Road – rest area	The project proposes to supplement existing HVSPP project. Works include paving and sealing of ingress and egress and providing picnic tables.	$310,230	$310230 State
Southern Downs Regional Council	Loading Facilities - Warwick	Livestock	Installation of double ramp with walkways and circular crowding yard	$120,000	$30,000 (Council)

The projects funded in Toowoomba Cunningham's gap and chinchilla included the development of heavy vehicles rest areas whilst in Warwick the projects had to do with livestock operations.

DIT (2012) records that the total amount funded by the federal government in the round three stage amounted to $45,845,051 whilst funding from unspecified contributors amounted to $36,698,243.

5.3.3.5 Further funding

Funding of $250 million will be provided by the Australian Government for extension of the Heavy Vehicle Safety and Productivity Program from 2012-13 to 2018-19 (DIRD 2013).

5.3.3.6 Evaluation of HVSPP

BITRE (2012) fatal crash statistical data revealed that the number of heavy vehicle accidents Australia wide has decreased since 2008. BITRE (2011) presented that there was a 3% reduction in fatal crashes involving articulated trucks over the 12 months ending June 2011 compared to 2010 .On average a 3.5% yearly decline of fatal crashes from June 2008 to June 2011 (BITR 2011). There were 61 fatalities from 57 crashes during the 12 months ending June 2011 nationally involving heavy rigid trucks which represented a 12.3% decline in the number of accidents compared to the same duration in 2010 (BITRE 2011). There has been an average of 14.7% reduction in the number of

crashes involving heavy rigid trucks in Australia since 12 months ending of June 2011 and same period from 2008 (BITRE 2011).

BITRE (2012) crash statistical data indicate that crashes involving articulated trucks and heavy rigid trucks increased by 1.6% and 43.3% respectively over 12 month period to the end of December 2012 compared to the same period in 2011 as shown in table 19 and 20.This accounted for an average increase of 0.1% involving articulated trucks and 3.3% for heavy rigid trucks over the 12 months to the end of December compared to same duration 2011.

Table 19: Fatal crashes involving articulated trucks by State/Territory

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
Calendar Years									
2007	53	30	38	6	14	4	2	0	147
2008	47	22	35	9	8	6	3	0	130
2009	33	17	38	9	13	10	2	2	124
2010	41	31	25	7	12	3	1	1	121
2011	43	21	32	12	10	2	2	0	122
2012	39	29	35	9	7	3	2	0	124
12 Months ended									
December 2011	43	21	32	12	10	2	2	0	122
December 2012	39	29	35	9	7	3	2	0	124
% change	-9.3	38.1	9.4	-25.0	-30.0	50.0	0.0	-	1.6
Average annual % change over 3 years [a]									
12 mths end Dec 2009 to 12 mths end Dec 2012	5.6	12.9	0.0	5.5	-18.4	-33.1	7.2	-	0.1

(BITRE 2012)

BITRE (2012) fatal crash statistical data indicate that the number of heavy vehicle accidents Australia wide has decreased since 2008. BITRE (2011) presented that there was a 3% reduction in fatal crashes involving articulated trucks over the 12 months ending June 2011 compared to 2010 .On average a 3.5% yearly decline of fatal crashes from June 2008 to June 2011 (BITR 2011). There were 61 fatalities from 57 crashes during the 12 months ending June 2011 nationally involving heavy rigid trucks which represented a 12.3% decline in the number of accidents compared to the same duration in 2010 (BITRE 2011). There has been an average of 14.7% reduction in the number of crashes involving heavy rigid trucks in Australia since 12 months ending of June 2011 and same period from 2008 (BITRE 2011).

BITRE (2012) crash statistical data indicate that crashes involving articulated trucks and heavy rigid trucks increased by 1.6% and 43.3% respectively over 12 month period to the end of December 2012 compared to the same period in 2011 as shown in table 19 and 20.This accounted for an average increase of 0.1% involving articulated trucks and 3.3% for heavy rigid trucks over the 12 months to the end of December compared to same duration 2011.

Table 20: Fatal crashes involving heavy rigid trucks by State/Territory

(Bitre 2012)

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
Calendar Years									
2007	28	24	10	5	10	1	1	1	80
2008	12	24	21	9	17	2	2	0	87
2009	23	18	13	2	16	1	1	0	74
2010	20	19	12	2	10	4	0	1	68
2011	15	14	13	6	8	2	2	0	60
2012	22	15	23	6	16	2	1	1	86
12 Months ended									
December 2011	15	14	13	6	8	2	2	0	60
December 2012	22	15	23	6	16	2	1	1	86
% change	46.7	7.1	76.9	0.0	100.0	0.0	-50.0	-	43.3
Average annual % change over 3 years [a]									
12 mths end Dec 2009 to 12 mths end Dec 2012	-4.1	-8.2	19.6	55.2	-2.2	14.9	-	-	3.3

Table 21 below shows that nationally on average there has been 9.3% reduction in the number of fatalities involving buses from 2009 to 2012.

Table 21: Fatal crashes involving buses by State/Territory

(Bitre 2012)

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
Calendar Years									
2007	11	4	7	1	2	0	0	0	25
2008	5	4	8	1	3	0	0	0	21
2009	8	6	8	2	0	1	0	0	25
2010	9	2	3	3	0	1	1	1	20
2011	11	5	7	0	1	0	0	0	24
2012	6	3	6	1	1	0	0	0	17
2012									
March	1	0	1	0	0	0	0	0	2
June	4	2	1	1	0	0	0	0	8
September	1	1	2	0	1	0	0	0	5
December	0	0	2	0	0	0	0	0	2
Average annual % change over 3 years [a]									
12 mths end Dec 2009 to 12 mths end Dec 2012	-6.4	-11.0	-0.2	-	-	-	-	-	-9.3

5.3.3.7 Conclusion

DIT (2012) claims that by developing and improving rest areas under the HVSPP this will lead to continued decline in the number of heavy vehicle related crashes.

The number of fatalities involving buses has declined over the 3 year period (2009-2012) by 9.3% whilst the number of fatalities involving articulated trucks and heavy rigid trucks nationally increased by 0.1% and 3.3% respectively (DIT 2012).

The first round of funding under the HVSPP took place in 2008 and results show that in Australia the number of fatalities involving articulated trucks in 2007 before the HVSPP funding were 147 and in 2012 the number of fatalities was 124.This shows a reduction in the number of fatalities in this category before and after the HVSPP. The number of fatalities involving heavy rigid trucks in 2007 pre first round HVSPP funding was 80 and in 2012 the fatalities were 86,which showed an increase in the number of lives lost. As for fatalities involving buses the number deaths in this category 2007 was 25 and in 2012 the number of fatalities were 2.

It is recommended that further research be conducted in this area and more strategies be introduced in reducing heavy vehicle related crashes. Sampled nationwide interviews should be conducted in getting ideas to improve road safety for heavy vehicles.

5.4 *Toowoomba Regional Council (TRC) Road Safety Initiatives*

Toowoomba regional council is involved in safety initiatives and programs that would combat road traffic crashes and fatalities in Toowoomba.

5.4.1 TRC Engineering Initiatives:

- Black Spot Studies – The Australian Government funds Toowoomba Regional council to conduct annual processes in identifying and eliminating black spots within the region
- Undertaking safety assessments and road safety audits – safety assessments and safety audits are conducted on existing roads.
- Involved in assessing roads crash potential and safety performance.
- Conducts LRRS audits by auditing the top ten routes in the region.
- Safety Improvement Register - Safety Improvement of projects with an approximate value of $2.5million.

- Annual community road safety (CRS) session-The team is composed of representatives from Toowoomba Regional council, Transport and main roads and Queensland police. The team covers identification and assessment of emerging black spots in order to further develop a safer region.
- In 2013 Toowoomba regional council submitted 6 project for funding during the 2014/15 financial year, with a combined value of $3million and is yet to receive outcome from the Australian Government (TRC 2013).

5.4.2 TRC Education Initiatives:

- Organize Fatality Free Friday campaign 2013 and 2014 period and participants from Toowoomba regional council, Transport and main roads, Queensland Fire and Rescue Service and Private organization within the Toowoomba region.
- Organizes Roadsafe Youth Driver Awareness (RYDA) – on average 800 young people per year attend the program
- Involved in the Alive 2 Drive @ 25 driver training project
- BRAKE Driver Awareness Ltd (PCYC and QPS)
- Conducts a Driver Simulator Program at Toowoomba Police Citizens Youth Club (TRC 2013).

5.4.3 Billboard Road Safety Awareness Campaign

The campaign is aimed at raising awareness within the region of road safety issues and the following topics are addressed

- Intersection Safety (Red Lights)
- Safe Following distance (Rear-ends)
- Pedestrian, Child and Cyclist safety in traffic
- School Zone Safety
- Seatbelts and Child Restraints
- Anti-drunk driving and drug driving
- Driving tired (Fatigue)
- Driver distractions (phone, radio, etc.)
- Driving under all road conditions (Drive to conditions: Wet, Dark, Fog etc.)
- Driving safely through road works
- Anti-Speeding and Speed Awareness
- Rail Crossing Safety

5.4.4 TRC Enforcement Initiatives:

- Assist police with speed data taken during AADT counts.

5.5 *Older driver (OD) safety Initiatives*

5.5.1 Overview Older Driver Safety

It is projected that in Queensland by the year 2031, out of every 5 people they will be one person that will be 65 years and above (TMR 2012).Future estimates show that the number of older Australians aged 75 years and beyond will increase to 11.4% by 2031, which will be an 83% increment compared to the year 2007 which had 6.2% number of older Australians in this category (TMR 2013). King et al (2012) communicated that past research conducted indicates that older drivers are more likely to make errors when driving mostly when it comes to merging and maneuvering thereby encounter a greater cognitive load in ordinary traffic situations. The percentage of older Australians aged 60 years in June 2011 was 18.5% .Evaluating the present situation regarding older driver usage it is evident that vehicle usage by older Australians is unlikely to decrease and may increase in the future (TMR 2013). Australian Bureau of Statistics (2013) claims that the proportion of older Australians aged 65 and above in 2056 will be between between 23% and 25% compared to 13% in 2006.Figure 15 below shows the age structure of the projected population showing the past and future projected aging of the Australian population (Australian Bureau of Statistics 2010).

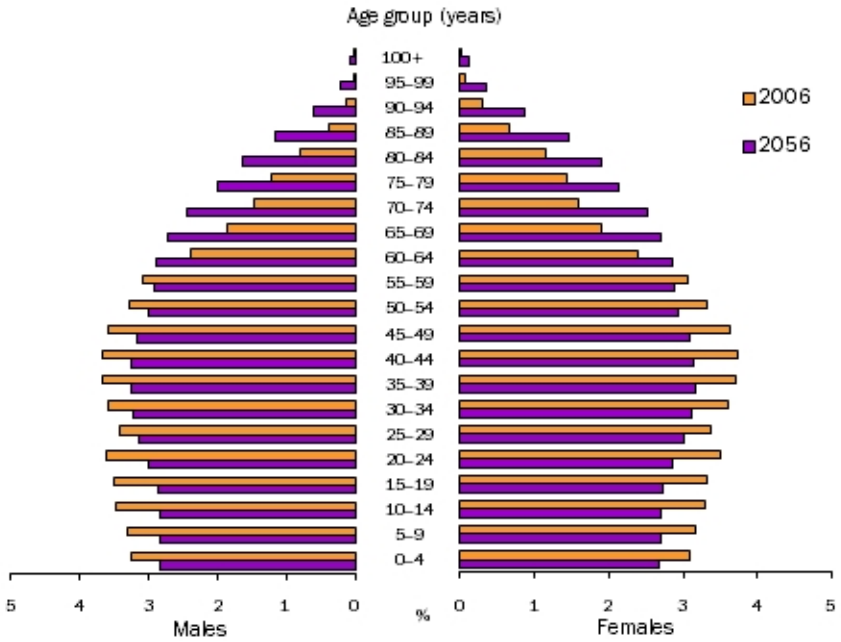

Figure 15: Age structure of the projected population (Australian Bureau of Statistics 2010)

5.5.2 Older Driver Australia wide Statistical Data

TMR (2012) indicates that there were 295 fatalities in 2011 involving senior adults a representation of 22.9% in this category nationwide road toll. 107 of the fatalities in this category in 2011 involved senior adults aged 60 to 69 an 8.3% Australia wide road toll (TMR 2012). In addition there were 188 fatalities involved adults 70 years or older which made up 14.6% of the national road toll (TMR 2012). The table below shows a break down of the fatalities for adult drivers aged 60 years and above in 2011.

Table 22: Adult Drivers Fatalities 2011
(TMR 2013)

Rank	Fatalities	Percentage	Age 60+
1	139	47%	Drivers
2	72	24.4%	Pedestrians
3	54	18.3%	Passengers
4	20	6.78%	Motorcycle riders
5	10	3.39%	bicyclists
Sum	295	100%	

5.5.3 Older Driver Queensland Statistical Data

TMR (2012) reports that the number of fatalities in Queensland involving senior adults 60 years and over was 51, a representation of 19% of the road toll in the state with an increase of 9.9% compared to 2010. Details show that the number of fatalities In 2011 road toll involving senior adults 60 to 69 years of age was 20 and the number of elderly drivers 70 years or above was 31 giving a total of 51 fatalities in Queensland in this category a representation of 7.4% (60-69 Years) and 11.5% (70+) road toll in Queensland in 2011 (TMR 2012). In Queensland, 51 fatalities were senior adults aged 60 years or older, which represented 19% of the state road toll - a 9.9% increase on the previous year's toll for this age group, but a 7.3% decrease on the previous five year average.

5.5.4 Why are older road users at higher risk?

Wood et al (2012) claims that there is a corelation between aging and number of physical and mental changes that take place in older drivers this include; diminished eyesight and hearing capabilities, reduced agility and muscle strength , slower reflexes and slower decision making processes, reduced cognitive performance and increased fragility. King et al (2011) suggests that it is evident with increase in age complex visuospatial skills,memory capabilities,eyesight strength,ability to focus and executive functioning skills diminish over time. Therefore with the decrease in all these important

qualities, research shows that older drivers are more likely to commit driving errors compared to other age categories and that older drives have a greater probability of being involved in a crash than any other age group (CARRS 2011).

Despite the evidence in loss of important qualities needed when driving, research indicates that people age differently and in diverse manner thereby some individuals would not loss certain qualities at the same age as others in the same age group (Wood et al 2012). Therefore the concept of differential aging is evident in that people will age at different rates and in various ways and forms (Wood et al 2012). There is conflicting research material on the impact of age on hazard perception and the impacts of health and medication status on driving performance thereby making this area of study inconclusive.

5.5.5 Common causes of crashes involving older drivers include:

5.5.5.1 Failure to see and/or yield to other road users;

King et al (2011) suggests that inability to see other road users ,lack of perception, not understanding traffic signals and sudden illness or black out lead to older drivers being responsible for crashes. In addition research suggests that older drivers are more likely to be involved in crashes involving failure to yield , when there are several vehicles and in complex road environments like intersections and round abouts

5.5.5.2 Sudden illness or blackout;

King et al (2011) claims that older drivers 65 years and over are at a higher risk of dying when driving than any other age group due to medical conditions that they may have or incur a sudden illness, if any of these take place then the occurrence of a crash or fatality is inevitable.

5.5.5.3 Lack of awareness of traffic signals;

It has been researched that older adults find it challenging to drive in complex situations such as when there is increased traffic flow or when there is need to drive in multiple lanes (King et al 2011).

5.5.5.4 Low Speed maneuvers

King et al (2011) suggests that older drivers are involved in crashes during low speed roads rather than high speed roads and most crashes take place when vehicles are being operated during low speed situations such as reversing or parking.In addition It

is also observed that crashes in this category occurs during daylight and in older vehicles (King et al 2011).

5.5.6 The Older Driver Safety Advisory Committee (ODSAC)

Osmond & Leal (2013) reports that in July 2011 the Older Driver Safety Advisory Committee (ODSAC) assembled in order to come up with policies and road safety initiatives that would improve older driver safety in Queensland . The meeting was conducted in the presence of the Centre for Accident Research and Road Safety Queensland (CARRS-Q) so that CARRS-Q could provide detailed research report on older driver safety.It is reported that the Older Driver Safety Advisory Committee (ODSAC) Committee agreed upon 26 recommendations and 234 survey responses were received from the committee. Table 23 below provides a summary of the 26 recommendations that the committee agreed upon including the proportion of respondents who supported the recommendations ranked from the highest to the lowest proportion of responses.

Table 23: Committee Recommendations
(TMR 2012)

#	Support	Subject	Recommendations
1	96.41%	How often should drivers license be renewed for Older Drivers	The committee agreed that the government should maintain the same automated system of driver license renewal
2	89.33%	Reestablishing of vision testing at in-person driver license renewal	The committee agreed that all the older adults 75 years undergo routine eyesight testing and possess a medical certificate from the medical doctor thereafter take the documents to the optometrists or ophthalmologists if need be for further treatment.
3	85.39%	Encourage family involvement	The committee agreed on increasing the availability of safe, alternative transport options for older people.In addition committee looked at ways of improving dissemination of information to older drivers regarding public transport and the community
4	83.48%	The minimum age of older drivers are required to	It was decided that older drivers 75 year and over should carry an up to date medical certificate granted by the Medical Doctor

		obtain medical certificates.	
5	82.81%	Attitudes towards speeding behavior	The committee agreed that there was need to develop communication strategies that would echo on the importance of following the speed limits and be aware that speed limits are the maximum safe speed in optimum driving conditions and that older drivers should drive below the speed limits if conditions allowed that.
6	80.63%	Encourage family involvement:	The committee agreed to develop initiatives that would aid older people be aware of driver safety related issues and develop self assessment tools that would enable older drivers plan a more positive transition from driving.
7	79.91%	Reinstatement of vision testing at in-person driver license renewal	The committee agreed on the need to encourage optometrists conduct annual routine checks on any drivers to ascertain the drivers safe driving capabilities
8	79.46%	How often should drivers license be renewed	The committee agreed on maintaining the five year driver license as long as the medical certificate was up to date
9	79.28%	On-road retesting for selected drivers:	The committee agreed on investigating options for ensuring that older drivers have the opportunity to explore the extent of their driving skills and apply the same to other age category of drivers.
10	77.83%	Restricted licenses	The committee agreed to develop improved guidelines that would make it possible for medical practitioners to more effectively identify driving restrictions on medical certificates which will make less severe the risks while still enabling mobility to be maintained.
11	76.82%	Attitudes towards speeding behaviour:	It was decided by the committee that communication strategies be developed that support tolerance and respect of the judgment of various groups of drivers of any age or road user group that choose to travel at speeds below the posted speed limit.
12	76.34%	Broaden the the range of professionals who can report	Almost 76% of the committee agreed that there was need to develop improved education and awareness to the current legislative provisions regarding medical certification and fitness for the general

		to Transport and Main roads with legal protection, triggering follow-up review	practitioners ,health workers,Transport and Main roads customer service staff who give council and guidance on older driver safety.
13	75.57%	Reestablish testing of vision or sight at in-person driver license renewal	The committee suggested that there was was need to provide additional professional development opportunities to medical practitioners like optometrists, general practitioners and ophthalmologists in order for them to comprehend more the impact of various eye conditions on drivers safety.
14	69.68%	Encourage family involvement	The committee agreed that there was need to develop educational strategies that would assist family members participate in positive communication with older drivers family members regarding road safety.
15	69.41%	Support buying of vehicles with better occupant protection characteristics	The older driver committee supported the idea of drivers purchasing vehicles with superior occupant protection ratings and car safety features proven to reduce the chances , severity and risk of accidents.
16	68.92%	Reestablishment to test vision/sight for older drivers at in-person driver license renewal:	The committee agreed on encouraging /monitoring the investigation of best practice in predictive vision tests, and consideration of the most appropriate means of linking these tests to the licensing system
17	67.92%	Encourage drivers purchasing vehicles with better occupant protection characteristics	The committee suggested that there is need to develop better vehicle safety features and devices and provide information on these development and its use to older drivers
18	66.67%	Design, construct and ensure roads are safe for older drivers	The committee suggested that a review of Queensland's Manual of Uniform Traffic Control Devices (MUTCD) that contains the design , standards, procedures and methods regarding every markings,signals,device or light placed on a road was important to ensure that MUTCD standards take age-related change into account, in accordance with the Austroads guidelines

19	64.19%	Promote drivers buying vehicles with better driver and passenger safety features	The committee suggested that a research into the various types of injuries sustained by older vehicle occupants be conducted and review vehicle crash test results be used to investigate safety features of vehicles that are paramount to the safety of older drivers and passengers
20	62.44%	Increase the range of qualified personnel who can report to Transport and main roads with legal protection, triggering follow-up review	The committee suggested that the current list of specialists be reviewed to whom drivers can be referred to .This decision was to ascertain if need be to include additional professions like psychologists and audiologists,
21	61.06%	On-road retesting for selected drivers	It was suggested by the older driver committee that CARRS-Q should monitor the best practice systems for interactions between older drivers and licensing authorities in relation to fitness to drive (on road testing) with a aim of providing advice to the Department of transport and main roads on successful programs that have yielded positive results on reducing crashes or programs that will reduce future risks of crashes.
22	60.77%	Present a road environment which is safer for older drivers:	The older driver committee suggested the need to undertake a systematic implementation of the Austroads guidelines on road environment design for older road users in Queensland.
23	59.91%	Encourage drivers purchasing vehicles with better occupant protection characteristics	The committee suggested that CARRS-Q should monitor research into in-vehicle systems and devices and their use by older drivers aiming at giving advice to the Department of Transport and Main roads on the devices and systems that would provide the greatest advantage to older drivers
24	59.65%	Older driver requirements imposed age for (medical certificates)	The older driver committee suggested that a new maximum for medical certificates issued to older drivers that are aged 75 years and above of of 12 months.
25	54.63%	The age at which older driver	It was suggested by the committee that an investigation into the practicability and benefits of requiring general practitioners to automatically send

		requirements be imposed (medical certificates)	medical certificates to the department of transport and main roads registration on the licensing database be conducted.
26	44.50%	Review speed limit criteria:	The committee suggested that a review on the speed limit criteria be conducted to confirm the speed limit criteria sufficiently take account of the aging driver

5.5.6.1 Summary Committee

It was evident that the older driver safety advisory committees perception was that any decisions to change current older driver policy by the government should be based on risk and not age (Osmond & Leal 2013). In addition the committee recognised the effect of aging on a persons health , nevertheless the committee was for the idea that Government should continue working on identifying road safety systems that identify risks and introduce policies regarding the same, unlike formulating initiatives that have limited or no proven road safety benefit. Osmond & Leal (2013) suggests that it is not definite to conclude that the views of the people who responded to the survey are a true representation of the views of the wider community of road users in Queensland. However, it was noticed that many respondents were concerned about older driver safety,older drivers losing their drivers licenses ,increased requirements imposed on them in order for them to keep and maintain their drivers licenses and road safety in general.

5.5.7 Older Driver Self Assessment and Self Regulation

Wood et al (2012) came up with interesting findings regarding older drivers driving abilities and their perceived self assessment The objective of the study was to compare the older drivers self -reported driving abilities with objective measurable results taken by qualified transport authorities to ascertain the older drivers level of skill ,competence and effect of aging on their driving abilities . The study comprised of two hundred and seventy older drivers aged 70 to 88 years who lived independently . The participants were asked to complete a standardized assessment of on-road driving performance and questionnaires to determine the older drivers own perception of driving ability, confidence, and driving difficulties.In addition the participants were asked to give a five year self reviewed crash history account.

5.5.7.1 Participants eligibility

- Older adults living independently
- Older adults who could walk unassisted
- Passed vision, cognitive, and motor control tests
- Had good eye sight or above visual standard recommended to obtain driver licensing in Australia (20/40 or 6/12)

5.5.7.2 Participants Activities

- Involved participants driving 19.4 km open road route in suburban and city streets comprising of simple and complex intersections, and a range of traffic densities.
- The duration of the driving assessment took approximately 50 minutes which was terminated any time the examiner noticed that the older driver was unsafe to continue
- Involved participants filling in questionaries Ratings of Driving Difficulty for General Driving Activities and Ratings of Difficulty for a Range of Technical Activities Involved in Driving
- After the self assessment by older drivers the results showed that 98% of participants rated themselves as average or above-average drivers, with 75% rating themselves as a good, very good, or an excellent driver as shown in figure 5 below

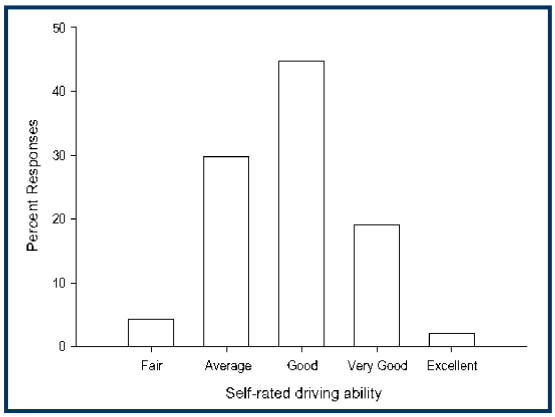

Figure 16: Self rated driving ability by participants
(Wood et al 2012)

5.5.7.3 Results.

The assessment of older drivers was conducted by an experienced driving assessment occupational therapist who sat at the back seat of the vehicle during assessment.

The study showed that a considerable proportion of drivers who rated themselves as above-average drivers had critical driving errors and some had to be stopped from driving during the assessment because the assessors considered them to be unsafe to drive.The study showed that of the 47 (17%) of drivers who were rated as potentially unsafe to drive by the assessors , 66% rated their own driving as good to excellent. In addition the drivers who made critical errors during the assessment in which the assessor had to take control of the vehicle, these participants had no lower self-rating of driving ability than the rest of the group. The study showed that participants reported difficulty when driving into the sun ,at night or dusk ,whilst driving in wet conditions and unfamiliar areas (Wood et al 2012).The self rating of the participants were not a true representation of the actual driving abilities possessed by the participants in which most of the drivers who rated themselves as good or above drivers had significant errors during the assessment and were more likely to report a crash in the future (Wood et al 2012).

5.5.7.4 Conclusion

Wood et al (2012) claims that older drivers pose the greatest risk to road safety as they are not aware of the difference between their perceived driving abilities and the actual reality of their driving abilities.Therefore, licensing authorities should not assume that older drivers are aware of these changes or will adopt appropriate compensatory driving behaviors towards the same but that there is need for evidence-based assessments to be adopted.

5.5.8 Older driver safety Initiative 2014

TMR (2013) reports that currently every older driver aged 75 and above needs to carry a medical certificate when driving as a road safety initiative for older drivers. Beginning 1 January 2014 a new rule will apply to older driver licensing program for older adults aged 75 and above .They will be required to undergo an annual medical check up and carry a medical certificate that is varied for a year (TMR 2013). The new rule verifies that older drivers be required to undertake medical check up every 12 months and be certified medically fit by medical doctors to drive on Queensland roads (TMR 2013).

TMR (2013) attributes the introduction of the new rule to the panel of leading road safety experts .The new licensing program will be implemented by the Queensland Government as part of the ongoing commitment to support older drivers continue to drive on Queensland roads as long it was safe for them to drive so. TMR (2013) emphasizes that the new rule to be introduced in January 2014 will be useful in reducing crashes and fatalities in over 60 age group as this age group has the highest percentage of road toll is in the age group category (TMR 2013)

5.5.9 Evaluation

5.5.9.1 Mandatory licensing assessment

Keall & Firth (2004) claims that older drivers who fail to renew their license are at greater risks of being involved in crashes in the future. King et al (2011) reports that studies have shown a positive outcome regarding mandatory license assessment procedures however, these studies have been criticised as methodologically flawed in their analyses of crash outcome data. Dobbs & Fildes et al (2008) propagate that the present driver policies and procedures used to identify high-risk older adult drivers are ineffective. Langford et al (2004) suggested that age-based mandatory assessment programs were not beneficial to older drivers because there was no advantage regarding crash reduction rates in places were these programs were used compared to places were the programs were not utilized.

5.5.9.2 Conclusion

Langford et al (2008) claims that there are no provable road safety benefit associated with the costly procedure of mandatory license assessment .In addition studies regarding older driver mandatory licensing programs have failed to show proven relationship between the use of licensing assessment systems and the reduction in traffic crashes for either older adult drivers or for other road users (Langford et al 2008). It is evident by analyzing research on older driver assessment programs that the studies have not attempted to focus on the relationship between the programs introduced and the reduction in the number of accidents,fatalities and crashes in the older driver category rather, the focus has been at changes in knowledge or behavior, or at one or two elements in the complex pattern of changing cognitive and physical abilities in relation to an environment with variable demands (TMR 2013).

5.6 *Young driver Program*

5.6.1 New Graduated licensing system (GLS)

TMR (2013) confirms that the new graduated licensing system was introduced by the Queensland government in July 2007 to reduce fatalities involving young adults. The new graduated licensing program was a significant change to the licensing system since 1999 (Newstead 2011). The changes that have been introduced since July 2007 are given in table 24 below.

Table 24: New graduated Licensing system changes

(RACQ (n.d))

Learner driver	**Provisional 1 (P1)**	**Provisional 2 (P2)**
Reducing the age to obtain learners license 16 years of age	Be in possession of P1 license for a minimum of 12 months	Possession of P2 license for 2 years minimum for under 25 years before getting an open license
Extension of learner licence duration to a minimum of one year.	Pass a hazard perception Test before advancing to a Provisional 2 license	Possession of P2 license for a year for if 25 year and above.
Under 25 year learners must gain 100 hours of supervised driving practice and record in a Logbook prior to proceeding to a provisional license level	Not allowed to drive high-powered vehicles (200kw or more, 8 or more cylinders, or a rotary engine greater than 1146cc)	Not allowed to drive any high-powered vehicle
Restricting under 25 years from using mobile phones,blue-tooth accessories and hands-free functions	Restricting under 25 years from using mobile phones,blue-tooth accessories and hands-free functions.	Required to display green P plates on the front and rear of the vehicle being used

Not allowed to drive when passengers(s) or supervisor are using a loudspeaker function on a mobile phone	Not allowed to drive with more than one non family member under 21 of age between 11pm and 5am	Adhere to a zero alcohol blood concentration
Zero blood alcohol concentration for under 25 years drivers	Obey zero blood alcohol concentration requirement for under 25 years	Not allowed to supervise a learner driver.
0.05 blood alcohol concentration for drivers 25 years and over	0.05 blood alcohol concentration for drivers 25 years and over	Not allowed to drive under the influence of illegal or prescribed drugs
Display L plates on the front and rear of the vehicle being used	Display red P plates on the front and rear of the vehicle being used	
learner license to be carried at all times whilst learning to drive	P1 license to be carried at all times whilst driving	

5.6.2 Evaluation of the new graduated program

5.6.2.1 Reducing the age to obtain learner license to 16

The aim of reducing the age to obtain learner license to 16 was to increase the driving experience of a learner driver thereby expanding and lengthening the learning process by incorporating a qualified open driver license holder as an instructor.

Gregersen (1997) revealed two studies from Sweden and Norway regarding evaluating the effectiveness of lowering the age to obtain learners license. Sweden lowered the minimum learner age from 17.5 years to 16 whilst Norway lowered the minimum learner age from 17 years to 16 years. Results after the study indicated that in Sweden the number of crashes reduced involving novice drivers (Gregersen 1997).However, in Norway there was no reduction in the number of crashes after reducing the age to obtain learners license. These two results posed conflicting views on the outcome of lowering the age at which young adults can obtain learners license. Therefore, it was not practical to relate these findings to its effective in Queensland.

5.6.2.2 Restriction to drive high-powered vehicles

P1 and P2 license holders in Queensland are restricted from driving any high-powered vehicle .The objective of this initiative was to reduce exposing drivers from high-risk driving situations. restriction for all P1 and P2 license (Newstead et al (n.d)). Senserrick & Whelan, (2003) claims that there are no evaluations that assesses the effectiveness of restricting P 1 and P2 drivers from operating high powered vehicles.This is supported by some studies that show that there is less than 2% crash reduction by implementing this initiative-restricting drivers from operating high powered vehicles (Senserrick & Whelan 2003). Newstead (n.d) claims that more research is required to assess the effectiveness of restricting P 1 and P2 drivers from operating high powered vehicles.

5.6.2.3 Conclusion

Newstead and Scully (2013) theorized of the new graduated licensing system (GLS) introduced in 2007, contributed to a 31% reduction in fatal crashes.The new graduated licensing system was associated with a 13% reduction in the number of fatal and serious injury crashes . In addition the new graduated licensing program was attributable to a 4% overall reduction in reported crashes (Newstead and Scully 2013). The new graduated licensing system was introduced in 2007 therefore in order to get adequate results there is need to gather more data over a longer period of time in order to conclusively evaluate the effectiveness of the graduated licensing system.

5.6.3 Comparison of the new (2007) and older (Prior 2007) Graduated licensing program

The graduated licensing scheme was introduced in December 1989 by the Prime minister of Australia and was one of the elements of the 1 0-point road safety package (Haworth,2004). Table 25 below shows the components of the learners phase for both the new and the old graduated licensing system.

Table 25: Learners Phase for new and old graduated licensing system

(Newstead et al (n.d))

Learner Phase	Graduated Licensing System 1999-2007	Graduated Licensing System 2007-Present
Minimum age to obtain license	16.5 years	16 years
Entry test	Test questions and eyesight test	Theory and no eyesight tests
Minimum length held	Six months	Twelve months
Driving supervisor	Should be fully licensed and 1 year possession of intermediate license	Must possess an open license at least for a year
Zero Blood alcohol concentration	Obey restriction	Applicable for under 25 whilst 25 years and over 0.05 BAC allowed
Use of a logbook	Was not a requirement	100 hours to be recorded in logbook for under 25 years and voluntary for 25 years and above drivers
Restricted from using mobile phone	There were no restrictions imposed	Driver and car occupants restricted from using mobile phones and blue tooth accessories
Compulsory L-plates	Not a requirement	Is a requirement when driving

Table 26 below shows details of the provisional license phase incorporating the graduated license system prior 2007,P1 and P2 graduated licensing program from 2007 to date.

Table 26: Provisional Phase

(Newstead et al (n.d))

Provisional License Phase	Graduated Licensing System 1999-2007	P1 Graduated Licensing System 2007 To date	P2 Graduated Licensing System 2007-Present
Age required	17 years	17 years	18 years
Test Required	On-road practical	Queensland Safe Practical Driving Test	Hazard perception tests
Minimum length held	3 years for Under 23 2 years for 23-24 year old drivers 1 years for over 24 year old drivers	1 year for under 25 25 years and over are exempted	2 years for under 25 years drivers 1 year for over 23 year old driver
Zero Blood alcohol concentration	Should obey the requirements	Obey restriction	Only applicable to under 25 year old drivers 0.05 BAC allowed for 25+ year old drivers

Minimum age to obtain full license	20 years	Not applicable	20 years
Restriction to operate a high Powered vehicle	Restricted to operate	Restriction apply	Restriction apply if under 25 years of age
Compulsory P plates	Not required	Drivers must display P plates	Mandatory to all drivers in this category

The number of people with learners license holders in Queensland has steadily increased in since 2003 and the number of provisional P1 and P2 holders has been on an increase since its introduction whilst the number of probational holders has dramatically decreased from 162,201 to 21,578 in the past ten years. Table 27 below shows the number of Queensland Current Driver Licenses by Level as from 30 June 2003 to 2013.

Table 27: Number of Queensland Current Driver Licenses by Level
(TMR 2013)

Number of Queensland Current Driver Licences by Level as at 30 June from 2003 to 2013											
Licence Level	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012^**	**2013**
Learner	92,021	92,506	90,333	91,730	105,751	106,699	155,981	177,348	179,709	175,617	177,458
Provisional 1*	0	0	0	0	0	51,589	51,377	62,981	70,206	74,083	77,761
Provisional 2*	0	0	0	0	0	8,670	38,263	72,511	86,464	99,199	104,257
Probational	162,201	160,254	163,683	168,964	179,338	124,247	79,745	31,424	26,503	21,715	21,578
Open	2,288,400	2,334,907	2,385,271	2,457,869	2,546,332	2,629,904	2,723,156	2,788,077	2,878,057	2,930,390	2,993,770
Total	2,542,622	2,587,667	2,639,287	2,718,563	2,831,421	2,921,109	3,048,522	3,132,341	3,240,939	3,301,004	3,374,824

** On 1 July 2007 the provisional P1 and provisional P2 licence was introduced.*

^ Licence figures for 2012 are only available for 15th July

5.6.4 **Young driver accident statistics, Queensland**

TMR (2013) reports that young drivers aged 17 to 24 are at a greater risk of being involved in a crash than any other age group segment .Table 28 below shows the statistical data of young drivers/riders .

Table 28: Young Adult drivers crash data
(CARRQ 2013;RACQ (n.d.);WHO 2007)

General	2010	2008
Globally approximately 400,000 under the age of 25 years are killed annually.	1 in 5 were killed on Queensland roads	85 fatalities involving young
World wide Millions of under 25 young adults are disabled or injured	58% were killed in a single-vehicle crash in Queensland	A 19.7% representation of all drivers and

		riders
Per one driver fatality an addition of 1.3 passengers or other road users are also killed.	79% of the drivers were male	Represented 13.0% of all license holders
During 2012-13 in Queensland young drivers accounted for 23.1% of fatalities	85.7% of young adult road users were at fault in respect to the crash	
There is a 2 ½ times of young adults being involved in fatal crash	1 in 4 of all fatalities were due to crashes involving young drivers/ riders	
In Queensland more than 100 fatalities annually happen as a consequence of young drivers		
More than 2000 young adults are hospitalized due to road crashes		
About 80% of fatalities involved males		
In Queensland there were 94,598 crashes involving young adults (16-24) between 1 January 2000 and 1 December 2009.		

5.6.5 **Reasons for crashes**

Newstead (n.d) gives the following reasons that contribute to young drivers road crash fatalities:

1. It is revealed that young drivers lack driving experience and this is the main contributing factor to young drivers being involved in road traffic crashes
2. Young drivers were reported to exhibit deliberate risk-taking behaviors thereby driving in high risk environments which may include recreational driving and many other aspects of high risk driving .
3. Young drivers have a tendency to take unintentional or intentional risks such trailing too close to the next vehicle or driving beyond the speed limits.
4. Young drivers tend to be overconfident and over estimate their driving skills which is not a true reflection of their driving abilities
5. Young drivers fail to perceive or meticulously assess risks when driving

6. Young drivers have inadequate ability to expect,acknowledge and immediately react to hazards.

7. Young drivers have not fully developed cognitive and perceptual skills

5.7 *Motorcycle safety initiatives*

5.7.1 Motor cycle statistics

Motorcyclist are 30 times more likely to be killed on road compared to car occupants.Table 29 below gives some crash statical data involving motor cycle riders (TMR 2013).

Table 29: Motorcycle riders crash data
(CARRSQ (n.d))

Australia	Queensland
The fatality rate of motorcycle riders is 30 times the rate for car occupants	1 out of 5 fatalities in 2010 was a motorcycle rider
The number of motorcyclist killed on the road in 2010 was 224	Police crash records indicated that 942 motorcyclist were hospitalized from July 2008 to June 2009
motorcycle riders and pillions contributes to almost 15% of all road crash deaths .	50 motorcyclist fatalities in 2010 were recorded
Motorists are 41 times likely to be injured compared to car occupants.	The number of fatalities involving motorcyclist in 2010 decreased by 16.7% compared to 2009
More than 40% of fatal motorcycle crashes in Australia are single vehicle crashes	In 2010 motorcycle and pillion fatalities in Queensland composed of 20.1% of all fatalities as a result of road crashes.

In Queensland the highest number of fatalities involving motorist from 2007 to 2013 was 72 recorded in 2007 whilst the highest number involving motorcycle pillion passenger was 6 recorded in 2008. Table 30 below gives the number of motorcycle riders and Motor cycle Pillion Passengers Fatalities from 2007 to 2013.

Table 30:Motorcycle riders and Motor cycle Pillion Passengers Fatalities 2007 to 2013
(TMR 2012)

Year	2007	2008	2009	2010	2011	2012	2013
Motor Cycle Riders	72	66	57	49	42	58	38
Motor Cycle Pillion Passengers	1	6	3	1	3	2	3

From 2007 to 2011, 30-39 year old motorists represented a higher fatality rate compared to other age group users. Table 31 below shows details of the motorcycle riders involved in fatal crashes within Queensland, between 1 January 2007 to 31 December 2011 (TMR 2013)

Table 31:Motorcycle riders involved in fatal crashes within Queensland, between 1 January 2007 to 31 December 2011
(TMR 2013)

Rank	Age	Percentage %
1	30-39 years	26.0%
2	40-49 year	19.7%
3	21-24 years	12.7%
4a	50-59 year	11.8%
4b	16-20 years	11.8%
5	60-74 years	6.6%
6a	12-15 years	1%
6b	75+ years	1%
7	5-11 years	0. 3%

TMR 2012 reported that the main contributing factors of motorcycle riders fatalities between 1 January 2007 to 31 December 2011 were speed related and alcohol/drug related characteristics which accounted for 37.5% and 29.3% respectively.Table 32 below shows the contributing factors that lead to fatalities of motor cycle riders in Queensland between 1 January 2007 to 31 December 2011 indicating the percentage of fatalities as well.

Table 32: Motorcycle riders fatalities details

(TMR 2013)

Ranking	Contributing Factors	Percentage %
1	Speed related	37.5%
2	Alcohol/drug related	29.3%
3	Disobeying a traffic light/signal	12.7%
4	Failure to give way or stop	4.5%
5	Fatigue related	3.0%
6	Illegal manoeuvre	2.4%
7	Rain/wet road	2.1%

5.7.2 New Motorcycle Licensing and Safety Initiatives (Queensland)

The new motor cycle licensing and safety initiatives used in Queensland are as follows:

- Learner Approved Motorcycle Scheme (LAM)
- Pillion passenger restrictions for learner riders
- Provisional P1 or P2 driver license holders to display P plate
- learners, provisional and probationary license holders of all ages to obey the zero blood alcohol concentration (0.00 BAC) requirement .

5.7.2.1 Learner Approved Motorcycle Scheme

TMR (2013) reveals that the learner approved Motorcycle Scheme (LAM scheme) commenced on 1 July 2009.The scheme was designed for learner riders and RE license holders. The learner approved motorcycle scheme authorizes class RE license holders to ride motorcycles that have been approved under the learner approved motorcycle scheme. Motorcyclist under the LAM scheme are not allowed to ride any motorcycle with an internal combustion engine capacity of not more than 660 milliliters (ml). However, six models of motorcycles that have engine capacity of 250ml are under are

not approved under the learner approved motorcycle scheme namely: Aprilia RS250,Honda NSR250, Kawasaki KR250 (KR-1 model), Kawasaki KR250 (KR1s model) and Suzuki RGV250.These motorcycles are not approved under the LAM scheme because they are designed to exhibit very high speed and can accelerate quickly (TMR 2010).Motorcyclist are not authorized to ride motorcycles that have a power to weight ratio of more than 150 kilowatts per tonne (Kw/t).Motorcycle riders calculate the power to weight ratio of a motor cycle by dividing the maximum engine power of a motor cycle by the prescribed weight (tare mass of the motorcycle plus 90kg) and then multiply the result by 1000 in order to convert the final results into kilowatts per tonne (kW/t) ;Power to weight ration = Maximum Engine Power (kW)/prescribed weight(kg) x 1000 =Kilowatts per tonne (kW/t) (TMR 2013). A list of approved motorcycles under the learner approved motorcycle scheme is given in appendix B.

5.7.2.2 Pillion passenger restrictions for learner riders

The safety initiative of restricting learner riders from carrying pillion passengers commenced on 1 July 2009. Under this motorcycle safety initiative class R and RE learner riders are not authorized to carry pillion passengers or instructors whilst riding a motorcycle or scooter on the road (TMR 2013).

5.7.2.3 Requirement to display a P plate

The requirement to display P plates for Provisional P1 and P2 license holders as a safety licensing initiative was introduced on 1 July 2009 (TMR 2013). Under this initiative Provisional P1 license holders are required to to display red P plate on the rear of the motorcycle, or on the back of a vest worn by the rider. Whilst provisional P1 license holders must display green P plate on the rear of the motorcycle, or on the back of a vest worn by the rider (TMR 2013).

5.7.2.4 Zero blood alcohol concentration for novice riders

On 1 July 2010 Queensland Government introduced the zero blood alcohol concentration motorcycle safety initiative requiring Restricted license holders must comply to the zero blood alcohol concentration rule (TMR 2013).Under this safety initiative class RE motorcycle license holders are required to ride with a zero blood alcohol concentration during their first year of riding (TMR 2013).

5.7.3 Evaluation of Motorcycle initiatives

5.7.3.1 Pillion passenger restrictions for learner riders

TMR (2010) claims that riders carrying passengers increases the risk to both the passenger and the rider.and increases the severity of injury to the rider when a pillion passenger is carried. Therefore, the introduction of this initiative removes any added burden from the learner riders. a crash.

5.7.3.2 Zero blood alcohol concentration for novice riders

TMR (2010) claims that in Queensland most motorcyclist fatalities take place during the first 12 months of a rider's learning life.It is evident from TMR (2010) record that the first year of a motorcyclist riding phase is the most critical time in terms of potential crash risk.Haworth (1996) revealed that in Queensland in 1990, 33 % of motorcyclists killed during that period had blood alcohol concentration that was higher than 0.05%.He further reported that in Australia 41% of motor cycle riders fatalities involve blood alcohol levels that are above 0.05%. Therefore, by the introduction of a zero blood alcohol concentration initiative this will help minimize the number of crashes and fatalities involving motor riders on Queensland roads.

5.7.3.3 Pre-learner training

The Queensland Government currently does not require learner motor cycle riders to undertake pre learner motorcycle rider training which other states like New South Wales (Haworth 2012).The aim of the pre-learner training is to ensure that motor cycle riders possess the basic riding knowledge and skills required before obtaining a learner permit and riding on the road thereby reducing the risk for motorcyclist (Haworth 2012). It is arguably claimed that in Queensland the number of crashes involving learner riders is small hence any program regarding pre learners training or programs of such a nature would not yield measurable results (Haworth 2012)

5.7.3.4 Helmets and clothings

TMR 2013 revealed that wearing motorcycle helmets is a very effective way of reducing head injuries. Moreover in Australia it is a road rule that motor riders wear helmets on Australian roads. According to research conducted in Newzealand motor cycle riders wearing fluorescent of any reflective clothing had a 37% lower crash risk compared to motorcyclists not wearing the mentioned clothing (Haworth 2012).

5.7.3.5 Conclusion

There is evidence that the introduction of a zero blood alcohol concentration motor cycle safety initiative and restricting learner riders from carrying pillion passengers has contributed to the reduction of crashes.However, research has to be conducted on the effectiveness of some other motorcycle cycle safety initiatives giving quantitative crash reduction data. It is possible that the lack or limited data available or obtained to date regarding some other motor cycle safety initiatives is not sufficient in conclusively producing quantitative data on the reduction of crashes in this area.

5.7.4 Process for getting a motorcycle license

The process for getting an open motor cycle rider license includes siting for a written road test and after passing the test a motorcycle learner is granted. Thereafter the learner rider has to sit for Q safe practical driving test or R-ride training and assessment. When this stage is completed a provisional license P1 is given to the rider then the next stage is to obtain a P2 provisional license and after being granted a P2 license an open license is given. In Appendix C a table showing the progression of a new rider through the motorcycle rider licensing system is given.

5.8 *Anti-drink driving initiatives*

5.8.1 Statistical Data Drink driving

TMR (2013) obtained results indicate that alcohol and drug driving contributes nearly 30% of fatal crashes in Queensland and that overall drink driving accounts for approximately 25.2% (1 in 4) fatalities in Queensland annually.It is revealed that more than 25% (1 in 5) fatalities involving riders and drivers on Australian roads have a blood alcohol concentration that is greater than the accepted legal limit (TMR 2013). In 2011, 55 fatalities involving drink drivers /motorcyclists were recorded and this represented 20.4% of the states road toll (TMR 2013).

5.8.2 Effect of drink driving

Records consumption of alcohol has a negative effect on the driver and that individuals ability drive properly. Research reveals that consuming alcohol reduces the drivers reaction time thereby increasing the drivers risk in terms of an emergency or challenging driving situation. In addition alcohol consumption slows down drivers thinking process consequently inhibiting the drivers ability to multitask .Further more

an intoxicated driver has a reduced attention span or limited concentration frame and cannot focus on the task of driving and observe throughly other road activities and has an increased chance of falling asleep whilst on the wheel.Alcohol impairs ones ability to hear and see clearly therefore any intoxicated driver experience difficulties in seeing and hearing properly whist operating a vehicle on the road and this increases the chances of crashes and fatalities. Lastly alcohol has an effect of inflating ones ability , this aspect makes drivers feel overconfident and perceive they possess superior driving skills overlooking their driving limitations , which in the long run leads to catastrophic results on the road (TMR 2013) .

5.8.3 **Penalties for drink driving**

In Queensland and Australia as a whole there are penalties that come with not obeying the required legal alcohol limit imposed on drivers and motor riders by the state.Culprits are taken to the court of law where the magistrate decides on the fines and suitable driving deterrent method or punishments to be imposed on the offender.The amount of fines and any deterrent measures imposed on the victim is dependent on the offenders previous drink driving offenses (TMR 2013).

Table 33 below gives the different blood alcohol concentration levels and the consequent penalities.

Table 33: Blood Alcohol concentration levels and consequent penalties

(TMR 2012)

BAC	Less than 0.05 but greater than 0.0	Less that 0.10 > 0.05	Less than 0.15> 0.10	BAC ≧ 0.15
Penalties for learner, provisional /probationary license motor vehicle license holders	Drivers are banned from driving for 3 to 9 months.	Drivers illegible to drive for a 1 to 12 months.	Drivers unauthorized to drive for 6 to 18	Driving suspended for 6 months to 2 years.
	Fined a maximum amount of between $1,540 and $6,600, or maximum imprisonment	Fined a maximum amount of between $1,540 and $6,600,imprisoned from between 3 to	Fined a maximum amount of between $2,200 and $6,600, or maximum imprisonment term from between of 6	Fined a maximum amount between $3,080 and $6,600,

	term from between 3 to 18 months	18 months	to 18 months	and/or maximum imprisonment term from 9 to 18 months.

5.8.4 **Evaluation of Drink driving safety campaigns/initiatives**

The effects of drink driving is evident from past fatality and crash records involving drivers and motorbicycle riders caught with a blood alcohol concentration greater than the accepted legal limit .It is certain from recent and past studies that attitudes and behaviors associated with drink driving have changed over the last few decades (Fleiter et al 2013). Changes regarding driving sober or with acceptable alcohol limit levels can be attributed to programs and campaigns targeting drivers and motor cycle drivers about the effect of drink driving.In Australia there is no tolerance to drivers and motor cycle riders operating with a higher than accepted blood alcohol concentration as evidenced by the implementation of random breath testing (RBT),penalties and suspensions to drunk drivers and motor cycle riders . Fleiter et al (2013) argues that in Australia motorists change in behaviour regarding drink driving initially took place as a consequence of enforcement. Fleiter et al (2013) confirmed that that drink driving advertising campaigns have positively contributed to the reductions of alcohol-related crashes .These campaigns have been effective in disseminating information regarding road safety and enforcement whenever drivers break the law.These initiatives have been effective in altering public perceptions regarding behaviour associated with drink driving whereby a drink driver apprehended by authorities is considered by society as a 'criminal' and as one 'breaking the law Fleiter et al (2013). In Queensland several campaigns have been conducted targeting drink driving and have been effective in changing drivers and the general publics attitudes and behaviour regarding drink driving . TMR (2013) reported that In Queensland, the Think twice before you drive safety campaign was reintroduced and aired on television in December 2012 and January 2013.The safety campaign was also advertised on bill boards and online.An evaluation of the first think before you drive safety campaign introduced in February 2011 indicated that 94% of respondents who had seen the drink driving television advertising were able to recall at least one key message from this campaign.In

supporting the effectiveness of this campaign the majority of drivers that drink and drive agreed that the " think before you drive " safety campaign had positively impacted drivers and riders attitudes towards drink driving TMR 2013).

5.8.5 **Conclusion**

It is clearly noticed that the implementation of road safety awareness campaigns and public education programs have significantly contributed to changed behaviors and attitudes towards drink driving and has contributed to decline number of crashes however, there is need for qualified traffic professionals and road safety researchers must be prepared to address surfacing alcohol-related road use and conventional problems (Fleiter et al 2013). It is reported that there are new and emerging road safety challenges such as the increase in the number of female drink drivers that will have to addressed in order for our roads to safe. In order to combat some of these emerging and habitual drink driving problems the Queensland government introduced alcohol ignition interlock law on 6 August 2010. Under this program a vehicle of a drink driver offender is installed with an alcohol ignition interlock device that stops a vehicle from starting if the driver has been drinking alcohol.It is recommended that more research be conducted in this area and remedial actions be implemented to reduce the high number of fatalities (1 in 5 fatalities involving drink drivers) in Queensland (TMR 2013).

5.9 *Designated Driver Programs (DDP)*

Nielson et al (2009) revealed that there is substantial evidence indicating that designated driver programs increases awareness and the use of designated drivers however, its effectiveness in reducing alcohol related or drink driving crashes is uncertain.

5.9.1 **Objective of DDP**

The primary focus of the designated driver programs is to decrease alcohol associated crashes thereby presenting alternatives to driving under the influence of alcohol,discouraging drink driving culture and promoting drivers to make travel arrangement prior to alcohol consumption (Nielson et al 2009).

Nielson et al (2009) defines a designated driver as a person who agrees to abstain from consuming alcohol and drives qualified driver who are under the influence of

alcohol. Some designated driver programs do not require a designated driver from consuming alcohol but keep the blood alcohol concentration levels below the legal limit.

5.9.2 DESIGNATED DRIVER PROGRAMS IN AUSTRALIA

Nielson et al (2009) reports that in Australia several designated driver programs have been implemented namely:

- Pick a skipper program that was used in Geraldton, Western Australia
- Sober Bob used in Northern Territory
- Who's DES Tonight? program used in Burnie, Tasmania
- The Skipper program currently used in Queensland on the Gold Coast, Sunshine Coast , Mackay, and Gympie .

5.9.2.1 Skipper program — Queensland.

The driver designated program used in Queensland is called the skipper program .In order to demoralize drink driving and to reduce the risk of crashes ,the Department of Transport and Main Roads has implemented driver Skipper program at the licensed premises on the Gold coast ,Sunshine coast, Gympie and Mackay (TMR2013). Research indicate that one out of five (20%) of drivers in Queensland have at least once in the past twelve months driven home under the influence of alcohol (TMR 2013). In Queensland at licensed premises the designated driver is offered some sort of incentive which may include receiving free soft drinks after the skipper has registered with bar staff (TMR 2013). Appendix D gives the names and places of licensed skipper program on the Sunshine coast and Gympie refer to Appendix D.

5.9.2.2 Evaluation of skipper program

Nelson et al (2009) reveals that preliminary evidence regarding evaluating skipper program effectiveness before and after the programs was implemented in Mackay suggests that the program has been associated with increased awareness and increased use of designated driver however, the program does not show precisely any impact on behaviour change. In Melbourne patrons of three licensed premises who were surveyed revealed the same results that the designated driver program lead to an increase in the use of designated drivers ; whilst results obtained from Geraldton

Western Australia revealed that the designated driver program contributed to a reduction in reported drink driving and a 6.5% reduction in the number of passengers where the driver was believed to be over the legal limit (Nielson et al 2009). It is evident that the designated driver program is effective in increasing awareness and increased use of designated drivers .Moreover the idea of a designated driver program promotes a culture of not mixing alcohol with driving (Nielson et al 2009).

5.9.3 **Conclusion DDP**

Whilst designated driver program has been praised for increasing awareness and increased use of designated drivers.However, there are few studies that focus on measuring drink driving behaviors that take into account if using a skipper or designated driver factually reduces drink driving (Nielson et al 2009).In addition studies conducted on drink driving crashes /offenses and the use of a designated driver have neglected to include suitable controls or datums as a basis of comparison (Nielson et al 2009).Researchers have confirmed that there are few studies conducted regarding the effectiveness of designated driver programs and globally there are many designated driver programs in place to which most of these programs have not been evaluated (Nielson et al 2009). The designated driver program has been effective in creating awareness and increased use of designated drivers.It is recommended that more research be conducted on the effectiveness of drink drivers behaviour change,quantitative data on crash reduction and better means of distributing the programs message as well as added improvements to the program like increasing skippers incentives ,awarding drivers that have shown tremendous alcohol reduction intake and reduced drink driving offenses.

5.10 *School road safety initiatives*

Safe school travel (SafeST) is composed of programs, schemes and initiatives that that are designed to foster travel safety for students to travel to and from school (TMR 2013). SafeST consists of SafeST Subsidy Scheme, School Crossing Supervisor Scheme, Safe School Bus Routes Program and Safe Walking and Pedaling (SWAP) Program.

5.10.1 School Crossing Supervisor Scheme

TMR (2013) provides details of school road safety initiative used in Queensland that commenced in 1984 known as the the School Crossing Supervisor Scheme.The School Crossing Supervisor Scheme was designed to improve the safety of school children in the school traffic environment and advance travel safety of students TMR 2013).Under this scheme special needs children and primary school students are assisted by the school crossing supervisor during peak hours in the morning and afternoon to safely cross the roads outside and within the school premises (TMR 2013).The job of the school crossing supervisors is important in that they assist children in safely crossing roads to and from school. In return school Crossing Supervisors are paid a minimum amount of $26.54 per hour plus casual loading, of up to 7.5 hours per week ,however these conditions are not uniform but dependent on crossing supervisor's locality allowance privilege (TMR 2013).

5.10.2 SafeST Subsidy Scheme

It is revealed that SafeST subsidy scheme is funded by the Queensland roads program and the goal of the scheme is to provide a 50% subsidy to Queensland local governments for approved school transport-related infrastructure works (TMR 2013). The projects subsidized by the Queensland government may include redesigning car parks ,pedestrian refuge islands ,construction of pick up and set down areas and any other transport related works (TMR 2013).

5.10.3 Safe Walking and Pedaling (SWAP) Program

The focus of the SWAP Program is to review bicycle paths , footpaths and transport infrastructure used by the students that is within a 3.2 km school radius. Under the SWAP programs, road safety professionals / consultants help with recognizing safety issues and developing possible solution (TMR 2013). SWAP funds minor projects and the amount of funding from this program is less than $10000.

5.10.4 Safe School Bus Routes Program

The primary focus of safe school bus program is to enhance the safety of school bus routes by assessing selected bus routes. Since the programs aims is to improve the safety of bus routes the safety issues addressed include installation of bus route signage,construction of bus stops and widening and improving visibility around curves.

5.10.5 Speed limits in School zone Initiative

In Queensland speeding accounted for 22.6% of fatalities during 2011–2012 period.It has been confirmed that speeding is a major contributor to the cause and severity of road crashes(TMR 2013).Speeding through school zones is unacceptable in Queensland because it is a dangerous act and increases tremendously the risk of crashes involving school students .In order to reduce and eliminate the risks associated with speeding,speed limits in school zones are established. Speed limits in School zones are installed to reduce traffic speed near schools during designated times displayed on the school zone signs.The speed limit school zones signs are displayed on both approaches to the school thereby directing drivers to reduce speed and drive to the required speed limit displayed.

5.10.6 Conclusion

School road safety is paramount in ensuring that school children safely return home .The implementation of safe travel program has been effective in ensuring student travel safety and modifying peoples behaviour in the vicinity of any school. However, there is limited research data on the effectiveness of each school road safety program regarding the number of crashes or fatalities prevented by the implementing of such a program. It is recommended that specific research be conducted on the school road safety initiatives used in Queensland and providing quantitative data by obtaining actual crash data results and formulate a viable analysis in terms of crash reduction or increment.

6.0 AUSTRALIA WIDE ROAD SAFETY RECORD

Bitre (2013) obtained road fatality results indicate that the number of fatalities in Australia has been decreasing steadily over the past five years.

6.1 *Australian road fatalities*

The total number of fatalities in 2013 decreased by almost 16% in comparison to 2012. So far 2013 has recorded the lowest number of fatalities in Australia since 1948. Table 34 below shows a five year record of fatalities in Australia from 2009 to 2013.

Table 34: Australian Road Fatality Statistics 2009-2013

Bitre (2013)

Australian Road Fatality Statistics						
Year	2009	2010	2011	2012	2013	Total
State/Territory						
NSW	453	405	364	369	311	1,902
VIC	290	288	287	282	212	1,359
QLD	331	249	269	280	251	1,380
SA	119	118	103	94	92	526
WA	190	193	180	185	149	897
TAS	63	31	24	33	30	181
NT	30	49	44	48	35	206
ACT	12	19	6	12	6	55
Total	1,488	1,352	1,277	1,303	1,086	6,506

Australia Capital Territories has had the lowest number of fatalities recorded in the past five years whilst New South Wales has recorded the highest number of fatalities followed by Queensland.

6.2 *Nationwide fatalities per 100000 population*

From 2003 to 2012 Australian Capital territories had the lowest number of deaths per 100000 populations from 2003 to 2012. Whilst all jurisdictions achieved reductions ,New South Wales had the greatest fall followed by South Australia and then Tasmania as evidenced from table 35. IRTAD (2013) claims that in the last 20 years, deaths per 100 000 population has decreased by 54%.

Table 35: Australia wide deaths per 100,000 populations by jurisdiction from 2003 to 2012.

(Bitre 2013)

Deaths per 100,000 population by jurisdiction									
Year	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
2003	8.08	6.7	8.14	10.25	9.22	8.58	26.49	3.38	8.15
2004	7.6	6.89	7.97	9.02	8.98	12.01	17.32	2.75	7.86
2005	7.52	6.85	8.26	9.53	8.08	10.49	26.65	7.87	7.98
2006	7.28	6.57	8.19	7.46	9.71	11.23	21.36	3.89	7.72
2007	6.32	6.38	8.62	7.84	11.12	9.12	26.97	4.1	7.63
2008	5.36	5.72	7.68	6.2	9.41	7.82	33.95	4.03	6.72
2009	6.41	5.38	7.58	7.37	8.46	12.5	13.23	3.39	6.83
2010	5.67	5.27	5.63	7.24	8.41	6.1	21.28	5.27	6.13
2011	5.05	5.19	6.01	6.29	7.65	4.69	19.02	1.63	5.72
2012	5.16	5.01	6.14	5.68	7.61	6.45	20.44	3.2	5.78
% change 2011-2012	2.2	-3.3	2.1	-9.7	-0.5	37.3	7.5	96.3	1
Ave. trend change p.a. (%)	-5.2	-3.9	-4	-5.6	-1.9	-6.8	-2.4	-3.9	-4.2

6.3 *Death by road user*

Bitre (2012) obtained fatality data revealed that fatalities involving road users from 2003 to 2012 had declined in pedestrians fatalities and driver deaths whilst the number of fatalities involving motorcyclist had increased during that period.Table 36 below shows death by road user from 2003 to 2012 .Overall road users deaths have decreased in the past 30 years by 49% (Bitre 2012). Deaths of all other road user groups have also decreased significantly.

Table 36: Deaths by road user 2003-2012
(Bitre 2012)

Deaths by road user 2003 – 2012						
Year	Drivers	Passengers	Pedestrians	Motorcyclists	Pedal Cyclist	All Road Users
2003	747	420	232	188	26	1,621
2004	760	362	220	195	43	1,583
2005	775	347	226	233	41	1,627
2006	757	336	228	238	39	1,598
2007	785	336	204	237	41	1,603
2008	671	302	189	245	28	1,437
2009	708	330	194	224	31	1,488
2010	635	284	170	224	38	1,352
2011	569	286	185	202	34	1,277
2012	616	259	174	224	33	1,310
Ave. trend change p.a. (%)	-3.1	-4.2	-3.4	0.9	-0.6	-2.8

As can be seen from the table above the number of driver's deaths has been reducing over the years and the total number of deaths has been reducing as well due to good road safety initiatives. The data above will be helpful in pointing out states that have had a lower road death toll and help in understanding the road safety strategies used in those successful states in terms of road safety.

6.4 *Deaths by age group*

Bitre (2012) fatality records indicate that from 2003 to 2012 in Australia the number of fatalities for under 16 year old and below has declined by almost 51%. Whilst the number of fatalities involving 17 -25 year old during the same period had decreased by almost 30%. There was has been a great decrease in fatalities involving 16 years and under from 2003 to 2012 with an average trend change per year of -6% however the number of fatalities involving 60 to 69 year road users from 2003 to 2012 had increased by 35% as evidenced from table 37 below.

Table 37: Deaths by age group 2003 – 2012
(Bitre 2012)

Deaths by age group 2003 – 2012							
	0-16	17-25	26-39	40-59	60-69	≥ 70	All Deaths
Year	years	years	years	years	years	years	years
2003	148	412	373	361	100	223	1,621
2004	112	429	353	368	125	195	1,583
2005	110	426	414	347	123	204	1,627
2006	118	435	393	359	107	185	1,598
2007	101	392	412	391	106	200	1,603
2008	88	376	345	352	96	180	1,437
2009	105	360	356	388	104	175	1,488
2010	74	336	305	356	113	167	1,352
2011	93	280	276	339	101	188	1,277
2012	72	286	300	320	135	196	1,310
Ave. trend change p.a. (%)	-6	-4.8	-3.4	-0.8	0.4	-1.6	-2.8

From the fatality records provided regarding the increase in the number of deaths involving 60 to 69 years old by almost 35%.It is recommended that new programs be designed or implementing existing road safety programs effectively that target this age group. Records indicate that the number of fatalities involving motorcyclist had increased by 16% from 2003 to 2012.

6.5 *Road fatality*

IRTAD (2013) claims that in Australia road fatality rates are lower for people who live in major cities than for people living in rural areas especially in remote locations because people who live outside cities drive in substandard rural roads,longer distances and generally drive more than people who live in major cities. In addition in rural areas it is difficult for road safety authorities to effectively enforce alcohol, speed limit restrictions and other road safety enforcements. Moreover some roads in rural parts of Australia such as Chinchilla and Toowoomba are not properly designed and maintained. It is recommended that rural roads be designed to a high standard and maintained properly because some of the rural roads are used for transportation purposes by farmers,manufacturing,mining ,construction and oil industries and by residents living in rural areas.

7.0 CANADA AND ENGLAND

7.1 *Canada*

Transport Canada (2013) reports that the number of serious injures and fatalities on Canadian roads is declining despite an increase in the number of vehicles. IRTAD (2013),published that the number of fatalities in Canada from 2000 to 2010 had decreased by 23.3% . In addition the number of fatalities per 100000 population between 1990 and 2010 had decreased by 54.4%.

Transport Canada (2012) crash data shows that the number of motor vehicle fatalities declined from 2230 in 2009 to 2227 in 2010 and there was a 5.1% reduction in the number of serious injuries in 2010 compared to 2009. In 2010 Canada recorded 6.5 fatalities per 100000 population (table 38) whilst in the same year Australia recorded 6.13.Experts suggest that "Fatalities per 100 000 head of population " is an appropriate tool to use when comparing mortality rates and fatality risk between countries with the same level of motorization (IRTAD 2013) .

Table 38: Casualty Rates 2010
(Transport Canada 2013)

Canada Casualty Rates 2010						
	Per 100,000 Population		Per Billion Vehicle kilometers		Per 100,000 Licensed Drivers	
	Fatalities	Injuries	Fatalities	Injuries	Fatalities	Injuries
Canada	6.5	500	6.6	504.1	9.5	724.8
N.L.	5.5	404.1	5.8	426.2	7.7	567.1
P.E.I.	6.3	451.9	6.9	493.7	9.1	655
N.S.	7.4	513	6.9	476.9	10.2	707.5
N.B.	12.4	458.7	11.5	425.9	16.9	626.5
QUE.	6.1	548.6	6.6	594.2	9.4	849.5
ONT.	4.3	477.3	4.5	498.3	6.2	682.9
MAN.	7	570.5	7.2	583.9	11	891.1
SASK.	16	625.9	12.8	499.5	23.1	905.3
ALTA.	9.2	490.5	6.6	349.5	12.4	655.8
B.C.	8	461.5	10.1	579.3	11.6	665.7
Y.T.	11.6	636.6	7.9	433.9	15.4	848.5
N.W.T.	6.8	257.8	9.4	353.6	12.1	455.9
NVT.	6.1	124.9	60.2	1,234.60	48.3	989.4

7.1.1 **Safety Initiative used in Canada**

Canada has some similar road safety initiative or programs.Below are some initiative used in Canada

- Speed management- Provinces introduced higher fines and impounding vehicles exceeding speed limit.
- Drink driving limitations -in Alberta a 3 day suspension and vehicle impounded if BAC of more than 50 mg/dl but under the criminal limit of 80 mg/dl
- Distraction-Campaigns against phone use whilst driving "Leave the Phone Alone"
- Child Safety/Vehicle occupant protection-Child seat aid material translated in English, french, Arabic, Chinese, Punjabi, Somali and Spanish.
- Safe vehicles- Transport canada ensures vehicles are manufactured to set standards, imported vehicles meet Canadian standards,defective vehicles investigated and recalled..
- Motor Carriers, Commercial Vehicles and Drivers- federally-regulated bus and truck motor carriers required to possess Motor Carrier Safety Fitness Certificate when crossing provincial and international llocations. Regulated work and rest hours for drivers.

7.2 *England*

Road Safety Foundation (2011) revealed that the chances of a British person to die on road is nearly 8 times more than in any activity and that almost 100 Britons are killed or seriously injured in united kingdom every day. England recorded the lowest number of fatalities per million population in 2010 and 2011 compared to Australia and United States of America shown in table 39.

Table 39: England, Australia and USA record 2010-2011

	2010		2011	
	Number of road deaths	Fatalities per million population	Number of road deaths	Fatalities per million population
England	1,553	30	1,594	30
Australia	1,352	61	1,292	57
USA	32,885	107	32,310	105

England has a population of approximately 53 Million and Australia's population is approximately 23 million and yet the number of fatalities per million in England is lower than the number of fatalities per million in Australia .It is recommended that a detailed study into Britain's safety programs /initiatives,its implementation and road users awareness and behaviour change be conducted.

8.0 GLOBAL ROAD SAFETY

- WHO (2013) tabulated facts regarding global road safety:
- Globally, road traffic fatalities accounts for 1.24 million people per annum
- Age groups between 15 to 44 contributes 59% of fatalities on the road.
- Nearly 20-50 million are injured or disabled per annum due to road crashes .
- Countries with low to medium income accounts for nearly 92% of road traffic fatalities globally
- 59 countries have implemented an urban speed limit of 50 km/h or less and these countries only represent 39% of the world's population
- Drink driving is one of the major the major causes of crashes and fatalities

Developing nations experience a high road fatality rate per 100000 population compared to developed nations .Table 40 below show the countries that have a higher fatality rate and most of them are developing nations.Appendix E the name s of countries its ranking and road traffic accidents per 100000

Table 40: Road Traffic Accidents per 100000 population

(WHO 2011)

Road Traffic Accidents per 100000 population		
Rank	Country	Rate
1	Namibia	53.4
2	Swaziland	48.2
3	Malawi	45.4
4	Iraq	44.7
5	Iran	43.8
6	Thailand	42.9
7	Congo	42.4
8	Central Africa	39.7
9	Sudan	39.2
10	Mozambique	38.2
11	Zambia	37.9
12	Ethiopia	37.8
13	Lesotho	37.4
14	Yemen	37.3
15	Belize	36.9
16	Angola	36.2
17	Venezuela	35.8
18	Dominican Rep	34.8
19	Uganda	34.7
20	Malaysia	34.5
21	Equ. Guinea	34.2
22	Djibouti	34
23	Jordan	32.9
24	Cameroon	32.6
25	El Salvador	31.8

9.0 Recommend 5 E's of Road Safety

Road safety as a whole is comprehensive ,therefore in order to ensure effective and measurable results. The 5'E of road safety have be incorporated.The five E's of road safety are ; Engineering; Education; Enforcement; Encouragement; Evaluation (Safe Routes to School National Partnership (n.d)).

9.1 *Engineering*

Engineering as an element of road safety include reviewing condition of road infrastructure , designing and ensuring that specifications are meet. These measures may include Traffic calming ;safety audits; assessing geometry of the road;Separation of local traffic ;Bus bays; Illuminations; Development of Junction; Signages; Bridges/CD Structures; Development and maintenance of walkways, trails and bikeways.

9.2 *Education*

This involves creating awareness and informing the general public especially road users on road safety related issues.Road safety information is disseminate to the public through television advertising, radio broadcasting, poster advertising ,garment advertising, seminars ,committee, exhibitions and other media suitable to the target group.

9.3 *Enforcement*

This component of road safety is there to ensure road users comply and obey road traffic rules. Comply to speed limits restrictions,licensing requirements , operate within the allowable Blood alcohol concentration level and other road traffic rules.

9.4 *Encouragement*

Encouragement was added recently as one of the 5E's of road safety to ensure that not only 'fear of prosecution' (through enforcement) kept road users from operating contrary to safe criteria, but to create awareness of road safety and encourage road users to behave properly on the roads.

9.5 *Evaluation*

Evaluation was added to ensure continuous monitoring of road safety initiatives and programs .Track the successes and failures of the initiatives and plan accordingly.

10.0 GEOMETRIC DESIGN OF ROADS

The main purpose of roads is to enable the safe, convenient, effective and efficient transport of persons and goods (CIV3703 2011).One of the five E's of road safety is Engineering therefore, roads have to be designed and maintained to the required standards. By designing roads to set standards the risks of crashes are reduced. CIV 3703 describes geometric design of roads as "the design of the visible dimensions of the roadway to acceptable design".

The three major areas of Geometric design include Locational design;alignment and cross sectional design; and access design, including the design of intersections.

10.1 *MVC Multi combination vehicles*

Toowoomba regional council uses Route Assessment Guidelines for Multi-Combination Vehicles in Queensland to assess the suitability of roads for MCV use (Toowoomba Regional Council 2012) There are many criteria to determine whether a road is suitable for MCV use, one of these requirements been road width. The table below is used to determine the road width requirements for rural roads for MVC multi combination vehicles.

Table 40: Minimum Carriageway and Seal Widths in Rural Areas for MCV Routes
(TMR 2012)

AADT	Existing Alignments						New Alignments (for comparison)	
	Absolute Minimum		Desirable Minimum					
			Limited Tourist Traffic		Prolonged Periods with > 5% Caravans			
	Seal Width (m)	C'way Width (m)	Seal Width (m)	C'way Width (m)	Seal Width (m)	C'way Width (m)	Seal Width (m)	C'way Width (m)
<150	-(2)	8.0	6.0	8.0	8.0	8.0	6.0 (3) 9.0	8.0 9.0
150 to 500	6.0	8.0	7.0(4)	8.0	8.0	8.0	9.0	9.0
500 to 1000	6.5	8.0	8	8.0	8.0	8.5	9.0	9.0
>1000	-	-	-	-	9.0	9.0	9.0	10.0

Notes:
1. The available seal and carriageway width on horizontal curves (i.e. what curve widening has been provided) will determine the suitability for a particular type or types of MCV (see Table 3-3: Curve Widening per Lane).
2. A sealed pavement is not mandatory for this traffic volume. In practice, many existing roads will have a 3.7m wide (or greater) single lane seal. Some roads may have a 6.0m seal which may function as a single lane (see Note 3) or two-lane if marked with a centre line.
3. The 6.0m seal is not marked and operates as a single 4m lane with partially sealed shoulders. An 8.0m seal provides acceptable two-lane operation.
4. Preferably 7.4 to reduce maintenance.
5. Carriageway widths < 9.0m on two-lane roads must be accompanied by embankment and table drain slopes 1 on 4 or flatter together with clear areas to prevent "shying" towards the centre of the

road. However, some short local exceptions (<200m) are possible.
6. Carriageway widths < 10.0m on roads with a single-lane seal must be accompanied by embankment and table drain slopes 1 on 6 or flatter so smaller vehicles can move over to clear an oncoming MCV that stays on the seal. However, some short local sections are possible where visibility allows drivers of smaller vehicles to move over and stop prior to the restricted width section if there is an oncoming MCV.

11.0 CONCLUSION AND FUTURE WORK

In Queensland the safety initiatives used include ; Camera Detected offence program (CDOP); Black spot program (BSP);Heavy Vehicle Safety and Productivity Program (HVSPP); Older driver safety program,Young driver safety programs;Anti-drink driving programs;motorcycle safety scheme;School crossing supervisor scheme,using Transport Inspectors,Queensland ,Driver reviver, School crossing supervisor scheme and Community Road Safety Grants program. The programs that have yielded good results include ;the Camera detected offence program which in 2008 in Queensland prevented 5,700 crashes and more than 1,100 fatalities;The black spot program which prevented BSP 32 fatalities and more than 1,500 serious injuries in first three years;HVSPP in 2007 contributed to 31% reduction in the number of fatal crashes and in 2011 attributed to 3% and 12.3% reduction in the number of fatality and accident respectively; New Graduated licensing program has been very effective in changing behaviors and increasing driving experience; Anti drinking programs like the designated driver program program has been effective in creating awareness regarding the dangers of drink driving . Some programs like driver revival ,community safety grant program and use of transport inspectors contained limited information on the number of fatalities that have been reduced by implementing such programs/initiatives.Most of the programs were just introduced recently and there is not enough information to conclusively determine and measure the outcome of the program like the New Graduated licensing program was introduced recently and some project regarding HVSPP were just completed and some are current.It is recommended that more research be conducted on GDP, HVSPP,community safety grant and comparison on safety initiatives used in developed nation.The focus should still be on safe road and road sides,safe speed,safe road user and safe vehicles (TRC 2013).Appendix F contains an extract summarizing road safety strategy for Queensland,Australia and United Nations.

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Appendix A. Project Specification

University of Southern Queensland

FACULTY OF ENGINEERING AND SURVEYING

ENG4111/4112 Research Project

PROJECT SPECIFICATION

FOR:	Melcuam Sebby
TOPIC:	Evaluation of Road safety Processes Currently Used in Queensland
SUPERVISORS:	Mr Trevor Drysdale
ENROLMENT:	ENG 4111- S1, D, 2013; ENG 4112 – S2, D,2013
PROJECT AIM:	This project focus on the study of the current road safety processes used in Queensland to eliminate fatalities and serious injuries and how effective these programs and initiatives have been in reducing the number of serious injuries and fatalities.
PROGRAMME:	(ISSUE A,11 MARCH 2013)

1. General road safety worldwide and in Australia
2. Road safety statistics in Queensland and analyses
3. Safety initiatives used in Queensland
4. Camera Detected Offence Program (CDOP)
5. Black Spot Program (BSP)
6. Heavy Vehicle Safety and Productivity Program (HVSPP)
7. Toowoomba Regional Council Road Safety Initiatives
8. Older Driver Safety Programs and Initiatives
9. Young Driver Road Safety Programs and initiatives

10. Motorcycle Safety Initiatives
11. Anti Drink Driving Safety Initiatives
12. Designated Driver Program
13. School Road Safety Initiatives
14. Australia wide Road Safety Statistics
15. Canada and England road fatality rates
16. Global Road Safety
17. 5E's of road Safety
18. Geometric Design
19. Conclusion and future work
20. Submit final thesis

AGREED: _____ (Student) _____, _____ (Supervisors)

___/___/2013 ___/___/2013 ___/___/2013

Appendix B.

B.1. Eligible Motorcycles in the category 0 – 250 mL

The following 0 mL – 250 mL motorcycles, are excluded from the LAM scheme

Make	Model
Suzuki	RGV250
Kawasaki	KR250 (KR-1 and KR1s models)
Honda	NSR250
Yamaha	TZR250
Aprilia	RS250

Conditionally registered motorcycles which have not been approved under Australian Design Rules certification are also excluded.

B.2. Eligible motorcycles in the category 251 mL – 660 mL

Eligible motorcycles in the category 251 mL – 660 mL

Make	Model	Make	Model
AJS	Model 18S	**ASIAWING**	ODES MCF450
Aprilia	Sport City 300		
	Pegaso 650	**ATK**	605 Dual Sports
	RXV450		605 Cross Country
	RXV550		
	SR Max 300	**Benelli**	Velvet 400
	SXV450		

	SXV550	**BETA**	RR350
	Scarabeo 300		RR400
	Scarabeo 500		RR450
			RR520
			RR525
BMW	C600 Sport	**BMW**	F650GS (under 661 mL versions only)
	C650 GT		G450X
	F650 Funduro		G650GS
	F650CS		G650GS Serato
			R45
Bolwell	(PGO & SYM) GTS250 (Firenze)		R50
	Firenze 300		R50S
			R60
BSA	B50SS Gold Star		R65
	B34 500 Gold Star		R65LS
	Gold Star		R69
	A10 650 Golden Flash		R69S
	A10 Super Rocket		
	A65L 650 Lightning	**Cagiva**	410TE
	A65SS 650 Spitfire		500 Canyon
	A65T 650 Thunderbolt		600 Canyon
			600 River
CF Moto	CF650NK		TE450
	CF650TK		W16 Dual Sport 600

	WR360
Derbi	Mulhacen
	Rambla 300
Dnepier	650
Ducati	400SS Junior
	Monster 400
	Monster 659
Enfield/Royal Enfield	Bullet Deluxe
	Bullet Electra
	Bullet 350
	Bullet 500
	Bullet Classic
	Lightning 500
Gas Gas	EC300
	FS40A
	FSE400
	FSE450
Honda	BROS 400
	BROS 650
	CB350
	CB360
Ducati	DM450
	DM500
	500SL
	600SL
	600SS
	600 Pantah
	600M Monster
	620 Multistrada Lite 24.5kW
	620 Sport Lite
	M 620 Lite i.e. (2005 to 2006
Fantic	EC30
Gilera	Nexus 500
	Fuoco
Honda	CBR500RA
	CBX400F
	CBX550F
	CJ360T
	CL350
	CL450
	CR500E

	CB400	CR500R
	CB400N	CRF450X
	CB400T	CX500
	CB450	CX500C
	CB500	FT500 Ascot
	CB500F	GB400
	CB500X	GB500
	CB550	GL400
	CB650	GL500
	CBR500R	NSS300 FORSA
		NT650v Deauville
Honda	XL600	NT650
	XL600 Transalp	NV400
	XL600R	NX650
	XL650v Transalp	NX650 Dominator
	XR350	NTV650 REVERE
	XR350R	RVF400
	XR400M	Steed 400
	XR400R	Steed 600
	XR500	VT400C - Shadow
	XR600	Silverwing
	XR600R	SH300i
	XR650L	SL350
	XR650R	VF400F
		VT500E
Hunter	Daytona 350	VT600 Shadow

	Spyder 350
	Bobber
Husaberg	FE4E8
	FE5E8
	FE7E8
	FE350
	FE390
	FE400E
	FE450
	FE450E
	FE501
	FE501E
	FE550
	FE570
	FE600
	FE600E
	FE650E
	FS390
	FS450
	FS570
	FS650
	TE300
	XBR500
	XL350
	XL350R
	XL500
Husqvarna	A301AA
	A600AA
	A601AA
	350TE
	400TE
	410TE
	510TE (Models 1983 – 1990)
	610TE (Models 1991 – 1999)
	SM450 (2006 models and later)
	SMR449
	SM510R (2006 models and later)
	SMR511
	SM610 (2007 models and later)
	SMS630 (VIN prefix must commence with ZKHA401AB)
	TE630 (VIN prefix must commence with ZKHA401AA)
	360WR
	430WR
	TE310
	TE449

Hyosung	GV650C (Aquila Classic)		TE450 (2006 models and later)
	GV650L		TE510 (2006 models and later)
	GV650-40		TE511
	GT650L		610SM (1991 – 1999)
	GT650RL		TE610 (2007 models and later)
	GT650SL		TR 650 Strada (VIN prefix must commence with ZKH0H11F)
	GT650-40		TR 650 Terra (VIN prefix must commence with ZKH0H11B or ZK0H11D)
	GT650SL-40		WR300
	GT650SH-40		
	GT650R-40	**JAWA**	350 Series
Kawasaki	450LTD (EN450)	**KTM**	400SC
	ER5		620SC
	ER6-NL (2010 onwards)		625SMC
	GPZ500S (EX500) (1989 – 1992 only)		450EXC
	GPZ550 (Z550H)		300EXC
	GT550		300EXC-E
	KH500		300EXC-R
	KL600		350EXC
	KL650		350 EXC-F
	KL650E		360EXC
	KLE500		380EXC
	KLR600		400EXC

KLR650		400EXC-R
KLX300R		450EXC-R
KLX450		500EXC
KLX450R		520EXC
KLX650		525EXC
KLX650R		530EXC-R
KZ400		300GS
KZ440		400GS
KZ500		620GS
KZ550		Freeride 350FR
MACH 1 S2		GS300 E/GS
Ninja 300		GS600
Ninja 650L		400 LC4
Ninja 650RL (2010 Onwards)		620 LC4
Versys 650L (Must obtain manufacturers certification letter)		625 LC4
W400		625SXC
W1 650		640 Adventure (2002 models and prior)
Z400		690 Rally Replica
Z440A		
Z440H	**Kymco**	Bug Xciting
Z500		Venox
Z550D (GPZ550)		Like 200
Z550 (GT550)		Downtown 300i
Z650		

	Zephyr 550 (ZR550)
	ZR550A
Laro-Dadyw	Pro Street 350
	SPT 350
MBK	Yamaha XT660R
Yamaha	XT660X
Moto Guzzi	Falcone 500
	V35
	V50
	V65
MZ	ETZ250
MV Augusta	350S
Norton	50
Norton	Dominator
	ES2
Panther	600
Suzuki	AN400
	AN650
	AN650A
	DL650AUE
	DR350
	DR350S
Lambretta	All models
Lifan	LF400
Lifan	LF400
Matchless	G80
Moto Guzzi	NTX650
MuZ	Baghira
	Mastiff Supermotard
	Skorpion
	Skorpion Replica
	Skorpion Sport
	Skorpion Tour
Peugeot	Satelis 500cc
	Geopolis 400
Piaggio	All models
QJ	P25 BJ600
Riya	300T
Sherco	3.0i
	4.5i
	5.1i
SYM	CITYCOM 300
TGB	XMOTION 300

Suzuki	DR400	**TM**	EN300
	DR500		TM300
	DR600		TM400
	DR600R		
	DR650	**Triumph**	Bonneville 650
	DR-Z400		Speed twin
	DR-Z400E		T100R Daytona 500
	DR-Z400S		Thunderbird 650
	DRZ400SM		Tiger 100 (under 661 mL versions only)
	GR650		Trophy 500
	GS450		
	GS500	**Triumph**	Trophy 650
	GS500E		TWR25
	GS500F	**URAL**	650
	GS550	**Velocette**	VENOM
	GSX400		400 Enduro
	GSX650FU		450 Enduro
	LS650		500 Enduro
	RE5 Rotary		530 Enduro
	SFV650U Gladius	**Vespa**	All models
	SV650SU	**Xingyue**	XY400Y
	T500 Titan		
	XF650	**Yamaha**	MT03
			RD400
Yamaha	XT660R		SR400

XTZ660	SR500
XT660Z Tenere	SRX600
XV535	SZR660
XVS400	TT350
XVS650	TT600
XVS650A	TX500
XZ550	TX650
YP400	WR400F
XP500	WR426
XS400	WR426F (2002 models and later)
XS650	WR450F
XT350	XJ650
XT500	XJR400
XT550	XJ6FL (Must obtain manufacturers certification letter)
XT600	XJ6NL (Must obtain manufacturers certification letter)
XT660X	XJ6SL (Must obtain manufacturers certification letter)

Appendix C. Process for getting a motor cycle license

	Written road rules test	• hold a class C (car) provisional (P1, P2) or open licence for at least one year in the last five years • pay the written road rules test fee
	Motorcycle learner licence	• pass the written road rules test • complete the Driver Licence Application/Renewal form (F3000) • show suitable evidence of identity and Queensland residency documents • pass an eyesight test, if required • declare that you are medically fit to learn to drive the class of motorcycle • pay the required learner licence fee
	Q-SAFE practical driving test or Q-Ride training and assessment	• class RE – either hold a learner licence for at least six months before undertaking a Q-SAFE practical driving test through the department or the QPS (regional and remote areas only) or complete a Q-Ride competency based training program to obtain a Q-Ride Certificate • class R – either hold your class RE licence for at least one year in the past five years before undertaking a Q-SAFE practical driving test through the department or the QPS (regional and remote areas only) or complete a Q-Ride competency based training program to obtain a Q-Ride Certificate
	P1 Provisional licence	• hold a class RE or R learner licence for at least six months during the two years before applying, or • complete a Q-Ride competency based training program to obtain a Q-Ride Certificate
	P2 Provisional licence	• hold a class RE or R P1 type licence for the required period, or • complete a Q-Ride competency based training program to obtain a Q-Ride Certificate
	Open licence	• hold a class RE or R P1 type licence for the required period, or • complete a Q-Ride competency based training program to obtain a Q-Ride Certificate

Appendix D. Licensed skipper program premises -Sunshine Coast venues

Sunshine Coast South	Sunshine Coast Central	Sunshine Coast North	Gympie
Caloundra RSL & Services Club Inc	Alexandra Headlands Surf Life Saving Club	Coolum Beach Surf Lifesaving Club	Country Life Hotel — Kin Kin
Caloundra Surf Club	Buderim Tavern	Koala Beach Resort	The Shaft Nightclub
CBX Caloundra	Mooloolaba Bowls Club	Laguna Jacks	Freemasons Hotel
Currimundi Coolabah Hotel	Mooloolaba Surf Lifesaving	Noosa Reef Hotel	Gympie RSL
Dicky Beach Surf Club	O'Malleys Irish Pub	Noosa Heads Bowls Club	Jockey Club Gympie
Golden Beach Tavern	Peregian Beach SLSC	Noosa Heads Surf Lifesaving Club	Gympie Pines Golf Club
Kings Beach Tavern	The Wharf Tavern	Villa Noosa Hotel	Mt Pleasant Hotel
Pelican Waters Tavern	The Pub — Mooloolaba		
Caloundra Power Boat Club	Palmwoods Hotel		
The Office Bar and Venue	Nambour RSL		
Kawana Waters Hotel			
Kawana Bowls n Recreation Inc			
Beerwah Hotel			

Appendix E. Road Traffic Accidents Rate Per 100000

Road Traffic Accidents Death Rate Per 100,000 Age Standardized								
Rank	**Country**	**Rate**	**Rank**	**Country**	**Rate**	**Rank**	**Country**	**Rate**
1	Namibia	**53.4**	65	Nigeria	**21.5**	129	Georgia	**11.4**
2	Swaziland	**48.2**	66	Liberia	**21.5**	130	Monaco	**10.7**
3	Malawi	**45.4**	67	China	**20.8**	131	Cyprus	**10.7**
4	Iraq	**44.7**	68	Mali	**20.5**	132	Serbia/Monten	**10.6**
5	Iran	**43.8**	69	Cape Verde	**20.5**	133	Philippines	**10.6**
6	Thailand	**42.9**	70	Ecuador	**20.4**	134	Estonia	**10.6**
7	Congo	**42.4**	71	Tunisia	**20.3**	135	Turkmenistan	**10.5**
8	Central Africa	**39.7**	72	South Africa	**20.2**	136	Hungary	**10.4**
9	Sudan	**39.2**	73	Togo	**19.6**	137	New Zealand	**10.3**
10	Mozambique	**38.2**	74	Zimbabwe	**19.3**	138	Timor-Leste	**10.3**
11	Zambia	**37.9**	75	Morocco	**19.3**	139	North Korea	**10.2**
12	Ethiopia	**37.8**	76	Ukraine	**18.8**	140	Portugal	**10**
13	Lesotho	**37.4**	77	India	**18.7**	141	Belgium	**10**
14	Yemen	**37.3**	78	Bhutan	**18.6**	142	Barbados	**9.9**
15	Belize	**36.9**	79	Colombia	**18**	143	Slovenia	**9.8**
16	Angola	**36.2**	80	Costa Rica	**17.9**	144	Uruguay	**9.6**

17	Venezuela	**35.8**	81	Senegal	**17.8**	145	Albania	**9.3**
18	Dominican Rep	**34.8**	82	Madagascar	**17.4**	146	Turkey	**9**
19	Uganda	**34.7**	83	St. Kitts	**17.2**	147	Tuvalu	**8.8**
20	Malaysia	**34.5**	84	Belarus	**17.2**	148	Saint Vincent	**8.6**
21	Equ. Guinea	**34.2**	85	Bolivia	**17.1**	149	Azerbaijan	**8.5**
22	Djibouti	**34**	86	New Guinea	**16.9**	150	Italy	**8.4**
23	Jordan	**32.9**	87	Cambodia	**16.7**	151	Luxembourg	**8.1**
24	Cameroon	**32.6**	88	Panama	**16.5**	152	Czech Republic	**8**
25	El Salvador	**31.8**	89	Kuwait	**16.5**	153	Cuba	**7.9**
26	Mongolia	**31.6**	90	Bangladesh	**16.4**	154	San Marino	**7.9**
27	Guinea-Bissau	**31.4**	91	Syria	**16.2**	155	Canada	**7.8**
28	Guinea	**31.4**	92	Trinidad/Tob.	**16.2**	156	Palau	**7.6**
29	Burkina Faso	**31.4**	93	Bahamas	**15.7**	157	Seychelles	**7.6**
30	Nauru	**30.9**	94	Pakistan	**15.5**	158	Haiti	**7.5**
31	Chad	**30.9**	95	Lithuania	**15.5**	159	Samoa	**7.4**
32	Sierra Leone	**30.2**	96	Latvia	**15.5**	160	Austria	**6.9**
33	Arab Emirates	**29.9**	97	Niger	**14.9**	161	Micronesia	**6.8**
34	Tanzania	**29.6**	98	Jamaica	**14.7**	162	Australia	**6.8**

35	Burundi	**29.5**	99	Algeria	**14.5**	163	Dominica	**6.6**
36	Guyana	**29**	100	Moldova	**14.5**	164	France	**6.6**
37	Cote d Ivoire	**28.6**	101	Poland	**14.3**	165	Vanuatu	**6.5**
38	Lebanon	**28.6**	102	Saint Lucia	**14.3**	166	Ireland	**6.1**
39	Rep Of Congo	**28.6**	103	Brunei	**14.2**	167	Spain	**6.1**
40	Kenya	**28.2**	104	Armenia	**14.1**	168	Cook Islands	**6**
41	Ghana	**28.1**	105	Mauritius	**14.1**	169	Solomon Isl.	**5.9**
42	Botswana	**26.6**	106	Peru	**13.9**	170	Germany	**5.7**
43	Mauritania	**26.1**	107	United States	**13.9**	171	Finland	**5.7**
44	Viet Nam	**26**	108	Greece	**13.8**	172	Iceland	**5.6**
45	Benin	**25.9**	109	South Korea	**13.7**	173	Kiribati	**5.5**
46	Gabon	**25.6**	110	Nicaragua	**13.7**	174	Denmark	**5.4**
47	Libya	**25.4**	111	Croatia	**13.6**	175	Singapore	**5.3**
48	Afghanistan	**25.1**	112	Oman	**13.3**	176	Guatemala	**5.2**
49	Rwanda	**24.2**	113	Mexico	**13.1**	177	Norway	**5.2**
50	Bahrain	**23.6**	114	Bulgaria	**13.1**	178	Tonga	**4.9**
51	Kyrgyzstan	**23.4**	115	Romania	**13**	179	Macedonia	**4.9**
52	Qatar	**23.3**	116	Sao Tome	**13**	180	United Kingdom	**4.8**
53	Saudi Arabia	**23.2**	117	Slovakia	**12.9**	181	Bosnia/Herzeg	**4.7**
54	Indonesia	**22.6**	118	Honduras	**12.8**	182	Antigua/Bar.	**4.4**
55	Comoros	**22.3**	119	Chile	**12.4**	183	Sweden	**4.1**

56	Paraguay	**22.2**	120	Uzbekistan	**12.3**	184	Israel	**4.1**
57	Brazil	**22.1**	121	Argentina	**12.2**	185	Netherlands	**4**
58	Laos	**22**	122	Somalia	**12.1**	186	Tajikistan	**3.9**
59	Suriname	**21.9**	123	Andorra	**11.7**	187	Switzerland	**3.8**
60	Russia	**21.9**	124	Myanmar	**11.6**	188	Fiji	**3.8**
61	Gambia	**21.7**	125	Sri Lanka	**11.5**	189	Japan	**3.8**
62	Eritrea	**21.7**	126	Grenada	**11.5**	190	Marshall Isl.	**3.8**
63	Egypt	**21.6**	127	Nepal	**11.4**	191	Malta	**3.1**
64	Kazakhstan	**21.6**	128	Niue	**11.4**	192	Maldives	**2.4**

Appendix F. Road Safety Intervention Queensland Australia and United Nations

QLD TMR
Safe System Framework

- **Safe roads and roadsides** — improve roads and the surrounding environment to minimise the likelihood and the severity of the crashes.
- **Safe speeds** — encourage travel at speeds that are appropriate to the conditions and limit the physical impact forces of crashes to survivable levels.
- **Safe road users** —influence alert and compliant road user behaviour through public education, enforcement and licensing.
- **Safe vehicles** —increase the adoption of safety features in vehicles that prevent crashes and minimise the danger to vehicle occupants

Australia
National Road Safety Strategy 2011–2020

- **Safe Roads** - Roads and roadsides designed and maintained to reduce the risk of crashes occurring and to lessen the severity of injury if a crash does occur.
- **Safe Speeds** - Speed limits complementing the road environment to manage crash impact forces to within human tolerance; and compliance with speed limits.
- **Safe People** - Encourage safe, consistent and compliant behaviour through well-informed and educated road users. Licensing, education, road rules, enforcement and sanctions are all part of the Safe System.
- **Safe Vehicles** - Vehicles which lessen the likelihood of a crash and protect occupants.

United Nations
'Decade of Action for Road Safety 2011-2020'

- **Pillar 1: Road Safety Management:** strengthening institutional and operational capacity to achieve national road safety objectives;
- **Pillar 2: Safer Roads and Mobility:** improving the planning, design, construction and operation of road networks to ensure safety for all users;
- **Pillar 3: Safer Vehicles:** promoting crashworthiness and empowering consumers with safety information;
- **Pillar 4: Safe Road Users:** putting vulnerable road users first in policy; promoting seat belts and crash helmets; tackling drink driving; setting and enforcing effective speed limits; improving driver training;
- **Pillar 5: Post-Crash Response:** improving emergency response and trauma care; rehabilitation and care of road injury victims, providing advice, support and legal redress for victims and their families.