

AN INVESTIGATION INTO THE IMPACT OF ROAD TRAFFIC COLLISIONS IN MAFIKENG



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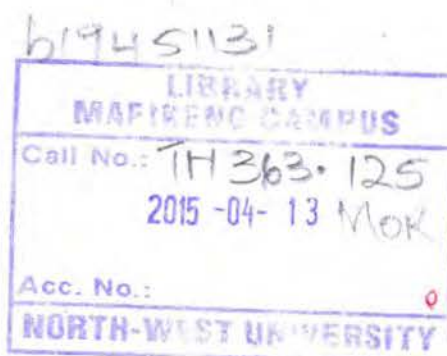
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DECLARATION

I Monamodi Andrew Moreosele declare that the mini-dissertation titled: **An Investigation into the Impact of Road Traffic Collision in Mafikeng**, which I herewith submit to the North West University as a partial completion of the requirements set for the Master of Business Administration degree, is my own work and has not already been submitted to any other University.

Signature: 

Monamodi Andrew Moreosele

Date: 24 August 2010

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ABSTRACT

This was an investigation into the impact of road traffic collisions in Mafikeng. The study revealed that community members in Mafikeng were aware of the fact that road traffic collisions had a number of impacts on the lives of the public in Mafikeng. These included loss of human life, damage to vehicles, medical costs, travel delays, insurance costs and effects on dependants. Various types of vehicles were involved in these collisions. The respondent community members had the view that the quality of the road in the Mafikeng Local Municipality was the main contributor to road traffic collisions. This was attributed to pot holes on the roads. They were all in favour of introducing Road safety Programmes in the municipality. The study recommends the following:

- Accident Report forms should be printed with serial codes in order to create a database of all traffic collision accidents in the local municipality. Currently there are no accurate data.
- The use of ICT techniques and facilities should be increased in order to improve efficiency and effectiveness of data capturing and preservation.
- There must be uniformity in the soft ware used to capture and preserve data collected.
- Road Safety awareness should be introduced in the school system at all levels to build a culture of road safety among the public.
- The government programme of Arrive Alive Campaign should not be promoted only during festive season. It must be a campaign conducted throughout the year.

CHAPTER ONE

INTRODUCTION

1.1 Background

The Transport Research Laboratory (1995) shows that annually thousands of people die in road accidents in South Africa. This makes Traffic Safety Education a necessity to inform and prepare road users to become traffic safety conscious. It is vitally important to educate our road users and learners to equip them with the necessary knowledge about the use of roads to behave safely on the road and have positive attitudes to become safe road users. In the past, most people in South Africa travelled by donkeys, camel, on foot or by horse cart. Round about 1903 the first motor vehicle appeared in the Cape and the first motor accident took place between the vehicle and a train from Johannesburg, nobody was killed. Since this incident the number of collisions with accompanying death and injuries has increased annually. At the same time the demand made on man as a road user gradually increased (Federal Highway Administration, 1994).

As technology developed, the modes of transport and the accompanying danger and relevant safety measure also changed. Since then, traffic safety has consequently become increasingly world wide priority. Blincoe (1999) indicates that during the last century motor vehicles have developed remarkably and manufacturers are producing faster and more modern cars. However, people have not been able to keep up with these advancements and changes in the motorized road traffic and society. Road traffic became increasingly less safe in the course of time and consequently the safety of people as road users has become a source of serious concern for authorities internationally.

In South Africa the problem of traffic accidents is considered to be one of the most important social issues because it is one of the greatest sources of deaths in the country. This problem is increasingly worsened by the growth of the population and the accompanying increase in the traffic population.

1.2 Statement of the Problem

In spite of the fact that road traffic collision is one of the major traffic accidents in South Africa including Mafikeng, very limited documented information is available on its various components including its impact on society and methodologies of determining that impact. Goosen (1990) states that road traffic collision has various impact on society. This includes human loss of life, financial costs, disability and impact on dependents, among others. Modern (1991) provides typical components of the impact of road traffic collision:

- Damage to vehicle;
- Medical costs for those affected by the collision;
- Costs of legal representation;
- Costs for Insurance claims;
- Travel delays;
- Loss of human life; and
- loss of income due to being incapacitated.

It is on the basis of the above considerations that the study examined the following questions with regard to the impact of road traffic collision in Mafikeng:

- What are the main causes of road traffic collision in Mafikeng?
- What are the typical components of the impact of road traffic collision in Mafikeng?
- What methodologies are used by traffic officers in Mafikeng to determine the impact of road traffic collision?
- What is the knowledge and attitude of community members in Mafikeng towards the methodologies used by the traffic officers to determine the impact of road traffic collision?
- What measures should be taken to improve the existing methodologies of determining the impact of road traffic collision in Mafikeng

1.3 Rationale and Significance of the Study

I am working with the Mafikeng Traffic Department as a traffic officer. During my work over the years I have experienced the problem of increasing number of road traffic collision in Mafikeng. In spite of this increase in road accidents, some of them being extremely fatal because they involve loss of human life and misery to their dependents, there has not been a concerted effort to document and analyze the impact of these accidents in order to develop strategies to improve the situation. It is on the basis of this consideration that I decided to undertake a study on this issue. The findings will provide valuable information to policy makers and also contribute to new knowledge for other researchers and students in related disciplines and research areas.

1.4 Aim of the Study

The main aim of the study was to investigate the impact of road traffic collision in Mafikeng.

1.5 Specific Objectives

The specific objectives of the study are:

- To determine the main causes of road traffic collision in Mafikeng;
- To determine the typical components of the impact of road traffic collision in Mafikeng;
- To determine the methodologies used by traffic officers in Mafikeng to determine the impact of road traffic collision;
- To determine the knowledge and attitude of community members in Mafikeng towards the methodologies used by the traffic officers to determine the impact of road traffic collision;
- To determine measures to be taken to improve the existing methodologies of determining the impact of road traffic collision in Mafikeng.

1.6 Hypotheses

The study was based on the following hypotheses:

Road traffic collisions have an impact on the Mafikeng community. The community does not know the methods used by traffic officers to determine the impact of road accidents.

1.7 Definitions of Terms and Explanatory Notes

The following definitions and explanatory notes as presented by the South African road traffic act 93 of 96 to clarify some of the terms used in the text, tables and graphs in this research.

Road Traffic: A road traffic accident is an accident, incident, event, collision or crash between two or more vehicles, a vehicle and a train, a vehicle and a cyclist, a vehicle and a pedestrian, a vehicle and an animal, a vehicle and a fixed object, such as a bridge, building, tree, post, etc, or a single vehicle that overturned on or near a public road. An accident is a single road traffic incident, regardless of the number of vehicles or persons involved. In short: a road crash happens when two road users (drivers of vehicles, cyclists or pedestrians) try to occupy the same space at the same time.

Degrees of Road traffic accidents are classified in the following four categories in accordance with the severity thereof:

Fatal accident: an accident resulting in the death of one or more persons. The persons killed may be drivers and passengers of vehicles, or cyclists and pedestrians. Such accidents can include serious and slight injuries.

Major accident: an accident in which one or more persons are seriously injured.

Minor accident: an accident in which one or more persons are slightly injured.

The above three categories are jointly referred to as casualty accidents.

Damage only accident: an accident in which no-one was killed or injured and resulted in damage to the vehicle or vehicles and/or other property only.

Degrees of casualties: Casualties or injuries are classified in the following three categories in accordance with the severity thereof:

Fatality: person killed during or immediately after an accident, or death within 6 days after an accident happened as a direct result of such accident.

Serious injury: person/s sustained injuries to such an extent that hospitalization is required. Serious injuries include fractures, crushing, concussion, internal injuries, severe cuts and lacerations, severe shock, etc. which require medical treatment, hospitalization and/or confinement to bed.

Slight injury: person/s sustained minor cuts and bruises, sprains and light shock which may be treated at the scene of the accident or at home.

Accident and Casualty Rates: Comparison of straight figures such as the number of accidents in one year with that of a following or previous year does not provide a true reflection on increases or decreases, or whether one region or country has less accident than another. The number of vehicles on the road, travel in terms of total distances covered, and fuel sales or number of inhabitants is usually used as reasonable basis to provide a more acceptable foundation for this purpose. Therefore, in order to "equalize" information for comparison purposes between different time periods, regions, provinces and countries, accident statistics and related information are usually expressed as "rates", for example: the number of accidents per 10 000 registered vehicles. The following rates are referred to in this report:

Casualty rates in terms of the degree of accidents:

Severity of Fatal Crashes or Fatality Rate: the mean of persons killed per fatal accident. This rate refers to the severity of fatal accidents – the more persons killed per fatal accident the more severe the accident. More severe accidents are indicative of the higher impact of such accidents, possibly resulting from higher speeds, drivers and passengers not wearing seatbelts, more vehicles involved in a single accident, or more high occupancy vehicles (HOV's), such as buses and minibuses involved in accidents.

Casualty rate: the mean number of casualties (deaths and serious and slight injuries) per casualty accident.

Some other rates:

Accident rate in terms of the vehicle population: The accident rate per 10,000 vehicle population is calculated by dividing the number of accidents by the vehicle population, in ten thousands, of the relevant region, province or country.

Accident rate per distance or kilometres travelled by vehicles: The accident rate per 100 million, motor vehicle kilometres (mvk) travelled is calculated by dividing the number of accidents by the combined distance travelled by all motorized vehicles, in hundred millions, within the relevant region, province or country. The distance travelled is usually calculated in terms of the number of the different types of vehicles, mean fuel consumption per vehicle type and fuel sales.

Fatality rate per human population: The fatality rate per 100,000 population is calculated by dividing the number of fatalities by the population, in hundred thousands, of the relevant region, province or country.

Casualty rate per human population: Similar to the fatality rate, the casualty rate per 100,000 population is calculated by dividing the number of casualties by the population, in hundred thousands, of the relevant region, province or country.

Fatality and Casualty Rates in terms of Vehicle Population or Distance Travelled: Similar to accident rates, fatality or casualty rates are also expressed in terms of the vehicle population (number of fatalities or casualties per 10,000 vehicles) or in terms of the distance travelled (number of fatalities or casualties per 100 million vehicle kilometres travelled)

Trends: Trends are used to indicate increases or decreases in the number of accidents, casualties and rates. Trends are usually expressed in terms of percentage (%) increase or decrease from the previous corresponding period to the current period under consideration, usually over a period of one (1) year.

Registering Authority: A registering authority is an agent that has been appointed by the Member of the Executive Council (MEC) for Transport of a Province to register and

licence the vehicles of owners who reside in a defined area within the Province concerned. The MEC of a Province also has to define such areas within his/her Province.

Un- roadworthy vehicles: Un-roadworthy vehicles are those which the owners failed to submit the vehicles for compulsory annual roadworthy tests (including buses, minibus taxis and freight transport vehicles) or on change of ownership.

Unlicenced vehicles: Un-licensed vehicles are those which the owners failed to renew the vehicle licences within the time frame allowed.

1.8 Organization of the Study

Chapter one is the introduction. It provides the background, rationale, aim and objectives of the study.

Chapter Two is a review of literature including theoretical discussions related to the research problem.

Chapter Three is methodology of the study, scope of the study, Data collection method, Data analysis and Ethical considerations

Chapter Four examines the methods of determining the impact of traffic collisions and significance of upgrading the methods of determining the impact of traffic collisions in Mafikeng.

Chapter Five discusses Knowledge and attitudes of the Mafikeng community members towards the impact of traffic collisions.

Chapter Six provides the conclusion and recommendations of the study.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL PERSPECTIVES

This Chapter reviews the relevant literature related to the study problem and the various theoretical perspectives.

2.1 Literature Review

Floor and Greenwood (1999) discuss the importance of review of related literature. They argue that while the form of the literature review may vary with different types of research studies, the basic purposes remain constant. The purpose of literature is to review.

- provide a context for the research;
- justify the research;
- ensure the research hasn't been done before (or if it is repeated, that it is marked as a "replication study");
- show where the research fits into the existing body of knowledge;
- enable the researcher to learn from previous theory on the subject;
- illustrate how the subject has been studied previously;
- highlight flaws in previous research;
- outline gaps in previous research;
- show that the work is adding to the understanding and knowledge of the field; and
- help refine, refocus or even change the topic.

Larsen and Madsen (2006) state that a traffic collision (motor vehicle collision, motor vehicle accident, car accident, or car crash) is when a road vehicle collides with another vehicle, pedestrian, animal, roads debris, or other geographical or architectural obstacle. Traffic collisions can result in injury, property damage and death. A number of factors contribute to the risk of collision including; vehicle design, speed of

operation, road design, and driver impairment. Worldwide motor vehicle collisions lead to significant death and disability as well as significant financial costs to both society and the individual.

Thomson (2007) indicates that many different terms are commonly used to describe vehicle collisions. The World Health Organization uses the term *road traffic injury* while the U.S. Census Bureau uses the term *motor vehicle accidents (MVA)* and Transport Canada uses the term "motor vehicle traffic collision". Other terms that are commonly used include auto accident, car accident, car crash, car smash, car wreck, motor vehicle collision (MVC), personal injury collision (PIC), road accident, road traffic accident (RTA), road traffic collision (RTC), road traffic incident (RTI), road traffic accident and later road traffic collision, as well as more unofficial terms including smash-up and fender bender.

Logan (2007) notes that as the factors involved in collisions have become better understood, some organizations have begun to avoid the term "accident," as the word suggests an unpreventable, unpredictable event and disregards the opportunity for the driver(s) involved to avoid the crash. Although auto collisions are rare in terms of the number of vehicles on the road and the distance they travel, addressing the contributing factors can reduce their likelihood. For example, proper signage can decrease driver error and thereby reduce crash frequency by a third or more. That is why these organizations prefer the term "collision" rather than "accident".

However, treating collisions as anything other than "accidents" has been criticized for holding back safety improvements, because a culture of blame may discourage the involved parties from fully disclosing the facts, and thus frustrate attempts to address the real root causes. Vehicle collisions may cause harm such as:

- **Injuries:** Whether an injury is reported may depend upon local law, compensation and medical procedures as well as on the amount of harm.
- **Fatality:** The definition of a road-traffic fatality varies from country to country. In the United States, for example, the definition used in the Fatality Analysis Reporting Systems (FARS) run by the NHTSA is a person who dies within 30 days of a crash on a US public road involving a vehicle with an engine, the death being the result of the crash. In America therefore, if a driver has a non-fatal heart attack that leads to a road-traffic crash that causes death, that is a road-traffic fatality. However, if the heart attack causes death prior to the crash, then that is not a road-traffic fatality.

The definition of a road accident fatality can change with time in the same country. For example, fatality is defined in France as a person who dies in the 6 days (pre 2005) after the accident; in the 30 days (post 2005) after the accident.

Broughton and Walter (2007) discuss the cause of road collision by indicating that a 1985 study by Rumar, using British and American crash reports as data, found that 57% of crashes were due solely to driver factors, 27% to combined roadway and driver factors, 6% to combined vehicle and driver factors, 3% solely to roadway factors, 3% to combined roadway, driver, and vehicle factors, 2% solely to vehicle factors and 1% to combined roadway and vehicle factors. On the issue of driver behaviour, Charles (1999) shows that a 1985 report based on British and American crash data found that driver error, intoxication and other human factors contribute wholly or partly to about 93% of crashes. One survey of drivers reported that they thought the key elements of good driving were:

- controlling a car including a good awareness of the car's size and capabilities.
- reading and reacting to road conditions, weather, road signs and the environment.
- alertness, reading and anticipating the behaviour of other drivers.

Although proficiency in these skills is taught and tested as part of the driving examination, a 'good' driver can still be at a high risk of crashing because:

"the feeling of being confident in more and more challenging situations is experienced as evidence of driving ability, and that 'proven' ability reinforces the feelings of confidence. Confidence feeds itself and grows unchecked until something happens – a near-miss or an accident". Thomson 2007 (page 233)

On the basis of experiences from various countries, Leeming (1999) points out those accompanying changes to road designs have been wide-scale adoptions of rules of the road alongside law enforcement policies that included drink-driving laws, setting of speed limits, and speed enforcement systems such as speed cameras. Some countries' driving tests have been expanded to test a new driver's behavior during emergencies, and their hazard perception.

Thomson (2007) states that there are demographic differences in crash rates. For example, although young people tend to have good reaction times, disproportionately more young male drivers feature in accidents with researchers observing that many exhibit behaviours and attitudes to risk that can place them in more hazardous situations than other road users. This gets reflected by actuaries when they set insurance rates for different age groups, partly based on their age, sex, and choice of vehicle. Older drivers with slower reactions would be expected to be involved in more accidents, but this has not been the case as they tend to drive less and, apparently, more cautiously. Attempts to impose traffic policies can be complicated by local circumstances and driver behaviour. In 1969 Leeming warned that there is a balance to be struck when "improving" the safety of a road.

It can safely be said that many places which look dangerous do not have accidents, or have very few. Conversely, a location that does not look dangerous may have a high

crash frequency. The reason for this is simple. If drivers perceive a location as hazardous, they take more care and there are no accidents. Accidents happen when hazardous road or traffic conditions are not obvious at a glance, or where the conditions are too complicated for the limited human machine to perceive and react in the time and distance available. This phenomenon has been observed in risk compensation research, where the predicted reductions in accident rates have not occurred after legislative or technical changes. One study observed that the introduction of improved brakes resulted in more aggressive driving, and another argued that compulsory seat belt laws have not been accompanied by a clearly-attributed fall in overall fatalities (Thew, 2006).

In the 1990s Monderman's studies of driver behavior led him to the realization that signs and regulations had an adverse effect on a driver's ability to interact safely with other road users. Monderman developed shared space principles, rooted in the principles of the woonerven of the 1970s. He found that the removal of highway clutter, while allowing drivers and other road users to mingle with equal priority, could help drivers recognize environmental clues. They relied on their cognitive skills alone, reducing traffic speeds radically and resulting in lower levels of road casualties and lower levels of congestion.

Regarding the issues of motor vehicle speed, Kinachi (2009) shows the relative risk of speeding in an urban 60 km/hr zone. For example, research on traffic speed in 1998 revealed that:

- the evidence shows that the risk of having a crash is increased both for vehicles traveling slower than the average speed, and for those traveling above the average speed.
- the risk of being injured increases exponentially with speeds much faster than the median speed.
- the severity of a crash depends on the vehicle speed change at impact.

- there is limited evidence that suggests that lower speed limits result in lower speeds on a system wide basis.
- most crashes related to speed involve speeds too fast for the conditions.
- more research is needed to determine the effectiveness of traffic calming.

Hamilton-Baillie (2005) states that driving faster or slower than the flow of traffic — which may or may not accord with the posted speed limit — has robustly been demonstrated to increase the likelihood and severity of crashes. For instance, the contributory factor report in the official British road causality statistics shows that for 2006, that "exceeding speed limit" was a contributory factor in 5% of all casualty crashes (14% of all fatal crashes), and that "traveling too fast for conditions" was a contributory factor in 11% of all casualty crashes (18% of all fatal crashes).

Bjerklie (2006) looks at the problem of driver impairment. One aspect is the issue of alcohol, i.e., the relative risk of an accident based on blood alcohol levels. In South Africa more than 40% of motor vehicle deaths were associated with alcohol use; second is physical impairment, e.g. poor eyesight and/or physical impairment, with many jurisdictions setting simple sight tests and/or requiring appropriate vehicle modifications before being allowed to drive; third is old age, with some jurisdictions requiring driver retesting for reaction speed and eyesight after a certain age; fourth Sleep deprivation; fatigue; drug abuse including some prescription drugs, over the counter drugs (notably antihistamines, opioids and muscarinis antagonists), and illegal drugs. Several conditions can work together to create a much worse situation, for example:

- Combining low doses of alcohol and cannabis has a more severe effect on driving performance than either cannabis or alcohol in isolation, or
- Taking recommended doses of several drugs together, which individually will not cause impairment, may combine to bring on drowsiness or other impairment. This could be more pronounced in an elderly person whose renal function is less efficient than a younger person's.

However, Hill (2008) argues that there are situations when a person may be impaired, but still legally allowed to drive, and becomes a potential hazard to themselves and other road users. Pedestrians or cyclists are affected in the same way and can similarly jeopardize themselves or others when on the road.

WHO (2004) suggests that the driver's attention is affected by distracting sounds such as conversations and operating a mobile phone while driving. Many jurisdictions now restrict or outlaw the use of some types of phone within the car. Recent research conducted by British scientists suggests that music can also have an effect; classical music is considered to be calming, yet too much could relax the driver to a condition of distraction. On the other hand, hard rock may encourage the driver to step on the acceleration pedal, thus creating a potentially dangerous situation on the road.

WHO (2005) discusses road design. Studies (Sagberg and Saetermo 1997) in various parts of both developed and developing countries show that more than about 30% of serious crashes had contributing factors related to the roadway or its environment. Most of these crashes also involved a human factor. The road or environmental factor was either noted as making a significant contribution to the circumstances of the crash or did not allow room to recover. In these circumstances, it is frequently the driver who is blamed rather than the road. Those reporting the accident have a tendency to overlook the human factor involved, such as the subtleties of design and maintenance that a driver could fail to observe or inadequately compensate for.

Adams (1992) looks at the issue of seatbelts. He shows that across all collision types, it is less likely that seat belts were worn in collisions involving death or serious injury, rather than light injury; wearing a seat belt reduces the risk of death by about two thirds. Concerning vehicle maintenance, Lum and Reasan (1995) indicates that a well-designed and well-maintained vehicle, with good brakes, tires and well-adjusted suspension will be more controllable in an emergency and thus be better equipped to avoid collisions. Some mandatory vehicle inspection schemes include tests for some aspects of road worthiness.

The design of vehicles has also evolved to improve protection after collision, both for vehicle occupants and for those outside of the vehicle. Much of this work was led by automotive industry competition and technological innovation, leading to measures such as Saab's safety cage and reinforced roof pillars of 1946, Ford's 1956 Lifeguard safety package, and Saab and Volvo's introduction of standard fit seatbelts in 1959. Other initiatives were accelerated as a reaction to consumer pressure, after publications such as Ralph Nader's 1965 book *Unsafe at Any Speed* accused motor manufacturers of indifference towards safety.

In the early 1970s, British Leyland started an intensive programme of vehicle safety research, producing a number of prototype experimental safety vehicles demonstrating various innovations for occupant and pedestrian protection such as: air bags, anti-lock brakes, impact-absorbing side-panels, front and rear head restraints, run-flat tires, smooth and deformable front-ends, impact-absorbing bumpers, and retractable headlamps. Design has also been influenced by government legislation, such as the Euro NCAP impact test. Common features designed to improve safety include: thicker pillars, safety glass, interiors with no sharp edges, stronger bodies, other active or passive safety features, and smooth exteriors to reduce the consequences of an impact with pedestrians.

Hill (2008) discusses center of gravity by stating that some types of crash tend to have more serious consequences; rollovers have become more common in recent years, perhaps due to the increase in popularity of taller SUVs, people carriers and minivans which have more top weight than standard passenger cars. Rollovers can be fatal, especially if the occupants are ejected because they were not wearing seat belts (83% of ejections during rollovers were fatal when the driver did not wear a seat belt, compared to 25% when they did). After a new design of Mercedes Benz notoriously failed a 'moose test' (sudden swerving to avoid an obstacle), some manufacturers enhance suspension using stability control linked to an anti-lock braking system in order

to reduce the likelihood of rollover. After retrofitting these systems to its models in 1999–2000, Mercedes saw its models involved in fewer crashes.

Now, about 40% of new US vehicles, mainly the SUVs, vans and pickup trucks that are more susceptible to rollover, are being produced with a lower centre of gravity and enhanced suspension with stability control linked to its anti-lock braking system in order to reduce the risk of rollover, and meet US federal requirements that will mandate anti-rollover technology by September 2011.

Logan (2007) shows that a large body of knowledge has been amassed on how to prevent car crashes, and reduce the severity of those that do occur. Furthermore, in most countries many jurisdictions require the collection and reporting of road traffic incident statistics. Such data enables figures for deaths, personal injuries, and possibly property damage to be produced, and correlated against a range of circumstances. Analysis of this data may allow incident clusters and incident causes to be identified.

UNO (2009) indicates that worldwide it was estimated in 2004 that 1.2 million people were killed (2.2% of all deaths) and 50 million more were injured in motor vehicle collisions. This makes motor vehicle collisions the leading cause of death among children worldwide 10 – 19 years old (260,000 children die a year, 10 million are injured).

WHO (2004) point out that the safety performance of roadways are almost always reported as rates. That is, some measure of harm (deaths, injuries, or number of crashes) divided by some measure of exposure to the risk of this harm. Rates are used so that the safety performance of different locations can be compared, and to prioritize safety improvements.

Common rates related to road traffic fatalities include the number of deaths per capita, per registered vehicle, per licensed driver, or per vehicle mile or kilometer traveled.

Simple counts are almost never used. The annual count of fatalities is a rate, namely, the number of fatalities per year.

There is no one rate that is superior to others in any general sense. The rate to be selected depends on the question being asked – and often also on what data are available. What is important is to specify exactly what rate is measured and how it relates to the problem being addressed. Some agencies concentrate on crashes per total vehicle distance traveled. Others combine rates.

Reynold (1999) states that the Road Research laboratory in the United Kingdom set the format that was followed in subsequent studies around the 1950's and 1960's. The occurrence of road accident inflicts a burden on the community, which may be considered in two parts:

- The pain, fear and suffering imposed by the occurrence, or the risk of occurrence of road accident. These are considered of great importance in a society that value human life and human welfare.
- The more concrete and ascertainable burdens in the form of net loss output of goods and service due to death and injury and the expenditure or resources necessary to make good the effects of accident. For example medical expenses, vehicle repairs and costs of administration.

Goosen (1982) suggests that the impact of road traffic collisions that can be evaluated are as follows:

- Damage to property, which consists mainly of damage to vehicle.
- Medical costs which are incurred for the treatment of casualties.
- Administration costs of motor insurance which can be ascribed to the occurrence of accidents.
- The net reduction in output of goods and services due to loss of output from people killed or injured, allowance being made in the case of persons killed or goods and services they would otherwise have consumed.

Hills (2008) add that there are other effects which, although theoretically capable of evaluation cannot be measured because of lack of data. These appear to be small and their exclusion would probably have very little effect on the final calculations.

These are as follows:

- Administrative costs incurred by the police, government and lawyers because of the occurrence of accidents. These cannot be separated from the costs incurred during the performance of their other duties.
- The effect of transfers of income within the community. With the occurrence of accidents, income is transferred from the rest of the community in compensation to those who suffer loss from accidents without any necessary change in the resources at the disposal of the community.

Winfrey (1996) states that many elements were considered within the total impact of traffic accident. These elements may be classified by several schemes, depending on which scheme serves the purpose to greater advantage. There are direct and indirect impacts, on –side and off side impact, impact on goods and impact on personal service, impact on those involved in the collision and impact on others, there are priceble impact. No one classifying system will serve all-purpose to equal advantage.

Glass (1999) expresses an early view on the still controversial subject of how to treat death in accidents impact analysis. That the probable future income of persons who died as a results of traffic collision, or whose probable future incomes are materially reduced represent some sort of cost chargeable to accidents is generally accepted. In principle, a fatal accident or permanently disabling injury needs to be treated no differently from other accidents. The impact of fatal injury accidents and accidents that results in permanent disability may be viewed from three aspects:

- The costs of property damage, medical attention and other direct expense.
- The worth of life to relatives and friends viewed from sentiment and love.

- The economic loss because a producing person is removed from his role in society as a producer. Compensation for body disfigurement may be included with the third factor.

De Vos and Burton (1995) looked at the early CSIR studies to set the basis for future South African work, including the identification of the components of collision costs and methods of estimating them. They found it difficult to assign monetary values to the humanitarian consequences of road accidents, those administrative system cost related to accidents incurred by police government and lawyers. The economic effect of a smaller population and the net reduction in output of goods and services as a result of the loss of life or permanent injuries were also difficult to quantify.

Schuttle (1994) examines the validity of the figures for income per capital and income per worker which were used as basis for valuing cost output in the CEAS manual for cost benefit analysis in South Africa. He concluded that these figures were not correct, and would lead to erroneous cost-benefit conclusions; he recommended that they be revised.

Hill and Jone-Lee (1975) address the question of which of these methods is the most appropriate for investment appraisal in developing countries and responded that this would depend on the use to which the cost data were to be put. They considered cost alternatives objectives of highway investment appraisal. They suggest that in the majority of cases, developing countries road investment policies would probably be pursuant to one of two classes of overall objectives. In the developing countries whose economic and social policies are tied more closely to output objectives, the definition and estimation of accident cost and values is fairly straight forward and will involve variants of the standard gross output measures.

South African policy as expressed in both RDP and GEAR policies includes both economic growth and social welfare, and therefore Hill's conclusion implies that the willingness to pay approach should be considered for the Department of Transport.

2.2 Theoretical Perspectives

Kinachi (2009) argues that it is important to start from the premise that theories enlighten. A theory is a set of related propositions that help to explain why events occur the way they do. Theory is an abstract idea, conjectural or speculative representation of reality. Thus, one does not ask whether it is true or false, rather one asks whether it is enlightening. To theorise is to speculate with an intention to explain or understand.

There are different theories on the issue of road traffic collision and its proliferation. These schools of thoughts explain the issue of road traffic collisions from different perspectives. These theories include the realists, the non-realists and the transnationalists. In this study we are looking at the realists and the neo-realists.

The realists view the world as characterized by anarchy and endless struggle for power. Realists argue that equality in road traffic collision may provide only a brief rest from the pattern of community. Moreover even if the balance of power work for peace, new development in road traffic collision on one side can still cause pain and loss of income. Henderson (1998) notes that states could not do better than arm themselves to deter the strong and prey on the weak. For a realist, the only hope for peace occurs when states form a balance of power arrangement to establish mutual deterrence from attack.

Neo-realists see a dangerous world, especially because of the technological development of motor vehicles. Transnationalists in contrast to realists and neo-realists are more optimistic about progress towards the prevention of road traffic collisions. They recognise the capacity of leaders of state to adopt new perceptions about national interests.

CHAPTER THREE

METHODOLOGY

A survey was used to determine the impact of road traffic collision in Mafikeng. Alreck (1995) states that we are currently living in an "information society, i.e. our major problems and tasks no longer mainly centre on the production of the goods and services necessary for survival and comfort. Our "societies," thus, require a prompt and accurate flow of information on preferences, needs, and behaviour. It is in response to this critical need for information on the part of the government, business, and social institutions that so much reliance is placed on surveys. Today the word "survey" is used most often to describe a method of gathering information from a sample of individuals or institutions. This "sample" is usually just a fraction of the population being studied (Andreassen, 1996).

According to Bassie (1990), surveys may involve multiple sources and methods of data collection and analysis. Researchers from different disciplines use the survey method to build upon theory, to produce new theory, to dispute or challenge theory, to describe and explain situations.

3.1 Scope of the Study

The study was conducted in the Mafikeng Local Municipality. The researcher is a traffic officer. Therefore the findings may not be generalised.

3.2 Data Collection Methods

According to Mouton (2002:67), data collection involves applying the measuring instruments to the people or the cases selected for the investigation. Data collection consists of both primary and secondary sources.

In primary data collection, the researcher collects the data him/herself using methods such as interviews and questionnaires. In this study, both sources were used. This research used both qualitative and quantitative research methods. Qualitative research

methods such as key informants interviews, focus group discussions and participant observations formed the core of the data collection methods; while a questionnaire was administered to the research sample in an effort to collect supportive quantitative data of the respondents. Qualitative methods are frequently used in conjunction with quantitative methods to give an overall representation of behaviour within a particular population. After data from both methods are collected, the results are triangulated for a comprehensive understanding of the research problem. In the social sciences there has been much debate about whether qualitative or quantitative methods are the best. Both methods have advantages and disadvantages. Qualitative data collects in-depth information but its ability to be extrapolated to the rest of the population is questionable; whereas quantitative data although providing comparable information, always leaves open the question of validity of responses.

3.2.1 Key- Informant Interviews

Key -informants including traffic officers and community leaders were interviewed at all levels of the research project as a means to gain in-depth qualitative information on the research problem. This approach is a traditional method used by social scientists for extracting cultural and community knowledge through well-placed individuals in the society. It is part of the ethnographic approach, often being used in situations where access to official records or data is weak or non-existent. Where official records exist, it is used as a means to gain further insight by questioning key people about their modes of life or specific social problem. Sociologists also use the approach within the field of social interactionist or ethno-methodological research. Key informant interviews consisted of asking questions that were mainly semi-structured or open, allowing detailed, full answers from respondents. This approach contrasts with quantitative questionnaires which allow only controlled and structured responses within narrow parameters.

3.2.2 Focus Group Discussions

Another approach used in collecting data was focus group discussions with randomly selected groups of 6-10 community members in the study area. A focus group

discussion is a semi-structured interview in which the discussant knows in advance the topics to be covered. The people included were known to have been involved in a particular situation/experience related to the research problem. Focus groups discussions are different from other types of group interview in that they focus on a particular topic and they rely on group dynamics in order to generate data. The interaction is mainly between group members themselves and not between the members of the group and the interviewer. Group interaction was used in this type of research to generate data and as a source of data analysis. The assumption was that there is an interaction that is productive in widening the range of responses, in activating forgotten details of cultural experience/knowledge and in releasing inhibitions that are part and parcel of interviews with individuals.

3.2.3 Examination of Secondary Sources

Much of the data used in this study came from secondary sources. Documented sources from various institutions related to the research problem provided readily available information. These sources included past research reports, published books, journal articles and internet publications.

3.3.4 A Questionnaire

A questionnaire was administered to a stratified random sample of 50 community members (25 male and 25 female). The sample was stratified on the basis of gender in order to provide both sections of the community members with an equal opportunity to participate in the study.

3.4 The Sampling Procedure

Sampling is that part of statistical practice concerned with the selection of respondents to the research design. Sampling procedure for this study was purposive. A purposive sample is one which is selected by the researcher subjectively. The researcher attempts to obtain sample that appears to him/her to be representative of the population and will usually try to ensure that a range from one extreme to the other is included (Firebaugh 1997). Its advantages as a non-probability sampling method are that it is cheaper,

useful when a sampling frame is not available and study population is so widely dispersed that cluster sampling would not be efficient. It also helps in a situation where the research is not keen in working out that proportion of population gives a particular response but rather in obtaining an idea of the range of responses on ideas that people have on a particular research issue (Fowler, 2000).

The sampling procedure in this study was stratified on the basis of gender in order to provide both sections of the community members with an equal opportunity to participate in the study. Glass and Hamilton 1989 state that in statistics, stratified sampling is a method of sampling from a population. When sub-populations vary considerably, it is advantageous to sample each subpopulation (stratum) independently. Stratification is the process of grouping members of the population into relatively homogeneous subgroups before sampling. The strata should be mutually exclusive: every element in the population must be assigned to only one stratum. The strata should also be collectively exhaustive. That is, no population element can be excluded. Then, random or systematic sampling is applied within each stratum. This often improves the representativeness of the sample by reducing sampling error.

3.4 Reliability and Validity of Data

While reliability refers to the reproducibility of data, validity refers to the extent to which data is true. In conducting this research, optimum effort was made to ensure the validity and reliability of the research findings. Through triangulation and cross-referencing of the data using different methods and sources, validation checks were made through all the phases of the data collection process to ensure the highest level of data accuracy. Information, which was unclear or missing, was clarified by returning to informants and relevant sources to review issues and explain concepts.

3.5 Data Analysis

Most of the data collected were qualitative. They included opinions and attitudes of the respondents towards the problem under investigation. The qualitative data in the form of audio taped interviews were transcribed. The data analysis process involved regular

comparison of data from both primary and secondary sources. Content analysis was done on the interview and documentary data collected by substantiation of data with the theoretical concepts outlined in the theoretical framework. Fink (1999) defines content analysis as "any technique for making inferences by objectively and systematically identifying specified characteristics of messages." Content analysis (sometimes called *textual analysis* when dealing exclusively with text) is a standard methodology in the social sciences for studying the content of communication. Quantitative data were subjected to descriptive statistical analysis.

3.6 Ethical Considerations

One of the goals of ethics in research according to Fink (1999) is to ensure that no one is harmed as a result of research activities. Taking into consideration the fact that the study involved both primary (human sources) and secondary sources of data collection, ethical issues were taken into account. The researcher obtained the informed consent from all respondents, ensured the anonymity of informants, and guaranteed their confidentiality. In addition, while all sources of information are acknowledged, all forms of research misconduct, fabrication, falsification, or plagiarism, including misrepresentation of credentials, in proposing, performing, or reviewing research, or in reporting research were avoided.

CHAPTER FOUR

METHODS OF DETERMINING THE IMPACT OF ROAD TRAFFIC COLLISIONS

This Chapter examines the methods used by traffic officers in Mafikeng in determining the impact of road traffic collision in society. This was based on the argument that in spite of the many road traffic collisions in Mafikeng, very little is known about the methods used by the traffic officer in determining the impact of these collisions. The Chapter is divided in the following sections: road collision occurrence; the impact of collisions; significance of upgrading methods of determining impact of road traffic collision in society.

4.1 Road Traffic Collision Occurrence

The study was interested in determining the extent of road collision occurrence in the Mafikeng Local Municipality in terms of number of accidents per user group; number and type of vehicles involved in fatal collision accidents and the impact of fatal collisions.

Table 4.1 shows the number of road traffic collision casualties in the Mafikeng Local Municipality per user group in the period 2005 to 2006

Table 4.1: Number of road traffic collision casualties in the Mafikeng Local Municipality per user group in the period 2005 to 2006

Year	Driver	Passengers	Pedestrians	Total
2005	3867	4358	5910	14135
2006	4466	5151	5776	15393
Change (%)	15	18	-2	9

Table 4.1 shows that driver fatalities between 2005 and 2006 increased by 15%; the figure for passengers was 18%; whereas the figure for pedestrians decreased by 2%. The figures indicate an overall increase of 9% on casualties. Interviews and focus group discussions with the various stakeholders in the local municipality indicated that

the increase in driver and passenger fatalities in the period was attributed to a combination of lack of education in road safety and not taking safety precautions seriously, weather conditions and road conditions, driver fatigue and consumption of intoxicating substances. The decrease in pedestrian fatalities in the period was attributed to increase in road safety education.

4.2 The Impact of Road Traffic Collisions

Interviews and focus group discussions with various stakeholders including community members indicated that in order to improve the investigation into the impact of road traffic collision in Mafikeng, the following information is essential:

- Collision data to establish the major causes of collision in the local municipality and number and type of vehicles involved in these collisions;
- Causalities caused by these collisions to gain insight into the human and other costs accruing to the causalities;
- Movement of vehicles in terms of kilometres travelled prior to collision. This will give the traffic authorities an insight into the conditions of the vehicles involved in the collisions; and
- Vehicles registered among others determine whether the vehicles involved in the road traffic collision are registered with the local traffic authority. This will give the local traffic authority an idea as to whether the collisions happening in Mafikeng are caused by the local vehicles or the ones passing through the municipal area.

Table 4.2 shows the number of fatal collisions in Mafikeng per type of vehicle in the period 2005 and 2006.

Table 4.2 Number and Type of Vehicles Involved in Fatal Collision in 2005-2006

Type	2005	2006	Change	% Change
Motorcars	6985	7578	593	8
Minibuses	1036	1243	207	20
Minibus taxis	477	346	-131	-27
Buses	275	373	98	36
Motorcycles	271	275	8	3
LDV	2645	3045	400	15
Trucks	1371	1671	300	22
Unknown	1476	1466	-10	-0.7
Total motorized	14536	16000	1464	10
Bicycle	368	342	-26	-7
Animal drawn	5	7	2	32
TOTAL	14908	16349	1440	10

Table 4.2 shows that during the period 2005 to 2006 the number of minibus taxis involved in fatal collision crashes decreased by 27%; whereas that of buses, animal drawn vehicles and trucks increased by 36%, 32% and 22% respectively. The decrease in the number of minibus taxis involved in fatal collision was attributed to the introduction of the government recapitalization policy programme. Whereas the increase in bus fatalities is attributed to the fact that the government no longer subsidizes most bus companies, hence most bus companies tend to use old and unroad-worthy vehicles. The increase in truck fatalities was attributed to fatigue. Most truck drivers drive long distances without enough rest. Increase in animal drawn fatalities was attributed to an increase in motor vehicles in the rural areas where most of the animal drawn vehicles are used. The overall percentage change in the number and type of vehicles involved in fatal collisions in the period 2005-2006 was 10%.

There are three police stations in the Mafikeng local municipality. Data available from the stations indicated that they all experienced a low number of fatal traffic accidents in

the period 2005 and 2006. However, interviews with various key persons and focus groups discussions revealed that the low statistics in these stations were attributed to the fact that most of the accidents are not reported and some are not recorded. Examination of secondary data and interviews with key persons in the Mafikeng Traffic Department showed that in the period between 2005-2007 the number of people who lost their lives due to traffic collision increased from 18 in 2005 to 27 in 2007. Most of the vehicles which were involved in these fatal collision were travelling at a speed of more than more than 100 km per hour on a 60 km zone/ area. In addition, it was established that more than 50% of the vehicles involved in fatal collision were not registered with the local traffic department. The accidents were caused by vehicles which were passing through Mafikeng to other areas.

KNOWLEDGE AND ATTITUDES OF MAFIKENG RESIDENTS TOWARDS IMPACT OF ROAD TRAFFIC COLLISIONS

The study was interested in establishing the knowledge and attitudes of community members in Mafikeng toward the impact of road collisions on society. The following aspects were investigated: community attitudes on the impact of road traffic collision. These aspects are discussed in detail in the following sections:

5.1 Community Knowledge on Impact of Road Traffic Collisions in Mafikeng

The study found that 50% of the respondents were involved in different types of road traffic accidents. Table 4.1 shows the percentage distribution of the types of road traffic collisions in which the respondent community members were involved.

Table 5.1: Percentage Distribution Of The Types Of Road Traffic Collisions In Which Community Members Were Involved.

Type of Road Traffic Collision	Male	Female
Motor cars	20	20
Minibuses	20	20
Minibus Taxis	20	40
Buses	20	16
Motor Cycles	8	0
Trucks	4	0
Bicycles	8	4
Total	100	100

Table 5.1 shows that the common types of road traffic collisions in which respondent community members, both male and female were involved were motor cars, minibuses, minibus taxis and buses. For instance, 40 % of the female respondents were involved

in minibus taxis collision. However, Table 5.1 indicates that none of the female respondents were involved in motor cycle and truck collision. Interviews with respondents and key persons such as road traffic officers indicated most of the female members of the local community do not drive trucks or ride motor cycles.

Table 5.2 shows the percentage distribution of the responses from the respondent community members on their knowledge of the impact of road traffic collision on the community.

Table 5.2: Percentage Distribution the Respondent Community Members' Knowledge of the Impact of Road Traffic Collision on the Community

(Responses) Effects	Male	Female
Loss of Human Life	100	100
Damage to vehicles	100	100
Damage to the road	30	10
Medical Costs	100	100
Travel Delays	60	80
Insurance Costs	95	86
Effects on Dependants	96	100
Total*	581	656

* Total percentages exceed 100% because respondents were allowed to indicate more than one effect of road traffic collision.

Table 5.2 shows that the majority of the respondents , both male and female (100%) knew about the impact of road traffic collision on human life, damage to vehicles, medical costs, travel delays, insurance costs and effects on dependants. The study wanted to establish as to who should take the responsibility of road traffic collision. The responses are shown in Table 5.3

Table 5.3: Percentage Distribution of Respondents Knowledge on who should take the responsibility of road traffic collision

(Responses)	Male	Female
Government	50	50
People Who cause the Collision	30	20
Insurance Companies	10	10
I do not Know	10	20
Total	100	100

Table 5.3 shows that the majority of the respondents, both male and female had the view that government should take responsibility of road traffic collisions. Twenty percent of female respondents felt that the person who caused the collision should be responsible; and thirty percent of the male respondents shared the same view. Only a small number (10%) of male respondents and 20% of female respondents did not know who should take the responsibility.

5.2 Community Perceptions on Impact of Road Traffic Collision in Mafikeng

The study was also interested in determining the attitudes of the community members towards the impact of road traffic collision. The following question to the respondents guided the survey, i.e. "Do you think the traffic officers are doing their work properly to prevent the effects of road traffic collisions? " The results are shown in Table 5.4.

Table 5.4 Percentage Distribution of the Respondents' Attitudes toward the Work of the Traffic Officers in Preventing the Effects of Road Traffic Collisions

(Responses)	Male	Female
Very Well	10	20
Well	40	30
Fairly Well	20	20
Bad	20	10
Very Bad	10	20
Total	100	100

Table 5.4 shows that 10% of male and 20% of female respondents had the opinion that traffic officials were doing their functions very well. The issue that was raised was the question of law enforcement agencies involvement in corruption. The researcher asked the respondents the following question: Does the quality of the roads in the Mafikeng Local Municipality Contribute to the number of road traffic collisions? The findings are reflected in Table 5.5

Table 5.5 Percentage Distribution of Respondents' Attitudes towards the Quality of Roads in the Local Municipality

(Responses)	Male	Female
Very much So	80	90
Much so	10	5
Might be	10	5
Not So	0	0
Totally not so	0	0
Total	100	100

Table 5.5 shows that the majority of the respondents both male (80%) and female (90%) respondents thought that the quality of the road in Mafikeng Local Municipality was the main contributor to road traffic collisions. They were attributed to pot holes on the roads. The researcher also asked the respondents the following question: Are you

in favour of the introduction of road safety programmes in the school curriculum? The responses are shown in Table 5.5

Table 5.6 : Percentage Distribution of Respondents' View on Whether They were In favour of Introducing Road safety Programmes

Responses	Male	Female
Very much So	80	80
Much so	10	10
Might be	10	10
Not So	0	0
Totally not so	0	0
Total	100	100

Table 5.6 shows that both respondents, male (80%) and female (80%) respondents were very much in favour.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

This Chapter provides the conclusion and recommendations emanating from the study.

6.1 Conclusion

The study revealed that community members in Mafikeng were aware of the fact that road traffic collisions had a number of impacts on the lives of the public in Mafikeng. These included loss of human life, damage to vehicles, medical costs, travel delays, insurance costs and effects on dependants. Various types of vehicles were involved in these collisions. The respondent community members had the view that the quality of the road in Mafikeng Local Municipality was the main contributor to road traffic collisions. They were attributed to pot holes on the roads. They were all in favour of introducing Road safety Programmes in the municipality.

6.2 Recommendations

The study recommends the followings:

- Accident Report forms should be printed with serial codes in order to create a database of all traffic collision accidents in the local municipality. Currently there are no accurate data.
- The use of ICT techniques and facilities should be increased in order to improve efficiency and effectiveness of data capturing and preservation.
- There must be uniformity in the soft ware used to capture and preserve data collected.
- Road Safety awareness should be introduced in the school system at all levels to build a culture of road safety among the public.
- The government programme of Arrive Alive Campaign should not be promoted only in during festivities. It must be a campaign conducted throughout the year.

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