Invited Article

The Road Safety in Namibia: Focus on Road Traffic Accidents

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Abstract

This paper discusses road traffic accidents in Namibia. The occurrence of road accidents and the resulting fatalities and injuries are of great concern to the government of the Republic of Namibia. This is confirmed by available vehicle collision rate and overload statistics as well as independent studies of the municipal and Namibia traffic police. The paper also discusses the new road traffic and transport act, which is envisaged to be implemented in due course. This will improve the control of vehicle roadworthiness testing and registration, licensing of drivers, rules of the road and traffic law enforcement. The so-called "human factor" plays a role in the majority of vehicle accidents. Cognitive psychology provides more detailed information on human factors. It explains theoretical concepts and principles on how the mind works. It has also been said that cars do not cause accidents, people do. For this reason a "technical" and "legal" approach alone are not regarded as sufficient to improve the road traffic safety situation in Namibia. Additional actions directed at applied research education of the public and in general the engendering of a road traffic safety ethic is necessary.

Keywords: Road accident, Overload Statistics, Traffic and Transport Act, Human Factor, Traffic Policing.

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1 Introduction

Road traffic safety is a complex multidisciplinary matter. It is widely accepted, and confirmed by analysis of accidents' statistics, that the so-called "human factor" is responsible for the majority of road accidents. In Namibia the road traffic situation is a cause for serious concern. It would be reasonable to conclude that to improve the road traffic safety situation in Namibia, considerable attention will have to be given to "human factor" (Report on Road Traffic Safety in Namibia, 1995). The new Road Traffic and Transport Act will provide a number of changes to improve road traffic safety. It consolidates the Road Traffic Ordinance, 1967 and after its repeal, the remaining provisions of the road transportation Act, 1977. The new Act is the main instrument to regulate road transportation and road traffic in accordance with the policies approved in the transport policy and for law enforcement in connection therewith. The Act, *inter alia*, addresses road traffic accidents, matters such as motor vehicle roadworthiness testing, registration of motor vehicles, driver testing and licensing, licensing of driving instructors, control of overloading, regulation of road traffic and rules of the road (Report on Road Traffic Safety in Namibia 1995). The above Act does not, however, primarily focus on the "human factors". The national road safety Act, 1972, dealing with aspects of road traffic safety not covered by the road traffic and transport Act, should rather been seen as the applicable legislation in the latter regard. The focus of the national road safety Act is on the activities designed to educate road users and the general public and to change people's attitude to road traffic safety. In this regard, it differs from, but complementary to the more "technical and legal" focus on the road traffic and transport Act. According to cognitive psychology, human factors and learning may be considered as a cognitive process in which the association between nodes (a term which represents thoughts) gets strengthened. People learn meaningful sequences of behavior. In the learning process people develop cognitive models of the world and their own actions. With the help of the memory structure, it is possible to take a mental walk from one place to somewhere else (Engestrom, 1982; Wickelgren, 1979). It is important that the mental models which the workers form about safe working are correct.

The present-day in-depth road accident studies (Girard, 1994) refers back to the work carried out in the 1970s regarding the mechanisms which control these accidents (Fell, 1979; Treat et al, 1979) and call for the realignment of these results in the light of advances in knowledge as to how drivers function. The observed trends in road accidents require the setting up of a comprehensive reference grid for human functional failures by which traffic safety malfunctions are revealed. This type of grid should be held to refine the conclusions made with regard to the human factors which are often incorrectly seen as "accident factor" (P. van Elslande Classifying "human errors" in road accidents. From Experience to Innovation: proceedings of the 13th Triennial Congress of the International Ergonomics Association, Tampere, Finland, 1997: 6:460). The focus of the national road

safety Act is on the activities designed to educate road users and the general public and to change people's attitude to road traffic safety (K.L. Saarela, 1991: Report on Road Traffic Safety in Namibia, 1995)

2 Extent of the Problem

2.1 Global level

Road traffic accidents constitute a serious problem all over the world. According to World Health Organization (WHO) study, by the year 2020 road traffic accidents will become the third largest disease or injury burden in the world (W. Sutton, 2000: presentation at Road Safety Conference, Accra Ghana, September 19-20, 2000). In 1999, seven hundred thousand (700,000) persons died and between 23 to 34 million persons were injured in road accidents throughout the world. Approximately 60% of these fatalities and injuries were experienced in developing countries. In 2013 WHO further estimated that approximately 1.24 million people die every year in road crashes and another 20 to 50 million sustain injuries as a result of road traffic crashes. Of great concern is the high number of young people affected by road crashes. According to WHO, people aged between 15 and 44 years account for 59% of global traffic deaths (WHO, 2013). Analysis of accident occurrence between 1968 and 1990 showed an increase of 350% in Africa. This compares unfavourably to a revising trend in industrialized countries, where car ownership per 1000 inhabitants has been estimated to be ten times higher on the average than in Africa. Further analysis of global accident statistics indicates that the fatality rate per vehicle registered in African countries ranges from 8 to 50 times, higher than in the industrialized world. A recent analysis of the global burden of disease, in assessing changes in the ranking order of disease burden for 15 leading causes in the world, shows that road traffic accidents ranked number 9 in 1990, will be number 3 in the year 2020. By the year 2020 Health Ministries will be spending 25% of their budgets on road accident casualties. According to a Global Road Safety Partnership (GRSP) report, during the next 10 years alone, a total of around 6 million persons will die and over 60 million will be crippled or injured as a result of road accidents in developing countries unless urgent action is taken to address this problem. The global health leader (WHO) and International Federation of Red Cross and Red Crescent Societies (IFRC) have specifically identified road accidents as a major public health problem and have urged that appropriate action be taken (M.E. Dhliway, 2000).

2.2 Country level

Namibia is faced with the reality of an upsurge in the number of motor vehicle crashes, deaths and injuries. This paper provides a statistical overview of the scope of road crashes in Namibia from 2010 to 2015. Namibia experiences a high crash rate per annum. The causes of these crashes are numerous but the most prominent ones are the following:

- absence of appropriate road safety policies;
- lack of an efficient and reliable collision information management system;
- lack of coherent traffic safety management strategies;
- lack of consistent and aggressive road users education;
- inadequate pedestrian and pedal cyclist facilities;
- wild animals.

The common road crashes are caused by human error such as distracted driving, speeding, reckless driving, overconfidence, lack of training, overloading, running red lights, running stop signs, teenage drivers, night driving, design defects, unsafe lane changes, wrong way driving, improper turns, tailgating, driving under the influence of drugs, potholes, road rage, drowsy driving, tire blowouts etcetera. The question is how government can prevent the car crashes on national roads. Because most traffic accidents are the product of several factors, the probability of accidents can be reduced in a number of different ways. There is no doubt that the following activities have prevented the increase in accidents that would normally result from increase in traffic density. The following may be adopted to prevent road traffic accidents.

The education and training of children in school by road-traffic instructors and school teachers; and of adolescents in the principles of safe driving and in good driving attitudes; by refresher courses for older drivers to bring home safe-driving principles and to refresh their knowledge of traffic law; and by means of newspaper, radio television, and other publicity, to draw the attention of all road users both to dangers and to safe practices on the road. Enforcement by adopting reasonable and enforceable traffic laws which, at the same time, are best designed to prevent accidents; concentrating the time and energy of traffic officers on the offences, locations, and times that feature frequently in accidents; and thoroughly testing new drivers to ensure they will not be prone to cause accidents. Engineering of vehicles and roads: Vehicle engineering, comprising regular inspection for a "warrant of fitness" to ensure that the main components of the vehicle are safe; improving the design of the vehicle to give ease of vision and control to the driver and so reduce the likelihood of injury in an accident;

fitting safety equipment, such as seat belts. Road or traffic engineering comprises the design of new roads which are inherently safe (separating opposing traffic flows, eliminating cross traffic, and providing wide shoulders and traffic lanes and good visibility); Improving existing roads by realignment, improving vision, and resurfacing slippery surfaces; regulating traffic movement by installing traffic signals, road markings, and regulatory signs such as "stop" and "give way" signs; and assisting the driver with warning and destination signs to avoid danger and confusion.

The transport policy makes mention of the fact that in a world perspective, Namibia has a very high per vehicle accident rate. If it is taken into account that Namibia generally has an excellently designed and relatively well-maintained road network and very low traffic densities, then this statement assumes an even greater significance as regards the so-called "human-factor" and the performance of Namibian road users. The high quality of the country's urban and rural roads and the long distances between urban areas that are characterized by uninterrupted long stretches of straight road sections are only some of the contributing factors to the country's high collision rate, which has shown an increase over the past years.

2.3 Overloading

Namibia is experiencing a high cost in maintaining roads due to over loading heavy trucks. Data is available on overloading and this also indicates an alarming state of affairs. According to a 1993-94 survey, 56% of heavy vehicles engaged in cross-border road transport between Namibia and South Africa were found to be overloaded by an average percentage of 14%. The cost of the damage to the Namibian road network due to overloading is enormous since road damage by overloading is an exponential function, rather than a linear function, of the degree of overloading. The estimated damage to road network due to overloading with no overload control was N$71 million per year from 2000. However, in 2008, the damage cost reduced to N$31 million as a result of overload control.

According to the 2014-2015 annual report, the division of road traffic and transport inspectorate encountered the following challenges:

- Overload prosecution: the suspension of overload prosecution remains suspended due to the slow pace in adopting technical standards.
- Decriminalization of overloading offences: the project is still ongoing but at a very slow pace.

2.4 Traffic policing

A 1991 report sponsored by the overseas development administration, entitled "Report on the Namibian Municipal and Traffic Police", found that although there were areas in the police traffic branch which were commendable there were a number of areas where improvement was necessary in both the short and long term. The report itself is worth studying but some of the main problems identified, at the time were:

- serious understaffing with regard to the traffic police function resulting in some cases in an enormous workload on available personnel;
- the large amount of time required of traffic police personnel to attend driver's license and vehicle testing duties to the detriment of on-road traffic law enforcement;
- serious differences in the level of training, experience and competence between different regional traffic police centers and also in traffic law enforcement, vehicle testing and driver's license testing capabilities; and
- unsatisfactory procedures for reporting of and keeping of record with regard to accidents (although within the Windhoek municipal area excellent statistics are available).

2.5 New policy on road safety

"Road safety" is a rather undefined concept unless supported by specific definition. Road safety is not something which can be "achieved" or "5+-Wensured". The road safety policy proposed herein is based on the approach that it should be mandatory for road safety to be expressed in terms of quantifiable parameters which define a "level of road safety". The concept "promotion of road safety", which is found in the existing national road safety Act of 1972, is in the new policy proposed to be specifically defined as referring to a function with an objective to educate, inform and change the attitude of the general public with regard to road safety. In line with the approach generally being adopted in various new Acts which deal with transport in Namibia, the road safety policy should do more than make provision for the establishment of institutional structures and the performance of various conventional functions which are related to road safety. The road safety policy is therefore based on the philosophy that for Government policies and strategies to be effective, it is necessary to provide in legislation for:

- an explicit formulation of objective (in this instance road safety objectives) to be achieved-as opposed to a formulation focusing on the performance of functions;

- the establishment of parties (institutions) to be responsible for the achievement of specific objectives;
- the provision of appropriate powers and resources to such responsible parties; subject to,
- mechanism to ensure transparence control and accountability (Draft Green Paper on National Road Safety Policy, 2000).

3 The need for an "intergrated" approach

A factor which influences the implementation of the above philosophy with regard to the management of road safety is the fact that a number of different and independent parties are involved, each of whom is responsible for particular function related to the achievement of what is regarded as a "safety road sector". The following functions, inter alia, affect the level of road safety in Namibia: the maintenance and construction of roads; the control of road worthiness of vehicles; the control of standards of drivers of vehicles; the regulation of the way in which vehicles are allowed to operate on roads (rules of the road); the promotion of road safety for purposes of influencing the attitude (or the ethic) of the general public in driving vehicles, the enforcement of traffic laws; the adjudication of traffic offences and the provision of emergency services for traffic accidents. Functionaries involved include: The Minister of Works, Transport, the Minister of Home Affairs and the Minister of Justice. For the various different functionaries to be able to work together effectively while retaining autonomy for own functions, an integrated (or coordinated) approach is necessary. For the purpose of the new policy, "integrated" is interpreted as implying "effectively coordinated with a view to the achievement of a common overall goal". The policy therefore includes the provision of a specific function "to coordinate" as well as for appropriate instruments in that regard. It is premised on the simple fact that a human being is prone to making mistakes regardless of the road system, hence the need for the system to be designed in such a way as to provide protection at every turn. It underpins the understanding that the loss of life on the road is not to be accepted as inevitable. An integrated management of road traffic systems should take account of human fallibility and minimizes both the opportunities for errors and the harm done when they occur. An integrated system that encompasses both law enforcement and prosecution elements could help in identifying habitual offenders and expedient prosecution of such offenders. Unfortunately, prosecution of offenders remains a challenge. As long as habitual offenders are on the road, law enforcement officers will be demoralized. An integral and essential component of any road safety management system relates to the timely identification of changes in the system, the development of new techniques and methods, the application of new knowledge and the transfer and application of knowledge to continually

improve the efficiency and effectiveness of the system in order to keep meeting the desired results.

Over the past years, there have been an upward trend in the number of injuries resulting from road crashes in Namibia. The number of injured persons increased by 35% from 2010 to 2014. Furthermore, an average of 5840 persons are injured in crashes each year. Table 2 indicates that the number of people injured by road crashes decreased only by 0.1% during the year 2012 as compared to 2011. However, the number increased again during 2013 by 3%. The 2014 injury statistics show an 18% increase compared to the previous year. The data corresponding to these situations is obtained from an in-depth investigation, involving a detailed recording, collection of information regarding vehicles, infrastructure and the drivers involved, together with a cinematic reconstruction which corroborates this information (Lechner and Jourdan, 1994). In monetary terms the current situation costs the country millions of dollars per year as shown in Table 5 below.

4 Results

4.1 Collision statistics

The increasing number of collisions and subsequent fatalities and injuries place a high burden on the country's economy. In addition, numerous families suffer through a loss of income due to injuries or death to family members. The figures below indicate statistics of accidents (collisions), fatalities and injuries according to severity for the period 2010 to 2015. As illustrated in Figure 1, most crashes occur in urban areas (69.5%), it should be noted that these road crashes are often damage only (vehicular damage) whereas crashes on rural roads are injury inducing.

Fatalities due to road crashes increased by 7% in 2014 as compared to the previous years. Statistics shows that on average, for the past 5 years 580 deaths are recorded on Namibia's roads annually. The findings of this report illustrate an exposure rate of 33.36 fatalities in road crashes per 100 000 population in 2015. Most of the fatalities were recorded in August (12%) and March (10%). The regions with the highest number of fatalities were Khomas (15%) and Otjozondjupa (14%) regions. Road crash statistics confirmed that more males than females have lost their lives due to traffic crashes in Namibia. Male deceased rate accounted for 21,717 (76.2%) of the fatality record, whereas, the female deceased accounted for 4,571 (16%) and a missing record of 2,208 (7.7%). According to the motor vehicle accident fund (MVA fund) report, the ages of people that perished in the recorded fatal crashes during January to August, statistics indicates that the majority of them are young people between the age brackets of 16 and 35 years of age, which accounted for 48% of

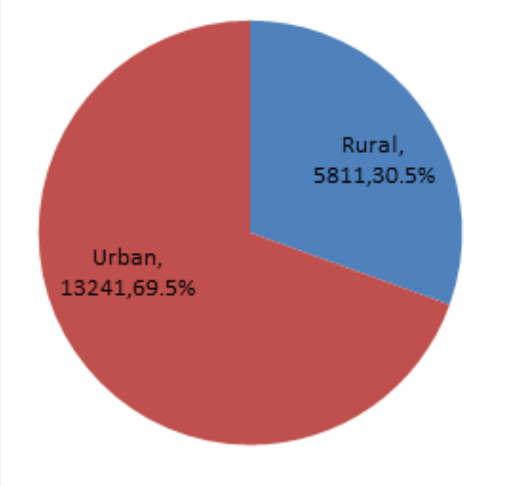

Figure 1: Comparison of road accidents in rural and urban areas.

the recorded fatalities. Other critical age groups with the highest number of fatalities are children under 10 years of age (11%) and elderly above 60 years of age (6%). The analysis of the recorded crashes per days of the week indicates that most of the crashes happened during week-ends (60%), with Saturday accounting for most of the crashes (38%). Tuesdays had few crashes with a record of only 9%. With respect to the distribution of crashes by time of day, it is evident that night hours are more critical for road crashes, with 54% of the recorded crashes occurring between 16h00 and 23h59.

Generally there is a slight variation of road crashes from month to month. However, there seems to be a spike during winter (June to August). No scientific study has yet been done to ascertain why this is the case. This is indicated in Figure 2.

Tabulation of road crash locations continues to be a challenge as road crash locations and coordinates are not properly recorded by police officers. Figure 1 and 2 represent less than five percent of crashes. However, the National Road Safety Council and Roads Authority are working on a plan to enhance data recording and analysis of road crash locations.

Table 1: Major roads in Namibia and their corresponding average rate of accidents.

		Number of crashes					
Road No.	Road link	2008	2009	2010	2011	2012	Average/yr
T0107	(Okahandja-Otjiwarongo)	216	218	65	82	9	118
T0106	(Windhoek-Okahandja)	215	229	62	58	24	117.6
M0092	(Ondangwa-Outapi)	163	299	844	622	207	427
T0701	(Okahandja-Karibib)	136	176	38	39	3	78.4
T0105	(Windhoek-Rehoboth)	129	144	3	0	0	55.2

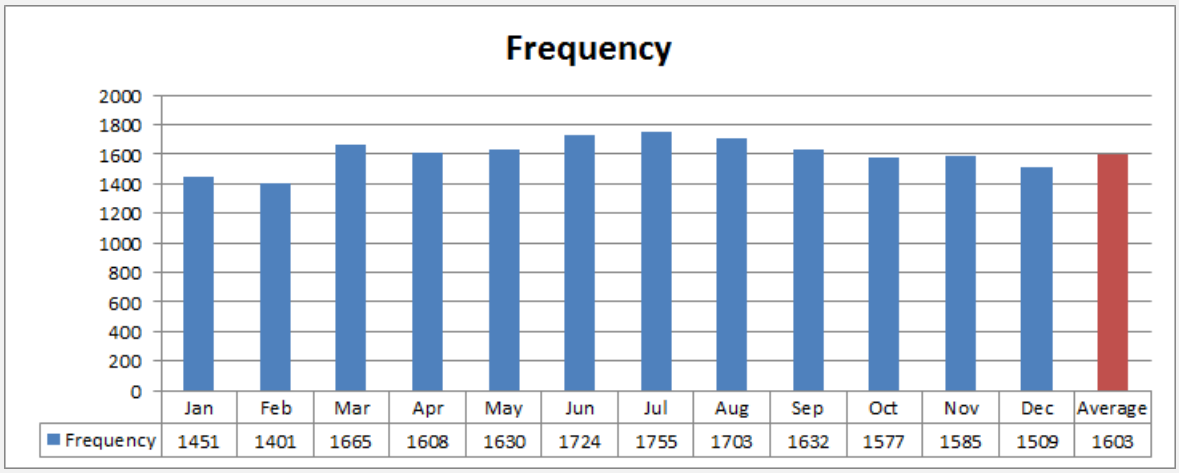

Figure 2: Comparison of road accidents in rural and urban areas.

Table 2: Damage to road network without overload control.

Road No.	Road link Origin - Destination	Estimated damage[N$(mill.)]
B1	Noordoewer to Oshikango	44,790,318
B2	Okahandja to Walvis Bay	9,565,972
B3	Ariamsvlei to Grunau	1,734,480
B4	Keetmanshoop to Luderitz	1,980,965
B6	Windhoek to Buitepos	4,414,383
B8	Otavi to Katima Mulilo	6,582,702
C33	Karibib to Otjiwarongo	2,060,352
	Total Estimated Damage	71,133,170

Table 3: Collision records according to severity (2010-2015).

Year	Number of collision	Fatalities	Injuries
2010	2,689	539	5,125
2011	2,902	492	5,659
2012	3,547	561	5,652
2013	3,484	633	5,845
2014	4,038	676	6,918
2015	4,238	705	7,371
Total	20,898	3,606	36,570

The figures presented here are meaningless or may seem insignificant when compared to statistics from other countries. It is important, though, to relate these figures to issues like human and vehicle population, level of development and motorization in order to be able to determine the rate at which individual countries' population and economies are being affected annually. With respect to medical service providers, the study shows that a total

Table 4: Expenses for medical service provider claims.

Years	Expenses
2012	N$ 80,758,090.11
2013	N$ 99,900,837.83
2014	N$ 134,693,097.87
2015	N$ 145,096,764.95

Table 5: Fatalities per 100 000 inhabitants.

Year	Fatality rate
2010	25.61
2011	23.28
2012	26.55
2013	29.96
2014	31.99
2015	33.36

Table 6: Fatalities per 1 000 vehicles.

Year	Fatality rate
2013	21.10
2014	20.68
2015	20.00

Table 7: Injuries per 1 000 vehicles.

Year	Injury rate
2013	194.80
2014	211.65
2015	208.33

of 24,937 claims were received, indicating an increase of 58% from 2014. With these claims, a total of N$ 145,096,746.95 (Table 4) claimed amount was processed, which indicates an increase of 10% from the N$ 134,693,097.87 claimed during the year 2014 (MVA Fund, Road crash and Claims Report, 2014/5).

5 Discussion and Conclusions

5.1 At the national level

From the above discussion it is fully accepted in Namibia that 80-90% of the causes of traffic related incidents can be ascribed to the human factor, yet too little attention is given to enhancement of road user knowledge, skills and attitudes. This function is regarded as a

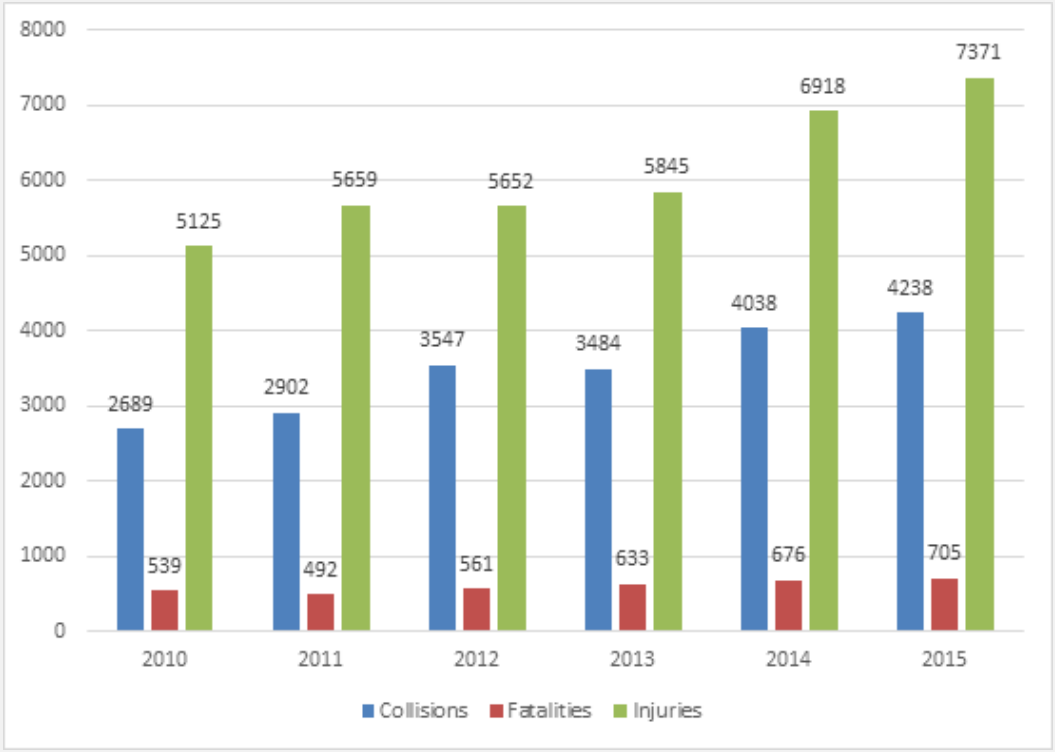

Figure 3: Collision records according to severity (2010-2015).

priority in view of its extreme importance and the role it plays in achieving acceptable levels of road traffic quality. Significant technical and financial resources, backed by support from the highest level in government, will be required to improve road safety in Namibia. All categories of road users should be exposed to a life-long programme aimed at enhancing their road user knowledge, skills and attitudes. A comprehensive programme will focus on the following:

- education and information campaigns should be given a high priority. Special emphasis should be put on the training of trainers;
- mass media campaigns which run throughout the year and which are not seasonal;
- training of teachers and student teachers to implement traffic safety education;
- comprehensive transport policies which encompasses, inter alia, road safety activities. This should be drawn up in consultation with a national road safety council and executed by a road safety unit;

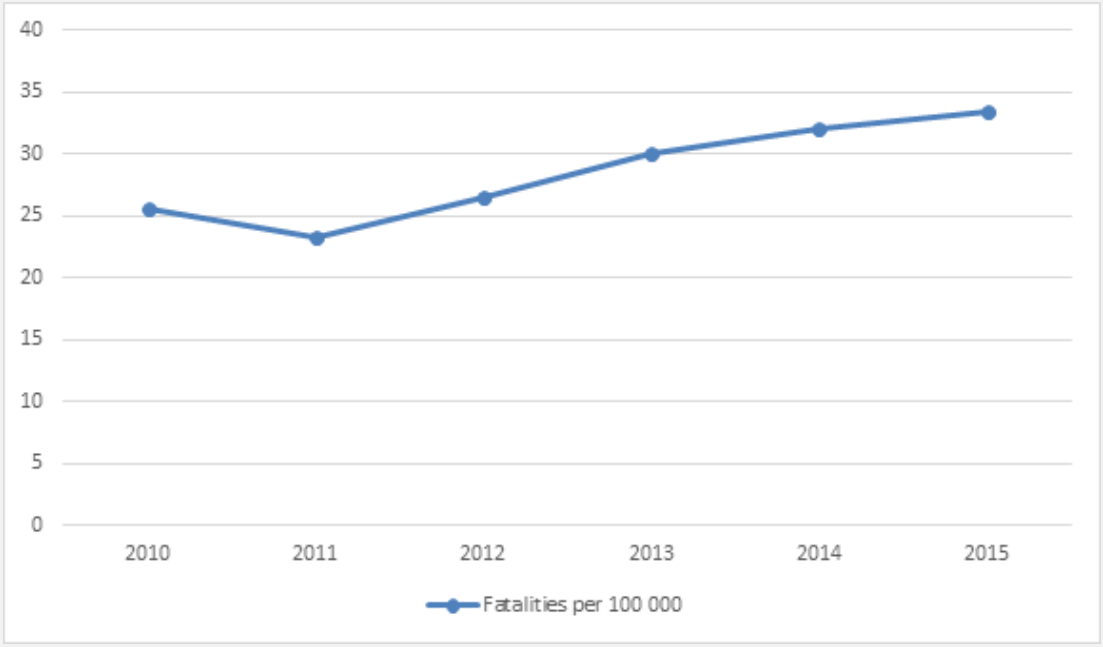

Figure 4: Fatalities per 100 000 inhabitants.

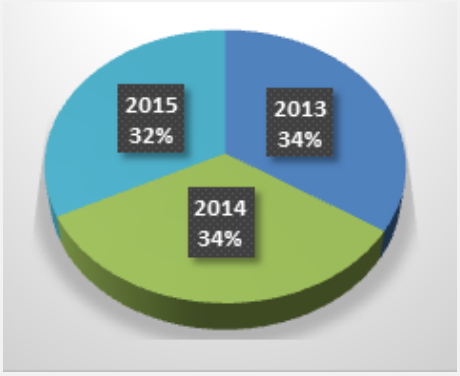

Figure 5: Percentage distribution of fatalities per 10 000 vehicles.

- adequate financial and human resources should be provided and institutional arrangements made for road safety activities;
- priority should be given to road safety aspects when planning road projects schemes. Safety audits should be introduced early enough to ensure inter alia the cost effectiveness of measures introduced;

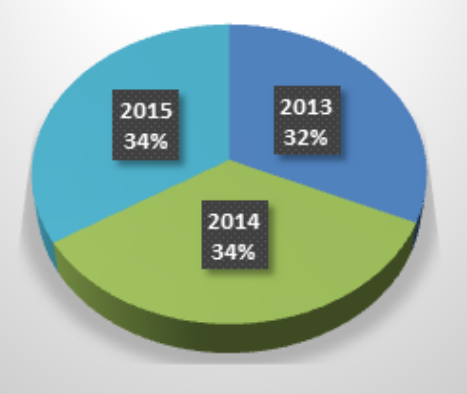

Figure 6: Percentage distribution of injuries per 10 000 vehicles.

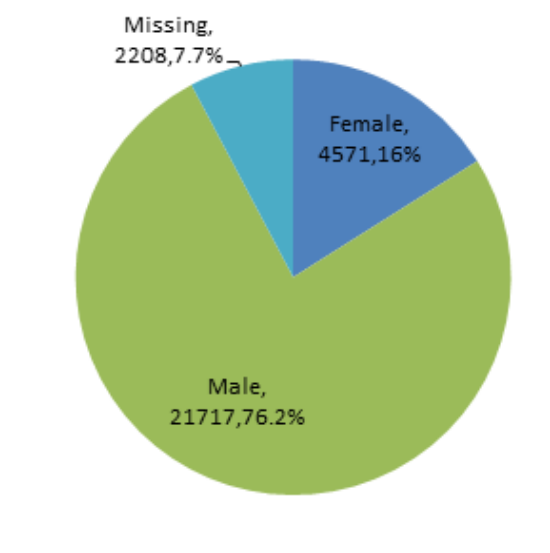

Figure 7: Gender distribution of injuries.

- strategies should be developed for short, medium and long term programme implementation. The short- term strategy could be the reduction of the speed limit in urban areas, while the medium and long term strategies could comprehensively address the priority areas identified in the preceding sections;
- adequate funding should be given to programmes relating to research and technology transfer. Cooperation between research institutions should also be encouraged;
- cultural and social issues should be considered when implementing some of the correc-

tive measures on existing and/or new schemes.

Countrywide implementation of an efficient "traffic information management system" is of critical importance and it is widely used in practice in the hope to improve safety. Films, posters and other informational material easily reach large numbers of people. Awareness campaigns are a visible action which seems to appeal to high level decision makers. Before any positive change can be expected in the number or seriousness of accidents, the campaign material has to be seen, understood and acted upon. At present, sufficient road traffic management information is not available. Implementation of comprehensive and effective information is recommended. This should include a standardized database for all road traffic aspects. This information should be made available to management at all levels according to their functions and needs. The services contributing towards effective incident management are inadequate and need to be enhanced. The long distance between urban areas has a negative influence on the reaction time of emergency services to the scene of incident. Communication between the scene of incident and the emergency services are not adequate. Mostly the first persons to arrive at the scene of the incident are not the emergency services, but members of the general public. Therefore, incident management could be made effective through:

- the development, implementation and operation of incident management plans aimed at improving the effectiveness and efficiency of the relevant services;
- co-operation between various emergency services;
- uniform and standardized guidelines on the contents of an incident management plan to be issued to local authorities;
- sufficient emergency equipment and shorter reaction times;
- improved communication between the accident victims and the relevant officials;
- enhanced first aid knowledge of drivers;
- vehicles should be equipped with emergency equipment such as fire extinguishers and first aid kits;
- the wearing of personal protective equipment (PPE).

5.2 At the regional level

Closer co-operation between SADC member states necessitates the formulation of road traffic safety policies, which are in line with the standards and norms set for the region. It

is also recommended that all organizations involved in road safety activities should pool together their resources to support all initiatives in addressing road safety issues in SADC member states. In this regard, successful road safety programme implementation being multi-disciplinary in nature, will require effective and sustained cooperation from the various agents involved. The increased mobility of the people of the region and the subsequent increase in cross-border traffic also emphasizes the fact that every opportunity should be taken to revise the policies and compare them with international norms as well.

5.3 At the international level

Increase Namibia's participation in international quality management of roads, with a view to increasing road safety on international trunk roads.

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