CURBING PEDESTRIAN FATALITIES ON THE AFRICAN CONTINENT.

Petrus Erasmus Jansen van Vuuren
Tswhane University of Technology
Private Bag X860
PRETORIA 0001, SOUTH AFRICA
Phone (+27 12) 548 4311, Fax: (+27 12) 548 4311
E-mail: jvvuurpe@absamail.co.za

ABSTRACT

Pedestrians are unprotected road users. Since between 37 and 45 per cent of all road collision fatalities in South Africa are pedestrians, special attention needs to be given to control and/or regulate pedestrians as road users. Up to 40% of all pedestrian fatalities occur on rural roads. Although statistics in respect of pedestrian fatalities in the rest of Africa is not readily available the same tendency exists. Pedestrians are regarded as a vital target group in the traffic management system. The National Department of Transport focuses on the promotion of road safety on a national basis. Provincial governments play a more prominent role to promote road safety in general, but also to initiate pedestrian safety programmes. Pedestrian management plans and strategies also include tools and policies from all the disciplines and supportive functional areas, namely engineering, education, enforcement and logistical support, especially electronics.

Role players from the various disciplines and functional areas are specialists. Historically, role players tend to act in a fragmented manner. Since the National Department of Transport in South Africa has adopted a holistic integrated traffic management approach, fragmentation can be overcome by involving multi disciplinary teams to attain information by means of various audits. With data obtained a situation analyses could be done and management plans could be developed. Plans could be implemented and finally be evaluated and revised on a continuous basis. The activities of the various teams need to be managed effectively in a co-ordinated integrated manner. Plans could include sub management plans and strategies for pedestrian units. A number of the specific actions have already been implemented in some jurisdictions in South Africa and others are still envisaged to be implemented. These plans could also be developed and be implemented in the other countries in Africa. The co-operation agreement between a number of countries in Southern Africa provides for capacity building in terms of knowledge, skills and attitudes of role players in the traffic environment.

This paper addresses the approach to pedestrian management plans, the development of such plans and the strategies for the implementation thereof.
1. INTRODUCTION

The aim of my paper is to explain what can be done to combat the killings and injuries on our roads with special reference to pedestrians as a target group. Although it is not my intention to bore you with collision statistics, the importance of statistics to emphasise my concern is imperative. In this paper I will concentrate on the pedestrian problems in the Gauteng province in South Africa and actions and management plans to address the unacceptable high incidence of pedestrian fatalities. I will also relate to a specific project as an example of the implementation of a holistic and comprehensive approach to enhance pedestrian safety. Reference will also be made of the extent that the training of Traffic Safety Managers could contribute to a safer road environment for the pedestrian.

2. PEDESTRIAN CASUALTIES

For the purpose of this paper a pedestrian is regarded as a person in the road environment who forms a pedestrian unit [1]. Units need to adhere to the rules of the road and when necessary have to be controlled/regulated by the action/s of traffic and/or municipal police officers. From a paper delivered by Makhanya, et al.[2] at the South African Transport Conference in September 1998 in Pretoria, it seems historically that pedestrian killings, as a proportion of all road traffic fatalities, varied between 37 and 45 per cent. This implies that approximately 3700 pedestrians are killed, 10 000 seriously injured and 20 000 slightly injured every year. In figure 1 pedestrian casualties for 1997 are compared between age groups in urban and rural areas. From figure 1 it seems that the age group 25 to 39 is the highest, whilst urban casualties are, as expected, most prominent.

![Figure 1: Pedestrian casualties](image-url)
In Figure 2 pedestrian casualties are displayed by severity per province for 1997. From Figure 2 it seems that pedestrian casualties in Gauteng, KwaZulu/Natal and the Western Cape are the highest.

In a survey conducted by the Gauteng provincial department it was found that children between the ages of 5 and 9 constituted quite a significant percentage of the child pedestrian casualties. The majority of pedestrian fatalities occurred on straight roads with no median, followed by straight roads with a median, and straight sections of the freeway [2].

### 3. FACTORS CONTRIBUTING TO PEDESTRIAN CASUALTIES AND COLLISIONS

From in-depth collision case studies undertaken and a National Accident Sampling System operated by the CSIR during the seventies and eighties, it was identified that in 90 per cent of all fatal accidents one or more traffic violations were present [3]. With regard to pedestrian collisions, there are a few prominent contributing factors, namely:-

- **Alcohol abuse - the old problem.** The drinking rate for pedestrians over and above the legal limit are just over 10 percent and those for drivers of vehicles approximately 7 percent. According to Steenkamp [4] this subject has become exhausted. The probability that a drunk road user should become involved in a fatal collision is six times higher than that of a sober road user.

- **A large number of pedestrians prefer to wear dark clothes - especially during night times.** It is difficult for drivers of vehicles to see pedestrians clothed in dark clothes. In this regard we have a *dilemma*. It is assumed that pedestrians tend to wear dark clothes to protect them from assaults at night.

- **Many pedestrians tend to cross roads diagonally which makes it difficult for drivers to judge their positions and actions.** These pedestrians are unable to judge the speed and distances of oncoming drivers - irrespective of their age. At the same time many pedestrians have the bad habit/attitude of jaywalking while crossing roads.
Young pedestrians - even as old as 13 - are unable to judge distances and speed of oncoming vehicles. Pedestrians, under the age of 8, are totally unable to judge any distance and speed of oncoming vehicles.

Many pedestrians in urban areas ignore the rules of the road. They cross roads illegally and unsafely.

Many pedestrians are illegally crossing or walking on freeways.

Many pedestrians are of the opinion that when they are seen by a driver of a vehicle, it is the driver’s responsibility to anticipate any driver/pedestrian conflicts. Such pedestrians claim that they have the right of way. In such cases it seems that we have to deal with uneducated pedestrians and/or pedestrians with bad habits and/or negative attitudes.

In many cases it seems that adults/parents are guilty by setting wrong examples. All collisions take place in the road environment. Although the contribution of the road environment, per sé, is relatively small, the lack of facilities and the inability of pedestrians, as well as the skill of drivers, to adapt to specific road environment situations, are unfortunately a major contributing factor to collisions. It is estimated that there are more than five thousand high risk and potentially high risk road sections/areas/locations in South Africa which need attention. These places include areas where pedestrian collisions occur. According to Dr Ribbens of the CSIR, specific road sections/areas/locations country wide, where a high concentration of pedestrian accidents occur, should receive urgent attention[5].

4. PEDESTRIAN HAZARDOUS LOCATIONS

Studies performed by the Gauteng Provincial Department of Transport Pedestrian on locations on rural roads indicated that these sites are situated on freeways near developing areas (N1-22) or shopping facilities (N12) and on rural roads through informal and developing areas. The problem in most of these was related to illegal mini-bus operations, inadequate facilities for both pedestrians and/or public transport and speeding. It was found that in many cases development alongside these roads had been poorly planned and hence pedestrians were forced to cross roads to reach certain facilities[6].

Each of these sites studied reflected problems typical to rural roads and roads on town fringes. Most of these sites were on high speed roads and hence the installation of pedestrian crossings was not practical. Viable options were to erect road signing, provide lighting and reduce the speed limit over the length of the road. In certain cases the sidewalks or queuing areas were not paved or were in a poor state of repair. It was observed at sites that pedestrians have a poor crossing discipline. In many instances pedestrians crossed at non designated areas. Pedestrian red light violations were in some cases as high as 35 per cent[6].

5. WAYS AND MEANS TO ADDRESS THIS TRAGIC SITUATION

5.1 A MULTI DISCIPLINARY AND SYSTEMS MANAGEMENT APPROACH

I believe it is common knowledge that all concerned with safety related issues are aware that traffic safety is not a discipline in its own right but a science comprising a number of disciplines and functional areas. Four prominent disciplines to manage traffic safety issues have been identified, namely the road environment (engineering), the need to control and
Regulate (law enforcement) pedestrian units in the road environment, the need to provide units with knowledge and skills, to develop positive attitudes (education) and to undertake research activities (logistical support) with a view to provide the authorities with information. Other relevant aspects are the role of rescue practitioners to manage all types of incidents on the road and the role of the courts.

To accommodate the multi facet character of traffic safety, the approach that traffic safety issues need to be managed systematically has been addressed since 1988 when the National Department of Transport appointed a National Task Force to develop a Holistic Integrated Traffic Management System (TMS)[1]. The National Task Force, identified a number of disciplines, functional areas, systems and sub systems for target groups as part of the TMS. The TMS are displayed conceptually in Figure 3. To have a clear understanding of the role of pedestrians in the TMS the position of the pedestrian unit needs to be explained. From Figure 3 it can be deducted that the TMS comprises three components. The first component is the physical component which comprises all the elements of the system, namely road users, vehicles, road sections and goods. The second component comprises the integrated units, namely pedestrian units, driver units, parking units, taxi units, passenger units, goods units, etc. The pedestrian unit has two elements, namely a road user and a road section. The third component is the management component. The management component comprises a management model which functions on three levels, namely a road user level, an operational level and an analytical level. The management model is supported by the four disciplines, a number of functional areas, policy view points [8,9,10], sub management systems and implementation strategies. To function effectively each discipline, functional area and sub management system needs a set of tools.

For example, roads are designed according to geometric design standards. Apart from the Road Traffic Act as a “tool”, traffic law enforcers need equipment such as enforcement vehicles, speed measuring apparatus, alcohol metres, safety jackets, etc. To provide road users with knowledge and skills, we need qualified educationists. With regard to pedestrians, provision has been made for traffic education programmes, research to identify and monitor contributing factors and the development of training manuals.

5.2 ROAD TRAFFIC MANAGEMENT STRATEGY

The Business Plan of the National Department of Transport makes provision for a large number of traffic safety issues to be addressed. With regard to pedestrians, provision has been made for traffic education programmes, research to identify and monitor contributing factors and the development of training manuals for adult pedestrians on the safe usage of the transport infrastructure. Although the role of law enforcement regarding pedestrians is not mentioned explicitly, the pedestrian law enforcement activities can be included in the activities of traffic and municipal police officers [11].

In line with the National Management Strategy the Gauteng Province developed their Pedestrian Management Plan for the province. In an effort to reduce pedestrian fatalities the Gauteng Province decided to address a number of specific issues. Some of the goals and objectives included measures to:

a) Reduce speeding and introduce speed calming measures in built up areas;

b) Introduce legislation for the improved enforcement of pedestrian behaviour;

c) Intensify the use of scholar patrols at schools and to provide ongoing training at scholar patrol procedures; and

d) Promote the implementation of raised block pedestrian crossings at schools [6].
5.3 HOLISTIC TRAFFIC MANAGEMENT APPROACH

The holistic management approach will include the identification of the needs of road users by performing various audits, analysing the scenario, develop and implement plans.

a) Audits

Three audits could be used to determine the status quo, namely:

Λ traffic safety management audit;
Λ a road safety audit; and
Λ a statistical audit.

The main aim of the traffic safety management audit is to evaluate to what extent criteria to manage traffic safety issues effectively is met, and whether pedestrian units are receiving sufficient attention. The main aim of a road safety audit is to assess the quality and safety of the road environment. If feasible, a selected audit to assess pedestrian related road safety issues could also be executed. A statistical audit is undertaken to analyse pedestrian collisions. Data/information can also be gathered by means of a statistical sampling plan to monitor pedestrian violation rates (quality control) and pedestrian volumes/capacities.

b) Scenario analysis

Traffic Safety Managers are trained to develop a scenario analysis by adopting a model known as the PESTAI-model. This model comprises political, economical, social, technological, agricultural and industrial issues. The model is supported by a futuristic model, based on data/information of the past (also known as FACTA) and futuristic issues (also known as FUTURA). The FACTA-part relates to facts of a historical nature and the FUTURA-part to future scenarios. Futuristic modelling includes four clearly defined periods, namely a short-, medium-, long-term and a period longer than 20 years. This would mean that, with regard to pedestrians units we need to plan more than 20 years ahead.

c) Development of plans

Once the abovementioned exercises have been performed, an overall traffic management plan and strategy could be developed. Strategies to manage pedestrian units could form an integral part of the overall strategy, or if justified a separate pedestrian management plan and strategy could be developed. Let us assume that a separate plan is justified. The question is what should be included in such a plan. The answer to this question is not so easy because the need differs from place to place. The pedestrian management plan should include the results of the audits; the scenario analysis; a futuristic model; a vision; a mission; a main or general goal; objectives; programmes; projects; details on the implementation plan/process; organisational developments; and a stress management plan.
Figure 3: Conceptualisation of the Traffic Management System

In addressing the functional areas, namely the engineering aspects (road and road environment)

Education, Law Enforcement and the Support Services, it is imperative to note that it would not be the ideal situation for a Safety Manager to be an expert in all areas. Since most of the participants in South Africa come from different backgrounds, it would be unrealistic to expect one Safety Manager to have expertise in all areas.
Africa would be Law Enforcers a few examples of Engineering and Education would be highlighted [3].

Traffic Safety Managers should be sensitised to observe the conditions on the road and road environment where the pedestrian would be walking or crossing. Thus it would be expected from a Traffic Safety Manager to recognise dangerous crossings, posted speed limits which are too high for prevailing conditions, inadequate facilities to cross fast moving traffic by means of underpasses or overpasses, and potential conflict areas such as the location of schools or shebeens on the opposite side of a residential area, alongside a fast moving freeway. The Traffic Safety Manager should also be able to advise Town Planners in the planning stages of new residential areas. They should also be able to decide on the requests for the placement of traffic calming engineering structures such as mini roundabouts[3].

d) Implementation

For various reasons implementation seems to be a problem for many organisations. Some of the reasons regarding pedestrians are:

Λ Some road and traffic authorities are ignorant by regarding pedestrian units not as a priority;
Λ Over killing or unrealistic planning;
Λ A lack of knowledge on systems management and traffic safety strategies;
Λ A lack of manpower, facilities, equipment, support, commitment and motivation from management;
Λ Implementation is treated as a function and not a process;
Λ A lack of support from engineers and educators; and
Λ a lack of organisational development to accommodate change.

The implementation process comprises three stages, namely
Λ Initiation of implementation process;
Λ Evaluation of implementation process; and
Λ Operationalisation [7].

6. THE SANRAL PROJECT AS AN EXAMPLE OF IMPLEMENTATION

The South African National Roads Agency Limited (SANRAL) is funded by the National Department of transport to enhance traffic safety. SANRAL decided to work in the Eldorado Park Community. Eldorado Park is about 20km from Johannesburg, near Soweto and Lenasia. Many of the people who live there are unemployed and there are many children in the area. Eldorado Park has many problems. There is a lot of violence, crime gang warfare and poverty. One of the main problems is road injuries and deaths. Because of high traffic volumes, many pedestrians are the victims of accidents, especially along the main roads like the Golden Highway and the N12. Drivers speed and ignore traffic signs. There are not enough sidewalks or pavements and taxi/bus bays. School pupils have to walk long distances to schools on dangerous roads without supervision [12].

The SANRAL project is based on the holistic approach and focus on one of the hazardous areas, namely the N12, as identified by the Gauteng Provincial Pedestrian Plan. SANRAL decided to
work with the community. The Eldorado project had three aims, namely to address the traffic engineering problems, to educate pupils, teachers and the community about the traffic engineering changes and safety regulations and thirdly to work hand in hand with the community to make sure that they were involved in the planning and implementing the planning. SANRAL was convinced that community involvement was imperative to guarantee success [12].

a) The first E - Engineering

An engineering company, Innovative Traffic Solutions (ITS), was contracted to supervise the traffic engineering part of the Eldorado Project. In an effort to make it safer for pedestrians, especially children, speed humps and sidewalks at specific sites, as identified by the community, were built. The construction began in September 2003 and finished 8 months later. Every one of the 23 schools in the area (with about 800 pupils per school) have something close to the school to make the roads safer for the pupils[12].

The people who worked on the construction were from the Eldorado Park community. SANRAL hired the contractor who had a lot of experience with road construction. The contractor had to employ 60% of the workforce from the community. More than a 100 people were employed and were trained whilst working on the project. A total of 19 pedestrian crossings have been built and more than 50 will be improved. A total of 30 speed humps were built. Special places on roads have been developed into bus and taxi ranks. These ranks are large enough to accommodate 3 taxis and two busses at the same time. A total of 970 metres of protective railings have been erected and 9,47 kilometres of sidewalks were built. A central ridge in the middle of the Main road and the Golden Highway (N12) will give pedestrians a place to wait until it is safe to cross the rest of the road. At the same time defective traffic lights have been repaired and lighting in general has been improved [12].

b) The second E - Education

SANRAL contracted the Council for Scientific and Industrial Research to train teachers from all the schools. The teachers included road safety in their daily lessons. The training was successful and to such an extend that Eldorado Park Road Safety Forum was established. The community and teachers are actively involved in the Forum’s activities [12].

c) The third E - Enforcement

Although this was not part of SANRAL’s responsibility, it goes without saying that visible policing is a very important factor to control traffic to ensure safe passage and enforce the law where road users do not comply with traffic signs and other rules of the road.

d) The fourth E - Electronics/Logistical support

It is very important that the necessary evaluation procedures should be introduced to ascertain what effect the implemented plan had on the environment and the affected community. This would, in turn influence the traffic safety authorities to adjust and to modify plans that have been implemented. Research in traffic safety related issues, administration, traffic information and emergency services did not fall within the ambit of the SANRAL project but would be outcomes which has to be addressed if the holistic approach for Traffic Safety Management is accepted. The above project is an excellent example of how the holistic, integrated approach has been planned and implemented in practice to enhance traffic safety in hazardous pedestrian locations.
7. CONCLUSION

The demand to regulate and control pedestrian units is higher than we realise. However, if we are serious to reduce pedestrian fatalities to an acceptable level as stipulated by the business plan and traffic management strategy of the National Department of Transport, we have no choice but to accept the complete new paradigm shift in Traffic Safety Management. That implies that all role players need to work together in a holistic and integrated manner. A well trained Traffic Safety Manager would be able to deliver effective service which could enhance traffic safety, save lives of pedestrians and vehicle occupants and protect property.

8. ACKNOWLEDGEMENTS:

I would like to acknowledge information supplied by the South Africa National Road Agency.

9. REFERENCES


