Road Traffic
Management Corporation

(RTMC)

Speed as a Contributory Factor to Road Traffic Crashes

February 2005

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Introduction

Since the invention of the motor vehicle over a century ago, it is estimated that about 30 million people have been killed in road crashes worldwide. The first road crash recorded in South Africa happened in the evening on 1 October 1903 in Maitland, Cape Town. The driver of the vehicle entered a level crossing through an open gate only to find the opposite gate closed. Before he or his passenger could open the gate or reverse, they were struck by the Johannesburg express train travelling at full speed. The passenger was thrown clear and the driver suffered only minor injuries. The motorcar was badly damaged, (see photograph below). The enquiry into the crash revealed a *remarkably casual attitude by drivers of motorcars* towards level crossings. Since this crash in 1903 to the end of 2003, one century later, a total of about 393,977 persons (1,31% of the world total) were killed in crashes on South African roads, mainly as a result of the "*remarkably casual attitude by drivers of motorcars"* towards law compliance.

Early Motoring in South Africa, R.H.Johnston, C. Struik Publishers, 1975.

There is a great variety of contributory factors that lead to road traffic crashes, most important of which are: the level of driver training; the general attitude of drivers; driver behaviour and the level of driver self-discipline, self regulation and law compliance. All of these relate to human factors in the road traffic environment.

Ever since the invention of the motor vehicle, speed as a factor in road crashes was a bone of contention. There are generally two schools of thought about the relationship between road traffic crashes and speed – the first group saying that there *is* a relationship ("speed kills") and those that say there is *no* relationship. The second group also states that all drivers should be assumed to be responsible and therefore be allowed to select and drive at any speed that they are comfortable with. The second group also almost always refers to some Western European countries as "*typical*" examples of countries with high speeds and low accident rates. What this group tend (or prefer) to forget is the fact that these countries most probably also have an excellent maintained road network; vehicles that are continuously maintained to a high standard; drivers that are generally well trained and skilled, with much better attitudes and more courteous driver behaviour; and where drunk drivers and pedestrians pose no problem due to a high level of self-discipline.

The fact is that in Europe, according to the *Commission of the European Communities Road Safety Action Programme*, published in June 2003, excessive and improper speed is the cause of about a third (33%) of fatal and serious accidents and a major factor in determining the severity of injuries. The European Union report further elaborates on the role of alcohol, drugs and fatigue in the road traffic environment and states that drinking and driving was found to be responsible for no less than 10,000 deaths per year in Europe.

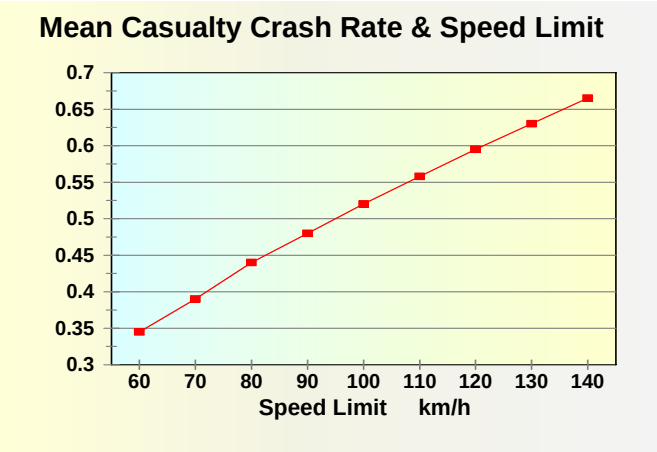
In a study undertaken in the United States of America (USA) in the late 1990's, it was found that speed contributes to 18,7% of road crashes. The contribution of alcohol was in the order of 18,2%. In Australian research in the 1990's it was found that the risk of involvement in a crash in a 60 km/h zone doubles for every 5 km/h in excess of the speed limit.

The purpose of this report is to provide some information on contributory factors to fatal road crashes in South Africa, with particular emphasis on the role of speed in the form of speed too high for circumstances and excessive speed.

1. Summary

During intensive research undertaken by the CSIR in South Africa from the mid 1970's to the mid 1980's, it was found that the lowering of speed limits (resulting in lower operating speeds on the rural road network) had an *overwhelming* effect on the occurrence of road accidents. A reduction in the speed limit from 120 km/h to 80 km/h resulted in a decrease in the casualty crash rate (number of casualty crashes per million vehicle kilometres travel) from about 0,59 to about 0,44. It was found that the relationship between the crash rate and the speed limit was almost linear, as shown in *Figure A* below.

Figure A : Casualty Crashes per Million Vehicle Kilometres



It was further found that a decrease of 1 km/h in the mean or average vehicle speed in rural areas resulted in a decrease of 9 fatal accidents and 120 total accidents per month. During this period an estimated 12,500 lives were saved due to about 140,000 fewer accidents. It should be noted that during this period there were also very high levels of self-discipline and self-regulation amongst South African road users, accompanied by a high level of law enforcement.

According to a similar study by the Transport Research Laboratory (TRL) in the United Kingdom in the late 1990's, a reduction in average speed of 3 km/h would save 5,000 to 6,000 lives each year in Europe, and would avoid 120,000 to 140,000 accidents.

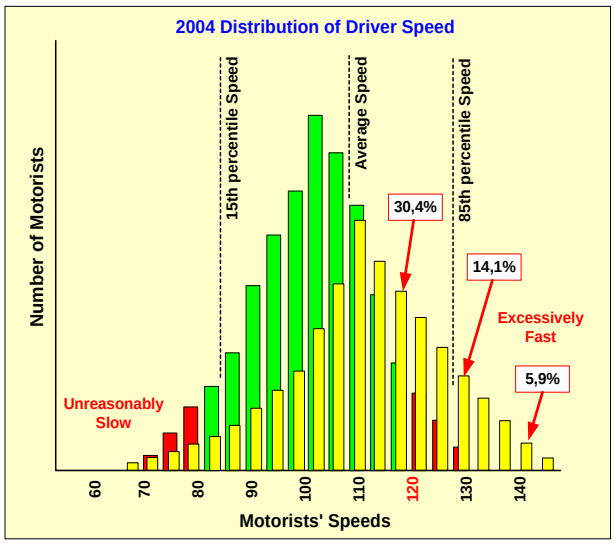
In a study undertaken by the Department of Transport in the late 1990's to review the speed limits and develop standards for the setting of speed limits, it was found that the speed limits in South Africa rated amongst the highest in the world. The

study concluded that, although it may be relatively high, the current limits should be retained.

It is, however, not the purpose of this report to review the relevancy of the current applicable speed limits, but to indicate to which extent the set limits are ignored. It is generally accepted in basically all countries, including South Africa, that not more than about 15% of the traffic should exceed the limit and that this 15% should be subject to effective enforcement and prosecution.

The current local situation is actually much worse. It was found in an extensive speed analysis of about 25,000,000 vehicles of all types in 2004 that the average speed increased by about 9% from 2003 to 2004. The information analysed further showed that, particularly over weekends, in the order of 30,4% of drivers exceed the 120 km/h limit; about 14,1% exceed 130 km/h and 5,9% drive faster than 140 km/h. These figures in yellow are superimposed on a more desirable speed distribution curve in green in *Figure B* below.

Figure B : 2004 Speed Distribution



The figures above in yellow indicate a much wider spread of speeds amongst vehicles in the traffic situation, with the higher group effecting an increase in the average speed. It further increases the potential conflict between drivers that are driving excessively fast and drivers in the lower 15% group that drive unreasonably slow, thus increasing the risk of being involved in a crash, as well as the severity of a crash, should it happen.

Although excessive speeds and particularly increased speed differentials between vehicles was found to be a major contributory factor to road crashes, not only in South Africa but also in many overseas countries, the local traffic situation creates

a much higher safety risk than some other countries. In this regard the factors that should be brought into the full equation include, amongst others : the level of training and skills of drivers; the number of fraudulently obtained driving licences; the high levels of drunk drivers and pedestrians on the road network; the high level of general lawlessness, such as unsafe and overtaking across barrier lines and skipping of red robots; the high level of reckless, negligent, inconsiderate, ignorant and aggressive drivers; changing lanes without indicating the intention to do so; following too close and swerving in front of other traffic; racing from robot to robot; the high number of un-roadworthy vehicles with faulty brakes, lights, steering and damaged or worn tyres; with added roads that are not maintained to acceptable standards and a general lack of pedestrian facilities, etc. All put together on the road, including the unacceptable low level of law enforcement, is a definite recipe for disaster.

Driving at unreasonable slow and excessively high speeds encourages further transgression of the law, such as ignoring red robots and unsafe overtaking; as well as aggravating the effect of all the other contributory factors to road crashes. For example, driving at an excessive, un-appropriate speed at night and encountering a slow moving vehicle with faulty lights; or a stray animal or a drunk pedestrian, greatly reduces the response time and decision making distance for the driver of the fast vehicle.

In order to effect a lasting change in the current road safety situation, all of these issues should be vigorously addressed and improved. An improvement in only one of these issues could, however, also effect an improvement in the overall situation – such as ensuring a meaningful reduction in the unacceptable high percentage of drivers exceeding the speed limit and those driving at excessive speeds.

According to SAPS reports to the National Fatal Accident Information Centre (NFAIC) at the Department of Transport, the number of fatal crashes that occurred due to excessive speeds or speed too high for circumstances, increased by 1,093 (46,10%) from 2,370 in 2003 to 3,463 in 2004. In 2003 fatal crashes in which speed played a role were 23,24% of a total of 10,246 fatal crashes. In 2004 fatal crashes in which speed played a role increased to 32,94% of a total of 10,523 fatal crashes. The estimated number of fatalities resulting from speed-related fatal crashes increased by 1,326 (46,41%) from 2,857 in 2003 to 4,183 in 2004.

From 2003 to 2004 there was a national average increase of 0,21% in the severity of fatal crashes (the average number of persons killed per crash). The severity is, amongst others, dependent on the speed at which crashes happen, the higher the

speed the bigger the impact, resulting in an increase in the severity rate. One Province showed an increase of 12,28% in the Provincial severity rate from 2003 to 2004. This province also showed an increase of 63,17% in speed related crashes from 2003 to 2004.

During an in-depth investigation into speed profiles on the national road network during 2004 it was found that the Province mentioned above also had the highest percentage of excessive speeds in the country. In comparison with the speed figures reflected in Figure B above, the percentage of drivers exceeding the speed limit in this Province was found to be as follows: 48,25%>120 km/h; 28,27%>130 km/h and 13,60%>140 km/h.

With regard to fatality rates in the particular Province under discussion, it was found that there was an overall increase in rates as follows: The number of fatalities per 10,000 registered vehicles increased by 9,79% from 31,18 in 2003 to a rate of 34,24 in 2004; the fatality rate in terms of the number of fatalities per 100 million vehicle kilometres travelled increased by 9,91% from 13,22 in 2003 to 14,53 in 2004; and the number of fatalities per 100,000 human population increased by 13,72% from 35,33 in 2003 to 40,00 in 2004. These increases in rates strongly correlate with the high percentage of drivers exceeding the speed limit in 2004.

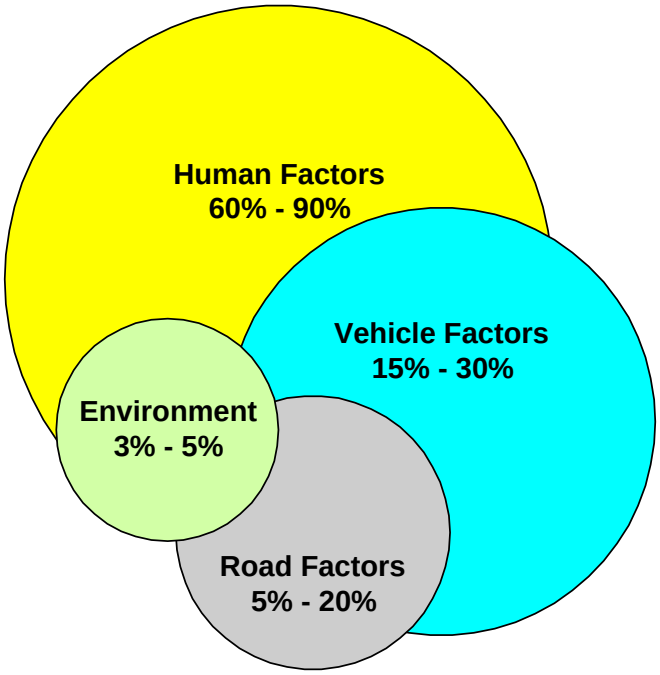
The total cost of fatal crashes is estimated at R8,566.11 million for 2003 and R8,834.83 million for 2004. On a national basis the estimated cost of speed-related fatal crashes increased by R925.79 million from R1,981.67 million in 2003, (23,13% of the total estimated fatal crash cost) to R2,907.46 million in 2004, (32,91% of the total estimated fatal crash cost). The above information is summarized in the table below.

Cost of Speed-Related Fatal Road Traffic Crashes (R million)						
Year	Total No. of Fatal Crashes	No. of Speed-Related Crashes	Unit Crash Cost (R m)	Cost of All Fatal Crashes	Cost of Speed Related Crashes	Speed-Related Crash Cost %
2003	10,246	2,370	0.836044	8,566	1,982	23.13
2004	10,523	3,463	0.839573	8,835	2,907	32.91

2. Contributory Factors to Road Traffic Crashes

Road traffic crashes do not just happen – they happen because of certain contributory factors. These contributory factors are real circumstantial elements that are present at the time of the crash and are generally classified under four main categories, namely: ***human, vehicle, roadway and the environment.*** The first three factors reflect human and authority behaviour, attitude and performance, while the fourth factor, the environment could, to a certain extent, be regarded as being beyond the control of the driver or the authorities. South African information collected over many years on contributory factors, show the percentage contribution of each of these categories to crashes as indicated in the diagram below.

Figure 1 : % Distribution of Contributory Factors to Road Crashes



Road crashes are rarely caused by a single factor. In most cases there are 2, 3 and even 4 or more factors from any one or more of the above categories simultaneously present in each crash. The percentage contribution of these factors is not fixed, it varies from month to month, from season to season and area to area, amongst others depending on the number of daylight hours per day, weather conditions the *level of lawlessness* in a particular area.

It is further accepted that 90% or more road traffic crashes happen as a direct result of traffic offences or non-compliance with prescribed norms and standards. In this regard the human element plays a major role. For example, should a crash result from a tyre burst, generally classified under *vehicle factors*, it still is the

responsibility of the driver or owner of the vehicle to see that the worn or damaged tyre is replaced timeously.

In case of a crash happening a result of a pothole in the road or a smooth road surface, generally classified under *road factors*, it is the responsibility of the driver to reduce speed and drive more carefully under such circumstances. In such a case it is also the responsibility of the roads authority to timeously detect the unsafe conditions through regular inspections and efficient routine maintenance programmes and either effect the required remedial measures as soon as possible or, to at least provide the required road signs to warn road users of the unsafe condition of the road.

Environmental factors include a low-lying sun blinding the view of the driver; fog, mist or rain resulting in poor visibility; animals in the road, etc. However, under such conditions the driver should take precautionary action, either by reducing speed and driving more alert and carefully; stop the vehicle until the conditions have cleared; or by following alternative routes.

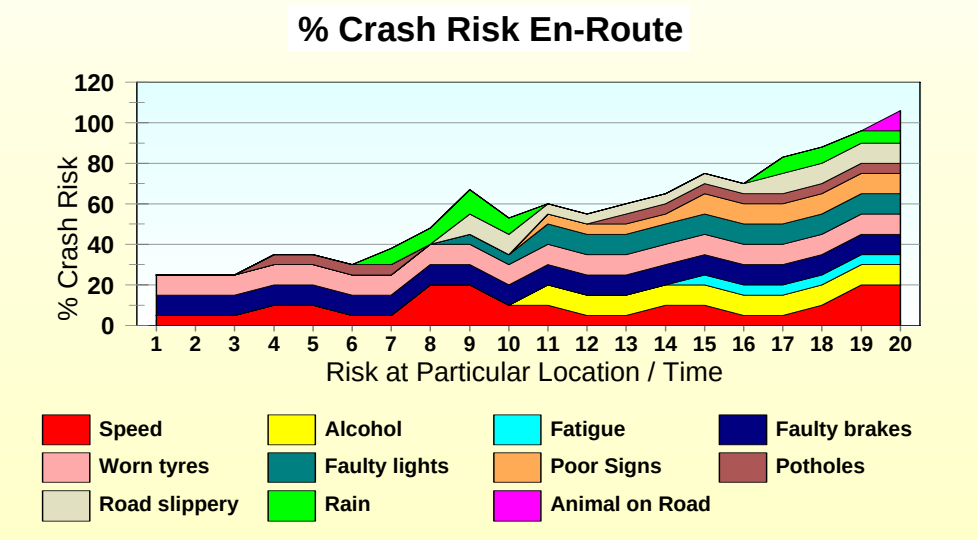
Major traffic offences and contraventions that mostly contribute to traffic crashes or the severity of crashes, have been identified and to some extent monitored during the past few years through independent ***Annual Traffic Offence Surveys***. These include:

- ***Driver offences*** : driving while under the influence of alcohol; unsafe and illegal overtaking across barrier lines or in the face of oncoming traffic; ignoring red traffic signals and stop signs; non-wearing of seatbelts and excessive speed. Other driver offences reflect reckless, negligent, inconsiderate and aggressive behaviour and include inadequate proof of their ability to drive through failure to produce a valid driving licence or professional driving permit.
- ***Vehicle contraventions*** : poor tyres and brakes; faulty steering and defective lights. Other “vehicle” offences include non-submission of vehicles for compulsory vehicle fitness testing (trucks, buses and minibus taxis and other vehicles on change of ownership); fitting of false vehicle licence plates, etc. Overloaded vehicles that damage the road network and contribute towards unsafe driving conditions can also be added to the above.

Whilst it is stated that these contributory factors are present at the time of the crash, in most cases the factors are all known to a certain extent before the crash. Drivers know that they are risk takers and that they will exceed the speed limit, they

also drink and get behind the wheel of a vehicle and deliberately not wear a seatbelt. It is also the responsibility of the driver to inspect and replace smooth and damaged tyres, defective lights, etc. Road authorities know of the poor condition of roads and missing fences, road signs, etc, yet fail to effect the required improvements in time. Under such circumstances the driver should reduce speed and drive more carefully. For illustration purposes only, a theoretical example of the *constant risks* related to the vehicle and the road which is known even before a trip starts, as well as varying *driver and road risks* during a trip, is shown in the graph below.

Figure 2 : Combined Crash Risk at Various Locations on a Route



As illustrated above, each and every trip starts and continues with a certain level of risk of being involved in an incident. The better a driver is educated and trained and complies with the law; the better a vehicle is maintained according to prescribed standards; and the better the roadway is maintained to comply with minimum standards, the lower the risk. The level or degree of lawlessness and non-compliance reflects the risk level, which in turn is directly related to the level or degree of safety. If we can measure the risk level through the level of lawlessness, we can start measuring the degree of safety. The above figure also illustrates the role of speed in crash risk – the higher the speed the higher the risk.

Authorities involved in traffic management have a responsibility to ensure that drivers are adequately educated and trained and that vehicles and roads comply with required minimum standards. The level or degree of traffic management aspects, but mostly enforcement, has an influence on the level of lawlessness, which, as indicated above, affects the degree of safety to a great extent. The quality of traffic management should therefore also be taken into consideration when determining the level or degree of road safety.

3. Speed Limits

Establishing safe and reasonable speed limits is an important and sometimes challenging responsibility of a transport and traffic authority. Speed restrictions should advise drivers of limits within which a vehicle can be operated safely under normal traffic conditions and allow sufficient time to react to unexpected conditions. Properly selected speed limits should facilitate efficient traffic flow, reduce the number of conflict or potential conflict situations, reduce traffic violations and road rage and promote safe driving conditions.

Speed regulations and speed limits are therefore intended to supplement motorists' judgment in determining speeds that are reasonable and proper for particular weather, road and traffic conditions. Limits are imposed to assist enforcement personnel and to promote better traffic flow by reducing or narrowing the wide variance in speeds.

Factors considered in determining reasonable and safe speed limits are categorised into two phases: ***the engineering investigation*** and ***the traffic investigation*****.**

- The ***engineering investigation*** involves a study of the geometric design of the road. Engineers review such items as lane width, pavement type and condition and terrain. In addition, the engineers look at parking conditions, commercial and residential development along the road and the number, width and types of entrances and intersecting streets.
- The ***traffic investigation*** involves gathering and analyzing traffic-related data. Engineers study the prevailing vehicle speeds, average test runs, traffic volumes, accident experience and traffic control devices that affect or are affected by vehicle speeds.

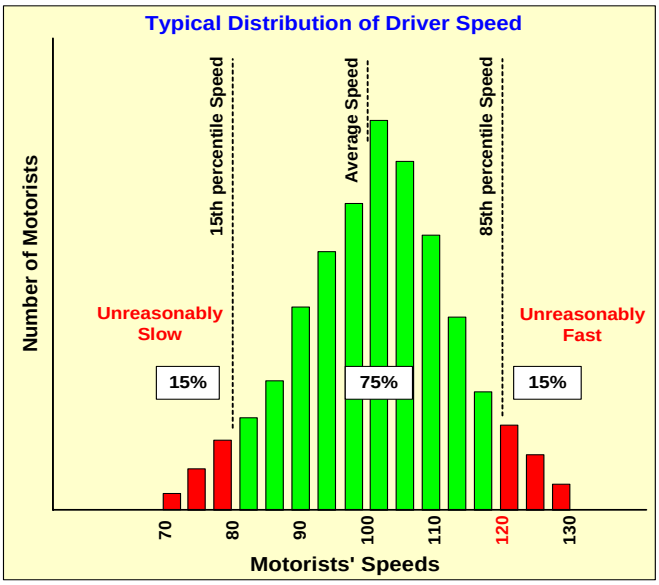
One statistic commonly used to study travel speeds is the 85th percentile speed. It is the speed at or below which 85% of the free-flow traffic travels. This is considered to be a reasonable and safe speed. 15% travel above the 85th percentile and may be travelling too fast for conditions.

Other statistics used are the 50th percentile speed and the 15th percentile speed. The 50th percentile is also the median or average speed. It is the speed at which one-half of the traffic is traveling above and one-half is travelling below. It is a good

measure of the central tendency of the speed distribution. The 15th percentile speed is the speed at or below which 15% of the free-flowing traffic is travelling.

The information in Figure 3 below illustrates a typical distribution of driver speed on a given section of road. The 70% of drivers who maintain a speed within 10-15 km/h of the average speed, plus the 15% slow drivers, equal the 85th percentile speed. The remaining 15% are exceeding reasonable limits and increase potential conflict situations and accident risk.

Figure 3 : Driver Speed Distribution Across Speed Ranges



In a study undertaken by the Department of Transport in the late 1990's to review the speed limits and develop standards for the setting of speed limits, it was found that the speed limits in South Africa rated amongst the highest in the world. It was however, concluded that the current limits be retained.

The urban speed limit used in most countries is 50 km/h, but it varies between 40 km/h and 60 km/h. The 40 km/h limit is used in some states of the United States, while the 50 km/h limit is popular in Canada and a number of European countries. The South African limit of 60 km/h is somewhat high, but it is not the only country with this limit.

The speed limit on non-freeway rural roads varies between 80 and 112 km/h. The South African general limit of 100 km/h falls within this range. However, in many instances the current limit on these roads has been increased to 120 km/h.

The freeway speed limit in most countries varies between 100 and 120 km/h, but a number of countries in Europe apply higher speed limits. The South African speed

limit of 120 km/h is high compared to limits in Australia and the United States, but average compared to the European countries. Heavy vehicle speed limits typically vary between 90 and 100 km/h, with a few countries applying a limit of 80 km/h. Many countries have no differential speed limits for heavy vehicles. The South African limit of 80 km/h for heavy vehicles appears to be somewhat low in comparison. Countries have not all introduced speed limits for buses. Those countries that have such limits typically apply a speed limit of 100 km/h, including South Africa. This limit is also applicable to minibus taxis.

During this review there were some important issues that were not taken into consideration. These include, amongst others : the level general lawlessness, such as overtaking across barrier lines and skipping of red robots; the number of un-roadworthy vehicles with faulty brakes, lights, steering and damaged or worn tyres; with added roads that are not maintained to acceptable standards and a lack of pedestrian facilities, etc.

More information on the setting of speed limits is provided under ***Annexure A***.

4. Overseas Road Safety Research Results and Road Safety Initiatives

Findings from various overseas research projects on road safety issues, undertaken in the United States of America, United Kingdom, Europe, Australia and New Zealand; as well as some road safety initiatives are briefly discussed below.

United States of America (USA)

A study was conducted in the USA in the late 1990's to determine the specific driver behaviours and unsafe driving acts that lead to crashes, and the situational, driver and vehicle characteristics associated with these behaviours. A sample of 723 crashes involving 1284 drivers was investigated at four different sites. In-depth data were collected and evaluated on the condition of the vehicles, the crash scene, roadway conditions, driver behaviours and situational factors at the time of the crash. Investigators used an 11-step process to evaluate the crash, determine the primary cause of each crash, and uncover contributing factors. The main contributory factors identified through this study are briefly summarised below.

- ***General driver behavioural errors : 99%, which include:***
- ***Driver inattention : 22.7%***
- ***Speed : 18.7%***
- ***Alcohol impairment : 18.2%***
- ***Perceptual errors (e.g. looked, but didn't see) : 15.1%***
- ***Decision errors (e.g. turned with obstructed view) : 10.1%***
- ***Incapacitation (e.g. fell asleep) : 6.4%***

These driving behaviours group into three basic types:

- ***Lapses,***
- ***Errors, and***
- ***Violations***.

Lapses are potentially embarrassing and may be a source of inconvenience to the driver, but are not usually life-threatening. They are more commonly reported by female drivers and by older drivers.

Errors are an example of "the failure of planned actions to achieve their intended consequence" and include both failures of observation and

misjudgements. Errors, like Lapses, have a weak, but statistically significant association with length of pre-licence driving but, typically, no systematic relation to driver gender.

Violations are defined as "*deliberate deviations from those practices believed necessary to maintain the safe operation of a potentially hazardous system*" or what is called deviations from normative, reference performance, and are to be distinguished from driver's traffic violations which are an official record of the number of times he or she has been apprehended for breaches of the road traffic regulations.

The USA report provides a simple test for drivers to evaluate themselves against the three behavioural groups above. A copy of this test is attached under ***Annexure B.***

Transport Research Laboratory (TRL), United Kingdom

According to a study by the United Kingdom Transport Research Laboratory, (TRL), a reduction in average speed of only 3 km/h would save 5,000 to 6,000 lives each year in Europe, and would avoid 120,000 to 140,000 crashes, producing a saving of €20 billion. According to the UK's observations, the installation of automatic surveillance cameras reduces average speeds by 9 km/h. If such cameras were fitted everywhere throughout the European Union, it would be possible to avoid a third of accidents and halve the number of people killed.

Slower Speeds Initiative, United States of America (USA)

Detroit (USA) - A report from the Insurance Institute for Highway Safety says increased interstate speed limits led to nearly 1,900 extra deaths in 22 states from 1996 to 1999.

"Speed is central to safety," said Leonard Evans, a safety researcher who worked for General Motors for more than three decades. "The largest yearly traffic fatality decline ever recorded in peacetime in the U.S. was in 1974, the first year of the nationwide 55 mph speed limit."

Evans noted that there were other factors involved, but "a major portion of the 16 percent decline, from 54,052 in 1973 to 45,196 in 1974, is related directly or indirectly to the speed limit change." "Increasing speed limits reverses the process," he added.

A copy of this article is attached under ***Annexure C,*** an USA media release titled "Study links higher speed limits to deaths" is attached under ***Annexure D***;

and a copy of an article giving the opposite point of view, is attached under ***Annexure E.***

New South Wales, Australia

Results of research undertaken in New South Wales, Australia, indicated that speeding is a factor in 40% of fatal crashes. A 'community dialogue' approach was adopted in 1991, designed to foster debate on speed and speed related government policy and practices. As a result, social attitudes to speed enforcement and penalties have shifted over the last ten years, enabling the government to introduce a range of strong, anti-speeding regulatory changes. Reduced urban speed limits, more enforcement by the police and higher penalties, combined with publicity, have resulted in reductions in speeds and, in some cases, significant reductions in road injury.

Excessive speed and alcohol consumption are the two major causes of road accidents. New Australian research has shown that the risk of involvement in a crash in a 60km/h zone doubles for every 5km/h in excess of the speed limit. So speeding at 10km/h over a 60km/h speed limit results in a fourfold increase in the risk. The 60km/h legal speed limit can be likened to driving with a Blood Alcohol Content (BAC) below 0.02 g/100mL. Driving at 65km/h is calculated as being similar to the risk of having a BAC exceeding 0.05 g/100mL. By extension, the level of risk doubles when the BAC is increased from 0.05 g/100mL to 0.08.

New Zealand

In New Zealand research it was found that a 19% reduction in the accident rate for a reduction of speed limit from 89 to 80 km/h is equivalent to a 21,1% reduction in the accident rate for a speed limit reduction from 90 to 80 km/h.

The European Union

On its 2003 declaration to improve road safety: "The Commission wants to save 20 000 lives a year on European roads Over 40 000 people killed and 1 700 000 injured each year; this is the sad testimony to the lack of safety on the roads in the EU. The European Commission will not accept this carnage, and is backing the Member States in their efforts to put an end to this tragedy. In the European Road Safety Action Programme 2003-2010 the Commission is pursuing an ambitious overall objective, that of halving the number of people killed on the roads by 2010. With this initiative, the Commission is seeking to guide action by

the EU in the field of road safety, complement the Member States' efforts and define a clear framework for the sharing of responsibilities between all the parties concerned. In particular, it wants to encourage users to behave better, make vehicles safer, and improve road infrastructure. In addition, the Commission will continue to enforce and promote new measures aimed at safe and high-quality commercial road transport, while promoting the harmonisation of penalties across Europe. "Saving human life through a genuine road safety policy is a challenge and an obligation, and all the public authorities should work together to this end: it is high time that, at all levels, actions are commensurate with intentions" the Vice-President of the European Commission with special responsibility for transport and energy. "For its part, the Commission will shoulder its responsibilities and will not hesitate to make all necessary proposals to make it possible to radically change the trends observable in many countries."

According the EU there are two main reasons for the high accident rate:

- Excessive and improper speed, which is the cause of about a third of fatal and serious accidents and a major factor in determining the severity of injuries, and
- The consumption of alcohol and drugs or fatigue. Drinking and driving is responsible for about 10 000 deaths each year. The problems of driving under the influence of drugs and fatigue are also increasing.

More detail on the European Unions' road safety initiatives is provided under ***Annexure F.***

5. The South African Reality

South African experience over the last 30 years with regard to speed as a factor in road traffic crashes is briefly discussed below, with reference to specific safety research findings in the 1970's; road traffic offence surveys in 2003, including speed; a detailed Provincial speed analysis in 2004 and speed as a contributory factor to fatal road traffic crashes from 2001 to 2004.

5.1 1973-1984 Research : Speed Limits and Road Safety

5.1.1 The so-called ***Oil Crisis*** during the 1970's resulted in the setting of various speed restrictions from the end of 1973 until 1984. The variety of speed limits over an extended time provided ample opportunity for the studying of the effect of the different limits on accidents and accident rates. Some of the main findings are summarized below.

(a) South Africa's speed limits are above average when compared with those of the United States of America (USA) and Eastern and Western European countries.

(b) The evidence that lowering the speed of traffic on rural roads reduces accidents was overwhelming. Similarly, increasing the speed limit increases the occurrence of accidents.

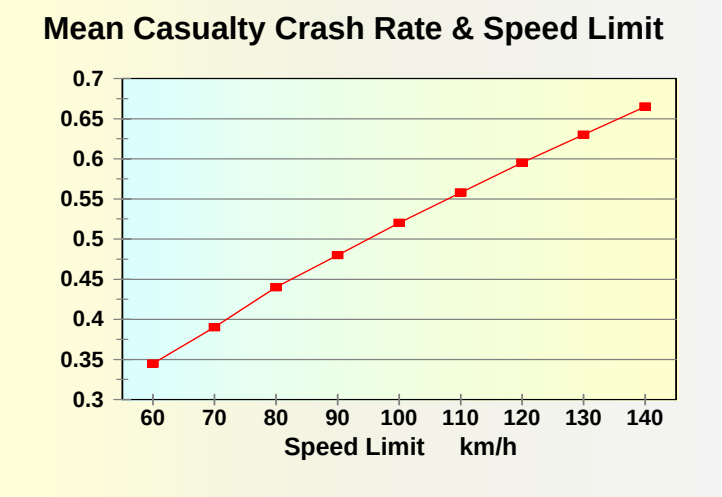
(c) It was found that rural accidents decreased 40%, with an estimated 20% reduction in rural travel during the same period, i.e. a 25% reduction in the accident rate.

(d) A 1 km/h increase in the mean vehicle speed in rural areas was shown to result in an increase of 9 fatal accidents and 120 total accidents per month.

(e) It was estimated that 12 500 lives and 140 000 accidents were saved in consequence and the estimated accident costs of a 1 km/h change in the rural mean speed is considerable, in the order of R19 million per annum.

(f) The analysis of the information collected indicated that the change in the accident rate is an almost linear function of the speed limit, as shown in Figure 4 below.

Figure 4 : Casualties per 100 Mil.Veh.Kms



More detail on these studies and resulting reports are provided under ***Annexure G.***

5.1.2 The above studies mainly investigated the speed-crash relationship and did not take any other factors that could have changed over the 12 year into account, for example: the general level of lawlessness at the start and the end of the period; a possible change in the average age of the vehicle population; the change in the drinking and driving rate and the level of law enforcement at the start and at the end of the 12 year period. It should further be noted that during the period 1973 to 1984 that a very high level of communication with road users was maintained, particularly during the first few years of the Oil Crisis period. This resulted in increased surveillance and enforcement and a high level of discipline and self-regulation amongst road users, which contributed to a large extent to compliance with the set limits.

5.2 The 2003 Road Traffic Offence Survey: Speed Offences

5.2.1 In order to combat the occurrence of road traffic accidents and to plan and undertake road traffic safety programmes and projects, two main sources of information are required, namely ***road traffic accident*** and ***road traffic offence survey*** statistics. The information obtained from *offence surveys* is mainly utilised to:

- complement accident reports and clarify contributory factors to road accidents,
- measure the effect and impact of road safety and law-enforcement programmes, and

- to determine the general level of lawlessness on the road and street network on a year to year basis.

5.2.2 In spite of the encouraging improvements in some cases, the reported offence rates and indices year on year are still too high in certain important cases; and enforcement levels are apparently too low. In the 2003 Traffic Offence Report the following issues of concern, amongst others were raised:

- Speed offence levels generally are still very high. In particular, the national average of 39% of drivers exceeding the urban speed limits by more than 10% in 2003 is a reason for serious concern. This figure increased from 28% in 2002.

- A significant deterioration in the urban speed offence situation occurred in particularly Gauteng and the Free State between the 2002 and 2003 studies. The urban speed offence rate reported for Gauteng is up from 17% to 56%, and in the Free State it increased from 23 to 37%.

5.2.3 Drivers of the various types of vehicles exceeding the speed limit in urban and rural areas are briefly discussed below. The information given relates to urban streets with a speed limit of 60 km/h and the rural roads are inter-city and inter-provincial national or main roads with a speed limit of 120 km/h.

5.2.4 The speeds of four types of vehicles in urban and rural areas per Province, as recorded in the 2003 survey, are given in Table 1 below.

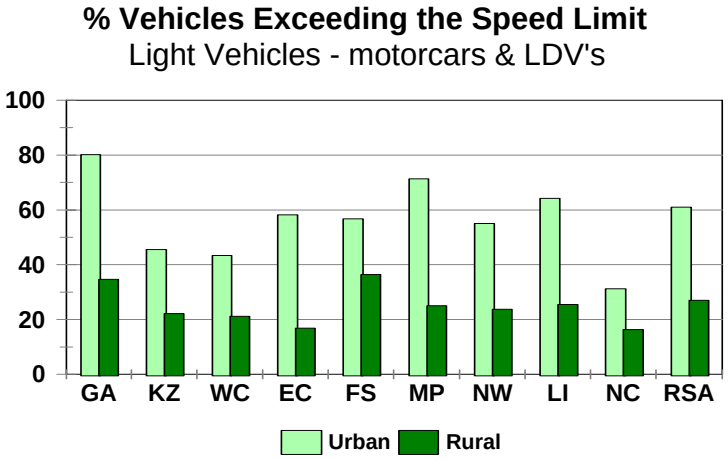
Table 1 : Percent of Vehicles Exceeding the Speed Limit

% Vehicles Exceeding the Speed Limit in Urban and Rural Areas : 2003											
Vehicle Type	**Area**	**GA**	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
Light Vehicles (Motorcars & LDV's)	**Urban**	80.20	45.50	43.40	58.20	56.70	71.30	55.00	64.20	31.20	**61.00**
	Rural	34.70	22.10	21.20	16.80	36.40	25.00	23.70	25.50	16.30	**27.00**
Minibus Taxis	**Urban**	88.60	43.30	40.60	58.10	54.00	50.70	29.30	54.40	14.90	**59.00**
	Rural	10.40	21.10	17.40	20.30	12.00	15.70	32.60	19.30	10.40	**16.50**
Trucks	**Urban**	32.80	39.80	18.40	25.00	37.50	41.00	21.40	27.70	*	**30.70**
	Rural	38.90	33.00	48.10	30.90	52.10	55.20	62.60	35.50	*	**41.00**

The above figures indicate that 80,20% light vehicles (motorcars and LDV's "bakkies") exceed the speed limit of 60km/h on urban streets in Gauteng. In Mpumalanga the figure is 71,3%, followed by Limpopo with 64,2% and the Eastern Cape with 58,2%. The highest percentage of light vehicles

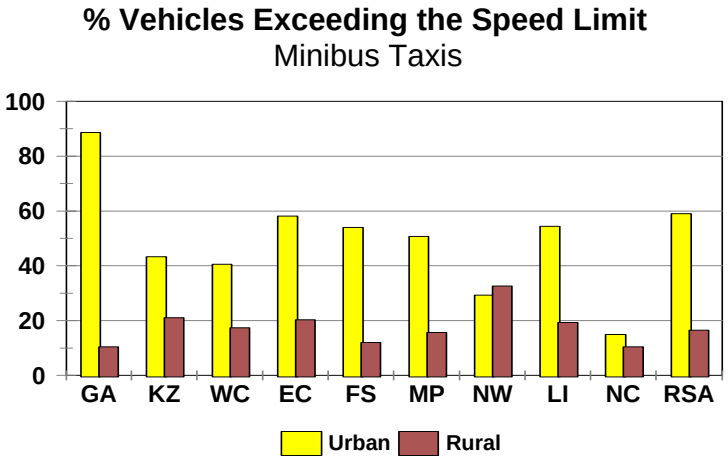
exceeding the limit on the rural road network was in the Free State with 36,40%, followed by Gauteng with 34,70%. The above figures for light vehicles are also reflected in Figure 5 below.

Figure 5 : Percent of Light Vehicles Exceeding the Speed Limit



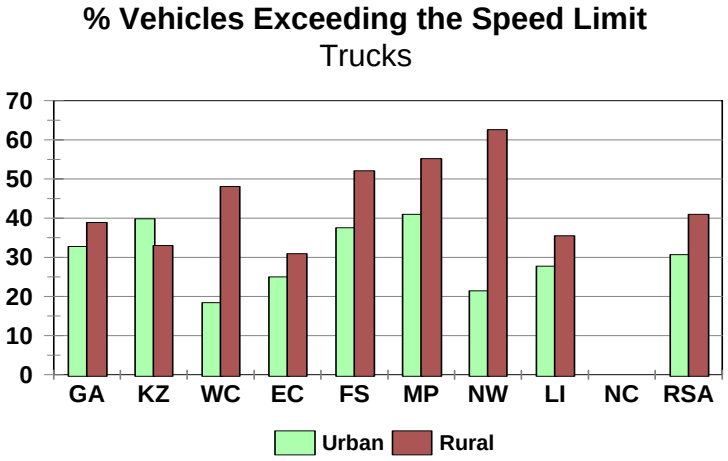
5.2.5 With regard to ***minibus taxis*** : In urban areas in Gauteng 88,6%, in the Eastern Cape 58,1%, in Limpopo 54,4% and in the Free State 54,0% minibus taxis exceed the 60 km/h limit applicable urban areas. The national RSA average is 59,0%. In rural areas 32,6% minibus taxis exceed the set limit of 100 km/h in North West, while the figure was 21,1% in KwaZulu-Natal and 20,3% in the Eastern Cape. The RSA average is 16,5%. These figures are also reflected in Figure 6 below.

Figure 6 : Percent of Minibus Taxis Exceeding the Speed Limit



5.2.6 With regard to ***trucks*** : In urban areas 41,0% trucks exceeded the limit in Mpumalanga, followed by 39,8% in KwaZulu-Natal and 37,5% in the Free State. On the rural road network, 62,6% of the trucks in North West exceeded the set limit of 80 km/h, followed by 55,2% in Mpumalanga, 52,1% in the Free State and 48,1% in the Western Cape. These figures are reflected in Figure 7 below.

Figure 7 : Percent of Trucks Exceeding the Speed Limit



5.2.7 ***Buses***: Insufficient data was available on speed information for buses to calculate reliable rates per Province. National figures in this regard are given in Table 2 below, followed by a graph in Figure 8 for the various speed categories of streets and roads.

Table 2 : Percent Buses Exceeding the Speed Limit

% Buses Exceeding the Speed Limit in Urban and Rural Areas	
Speed Limit on Street/Road	**% Exceeding Limit**
Streets with 60 km/h limit	37.7
Roads/Streets with 80 km/h limit	41.8
Roads with 100 km/h limit	5.8
Roads with 120 km/h limit	32.7

Figure 8 : Percent Buses Exceeding the Speed Limit

The above figures indicate, amongst others, that 37,7% of buses exceed the speed limit of 60 km/h in urban areas and 32,7% exceed the limit of 100 km/h set for buses on 120 km/h limit rural roads.

5.3 The 2004 Rural Road Traffic Speed Analysis:

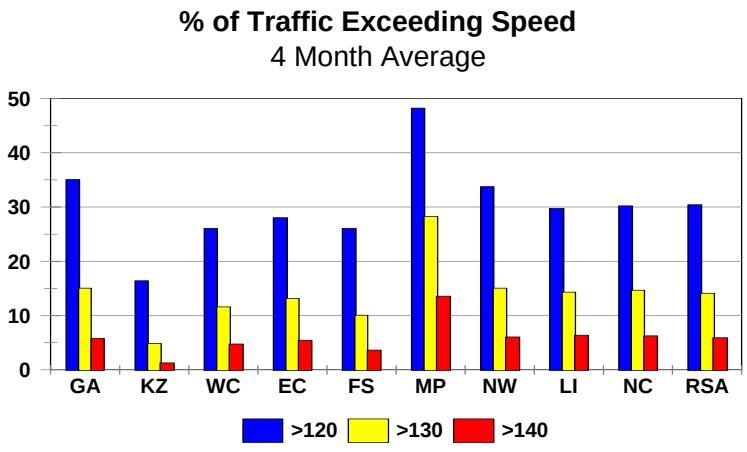
5.3.1 In order to determine the extent of vehicles exceeding the speed limit in 2004, it was decided to collect and analyse the speeds of vehicles over a continuous period of about 4 months on the national road network. The available information did not provide for speeds for the different types of vehicles.

5.3.2 Three stations per Province on different national routes (27 stations in total) were selected for the analysis of the daily speed, per hour of each day, 7 days per week of 24,811,065 vehicles over the 18-week period from Sunday, 30 May 2004 to Saturday, 2 October 2004. Although these stations are all located on national routes, the results can never the less be regarded as a barometer of the general extent to which speeds are ignored on a Provincial basis. The main findings of the study are summarized below.

5.3.3 The average percentage (%) of vehicles exceeding the speed limit on a Provincial basis over the 4-month period is reflected in Figure 9 below. Note should be taken that this is average information only, as average night/day speeds and speeds over weekends, the time-of-day and day-of-week when almost 70% of fatal crashes happen, is generally higher than the average.

5.3.4 The information in Figure 9 indicates that the % of vehicles exceeding speeds of 130 km/h and 140 km/h are generally unacceptably high. The situation in Mpumalanga being the worst where, on average, 48,25% of the traffic exceeded 120 km/h; 28,27% exceeded 130 km/h and 13,60% exceeded 140 km/h.

Figure 9 : Percent of Vehicles Exceeding the Speed Limit



5.3.5 The percentage of traffic exceeding the speed limit over weekends is generally higher than over weekdays. National figures in this regard are given in Table 3 below.

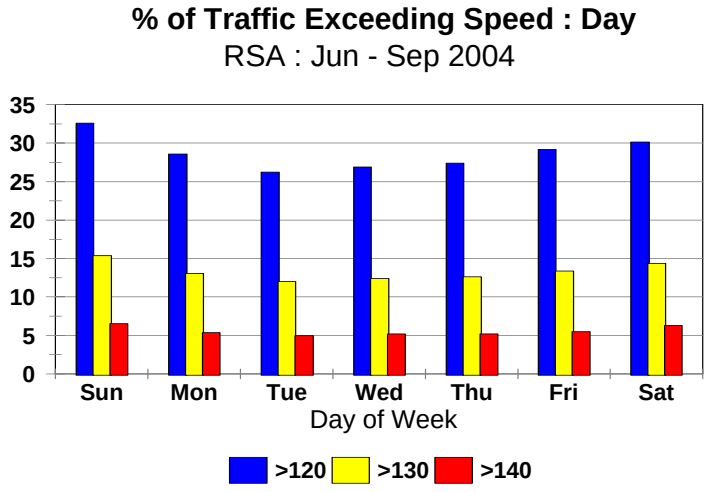
Table 3 : Percent of Vehicles Exceeding peed Limit per Day of Week

RSA	Jun-Sep 2004			All Provinces	
Day of Week	% of Vehicles in Speed Group				
	120-130	130-140	>120	>130	>140
Sun	17.21	8.84	32.58	15.37	**6.52**
Mon	15.48	7.72	28.56	13.08	**5.36**
Tue	14.23	7.03	26.23	12.00	**4.97**
Wed	14.51	7.20	26.89	12.38	**5.18**
Thu	14.80	7.40	27.41	12.61	**5.21**
Fri	15.82	7.86	29.17	13.35	**5.49**
Sat	15.79	8.08	30.15	14.36	**6.28**
Week Av	**15.44**	**7.75**	**28.73**	**13.29**	**5.55**

The figures in Table 3 above indicate that, on average on Sundays 6,52% of the traffic exceeded 140 km/h, while 15,37% exceeded 130 km/h. On Fridays 6,28% exceeded 140 km/h and 14,36% exceeded 130 km/h.

5.3.5 The figures given in Table 3 are also graphically reflected in Figure 10 below.

Figure 10: Percent of Traffic Exceeding Speed Limit per Day of Week



(***Note***: This Figure should be compared with Figure 23 below, which gives a graphical presentation of the days of the week on which most fatal crashes happened in 2003 and 2004)

5.3.6 In the 2004 rural road speed analysis it was found that at some stations on average throughout the day, about 17% of the traffic exceeded 140 km/h. Some early evening speeds (between 18:00 and 21:00 when most fatal crashes happen), show that more than 20% of the vehicles

exceed 140 km/h. Some examples in this regard are given in Figures 11 and 12 and below.

Figure 11 : Percentage of Traffic Exceeding Limit per Hour on Sundays

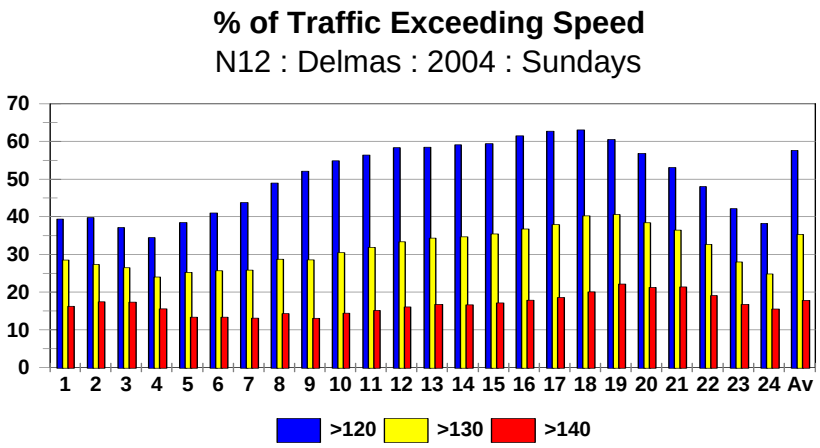
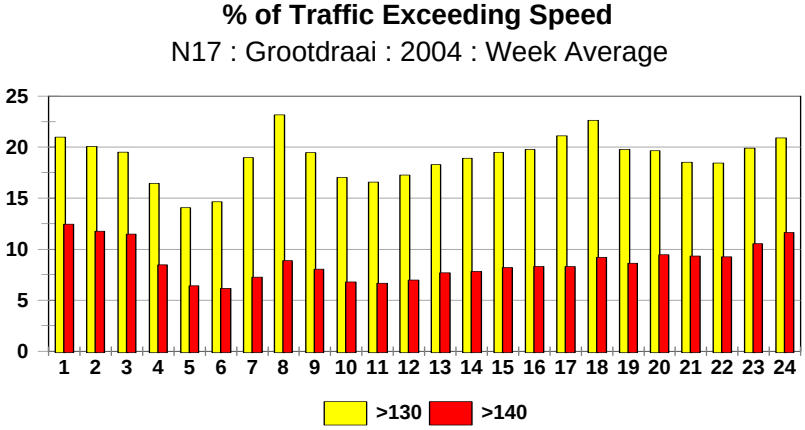


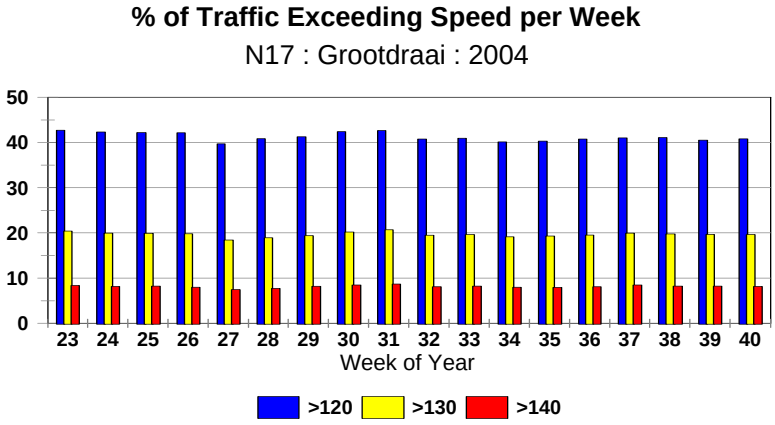
Figure 12 : Percentage of Traffic Exceeding Limit per Hour : Week Average



The information in the above figure indicates the week average percentage of traffic exceeding 130 km/h and 140 km/h respectively on the N17 freeway just east of Springs in Gauteng.

5.3.7 Information in Figure 13 below shows the weekly average percentage of traffic exceeding the various speeds over the 18-week period from June to September 2004.

Figure 13 : Week Average percentage of Traffic Travelling at Speeds higher than indicated.

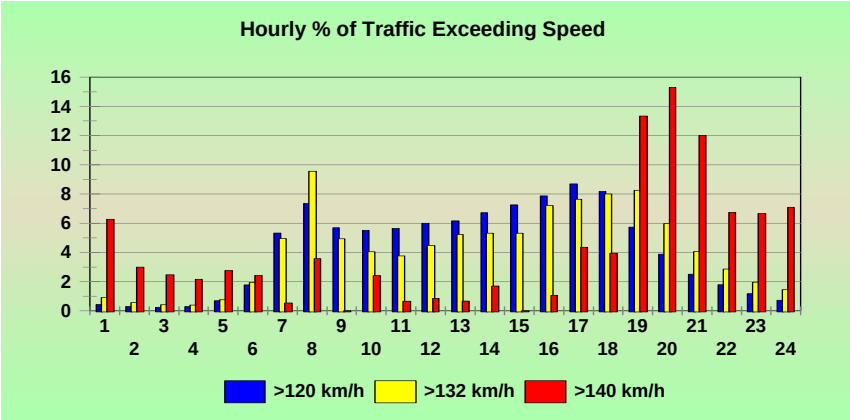


The above continuous and constant percentage of traffic exceeding of the speed limit clearly indicates that there was either NO or very little speed enforcement on at least the above section of the N17 over the 18-week period covered by the information. This information is also similar to and representative of findings at the other locations analysed.

5.3.8 During 2003 a similar speed study was undertaken. The study did not include information as detailed as the 2004 speed study and was undertaken on a much lower scale. Information was also not on a Provincial basis but did cover the country as a whole. The outcome of this study is briefly discussed below.

A comparison between the 2003 and 2004 speed studies indicated that there was an average national increase of about 9,56% from 2003 to 2004 in traffic exceeding the 120 km/h limit. The national distribution of the percentage of vehicles exceeding the various speeds indicated per hour of the day during 2003 is shown in Figure 14 below.

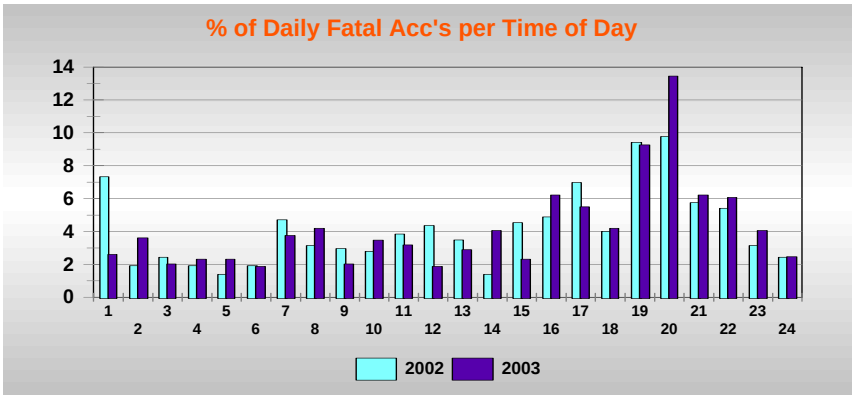
Figure 14 : Speed distribution per Hour of the Day : 2003



The information above indicates relatively high percentages of traffic exceeding the limit during the early hours of the morning, again at around 08:00 and in the evening between 18:00 and 21:00.

In comparison, the percentage of fatal crashes per hour of the day during 2002 and 2003 is shown in Figure 15 below.

Figure 15 : Percentage of Fatal Crashes per Hour of Day



The information in Figures 14 and 15 above suggest a strong relationship between the percentage of traffic exceeding the speed limit and the occurrence of fatal road traffic crashes.

5.4 Speed as a Factor in Fatal Crashes from 2001 to 2004

Since December 2000 the National Fatal Accident Information Centre (NFAIC) at the Department collects summarized information directly from SAPS on fatal accidents. The information is provided by the SAPS to the Centre on a specially designed, one-page "***Quick Fatal Crash Response Form***" as soon as possible after a fatal crash happened. This form also provides for the submission of possible contributory factors to each crash under Human, Vehicle and Road and Environment factors, information that is not provided for on the "*formal*" Accident Report form. The information collected by the Centre is analysed continuously for monthly fatal crash reports to be produced.

5.4.1 Number of Fatal Crashes:

Summarised information on the number of fatal crashes per Province for the full years 2001 to 2004 is given in Table 4 below and the percentage annual change in Table 5.

Table 4 : Number of Fatal Crashes per Annum : 2001 to 2004

Total No. of Fatal Crashes from 2001 to 2004										
Year	**GA**	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
2001	2,206	1,971	1,206	599	773	849	565	423	210	**8,802**
2002	2,297	2,191	1,253	747	778	950	797	671	289	**9,973**
2003	2,284	2,189	1,210	886	725	949	850	880	273	**10,246**
2004	2,296	2,288	1,240	947	718	959	891	892	292	**10,523**

Table 5 : % Annual Change in Fatal Crashes : 2001 to 2004

% Annual Change in the No. of Fatal Crashes from 2001 to 2004										
Year	**GA**	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
2001-2002	4.13	11.16	3.90	24.71	0.65	11.90	41.06	58.63	37.62	**13.30**
2002-2003	-0.57	-0.09	-3.43	18.61	-6.81	-0.11	6.65	31.15	-5.54	**2.74**
2003-2004	0.53	4.52	2.48	6.88	-0.97	1.05	4.82	1.36	6.96	**2.70**

The information in the Tables above indicate an increase of 13,30% in the number of fatal crashes from 2001 to 2002. From 2002 to 2003 there was an increase of 2,74% from 9,973 fatal crashes in 2002 to 10,246 fatal crashes in 2003. From 2003 to 2004 the increase was 2,70%.

Only the Free State recorded a decrease in the number of fatal crashes from 2003 to 2004. On a percentage basis, the biggest increases were recorded in: Northern Cape 6,96%; Eastern Cape 6,88%; North West 4,82% and KwaZulu-Natal 4,52%.

5.4.2 Number of Fatalities:

Information on the number of fatalities per Province for the years 2001 to 2004 is given in Table 6 below and the percentage annual change in Table 7

Table 6 : Number of Fatalities per Annum : 2001 to 2004

Total No. of Fatalities resulting from Fatal Crashes from 2001 to 2004										
Year	**GA**	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
2001	2,605	2,578	1,517	812	1,027	1,144	785	463	272	**11,201**
2002	2,621	2,567	1,499	1,023	1,085	1,245	964	855	340	**12,198**
2003	2,608	2,593	1,455	1,144	949	1,144	1,037	1,066	353	**12,348**
2004	2,574	2,705	1,421	1,255	947	1,298	1,095	1,071	344	**12,709**

Table 7 : % Annual Change in Fatalities : 2001 to 2004

% Annual Change in the No. of Fatalities resulting from Fatal Crashes from 2001 to 2004										
Year	**GA**	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
2001-2002	0.62	-0.42	-1.18	25.97	5.67	8.86	22.80	84.78	24.89	**8.90**
2002-2003	-0.50	1.01	-2.94	11.88	-12.55	-8.16	7.60	24.73	3.90	**1.23**
2003-2004	-1.29	4.33	-2.33	9.68	-0.13	13.46	5.56	0.44	-2.76	**2.92**

The information in the Tables above indicates an increase of 8,90% in the number of fatalities from 2001 to 2002. From 2002 to 2003 there was an increase of 1,23% from 12,198 fatalities in 2002 to 12,348 fatalities in 2003. From 2003 to 2004 the increase was 2,92%.

Four Provinces show decreases in the number of fatalities from 2003 to 2004. These Provinces are : Northern Cape 2,76%; Western Cape 2,33%; Gauteng 1,29% and the Free State 0,13%. Although three of these provinces show in creases in the number of fatal crashes, these decreases in the number of fatalities are mainly attributed to decreases in the severity of crashes.

On a percentage basis the biggest increases in the number of fatalities from 2003 to 2004 were recorded in the following Provinces: Mpumalanga 13,46%; Eastern Cape 9,68%; North West 5,56%; KwaZulu-Natal 4,33% and Limpopo 0,44%

5.4.3 Severity Rates:

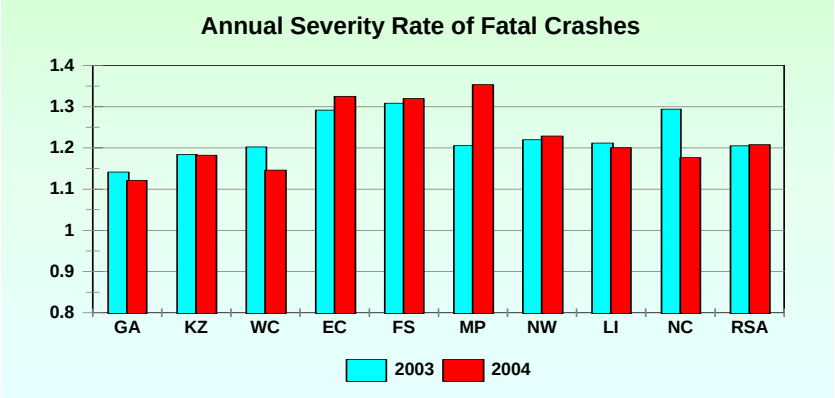
The severity rate of fatal crashes is the average number of persons killed per fatal crash. The severity rate is dependent on a number or combination of factors, such as for example: whether vehicle occupants wore seatbelts or not; the number and percentage distribution of the type of vehicles involved in crashes (for example an increase in the number of buses could result in the increase of the rate); and the speed at which vehicles were traveling prior to a crash. Higher speeds would result in higher impact crashes, claiming more lives and increasing the severity rate. (Additional severity rates, for example per type of crash or per type of vehicle can also be determined)

Information on the severity rates of fatal crashes from 2001 to 2004 is given in Table 8 and for 2003 and 2004 also reflected in Figure 16 below.

Table 8 : Crash Severity Rates per Province : 2001 to 2004

Severity Rates from 2001 to 2004										
Year	**GA**	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
2001	1.18	1.31	1.26	1.36	1.33	1.35	1.39	1.09	1.30	**1.27**
2002	1.14	1.17	1.20	1.37	1.39	1.31	1.21	1.27	1.18	**1.22**
2003	1.14	1.18	1.20	1.29	1.31	1.21	1.22	1.21	1.29	**1.21**
2004	1.12	1.18	1.15	1.33	1.32	1.35	1.23	1.20	1.18	**1.21**

Figure 16 : Severity Rate per Province : 2003 & 2004

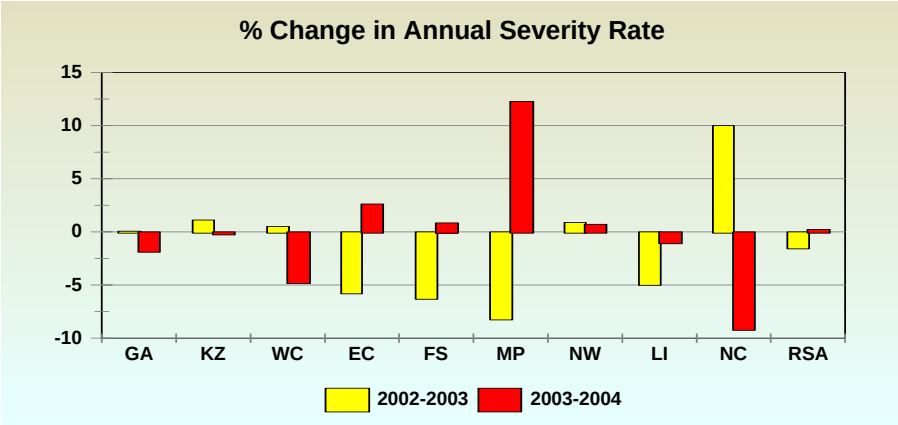


The figures in the table above indicate a decrease in the national severity rate from 1,27 in 2001 to 1,21 in 2004. The rates in some Provinces have continuously been higher than the national rate. The percentage annual change in Provincial rates is given in Table 9 below and the 2002-2003 and 2003-2004 changes are also reflected in Figure

Table 9 : % Annual Change in Provincial Severity Rates

% Annual Change in Severity Rates from 2001 to 2004										
Year	**GA**	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
2001-2002	-3.36	-10.42	-4.89	1.01	4.99	-2.72	-12.94	16.49	-9.25	**-3.89**
2002-2003	0.06	1.10	0.51	-5.67	-6.15	-8.06	0.89	-4.90	9.99	**-1.46**
2003-2004	-1.80	-0.19	-4.69	2.62	0.84	12.28	0.70	-0.91	-9.09	**0.21**

Figure 17 : % Annual Change in Provincial Severity Rates



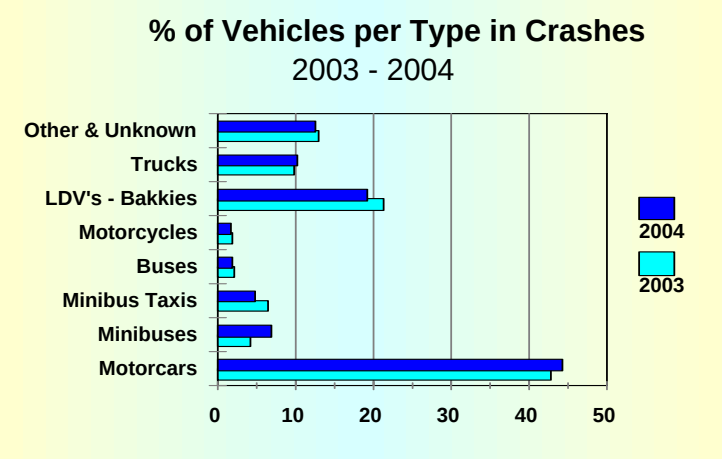
The above information indicates minor increases in the Provincial severity rates from 2002 to 2003, except for the Northern Cape, which shows an increase of 9,99% from a rate of 1,18 in 2002 to 1,29 in 2003. This up-ward trend in the Northern Cape was reversed in 2004 when the rate decreased back to 1,18.

From 2003 to 2004, when most Provinces showed decreases and even downward trends, the rate in Mpumalanga increased by 12,28% from a rate of 1,21 in 2003 to a rate of 1,35 in 2004. This increase in the severity rate in Mpumalanga could, in the first instance possibly be attributed to the exceptional high number of vehicles exceeding the speed limit in the Province during 2004 as discussed under section 5.3 above, or an increase in the number of high occupancy vehicles involved in fatal crashes.

5.4.4 Vehicle Types involved in Fatal Crashes 2003-2004:

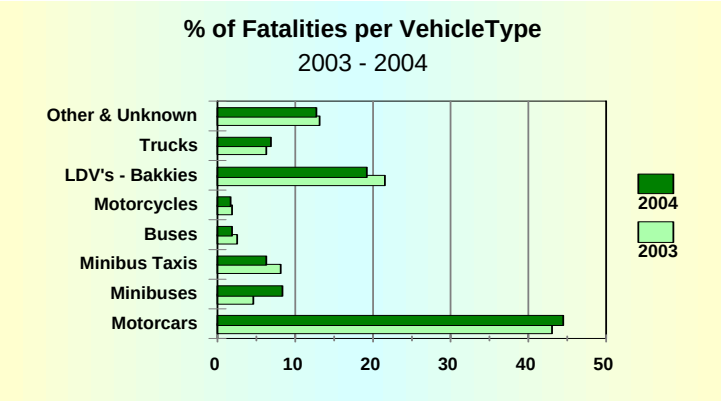
The total number of vehicles involved in fatal crashes increased by 3,20% from 12,957 in 2003 to 13,372 in 2004. On a percentage basis the biggest increase was in minibuses (not taxis) which increased by 75,53% from 521 in 2003 to 914 in 2004. The biggest decrease was in minibus taxis which decreased by 25,66% from 820 in 2003 to 610 in 2004. Detailed figures per type of vehicle per Province are given in the tables under ***Annexure H-1***. The percentage of vehicles involved in fatal crashes in 2003 and 2004, per vehicle type is shown in Figure 18 below.

Figure 18 : Vehicle Percentage Involvement in Fatal Crashes



Detailed figures on the number of fatalities per type of vehicle per Province are given in the tables under ***Annexure H-2***. The percentage of fatalities per type of vehicle in 2003 and 2004 are shown in Figure 19 below.

Figure 19 : Percentage of Fatalities per Vehicle Type

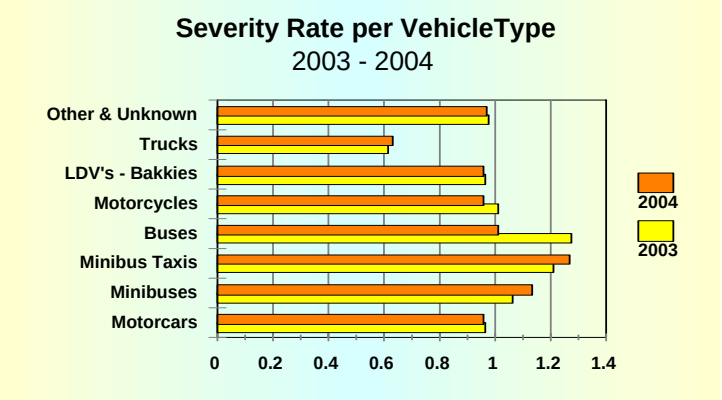


As shown in the figure above, based on the information under Annexure H-2, the fatalities per type of vehicle decreased as follows: minibus taxis 22,21%; buses 26,20%; motorcycles 8,67%; LDV's (bakkies) 8,11%.

Increases in fatalities per type of vehicle from 2003 to 2004 were as follows: motorcars 6,20%; minibuses (not taxis) 87,32% and trucks 10,90%.

Changes in the national severity rate per type of vehicle are shown in Figure 20 below which is based on the information contained in the tables under ***Annexure H-3***.

Figure 20 : Severity per Type of Vehicle : 2003-2004

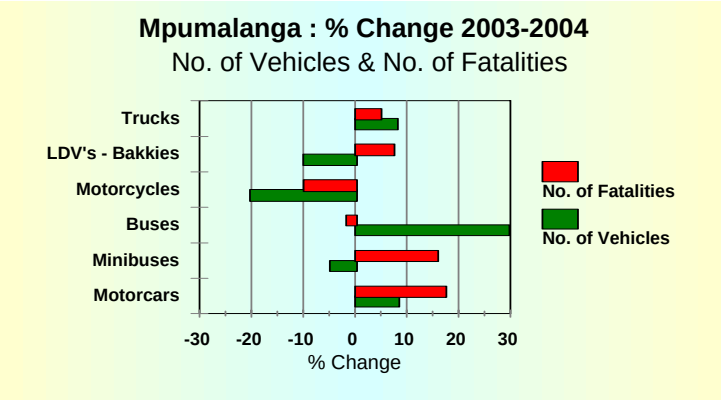


The information above shows decreases in the severity rates for most types of vehicles, except for minibuses, minibus taxis and trucks which increased from 2003 to 2004 as follows: minibuses 6,72%; minibus taxis 4,64% and trucks 3,34%.

Following on the discussion under 5.4.3 above on the substantial increase in severity rates from 2003 to 2004 in Mpumalanga, the percentage change in

number of vehicles and fatalities per type of vehicle from 2003 to 2004 in Mpumalanga are shown in Figure 21 below, specifically for this Province.

Figure 21 : Mpumalanga : Change in Vehicles and Fatalities

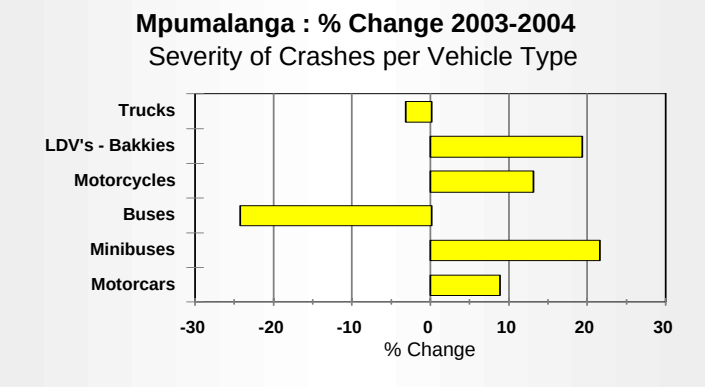


The above information indicates that there was a decrease from 2003 to 2004 in the number of vehicles involved in fatal crashes in Mpumalanga for the following types of vehicles: minibuses 4,80%; motorcycles 20,25%; and LDV's (bakkies) 9,96%. Other types of vehicles show increases as follows: motorcars 8,21%; buses 29,74% and trucks 8,05%.

It should be noted that although there were decreases in the number of minibuses and LDV's involved in fatal crashes from 2003 to 2004 in Mpumalanga, there were increases in the number of fatalities resulting from these vehicle types. The percentage increases in this regard were as follows: minibuses15,69% and LDV's 7,27%. For motorcars the increase was 17,52%.

Based on the above and the information under Annexure H-3, the changes in the severity per type of vehicle from 2003 to 2004 in Mpumalanga are shown in Figure 22 below.

Figure 22 : Mpumalanga : Change in Vehicle Severity Rates

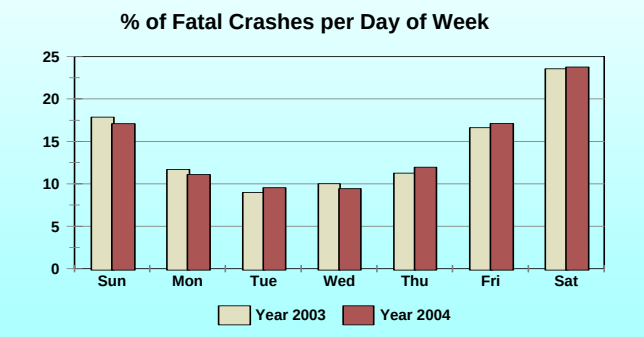


The above information indicates that the severity rates for buses and trucks in Mpumalanga decreased from 2003 to 2004. The severity rates for all other types of vehicles increased, some substantially, as follows: motorcars 8,60%; minibuses 21,53%; motorcycles 12,99% and LDV's (bakkies) 19,14%. These increases in severity rates for the specific types of vehicles strengthen the possibility of high and excessive speeds being the main influencing factor for these increases, as mentioned under 5.4.3 above.

5.4.5 Day of Week and Time of Day of Fatal Crashes:

Information on the day-of-week on which country-wide fatal road traffic crashes happened in 2003 and 2004 is given in Figure 23 below.

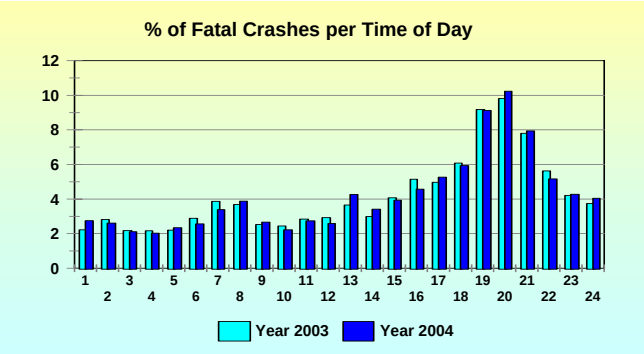
Figure 23 : % Distribution of Fatal crashes per Day of Week



The information above indicates that, similar to 2003, most fatal crashes during 2004 happened on Fridays 17,11%; Saturdays 23,77%; and Sundays 17,10%; totaling 57,98% of the weekly crashes. This information correlates with the information provided in Figure 10 above, which shows the days of the week when the highest number or percentage of speed offences are committed.

Information on the time-of-day at which fatal road traffic crashes happened in 2003 and 2004 is given in Figure 24 below.

Figure 24 : % Distribution of Fatal Crashes per Time of Day



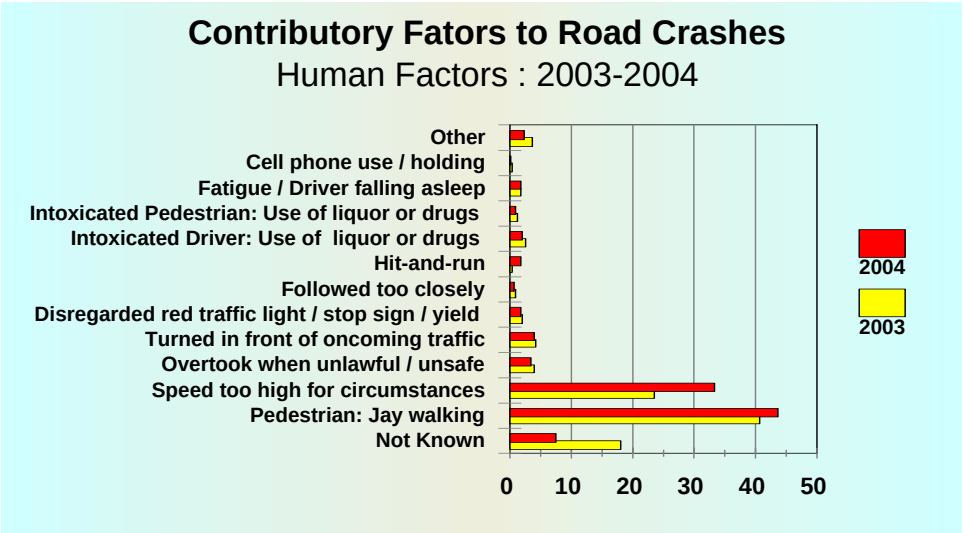
The information above indicates that most fatal crashes during 2004 (similar to 2003 information), per time of day happened between the hours of ***17:00-18:00*** 5,93%; ***18:00-19:00*** 9,12%; ***19:00-20:00*** 10,23%; ***20:00-21:00*** 7,94% and ***21:00-22:00*** 5,16%; over a period of only 5 hours totaling 28,39% of the daily fatal crashes. This information correlates to a certain extent with the information provided in Figure 14 above, which shows the time of day when the highest number or percentage of speed offences in 2003 were committed.

5.4.6 Contributory Factors to Fatal Crashes:

As mentioned above, the SAPS also indicate the possible contributory factors to each fatal crash on the ***Quick Fatal Crash Response Form*** submitted to the National Fatal Accident Information Centre (NFAIC) at the Department. These factors are sub-divided under Human, Vehicle and Road and Environment factors. A list of factors under each category is provided in the Table under ***Annexure I-1***.

The percentage *Human Factors* contribution to fatal crashes during 2003 and 2004, according to the submitted SAPS reports, are shown in Figure 25 below. The detailed information on which this figure is based is provided in the tables under ***Annexures I-2 and I-3***.

Figure 25: Human Factors in Fatal Crashes : 2003 and 2004



The above information indicates that the two major human factors, pedestrians and speed remained high and both showed increases from 2003 to 2004. Pedestrians jay-walking increased from 40,55% in 2003 to 43,50%

in 2004. The percentage fatal crashes attributed to *speed too high for circumstances* increased from 23,24% in 2003 to 32,94% in 2004 – the biggest increase in relation to all other reported human factors.

The number, as well as the percentage of fatal crashes attributed to "*speed too high for circumstances*" for the years 2001 to 2004 per Province are summarized from ***Annexures I-2 and I-3*** in Tables 10 and 11 below.

Table 10 : Number of Fatal Crashes in which Speed played a role

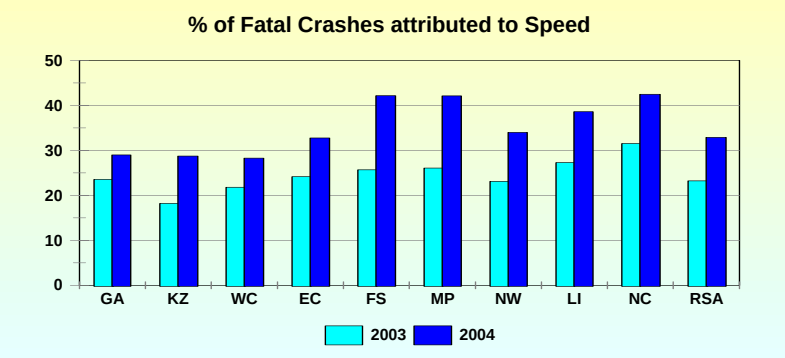
No. of Fatal Crashes in which Speed too fast for circumstances was a Contributory factor										
Year	**GA**	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
2001	546	549	296	156	152	223	127	119	97	**2,265**
2002	530	482	262	204	218	320	227	188	78	**2,510**
2003	538	398	264	214	186	248	196	240	86	**2,370**
2004	666	658	351	310	303	404	303	344	124	**3,463**

Table 11 : % of Fatal Crashes in which Speed played a role

% of Fatal Crashes in which Speed too fast for circumstances was a Contributory factor										
Year	**GA**	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
2001	24.74	27.85	24.56	26.00	19.64	26.32	22.50	28.13	46.15	**25.57**
2002	23.09	22.00	20.91	27.24	28.08	33.72	28.49	28.06	27.09	**25.44**
2003	23.55	18.19	21.80	24.15	25.68	26.08	23.11	27.30	31.52	**23.24**
2004	29.01	28.76	28.29	32.77	42.16	42.11	33.98	38.61	42.48	**32.94**

The information in Table11 above for 2003 and 2004 is also reflected in Figure 26 below.

Figure 26 : % of Fatal in which Speed played a role



The above information indicates that speed, as a contributory factor, played a major role in fatal crashes in all Provinces during 2003 and 2004. There was also a substantial increase in speed related crashes from 2003 to 2004 in all Provinces, detail of which is given in Table 12 below.

Table 12 : % Annual Change in Speed Related Fatal Crashes per Province

% Change in No. of Fatal Crashes in which Speed was a Contributory factor										
Year	**GA**	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
2001-2002	-2.84	-12.18	-11.54	30.68	43.89	43.39	78.62	58.26	-19.22	**10.84**
2002-2003	1.43	-17.39	0.68	5.12	-14.77	-22.74	-13.48	27.58	9.90	**-5.58**
2003-2004	23.82	65.24	32.98	45.07	62.58	63.17	54.12	43.38	44.16	**46.10**

The above information indicates that the increase in speed related fatal crashes from 2003 to 2004 for some Provinces were as follows: KwaZulu-Natal 65,24%; Mpumalanga 63,17%; Free State 62,58% and North West 54,12%. On a national basis speed related crashes increased by 46,10%.

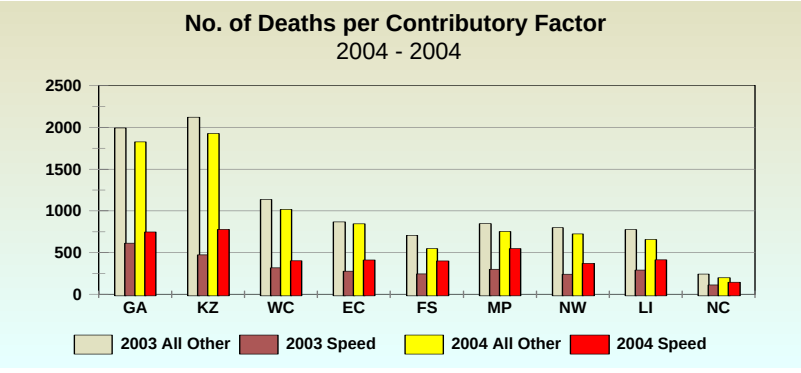
The estimated number of fatalities resulting from speed related fatal crashes per Province for the years 2001 to 2004 are given in Table 13 below.

Table 13 : Estimated No. of Fatalities Resulting from Speed Related Crashes

Est. No. of Fatalities resulting from Crashes attributed to Speed too High for Circumstances										
Year	**GA**	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
2001	644	718	373	211	202	301	177	130	126	**2,882**
2002	605	565	313	279	305	420	275	240	92	**3,070**
2003	614	472	317	276	244	298	240	291	111	**2,857**
2004	747	778	402	411	399	547	372	413	146	**4,183**

The above information indicates that a total of 2,882 persons were killed in speed related crashes in 2001; *3,070* in 2002; *2,857* in 2003 and *4,183* in 2004. The estimated number of speed related fatalities in relation to all other fatalities per Province for 2003 and 2004 are reflected in Figure 27 below.

Figure 27 : Est. No. of Speed Related Fatalities

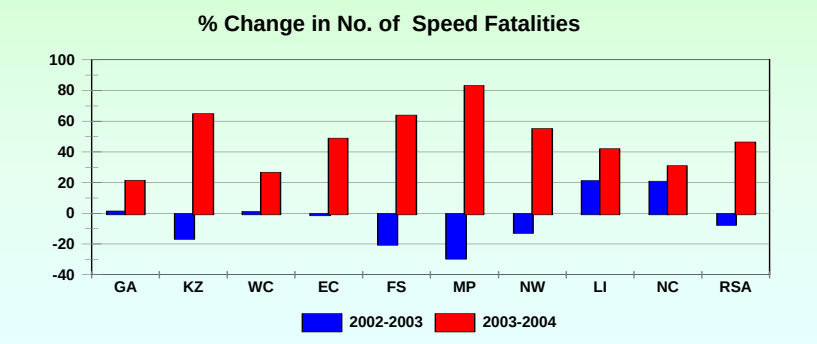


The percentage annual change in the number of speed related fatalities are given in Table 14 below. These changes from 2003 to 2004 are also reflected in Figure 28.

Table 14 : % Annual Change in Speed Related Fatalities

% Change in No. of Fatalities resulting from Speed Related Crashes										
Year	**GA**	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
2001-2002	-6.11	-21.32	-15.87	32.00	51.07	39.50	55.50	84.35	-26.69	**6.53**
2002-2003	1.50	-16.48	1.19	-0.84	-20.02	-28.97	-12.71	21.33	20.88	**-6.96**
2003-2004	21.59	64.93	26.75	48.86	63.95	83.20	55.20	42.08	31.06	**46.41**

Figure 28 : % Annual Change in Speed Related Fatalities



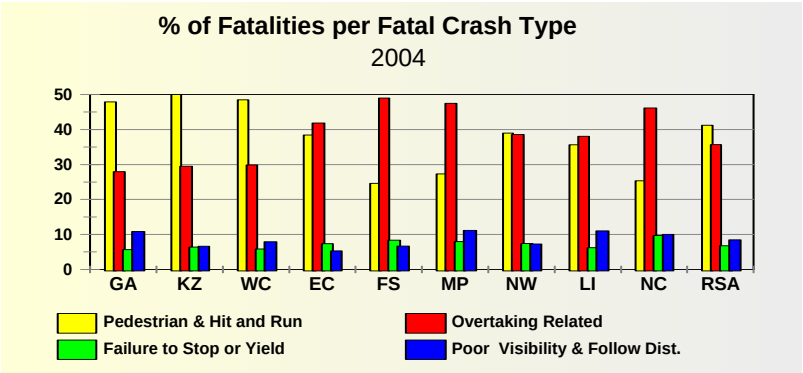
The above information indicates that, without exception, all Provinces had high increases in fatalities resulting from speed related crashes from 2003 to 2004. The biggest increases were in Mpumalanga 83,20%; KwaZulu-Natal 64,93%; Free State 63,95% and North West 55,20%. On a national basis, deaths resulting from speed related fatal crashes increased by 46,41% from an estimated 2,857 fatalities in 2003 to 4,183 fatalities in 2004.

The information on contributory factors to fatal road traffic crashes, as provided by the SAPS, correlates with the overall indicators given and discussed in the various sections above, in that speed has been proved to be one of the major contributory factors to road traffic crashes.

5.4.7 Types of Fatal Crashes : 2003 and 2004

The percentage of fatalities per type of crash during 2004 is shown in Figure 29 below.

Figure 29 : % of Fatalities per Crash Type

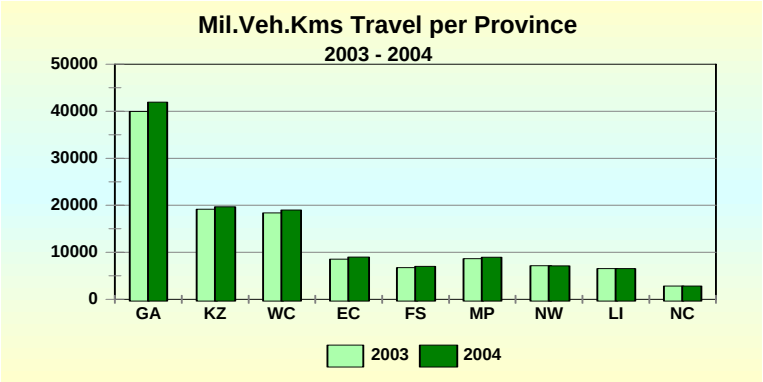


In 2004 pedestrian fatalities accounted for 42,74% of all fatalities. Fatalities resulting from overtaking related crashes increased from 33,56% in 2003 to 35,70% in 2004. The biggest increase was in the Free State with 25,66% followed by Mpumalanga with an increase of 21,04%,

5.4.8 Estimated Distances Travelled : 2003 and 2004

The estimated distances travelled per Province, in terms of million vehicle kilometres (mvk) during 2003 and 2004 is shown in Figure 30 below. More detailed information in this regard is given in the Table under ***Annexure J***.

Figure 30 : Estimated Distances Travelled (Mil.Veh.Kms)



The estimated distance travelled on the road and street network increased by 3,46% from 117,875 mvk in 2003 to 121,954 mvk in 2004.

On a percentage basis the biggest increase was in the Eastern Cape where travel increased by 5,19% from 8,528 mvk in 2003 to 8,970 mvk in 2004; followed by Gauteng with an increase of 4,99% from 39,974 in 2003 to 41,968 in 2004. Travel in North West shows a slight decrease of 0,46% from 7,138 to 7,106.

5.4.9 Fatality Rates:

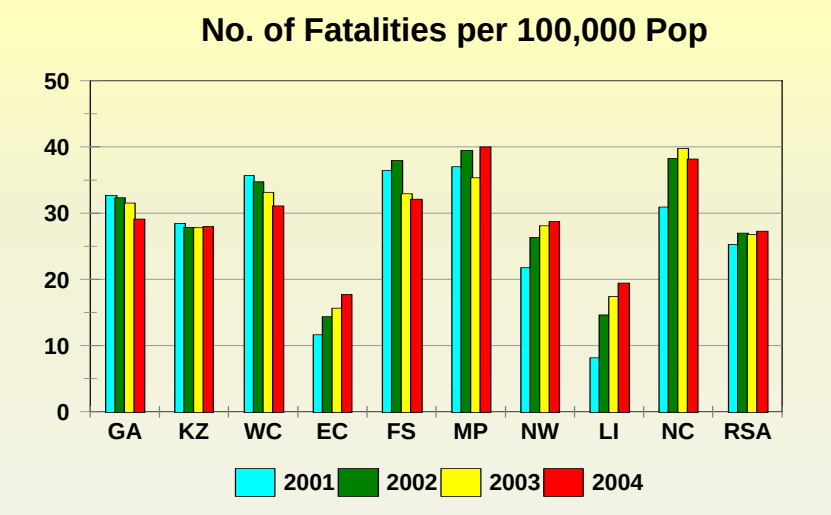
The fatality rates in terms of the number of fatalities resulting from road crashes per 100,000 Human Population per Province over the last 4 years is given in Table 15 below.

Table 15 : Road Fatalities per 100,000 Human Population

Fatality Rate : Number of Fatalities per 100,000 Population										
Year	**GA**	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
2001	32.69	28.42	35.70	11.63	36.44	37.01	21.77	8.16	30.95	**25.27**
2002	32.33	27.86	34.75	14.34	37.94	39.46	26.33	14.63	38.27	**27.00**
2003	31.51	27.82	33.16	15.63	32.91	35.33	28.07	17.39	39.80	**26.77**
2004	29.09	27.98	31.09	17.70	32.11	40.00	28.75	19.43	38.20	**27.28**
% Change in Fatality Rate from Previous Year										
2002	-1.11	-1.95	-2.66	23.26	4.12	6.60	20.95	79.32	23.66	**6.87**
2003	-2.54	-0.14	-4.56	8.99	-13.25	-10.46	6.59	18.89	4.00	**-0.88**
2004	-7.67	0.58	-6.25	13.28	-2.44	13.22	2.42	11.72	-4.03	**1.92**

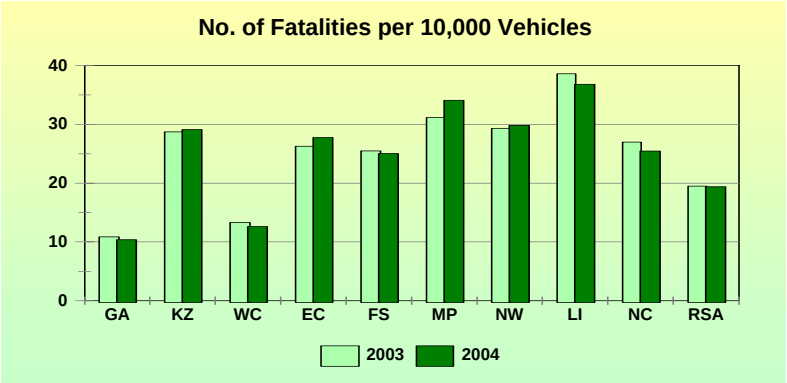
The national rate in this regard increased by 1,92% from 26,77 in 2003 to 27,28 in 2004. On a percentage basis the biggest increase was in the Eastern Cape where the rate increased by 13,28% from 15,63 to 17,70 in 2004; followed by Mpumalanga where the rate increased by 13,22% from 35,33 from to 40,00 in 2004. The information above indicates continuous downward trends over the last 4 years in Gauteng and the Western Cape. Continuous upward trends were recorded in the Eastern Cape, North West and Limpopo. The highest rate for 2004 was in Mpumalanga with 40,00 fatalities per 100,000 population. The above figures are also reflected in Figure 31 below.

Figure 31 : Road Fatalities per 100,000 Human Population



The recorded road fatality rates in terms of the motor vehicle population per Province for 2003 and 2004 are shown in Figure 32 below.

Figure 32 : No. of Fatalities per 10,000 Registered Motorised Vehicles

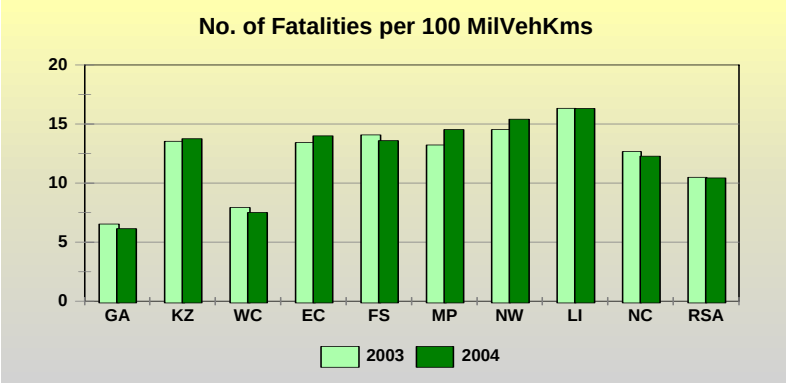


Information in this regard indicates that the national rate decreased by 0,04% from an average of 19,45 fatalities per 10,000 registered vehicles in 2003 to 19,44 fatalities per 10,000 vehicles in 2004.

On a Provincial percentage basis the biggest increase was recorded in Mpumalanga where the rate increased by 9,79% from a rate of 31,18 in 2003 to a rate of 34,24 in 2004. In the Eastern Cape the rate increased by 6,03% from 26,15 in 2003 to 27,73 in 2004. The highest rates in 2004 were recorded in Limpopo with an average rate of 36,77 followed by Mpumalanga with a rate of 34,24.

Decreases were recorded in Gauteng, Western Cape, Free State, Limpopo and the Northern Cape.
Road fatality rates in terms of the distance travelled per Province for 2003 and 2004 are shown in Figure 33 below.

Figure 33 : No. of Fatalities per 100 Mil.Veh.Kms



Information in this regard indicates that the national rate decreased by 0,11% from an average of 10,45 fatalities per 100 million vehicle kilometres travelled in 2003 to 10,44 fatalities per 100 mil.veh.kms travelled in 2004.

On a Provincial percentage basis the biggest increases were recorded in Mpumalanga where the rate increased by 10,25% from a rate of 13,23 in 2003 to a rate of 14,58 in 2004; followed by North West where the rate increased by 5,73% from 14,54 in 2003 to a rate of 15,38 in 2004.

The highest rates in this regard for both 2003 and 2004 were recorded in Limpopo where the rate slightly decreased by 0,08% from a rate of 16,31 in 2003 to a arte of 16,30 in 2004.

The number of road fatalities resulting from SAPS reported speed related fatal crashes in 2003 and 2004, in terms of the distance travelled per Province, is given in Table 16 below.

Table 16 : Speed Related Fatalities per 100 Million Vehicle Kilometres

Speed Related Fatalities and Distance Travelled per Province										
Prov	**GA**	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
Year	**Number of Fatalities due to Speed too High for Circumstances**									
2003	2.608	2.593	1.455	1.144	949	1.144	1.037	1.066	353	12.348
2004	2.574	2.705	1.421	1.255	947	1.298	1.095	1.071	344	12.709
Year	**Estimated Annual Mil.Veh.Kms Travel per Province**									
2003	39.974	19.150	18.371	8.528	6.737	8.651	7.138	6.533	2.791	117.875
2004	41.968	19.678	18.967	8.970	6.973	8.931	7.106	6.564	2.797	121.954
Year	**Number of Speed Related Fatalities per 100 Mil.Veh.Kms**									
2003	6.52	13.54	7.92	13.42	14.08	13.22	14.53	16.32	12.66	10.48
2004	6.13	13.75	7.49	13.99	13.59	14.53	15.40	16.31	12.28	10.42
% change	-5.98	1.53	-5.39	4.27	-3.51	9.91	6.04	-0.03	-2.95	-0.52

The above information shows a decrease of 0,52% in the national average number of fatalities resulting from speed related crashes from an average of 10,48 speed related fatalities per 100 million vehicle kilometres travelled in 2003 to 10,42 speed related fatalities per 100 mil.veh.kms travelled in 2004.

On a Provincial percentage basis the biggest increases were recorded in Mpumalanga where the rate increased by 9,91% from 13,22 in 2003 to 4,53 in 2004. In North west the rate increased by 6,04% from 14,53 to 15,40 in 2004; followed by the Eastern Cape with an increase of 4,27% to a rate of 13,99 and KwaZulu-Natal where the rate increased by1,53% from 13,54 to 13,75. Although it showed a slight decrease of 0,03%, the rate in Limpopo remained the highest in the country over the 2-year period at 16,32 in 2003 and 16,31 in 2004.

The information in Table 16 above is also reflected in Figures 34 and 35 below.

Figure 34 : No. of Speed related Fatalities per 100 mil.veh.kms

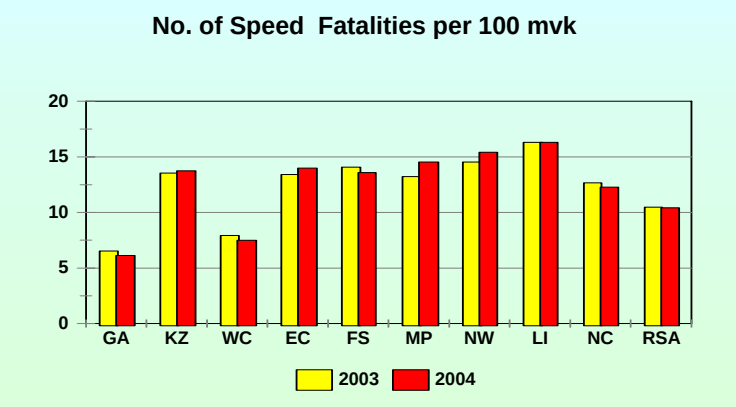
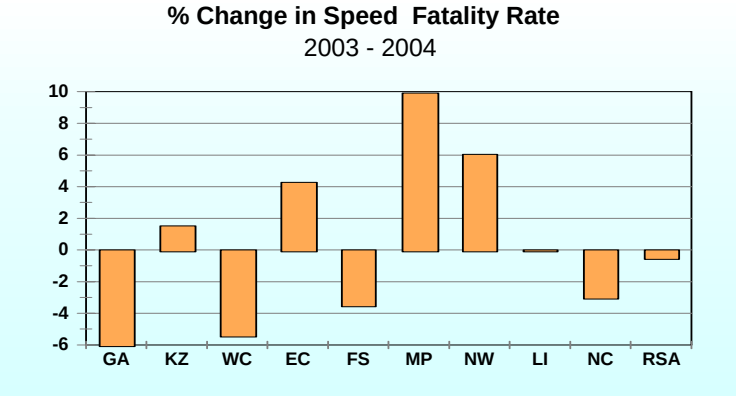


Figure 35 : % Change in Speed related Fatalities per 100 mil.veh.kms



5.4.10 Fatal Crash Rates:

The overall fatal crash rates in terms of the number of fatal crashes per distance travelled per Province in 2003 and 2004 is given in Table 17 and Figure 36 below.

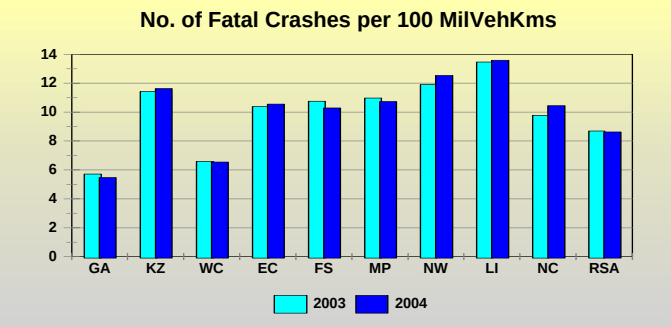
Table 17 : Overall fatal Crash Rates per 100 mil.veh.kms

Year	Est. Number of Fatal Crashes per 100 Mil.Veh.Kms									
	GA	KZ	WC	EC	FS	MP	NW	LI	NC	RSA
2003	5.71	11.43	6.59	10.39	10.76	10.97	11.91	13.47	9.78	**8.69**
2004	5.47	11.63	6.54	10.56	10.30	10.74	12.54	13.59	10.44	**8.63**
% Change	**-4.25**	**1.72**	**-0.74**	**1.62**	**-4.32**	**-2.11**	**5.30**	**0.89**	**6.74**	**-0.73**

The information in the table above indicate a decrease of 0,73% in the overall national fatal crash rate from 8,69 fatal crashes per 100 mil.veh.kms in 2003 to a rate of 8,63 in 2004. The biggest decrease was recorded in the Free State where the rate decreased by 4,32% from 10,76 to 10,30 in 2004.

The biggest increase was recorded in the Northern Cape where the rate increased by 6,74% from 9,78 in 2003 to a rate of 10,44 in 2004.

Figure 36 : No. of Fatal Crashes per 100 mil.veh.kms



Fatal crash rates in terms of the number of speed related fatal crashes per distance travelled per Province in 2003 and 2004 are given in Table 18 below.

Table 18 : Speed related Fatal Crashes per 100 mil.veh.kms

Speed Related Crashes and Distance Travelled per Province										
Prov	**GA**	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
Year	**Number of Reported Fatal Crashes due to Speed too High for Circumstances**									
2003	538	398	264	214	186	248	196	240	86	2.370
2004	666	658	351	310	303	404	303	344	124	3.463
Year	**Estimated Annual Mil.Veh.Kms Travel per Province**									
2003	39.974	19.150	18.371	8.528	6.737	8.651	7.138	6.533	2.791	117.875
2004	41.968	19.678	18.967	8.970	6.973	8.931	7.106	6.564	2.797	121.954
Year	**Number of Speed Related Fatal Crashes per 100 Mil.Veh.Kms**									
2003	1.35	2.08	1.44	2.51	2.76	2.86	2.75	3.68	3.08	2.01
2004	1.59	3.34	1.85	3.46	4.34	4.52	4.26	5.25	4.43	2.84
% change	17.93	60.80	28.80	37.92	57.08	58.06	54.83	42.71	43.86	41.21

The information in the table above indicates a substantial increase of 41,21% in the national speed related fatal crash rate from an average of 2,01 fatal crashes per 100 mil.veh.kms in 2003 to a rate of 2,84 in 2004.

All Provinces show increases in this rate. The biggest increase was recorded in KwaZulu-Natal where the rate increased by 60,80% from 2,08 in 2003 to a rate of 3,34 speed related fatal crashes per 100 mil.veh.kms in 2004. In Mpumalanga the rate increased by 58,06% from 2,75 in 2003 to 4,26 in 2004, followed by the Free State with an increase of 57,08% from 2,76 to 4,34 in 2004.

The highest rates in this regard in 2004 were for Limpopo (5,25) followed by Mpumalanga (4,52).

The above information is also reflected in Figures 37 and 38 below below.

Figure 37 : No. of Speed related Crashes per 100 mil.veh.kms

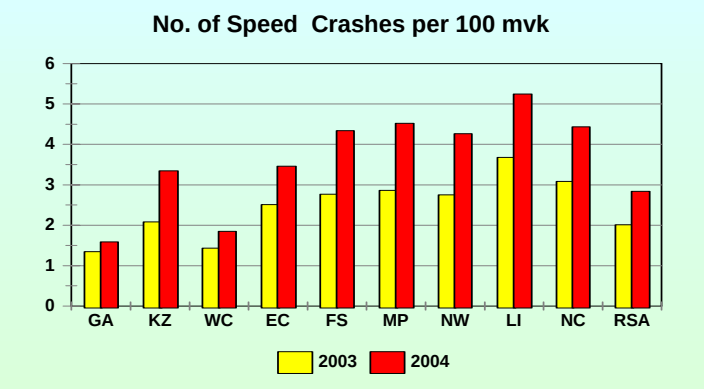
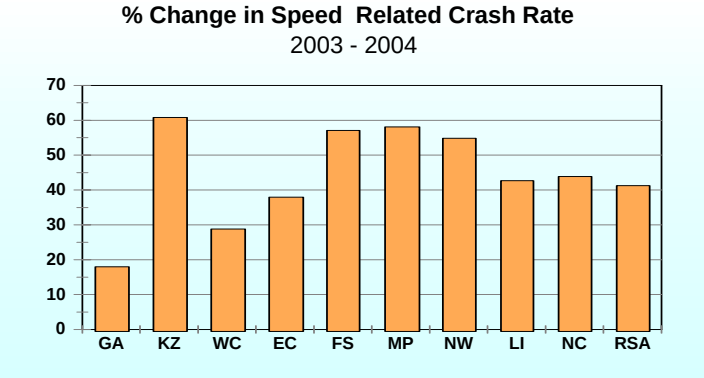


Figure 38 : % Change in Speed related Crashes per 100 mil.veh.kms



5.4.11 Estimated Cost of Fatal Crashes:

Based on the available information, the estimated cost of fatal crashes for 2003 and 2004 was calculated and given in Table 19 below.

Table 19 : Estimated Cost of Fatal Crashes : 2003 and 2004

Cost of Fatal Road Traffic Crashes (R million)						
Year	**No. of Fatal Crashes**	**No. of Speed Crashes**	**Unit Crash Cost (R m)**	**Cost of All Fatal Crashes**	**Cost of Speed Crashes**	**Speed Crash Cost %**
2003	10,246	2,370	0.836044	**8,566.112**	**1,981.668**	**23.13**
2004	10,523	3,463	0.839573	**8,834.831**	**2,907.461**	**32.91**

The information in the table above shows that the estimated cost of all fatal crashes in 2003 is in the order of R 8,6 billion of which R 2,0 billion (23,13%) was for speed related crashes. The total estimated cost in 2004 is in the order of R 8,8 billion of which R2,9 billion (32,91%) accounts for speed related crashes. The cost of speed related fatal crashes increased from 23,13% of the total cost in 2003 to 32,91% of the total cost in 2004.

6. Other Related Issues

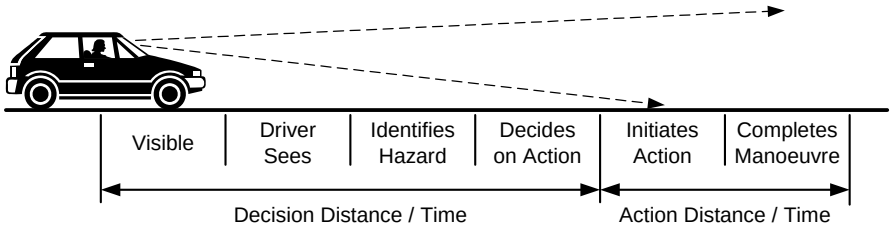
6.1 Human Factors and the Road Environment

Human level of training in the driving task, abilities, skills and limitations play an important role in roadway design and in traffic operations on a daily basis. The term "human factors" is used to describe the interaction of people with objects and processes within the natural and man-made environment. This interaction of people and the roadway environment is called "driver or road user behaviour". The efficient operation of the road traffic system depends on the behaviour of both drivers and pedestrians.

Approximately 95% of a driver's information is provided by vision. Drivers do not observe the roadway continuously but blink, observe objects well off the road, use the rear view mirror, read the vehicle instruments, talk to passengers and perform many other tasks. The process is one of sampling. Sampling levels are low when a driver has a good local knowledge, but they need to be much higher in an unfamiliar environment, when light is bad, traffic volumes are high, weather conditions are bad or when the road/street system is complex. When several such factors are involved simultaneously, information overload and resultant misunderstanding is possible. Such situations are more common on multi-lane metropolitan freeways carrying high volumes of traffic. Drivers should be aware of the "decision sight distance". This is the distance it takes for a driver to detect a hazard, recognise it as a threat, select an appropriate speed/path to perform the required manoeuvre safely and efficiently.

A "decision sight distance" model is shown schematically in Figure 39 below:

Figure 39 : Theoretical Decision Sight Distance Model



Decision Sight Distance Model

As indicated in the figure above, speed plays a major role in the decision sight distance model. For example: Travelling at a speed of 60 km/h in a small car it requires a distance of about 60 metres from where a hazard is

seen until a braking action or other avoidance measure is completed. Travelling at a speed of 100 km/h in the small car a total distance of 146 metres is required to complete the same procedure.

Travelling at a speed of 60 km/h in a bus it requires a distance of about 116 metres from where a hazard is seen until a braking action or other avoidance measure is completed. For the bus travelling at a speed of 100 km/h a total distance of 300 metres is required to complete the same procedure.

Information in the above regard for various types of vehicles is provided in Tables 20 and 21 below.

Table 20 : Required Stopping Sight Distance - metres

Required Stopping Distance - metres Decision distance plus Action distance				
Speed km/h	**Small car**	**Medium car**	**Large car**	**Heavy vehicle**
60	60	66	77	116
70	78	86	101	154
80	99	109	129	197
90	121	135	159	246
100	146	163	193	300
110	174	193	230	359
120	203	227	271	424
130	235	263	314	495
140	269	301	361	570
150	306	342	411	651
160	344	386	464	737
170	385	432	521	829
180	429	481	581	926
190	474	533	644	1.029
200	522	587	710	1.136

Table 21 : Required Stopping Time - seconds

Required Stopping Time - seconds Decision time plus Action time				
Speed km/h	**Small car**	**Medium car**	**Large car**	**Heavy vehicle**
60	5.73	6.44	7.76	12.37
70	6.50	7.32	8.87	14.24
80	7.27	8.21	9.97	16.11
90	8.03	9.09	11.07	17.98
100	8.80	9.97	12.18	19.86
110	9.56	10.86	13.28	21.73
120	10.33	11.74	14.38	23.60
130	11.09	12.62	15.49	25.47
140	11.86	13.51	16.59	27.34
150	12.62	14.39	17.70	29.21
160	13.39	15.27	18.80	31.08
170	14.16	16.15	19.90	32.96
180	14.92	17.04	21.01	34.83
190	15.69	17.92	22.11	36.70
200	16.45	18.80	23.21	38.57

The faster a vehicle is travelling, the longer it takes to stop or take remedial action. Every single kilometre per hour over the speed limit therefore not

only affects whether a crash happens, but how severe it is. In some cases, this could mean the difference between life and death. A medium size car travelling at 120 km/h can stop in the order of 150 metres sooner than one travelling at 160 km/h. This means that by the time a car travelling at 120 km/h has stopped under emergency braking, another car braking from 160 km/h would still be travelling at about 40-50 km/h, resulting in the inability of the driver to avoid a crash and/or an increase in the severity of the crash.

6.2 Road Users and Alcohol

Information collected during the 2003 Traffic Offence Survey on the percentage of drivers found driving under the influence of alcohol is given in Table 22 below. The figures include the 10% tolerance as required by the Judiciary for law enforcement purposes.

Table 22 : % Drivers found driving under the influence of Alcohol (Including 10% tolerance)

Vehicle Type	Year	GA	KZ	WC	EC	FS	MP	NW	LI	NC	RSA
All Vehicles All Times	2002	2.00	0.90	2.00	1.50	1.00	1.80	4.00	2.20	3.10	**1.80**
	2003	1.14	1.68	2.85	1.74	1.48	4.68	2.63	3.73	2.29	**2.08**
All Vehicles Between 18:00-21:00	2002	7.80	2.50	2.60	6.25	3.60	5.00	8.90	8.00	7.40	**5.50**
	2003	2.65	4.49	8.13	2.48	4.40	13.42	2.86	8.90	4.69	**5.08**
Drivers of Trucks, Buses & Taxis	2002	3.00	4.20	1.60	1.40	0.80	1.10	2.30	2.00	3.40	**2.50**
	2003	1.44	0.90	0.51	2.74	0.50	6.12	1.79	1.92	1.23	**1.74**

The above figures for all vehicles at all times indicate an increase in the national rate of about 15,56% from 1,80% drivers found under the influence of alcohol in 2002 to an average of 2,08% drivers under the influence in 2003. The above information is also reflected in Figures 40 and 41 below.

Figure 40 : % of Drivers Exceeding Alcohol Limit

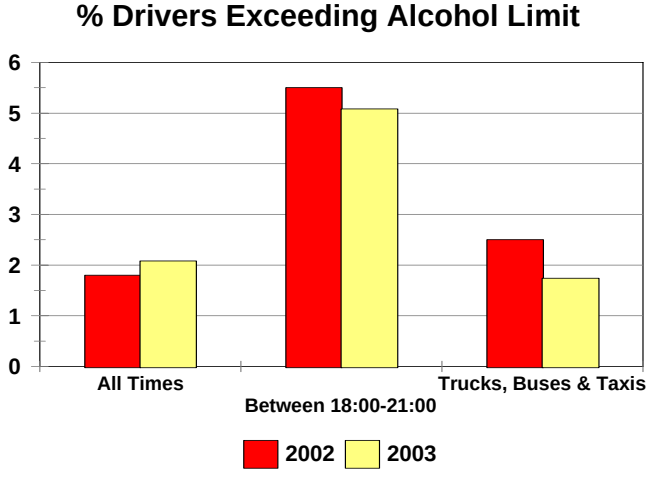
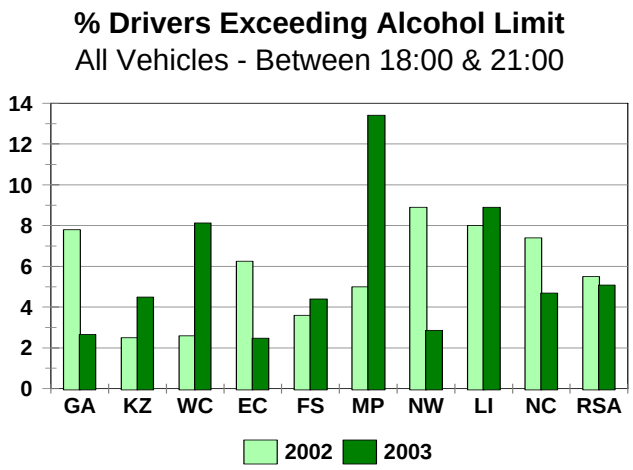


Figure 41 ; % Drivers Exceeding Alcohol Limit 18:00-21:00



Figures for 2001 were also released early in 2003 by the Medical Research Council on the number of persons killed in road accidents that were found to be under the influence of alcohol. These figures are given in Table 23 below.

Table 23 : Percent of User Group Road Deaths involving Alcohol

Road Accidents	Blood Alcohol Concentration (BAC) - g/100ml						
User Group	**Zero**	**0,01-0,04**	**0,05-0,14**	**0,15-0,24**	**>0,25**	**Excl Zero**	**>0,05**
Drivers	48.20	5.30	**18.20**	18.80	9.50	**51.8**	**46.5**
Passengers	62.60	4.70	**14.00**	13.70	5.00	**37.4**	**32.7**
Pedestrians	37.50	5.40	**12.00**	20.40	24.70	**62.5**	**57.1**
Cyclists	61.20	3.20	**15.10**	14.00	6.50	**38.8**	**35.6**

In accordance with the above figures, the Blood Alcohol Concentration (BAC) of 46,5% of all drivers killed in crashes exceeded the legal limit of 0,05 g/ml while 9,5% consumed more than 5 times than the legal limit. The BAC of 57,1% of pedestrians killed in crashes exceeded the legal limit while 24,7% consumed more than 5 times the legal limit of alcohol. These figures, taking into consideration the high percentage of pedestrians jaywalking is a matter of great concern.

6.3 Overtaking Across Barrier Lines:

Although the 2003 Offence Survey indicated that there was a general improvement in this regard from 2002 to 2003, unsafe and illegal overtaking across barrier lines remains an issue of serious concern. Barrier line and unsafe overtaking offences are generally associated with head-on, sideswipe, as well as single vehicle and some fixed object accidents, where one vehicle is forced off the road in order to avoid a crash with another vehicle when an overtaking offence is committed. Together with jumping red

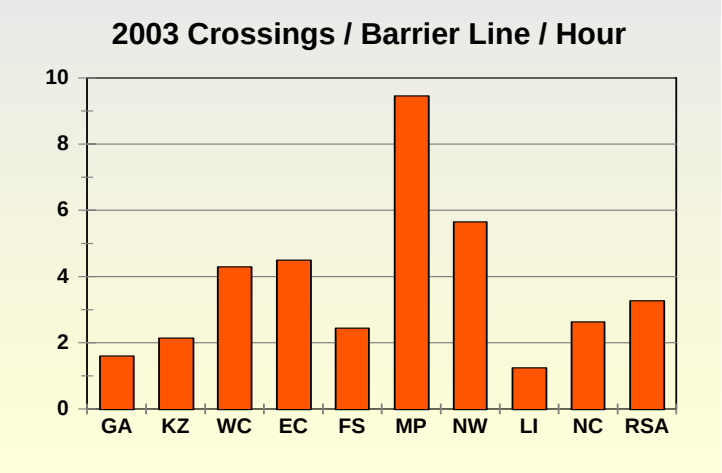
traffic signals, this is one of the most serious and dangerous offences a driver can commit. The survey results in this regard for 2002 and 2003 are given in Table 24 below.

Table 24 : Overtaking Across Barrier Lines : All Vehicles : Average number of crossings per barrier line per hour

Year	GA	KZ	WC	EC	FS	MP	NW	LI	NC	RSA
2002	10.50	9.00	4.20	5.10	3.00	27.30	4.80	2.40	0.90	**8.70**
2003	1.60	2.14	4.29	4.50	2.44	9.46	5.65	1.24	2.63	**3.27**

The national, weighted average number of overtaking offences recorded at barrier lines is 3.27 offences per barrier line per hour. Considering how many barrier lines there are in the country, the scenario is frightening. For every 1,000 barrier lines on our roads, an average of 3,270 overtaking offences can be expected every hour! The seriousness of this situation is confirmed by the large number of fatalities that could be linked back to the barrier line offences. Overtaking offences should be a high priority in enforcement and traffic management operations. The average number of illegal and unsafe crossings per barrier line per hour per Province observed during the 2003 survey is shown in Figure 42 below.

Figure 42 : Average Crossings per Barrier Line per Hour



6.4 Ignoring Red Traffic Signals

Ignoring of traffic signals is a very serious offence and one that leads to the majority of fatal accidents in urban areas. Information on the average number of offences per phase collected during the 2003 Traffic Offence Survey is provided in Table 25 below.

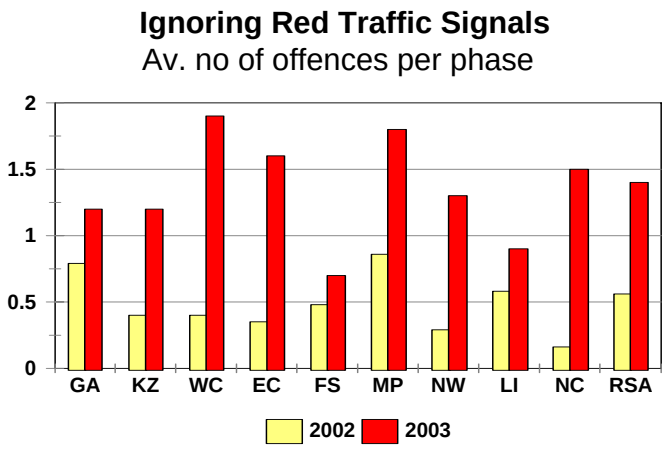
Table 25 : Ignoring Red Traffic Signals : Average no. of Offences per Phase										
Year	**GA**	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
2002	0.79	0.40	0.40	0.35	0.48	0.86	0.29	0.58	0.16	**0.56**
2003	1.20	1.20	1.90	1.60	0.70	1.80	1.30	0.90	1.50	**1.40**
% Change	51.90	200.00	375.00	357.14	45.83	109.30	348.28	55.17	837.50	150.00

The figures in the table above indicate that traffic signal offences increased by 150% from a national average of 0.56 offences per phase to 1,40 offences per phase. Increases in this offence was experienced in all Provinces with the highest in the Northern Cape where the increase was 837,5% from an average of 0.16 offences per phase in 2002 to an average of 1,40 offences per phase in 2003.

The traffic signal offence rate is the highest in the Western Cape with an average of almost 2 offences per phase. The second highest rate is in Mpumalanga with an average of 1,8 offences per phase. It should be noted from section 3.6 above that the driver alcohol rates in the Western cape and Mpumalanga were also amongst the highest and indicative of a possible link between the two types of offences.

The above figures are also reflected in the graph below.

Figure 43 : Average No. of Traffic Signal Offences per Phase



6.5 Non-Wearing Rate of Seatbelts:

Information on the percentage of drivers, front and backseat passengers not wearing seatbelts is given in Table 26 below.

Table 25 : % Vehicle Occupants Not Wearing Seatbelts : Rural Roads : 2003										
Occupant	**GA**	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
Driver - Unobserved	74.10	69.40	61.30	63.10	63.80	63.10	60.20	70.20	57.60	**67.50**
Driver - Roadblock	16.80	13.30	14.80	11.10	16.60	9.10	10.60	15.90	12.40	**14.20**
Front Pass - Roadblock	36.90	32.60	30.40	31.00	32.20	35.00	20.90	40.60	28.90	**33.30**
Back Pass - Roadblock	98.00	95.90	88.30	93.10	87.40	85.80	95.30	90.60	80.80	**93.20**

The figures in the above table indicate that, on average 67,5% of drivers during the un-observed, rural survey, did not wear seatbelts. This figure changed to 14,2% for the observed (roadblock) survey where they had the opportunity to quickly put on their seatbelts while waiting to be interviewed. The roadblock survey indicated that 33,3% of front seat passengers and 93,2% backseat passengers do not wear seatbelts. Based on the figure for drivers during the un-observed survey, these figures can be assumed to be higher in reality.

The improved wearing of seatbelts will contribute to a reduction in the severity rate of accidents as seatbelts can assist in reducing fatalities and serious injuries by as much as 50%.

Improved law enforcement on seatbelts at roadblocks will not have the desired effect as vehicle occupants will fit their seatbelts on approaching a roadblock. Possible other, more effective law enforcement procedures will have to embark upon, for example observations during moving road patrols.

6.6 Age of Motor Vehicle Population

The average of the motor vehicle population in 2004 is given in Table 26 below.

Table 26 : Average Age of Motor Vehicle Population

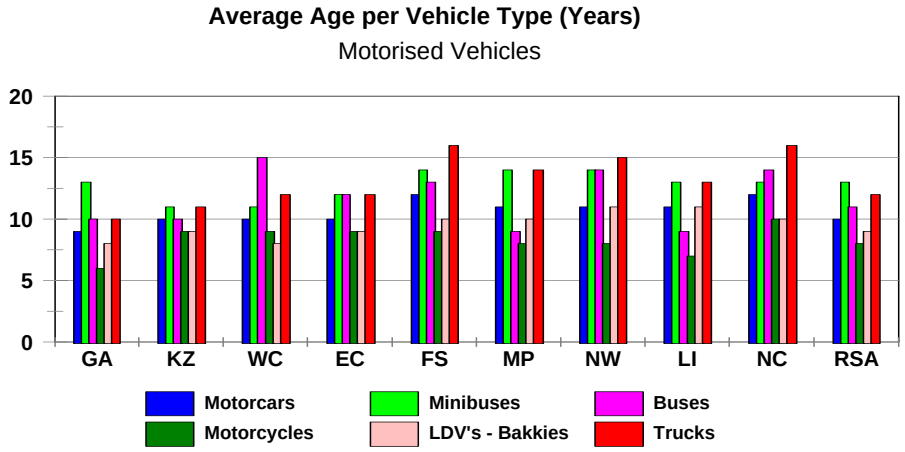
Average Age per Vehicle Type per Province (years)										
Vehicle Type	**GA**	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
Motorcars	9	10	10	10	12	11	11	11	12	**10**
Minibuses	13	11	11	12	14	14	14	13	13	**13**
Buses	10	10	15	12	13	9	14	9	14	**11**
Motorcycles	6	9	9	9	9	8	8	7	10	**8**
LDV's - Bakkies	8	9	8	9	10	10	11	11	10	**9**
Trucks	10	11	12	12	16	14	15	13	16	**12**
Other & Unknown	13	12	11	13	21	17	20	16	13	**15**
All Motorised Vehicles	**9**	**10**	**10**	**10**	**12**	**11**	**12**	**11**	**12**	**10**
Caravans	18	18	21	20	20	19	19	19	20	**19**
Heavy Trailers	10	10	11	10	11	12	15	11	11	**11**
Light Trailers	10	11	12	12	16	11	11	11	12	**11**
Unknown	8	10	11	10	11	23	27	20	12	**12**
All Towed Vehicles	**11**	**11**	**13**	**12**	**15**	**13**	**13**	**13**	**13**	**12**
All Vehicles	**9**	**10**	**10**	**10**	**12**	**11**	**12**	**11**	**12**	**10**

The above indicates that the average age of all motorized vehicles is 10 years and that of towed vehicles 12 years. The average age of motorcars is 10 years; minibuses 13 years, buses 11 years and trucks 12 years. The average age of caravans is 19 years; heavy trailers 11 years and light trailers 11 years.

48,03% of motorcars are older than 10 years; 15,81% older than 20 years and 2,67% older than 30 years. 61,70% of minibuses are older than 10 years; 16,36% older than 20 years and 1,85% older than 30 years. 53,43% of buses are older than 10 years; 25,25% older than 20 years and 3,57% older than 30 years. 44,15% of LDV's (bakkies) are older than 10 years; 15,79% older than 20 years and 2,60% older than 30 years. 55,22% of trucks are older than 10 years; 25,49% older than 20 years and 3,72% older than 30 years.

The above information is also reflected in Figure 44 below.

Figure 44 : Average Age of Motor Vehicles



6.7 Number of Un-Roadworthy Vehicles

The number of un-roadworthy vehicles, as recorded on the National Traffic Information System (NaTIS), increased by 23,009 (13,60%) from 169,199 on 31 December 2003 to 192,208 on 31 December 2004.

On a percentage basis, on 31 December 2004 the highest number of un-roadworthy vehicles was trucks at 10,99% (25,191) of all trucks registered being un-roadworthy; followed by 9,37% (2,591) of all buses; 9,21% (21,932) minibuses and 9,06% (9,539) heavy trailers being un-roadworthy. Detailed information in this regard is provided in Table 27 below.

Table 27 : Number of Recorded Un-Roadworthy Vehicles

Number of Un-Roadworthy Vehicles Registered on NaTIS										
Dec 2004	**GA**	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
Motorised Vehicles										
Motorcars	33,904	12,484	12,130	4,031	4,050	3,854	5,013	2,698	665	**78,829**
Minibuses	7,785	4,612	1,883	1,565	1,081	1,264	1,944	1,608	190	**21,932**
Buses	781	508	264	197	140	183	247	207	64	**2,591**
Motorcycles	6,270	1,218	1,493	463	1,152	1,145	995	696	212	**13,644**
LDV's - Bakkies	8,099	5,708	2,966	1,930	1,485	1,851	2,175	1,717	401	**26,332**
Trucks	7,315	3,861	2,703	1,795	2,470	2,373	1,920	1,865	889	**25,191**
Other & Unknown	752	758	300	188	801	509	521	407	78	**4,314**
Sub-Total	**64,906**	**29,149**	**21,739**	**10,169**	**11,179**	**11,179**	**12,815**	**9,198**	**2,499**	**172,833**
Towed Vehicles										
Caravans	767	190	229	81	144	181	203	136	36	**1,967**
Heavy Trailers	3,334	1,456	768	455	980	980	682	618	266	**9,539**
Light Trailers	2,703	1,012	959	309	920	439	578	380	103	**7,403**
Unknown	110	102	49	21	58	52	35	25	14	**466**
Sub-Total	**6,914**	**2,760**	**2,005**	**866**	**2,102**	**1,652**	**1,498**	**1,159**	**419**	**19,375**
All Vehicles	**71,820**	**31,909**	**23,744**	**11,035**	**13,281**	**12,831**	**14,313**	**10,357**	**2,918**	**192,208**

Some of the highest numbers (percentages in brackets) of these un-roadworthy vehicles types per Province are as follows:

Trucks : Gauteng : 7,315 (9,14%); KwaZulu-Natal : 3,861 (10,73%); Western Cape : 2,703 (8,80%); Free State : 2,470 (15,86%) and Limpopo : 1,865 (14,36%).

Buses : Gauteng : 781 (9,11%); KwaZulu-Natal : 508 (11,12%); North West : 247 (10,09%).

Minibuses : Gauteng : 7,785 (8,97%); KwaZulu-Natal : 4,612 (12,97%); North West : 1,944 (11,16%).

Heavy trailers : Gauteng : 3,334 (10,08%); KwaZulu-Natal : 1,456 (7,53%); Mpumalanga : 980 (10,23%).

The total percentages of un-roadworthy vehicles registered per Province and type of vehicle at the end of 2003 and 2004 respectively, are shown in Figures 45 and 46 below.

Figure 45 : % of Un-Roadworthy Vehicles per Province

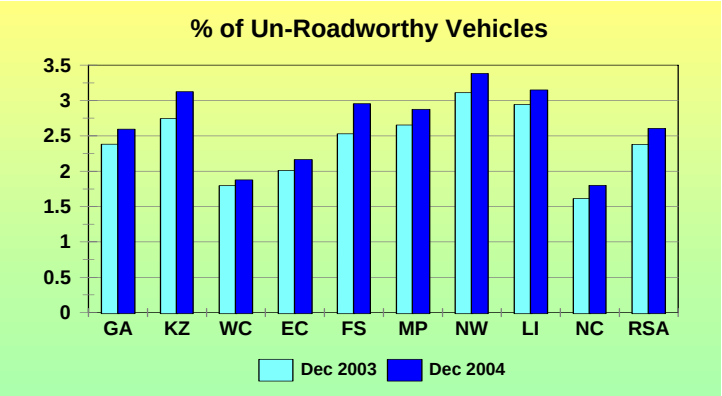
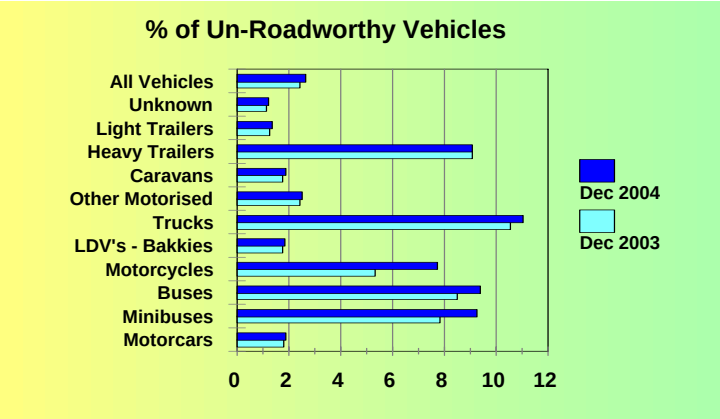


Figure 46 : % of Un-Roadworthy Vehicles per Type



It should be noticed that the figures given above could possibly be only the tip of an iceberg. It is known that there are many vehicles of all types that could be shown on NaTIS as being roadworthy, but which was obtained in a fraudulent manner.

6.8 Vehicles with Defective Tyres

Information on the quality of vehicle tyres found on minibus taxis, buses and trucks during the 2003 survey is summarized in Table 28 below.

Table 28 : % Vehicles with at least One Worn or One Damaged Tyre

Vehicle Type	Status	GA	KZ	WC	EC	FS	MP	NW	LI	NC	RSA
Minibus Taxi	Worn	17.00	19.00	19.00	19.00	20.00	8.00	18.00	17.00	19.00	**17.00**
	Damaged	2.00	3.00	3.00	2.00	3.00	5.00	4.00	2.00	5.00	**3.00**
Bus	Worn	2.00	9.00	8.00	5.00	6.00	7.00	6.00	6.00	10.00	**6.00**
	Damaged	14.00	5.00	2.00	3.00	6.00	9.00	6.00	6.00	3.00	**8.00**
Truck	Worn	15.00	21.00	23.00	25.00	19.00	13.00	18.00	17.00	19.00	**19.00**
	Damaged	26.00	17.00	14.00	11.00	28.00	18.00	16.00	29.00	17.00	**20.00**

The information in Table 7 above indicate that, on average in the RSA, about 17% of all minibus taxis are fitted with at least one worn tyre, while 3% have at least one tyre fitted that is damaged. The number of trucks with smooth and damaged tyres is of great concern. On average in the RSA about 19% of all trucks have at least one smooth tyre and 20% have at least one damaged tyre. Based on the above percentages, the estimated number of vehicles per Province with worn or damaged tyres is shown in Table 29 below.

Table 29 : Number of Vehicles with at least One Worn or One Damaged Tyre

Vehicle Type	Status	GA	KZ	WC	EC	FS	MP	NW	LI	NC	RSA
Minibus Taxi	Worn	7,477	3,410	3,250	1,731	1,099	639	1,586	1,359	297	**20,848**
	Damaged	880	538	513	182	165	400	352	160	78	**3,268**
Bus	Worn	183	421	317	97	82	168	155	125	68	**1,615**
	Damaged	1,281	234	79	58	82	216	155	125	20	**2,250**
Truck	Worn	12,965	7,970	7,277	4,354	3,054	2,379	2,573	2,351	1,235	**44,158**
	Damaged	22,472	6,452	4,430	1,916	4,500	3,294	2,287	4,011	1,105	**50,467**

6.9 Vehicles with Defective Lights

Some information from the 2003 Survey on the condition of the front lights of vehicles is summarized in Table 30 below.

Table 30 : % Vehicles with One or More Front Lights not working

Vehicle Type	Status	GA	KZ	WC	EC	FS	MP	NW	LI	NC	RSA
Motorcar & LDV	Main - Dim	2.20	0.70	1.60	2.00	3.10	3.20	4.40	2.80	3.10	**2.20**
	Flicker	1.40	1.50	2.10	2.70	1.60	4.00	3.00	1.50	2.00	**2.00**
Minibus Taxi	Main - Dim	5.00	5.90	4.70	3.30	4.50	3.40	11.00	6.30	4.80	**5.30**
	Flicker	3.90	6.20	3.80	3.30	4.00	5.80	4.50	2.40	3.00	**4.30**
Bus	Main - Dim	3.10	0.00	0.00	0.00	0.00	2.40	3.10	0.00	1.70	**1.40**
	Flicker	0.00	1.30	0.00	0.00	4.50	1.20	1.50	1.20	0.00	**0.80**
Truck	Main - Dim	2.40	1.10	1.50	2.40	1.10	3.50	4.30	2.80	3.80	**2.20**
	Flicker	2.10	0.80	3.30	1.90	1.70	2.90	1.70	2.30	2.30	**2.10**

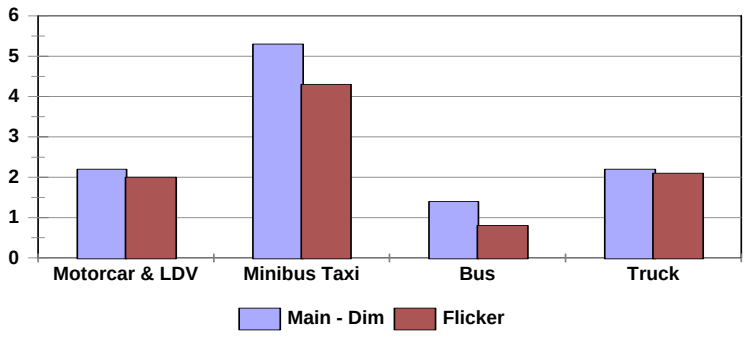
The figures in the table above indicate that, on average in the RSA 2,2% of motorcars and LDV's; 5,3% of minibus taxis; 1,4% of buses and 2,2% of all trucks have at least one front main beam (dim position) that are defective.

In North West 11,0% of minibus taxis have at least one front main beam (dim position) that is not working. In KwaZulu-Natal 6,2% of minibus taxis have at least one front flicker light that is defective.

4,3% of the trucks in North West and 3,5% of the trucks in Mpumalanga were found with defective front lights in the dim position. In the Western Cape 3,3% of the trucks were found with defective front flicker lights.

The above figures are also reflected in Figure 47 below.

Figure 47 : % Vehicles with Defective Front lights



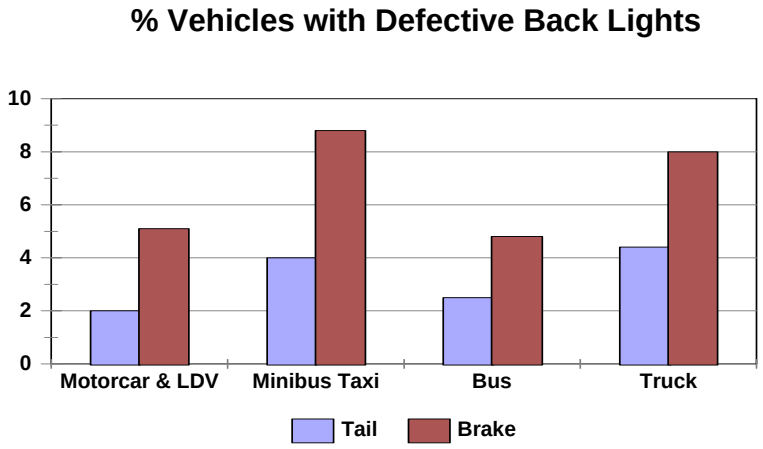
Some information from the 2003 Survey on the condition of the rear lights of vehicles is summarized in Table 31 below.

Table 31 : % Vehicles with One or More Back Lights not working

Vehicle Type	Status	GA	KZ	WC	EC	FS	MP	NW	LI	NC	RSA
Motorcar & LDV	**Tail**	0.80	2.20	2.50	1.90	1.90	3.70	4.00	2.30	3.80	**2.00**
	Brake	6.50	4.60	3.20	5.20	3.30	4.60	6.30	4.20	4.80	**5.10**
Minibus Taxi	**Tail**	3.10	1.90	5.10	3.60	6.80	2.90	10.00	3.20	7.40	**4.00**
	Brake	12.00	6.70	6.40	5.70	9.70	6.10	13.00	7.40	5.90	**8.80**
Bus	**Tail**	3.10	1.30	1.70	3.20	3.00	3.60	1.50	3.70	1.70	**2.50**
	Brake	6.30	5.30	3.30	4.80	4.50	2.40	1.50	7.30	1.70	**4.80**
Truck	**Tail**	3.10	5.20	5.50	5.90	5.20	4.30	3.70	4.10	4.30	**4.40**
	Brake	8.60	7.10	8.40	10.80	8.00	6.20	6.30	6.70	9.00	**8.00**

The figures in the table above indicate that 2% of light motor vehicles (motorcars and LDV's), 4% of minibus taxis, 2,5% buses and 4,4% trucks in the RSA have at least one tail light (back) that is defective. The percentage of vehicles per type with defective brake lights are as follows: light vehicles 5,1%; minibus taxis 8,8%; buses 4,8% and trucks 8%. In North West 13% of minibus taxis and in the Eastern Cape 10,8% of trucks have defective brake lights. These figures are also reflected in Figure 48 below.

Figure 48 : % Vehicles with Defective Rear Lights



6.10 Level of Law Enforcement

The observed traffic law enforcement levels, if any, were far too low for the high level of lawlessness observed. During the 2003 Survey the presence of traffic officers were observed only 5 times over a total distance of 4,600 kilometres travelled over a period of about 2½ months on the inter-city and inter-provincial road network, (see Table 32 below). In only 3 cases was

there active interaction with road users. The other 2 cases observed, were officers sitting under bridges “observing” the traffic.

Table 32 : Presence of Traffic Officers Observed on Main Routes									
GA	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
0	2	0	1	0	2	0	0	0	5

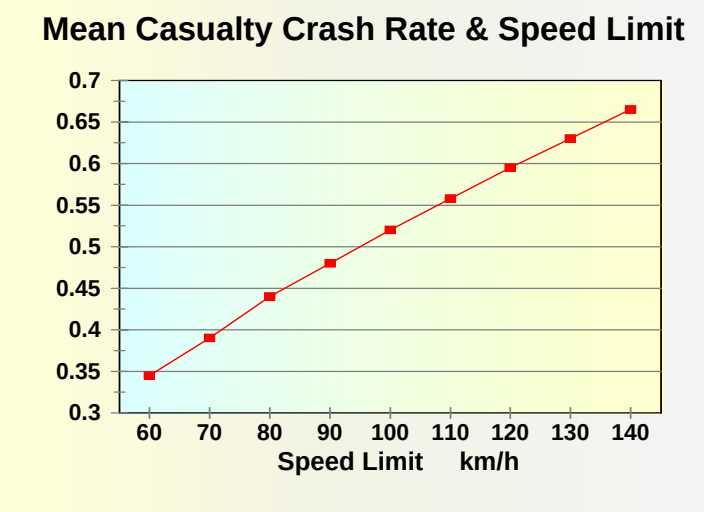
This signifies that the function of law enforcement needs urgent attention, with the view to drastically improve the active presence of officers and to increase personal interaction with road users on the national and major provincial road network.

7. Discussion

The issue around travel speed and excessive speed in particular, has been an issue of major concern over the last few years.

Local research has shown that the lowering of speed limits (resulting in lower operating speeds on the rural road network) had an *overwhelming* effect on the occurrence of road accidents. A reduction in the speed limit from 120 km/h to 80 km/h resulted in a decrease in the casualty crash rate (number of casualty crashes per million vehicle kilometres travel) from about 0,59 to about 0,44. It was found that the relationship between the crash rate and the speed limit was almost linear, as shown in *Figure A* below.

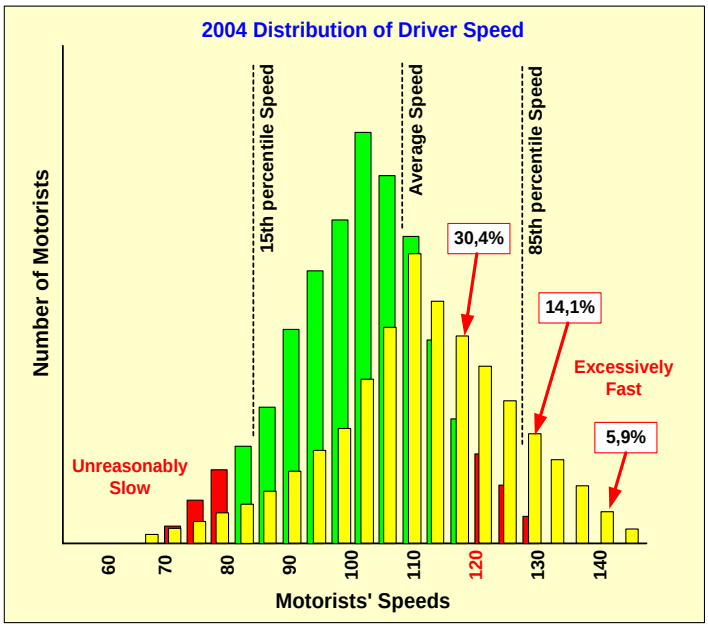
Figure A : Casualty Crashes per Million Vehicle Kilometres



It was further found that a decrease of 1 km/h in the mean vehicle speed in rural areas resulted in a decrease of 9 fatal accidents and 120 total accidents per month.

It is generally accepted in basically all countries, including South Africa, that not more than about 15% of traffic exceed the set limit and that this 15% should be subject to enforcement and prosecution. The current local situation is actually much worse. As indicated above, it was found in the 2004 speed analysis that in the order of 30,4% of drivers exceed the 120 km/h limit; about 14,1% exceed 130 km/h and 5,9% drive faster than 140 km/h. These figures in yellow are superimposed on a more desirable speed distribution curve in green in *Figure B* below.

Figure B : 2004 Speed Distribution



The figures above indicate a much wider spread of speeds amongst vehicles in the traffic situation, which result in an increase of the average speed. It further increases the potential conflict between drivers that are driving excessively fast and drivers in the lower 15% group that drive unreasonably slow, thus increasing the risk of being involved in a crash, as well as the severity of a crash, should it happen.

Although excessive speeds and particularly increased speed differentials between vehicles was found to be a major contributory factor to road crashes, not only in South Africa but also in many overseas counties, the local traffic situation creates a much higher safety risk than many other countries. In this regard the factors that should be brought into the full equation include, amongst others : the level of training and skills of drivers; the number of fraudulently obtained driving licences; the high levels of drunk drivers and pedestrians on the road network; the high level of general lawlessness, such as overtaking across barrier lines and skipping of red robots; the high level of ignorant and aggressive drivers; the number of un-roadworthy vehicles with faulty brakes, lights, steering and damaged or worn tyres; with added roads that are not maintained to acceptable standards and a lack of pedestrian facilities, etc.

The great speed differential between vehicles, excessive speed and speed too fast for circumstances; as well as the drinking and driving problem, encourages and contribute to a certain extent to many of the so-called moving violations such as illegal and unsafe overtaking; skipping of red robots; continuous changing of lanes; swerving in front of other traffic and generally decrease the quality in road traffic.

8. Conclusion and Recommendation:

Speed remains an immense problem, and increasingly so. the number of fatal crashes that happened because of excessive speeds or speed too high for circumstances in creased by 1,093 (46,10%) from 2,370 in 2003 to 3,463 in 2004. In 2003 fatal crashes in which speed played a role was 23,24% of a total of 10,246 fatal crashes. In 2004 fatal crashes in which speed played a role increased to 32,94% of a total of 10,523 fatal crashes. The number of fatalities resulting from speed related fatal crashes increased by 1,326 (46,41%) from 2,857 in 2003 to 4,183 in 2004.

Speed plays a role in every accident and high speeding levels are indicative of a serious road safety threat. Urban speeding is even more lethal, considering the number of pedestrians and children that are present in the urban environment. Reduction of speed is emphasised as an important facet of The Road to Safety 2001-2005 Strategy. However, no significant success with speed management is apparently being achieved, due to very low levels of enforcement as indicated in the report.

Not to be seen as the one and only contributory factor in road crashes, excessive speed and speed too fast for circumstances do play a major role in the occurrence; as well as the severity of crashes. Such speeds, brought into context with simultaneous negligent, inconsiderate and aggressive driver behaviour; the presence of pedestrians and animals; together with a high percentage of drivers driving under the influence of alcohol or being fatigued; and vehicles with smooth tyres, faulty lights and brakes; illegal and unsafe overtaking; as well as poorly maintained roads and road signs, is a recipe for disaster.

In order to effect a lasting change in the current road safety situation, all of these issues should be vigorously improved. An improvement in only one of these issues could, however, also effect a slight improvement in the overall situation – such as ensuring a meaningful reduction in the very high percentage of drivers exceeding the speed limit and driving at excessive speeds.

Of all the functional areas within the field of road traffic quality and safety law enforcement is probably the most important, but also the most neglected and should be addressed as a matter of urgency.

Speed as a Contributory Factor to Road Traffic Crashes

Index to Annexures

Annexure A

SETTING OF SPEED LIMITS IN SOUTH AFRICA

EXECUTIVE SUMMARY

INTRODUCTION

General speed limits in South Africa are prescribed in the National Road Traffic Act (Act No. 93 of 1996) and the National Road Traffic Regulations (1997). General speed limits, however, cannot accommodate all possible conditions that may occur on roads, and provision has therefore been made for the posting of lower or higher speed zone limits on particular roads and streets.

The Traffic Act and Regulations do not prescribe a method or procedure for the setting of speed zone limits. The CSIR Technical Report RV/19 "Guidelines for setting speed limits" was developed for this purpose. Although it was applied in some provinces, it did not gain widespread support. The South African Department of Transport has established that an urgent need exists for a revision of this document for the setting of speed limits. This was in response to the increased debate on speed limits in the country, as well as the high levels of speeding which are being experienced on South African roads.

The main objective of this study was to revise the current guidelines for setting speed limits for all classes of roads and streets. A further objective of the study was to consider the possible lowering or raising of speed limits on different classes of roads and streets which are currently subject to speed limits of 60 km/h and 100 km/h respectively (an investigation into the maximum speed limit of 120 km/h was specifically excluded from the study). The feasibility of introducing differential speed limits for different vehicle classes, wet and dry conditions as well as day and night conditions was also investigated.

STUDY METHODOLOGY

The methodology followed in the study consisted of the following:

a) *Evaluation of existing local and overseas practices and other information.* A major review of research and other reports was undertaken during the course of the study. Information was obtained from various countries in the world. More than 200 reports were collected and reviewed during the study.

b) *Evaluation of South African data on accidents and speeds.* South African data on accidents and speeds were obtained from a number of organisations. Additional speed observations were undertaken during the study.

c) *Questionnaires and consultation with interested parties.* An important phase of the study was to obtain and assess views of road and traffic authorities, organisations and other

interested parties on issues regarding speed limits. These views were collected by means of questionnaires and interviews.

d) *A study tour on roads in South Africa.* A study tour was undertaken to various regions in South Africa to investigate road and traffic conditions. An attempt was made to inspect as many road types and environments as possible during the tour. Many of the recommendations incorporated in this report are based on information obtained during this tour.

e) *Evaluation of proposals by the STOP committee of traffic experts.* The STOP (Safety in Traffic Operations Programme) committee of the Department of Transport was responsible for controlling the project and approving recommendations made in the report. This committee provided valuable input during the investigation to ensure that proposals were developed as objectively as possible.

SPEED LIMITS IN PRACTICE

Information on speed limit practices was obtained from a number of countries, including the United States of America, Canada, the United Kingdom, European countries and Australia. South African speed limits compare as follow with limits in these countries:

a) The urban speed limit used in most countries is 50 km/h, but it varies between 40 km/h and 60 km/h. The 40 km/h limit is used in some states of the United States, while the 50 km/h limit is popular in Canada and a number of European countries. The South African limit of 60 km/h is somewhat high, but it is not the only country with this limit.

b) The speed limit on rural roads varies between 80 and 112 km/h. The South African general limit of 100 km/h falls within this range.

c) The freeway speed limit in most countries varies between 100 and 120 km/h, but a number of countries in Europe apply higher speed limits. The South African speed limit of 120 km/h is high compared to limits in Australia and the United States, but average compared to the European countries.

d) Heavy vehicle speed limits typically vary between 90 and 100 km/h, with a few countries applying a limit of 80 km/h. Many countries have no differential speed limits for heavy vehicles. The South African limit of 80 km/h for heavy vehicles appears to be somewhat low in comparison.

e) Countries have not all introduced speed limits for buses. Those countries that have such limits typically apply a speed limit of 100 km/h.

Speed zoning is the process of determining whether the general speed limits are applicable to a specific road and, if not, to establish the most appropriate limit. Speed zone limits in most countries are principally established based on *85th* percentile speed, although limits are adjusted for factors such as roadside development and road geometry.

SPEED LIMITS AND SPEEDING

It is axiomatic that speed limits affect safety only if limits affect the actual speed selection of drivers. There is little point in establishing a speed limit, however desirable, if it is not going to have any effect on actual vehicle speed. This issue was investigated in some detail during the study.

Speed observations on South African roads indicated that there is a considerable extent of speeding in the country. Speeding is especially prevalent on roads with lower speed limits. In some cases, it appears as though drivers were of the opinion that the speed limit is the minimum limit since nearly all drivers were found to travel faster than the limit. The 120 km/h speed limit, however, is not exceeded to the same degree as the 100 km/h and lower limits. The 80 km/h speed limit for heavy vehicles is also exceeded by a large number of heavy vehicles.

The high non-compliance rate on 100 km/h roads seems to indicate that many South African drivers are under the impression that a 120 km/h limit applies to rural roads, and not the 100 km/h limit. The reason for the higher compliance rate on the 120 km/h roads, however, could also simply be that many vehicles do not have sufficient power to reach the high speeds or that drivers do not consider higher speeds to be safe for prevailing conditions on such roads.

South Africa is not the only country in the world which is experiencing problems with the non- compliance of speed limits. A review of a number of reports indicated that the problem is rather widespread throughout the world, and that the problem has been experienced for a number of decades. Various studies in other countries indicated that speed limits are exceeded by large numbers of drivers, and that speed limits have little influence on vehicle speeds.

The current situation concerning speeding in South Africa and throughout the world is unsatisfactory. Most persons appear to support the use of speed limits, and even very low speed limits, but simply continue to ignore speed limits as if they do not exist and treat them with contempt. ***These problems have now been experienced for a number of decades, which suggest that either no will or desire exists to enforce speed limits, or that traditional forms of law enforcement have failed in curbing speeding.***

An urgent need exists for new and innovative approaches to control and manage speeds. The most promising approach appears to be the application of engineering solutions where physical impediments are placed in the way of drivers (speed calming measures). Innovative methods of law enforcement are also required, but are less likely to be successful. Safety problems, however, will not be addressed by simply continuing posting speed limits that are ignored by most drivers. It is not surprising that speed limits are being ignored when speed limits are posted which are considerably lower than the design speed of a road.

SPEED LIMITS AND SAFETY

Speed control and management has been identified as one of the most important measures to reduce speed-related accidents. The severity of accidents increases exponentially with higher speed. It also becomes more difficult to avoid accidents at high speed because of reaction time and the greater difficulty of controlling vehicles at such speeds.

It does however, not follow that changing a speed limit will automatically increase or reduce accidents. It is not necessary speed that kills, but speed which is inappropriate for prevailing conditions. Low speed is likely to kill as much as high speed, for example a truck that travels at a very low speed at night on a high-speed road. There is also a tendency in South Africa to assume that it is safe to travel at the speed limit under all circumstances.

The basic problems with establishing a speed limit are that it applies to a wide range of conditions and, that it represents a compromise-between mobility and safety. There is considerable controversy on this issue, which makes the establishment of numerical speed limits difficult and contentious. The only safe speed is zero, since accidents occur at all speeds (it could even be argued that a zero speed is not necessarily safe). A speed limit is a trade-off that must be accepted by both those who are in favour of lower limits, as well as those in favour of higher limits. It should, however, also be acknowledged that a speed limit is perhaps not the best method of speed control and that alternative measures could be more effective.

THE NEED FOR SPEED LIMITS

The need for speed limits is clearly recognised throughout most countries of the world - with few countries allowing unlimited speeds. The problem, however, with a speed limit is that it is not the ideal method of controlling speed. It has in fact a number of disadvantages that make the use of speed limits highly undesirable.

One of the most important disadvantages of speed limits is that limits are normally established for favourable conditions. Drivers are then expected to reduce speeds according to their judgement when prevailing conditions are poor. It is ironic that drivers are allowed to use their judgement when conditions are unsafe, and not when it is safe.

A notion also exists that a speed limit can be precisely established and that it should be treated as an absolute value. This is highly improbable; in fact no single speed can -be considered as a precise limit of safety.

A further problem with speed limits is that there is little sense in having such limits if they are not consistently enforced. If a speed limit is not enforced, then drivers transgressing the law are perceived by others to have an unfair perceived advantage (commercial vehicles could even have an unfair economic advantage due to faster turn-around times). Allowing persons to exceed the speed limits also has a number of serious safety repercussions. Drivers have to observe the speed limit, not only for their own safety, but also the safety of other users of the road, including vulnerable road users such as pedestrians, cyclists, the

young and the elderly. The recommendations of the report are subject to the strict enforcement of speed limits.

The main advantage of a speed limit is that it serves as a general control on drivers, indicating to drivers that they are subjected to limits. It is especially important to restrict drivers from travelling at too high speeds. The designs of road signs and traffic signals are also dependent on the speed limit. The length of no-overtaking lines, for example, is directly dependent on the speed limit. Traffic signal settings and particularly the critically important amber periods are also set according to the speed limit.

SPEED LIMIT PRINCIPLES

Procedure for establishing speed limits must ensure that the limits are both realistic and objective in order to achieve the potential benefits of consistent and uniform speed regulations. It is of utmost importance that the majority of drivers should perceive speed limits as reasonable. Unrealistic speed limits that fail to gain the respect of drivers will be largely ignored and will undermine respect for speed limits in general.

Many speed limits in South Africa appear to have been established arbitrarily, especially in urban areas. This is probably one of the main causes for the inconsistent speed limits found in the country. The arbitrary approach, however, has been applied due to shortcomings in existing procedures for setting speed limits.

The engineering approach to the establishment of speed limits attempts to establish the maximum safe speed on a road on the basis of fundamental engineering principles. Most of the models are mathematical in nature, but based on empirical observations of basic parameters. The engineering approach, however, does not cater for all conditions, and must therefore be supplemented by measurements of the 85th percentile speed.

The 85th percentile speed is used as a norm in setting speed limits in many countries. It has been argued that the 85th percentile speed serves as a norm set by drivers themselves, and that it should therefore find a high degree of acceptance. The normally cautious and competent actions of a reasonable person should be considered legally acceptable. Drivers, however, do not always fully consider all conditions; and credible reliance can therefore not always be placed on their judgement of safe speeds.

GENERAL SPEED LIMITS

The following general speed limits are proposed:

a) *Urban speed limit.* The current general urban speed limit in South Africa is 60 km/h, while a lower speed limit of 50 km/h is used in many other countries. The problem in many South African cities is that the functional hierarchy of the road network is often poor or even non-existent. Narrow residential streets are sometimes used as major arterials. It is therefore highly unlikely that lower speed limits in South Africa will result in lower speeds. The solution to the problem is to provide an environment in which it is difficult, if not impossible, to speed. It is therefore proposed that the general speed limit of 60 km/h be retained, but that road authorities should be encouraged to use proper design guidelines

when new residential areas are developed and to use traffic calming techniques in all sensitive residential areas.

b) *Rural speed limit.* The current rural road speed limit in South Africa is 100 km/h, which applies to roads other than freeways. A speed limit of 120 km/h has however been posted on a large number of these roads as allowed by the National Road Traffic Regulations. It also appears that many South African drivers are unaware of the general 100 km/h limit. Speed limit signs, however, have not been posted on all rural roads. Many of these roads are also of a relatively high design standard, which creates the impression that a speed limit of 120 km/h could apply. It would therefore be unfair to prosecute drivers who exceed the 100 km/h speed limit on such roads. This is also of specific relevance to the high number of foreign visitors and tourists in South Africa.

In order to address this problem, it is preferable that speed limits should be posted on all paved rural roads in South Africa, even if the general limit applies. This could in fact eliminate the need for a general rural speed limit. It is, however, proposed that the 100 km/h be retained as a "default" limit in the absence of a posted speed limit (drivers may, however, only be prosecuted for the speed limit applicable to the road). The 100 km/h limit should also be retained for all rural gravel roads.

c) *Maximum speed limit.* The investigation of the 120 km/h general maximum limit was specifically excluded from this study. It. is, however, important to reiterate that the problem of speeding should be urgently addressed. It cannot be allowed that a general speed limit is ignored by large numbers of drivers. The argument raised that it is reasonable to exceed the speed limit in remote areas of the country or on high standard roads carries no weight. The law should and must be enforced, even in such remote places. If the general speed limit should continually be ignored by a large proportion of the population, then the consequence is not only an increased risk of accidents, but also that drivers will lose their respect for traffic laws and regulations.

d) *Speed limits for different vehicle types.* A general speed limit of 80 km/h is currently in force for heavy vehicles in South Africa. This speed limit is unrealistic and could result in protest actions if properly enforced. Compliance with the limit would also increase impedance of other traffic due to increased catching up rates. The South African Road Freight Association (RFA) is, however, not in favour of increasing the limit because of the poor quality of many heavy vehicles. It is therefore proposed that the 80 km/h speed limit should be retained, but with strict law enforcement.

The consequences of accidents involving *mini-buses, buses* and *coaches* are significantly greater than those of heavy vehicles. Statistics show that between six and eight persons are killed or seriously injured per ten mini-buses and buses involved in accidents, while only one person is killed or seriously injured per ten heavy vehicles involved in accidents. It is therefore proposed that a speed limit of 100 km/h be introduced for these classes of vehicles.

The National Road Traffic Act provides for the voluntary display of speed limits on the rear ends of vehicles subject to differential limits. It is proposed that this display must be made mandatory.

e) *Enforcement tolerances.* Tolerances vary between jurisdictions and even differ between roads. This creates an unfair and confusing situation in South Africa. It is therefore recommended that the tolerance be prescribed in the National Road Traffic Act and Regulations. A tolerance of 10% (subject to a minimum of 5 km/h) is proposed.

SPEED LIMITS FOR SPECIAL CONDITIONS

A number of speed limits for special conditions that warrant differential speed limits have been considered during the study. They are the following:

a) *Variable speed limits.* These are used under circumstances where speed limits are changed according to prevailing weather and operational conditions. Variable advisory speeds are preferred to variable limits (because of the likelihood that offending drivers can claim confusion because of changing speed limits during prosecution).

b) *Speed limits for wet conditions.* Driving in wet conditions can be particularly dangerous, not only because of reduced skid resistance, but also due to reduced visibility and more importantly, the possibility of hydroplaning. Although desirable, there are a number of problems with the implementation of such limits, of which the most important is the difficulty in finding a legal definition for wet conditions. Such speed limits are therefore not recommended.

c) *Speed limits for night conditions.* Driving at night in South Africa is particularly dangerous and night speed limits can therefore be justified. Night speed limits should be posted on roads that experience a high accident rate at night (but only if the limits are likely to be effective and adequately enforced).

d) *Speed limits at schools.* Lower speed limits at schools are justified because children are less experienced road users and that high speeds pose a particular danger near schools. Studies, however, have indicated that such speed limits are ineffective in controlling speeds. It is therefore proposed that such speed limits should not be used, but that physical, traffic calming measures should be introduced to control speeds.

e) *Minimum speed limits.* Minimum speed limits on roads, and particularly freeways, are justified on the basis that they reduce the speed differential, and therefore the accident potential. Minimum limits also have the advantage that travel impedance on roads would be reduced. The problem with minimum limits, however, is that no practical alternative choices are provided to a driver who is trapped in a situation where he or she is unable to comply with the minimum limit. For this reason, minimum speed limits should only be introduced on the faster inner lanes of multilane roads. Minimum speed limits should also be established according to specific conditions on a road.

SPEED ZONING

Speed zoning is the process of establishing safe and reasonable speed limits for specific sections of roads and streets. Such limits are established based on factors that are

considered to contribute to road accidents. Two broad approaches can be followed in the identification of such factors, namely the less detailed and the more detailed approaches. The more detailed approach is more objective, but insufficient information is currently available in South Africa to establish speed limits on this basis. The less detailed approach is therefore recommended in which speed limits are prescribed in general terms, and reliance placed on 85th percentile speeds to adjust the speed limits downwards.

The most important factors in establishing speed limits were found to be land-use, road type and intersection control. Speed limits were therefore developed for the range of land uses, road types and intersection control measures typically found in South Africa. These limits were established based on existing limits in South Africa, as well as limits used in other countries.

ADVISORY SPEEDS

Advisory speed signs are used to indicate safe speeds for specific isolated problems on a road. Advisory speeds are particularly useful in that they can reduce the need to vary speed limits along a road. However, when problems occur continuously along the length of a road, it becomes unpractical to use advisory speeds repeatedly, and a speed limit should then be posted.

One of the main considerations in the establishment of advisory signs is the available sight distance on a road. Other considerations include side skidding on horizontal curves and the presence of isolated hazards. The methods proposed for the establishment of sight distances and comfortable speeds on curves differ from standard road engineering practice. This is in response to criticisms raised against standards currently in use.

REFERENCE

Department of Transport, Setting of Speed Limits in South Africa, Research Report 96/006, November 1998

Annexure B

Self-Test for drivers to evaluate their driving behaviour

Lapses. How often do you:

- Try to pull away from the traffic lights in third gear?
- Switch on one thing when you meant to switch on another?
- Take the wrong lane approaching a roundabout or junction?
- Forget where you left the car in the car park?

Errors. How often do you:

- Fail to see a `Stop' or `Give Way' sign and narrowly avoid colliding with traffic having right of way?
- On turning nearside, fail to see a cyclist or a pedestrian who has come up on your inside?
- Underestimate the speed of an oncoming vehicle when overtaking?
- Brake too quickly on a slippery road, or steer the wrong way in a skid?

Violations. How often do you:

- Disregard the speed limits late at night or very early in the morning?
- Cross a junction knowing that the traffic lights have already turned against you?
- Drive especially close to the car in front as a signal to its driver to go faster or get out of the way?
- Drive even though you realise you may be over the legal blood-alcohol limit?
- Overtake a slower moving vehicle when it is illegal or unsafe to do so?

Annexure C

THE BENEFITS OF SLOWER SPEEDS

Written by the Slower Speeds Initiative,
PO Box 746, Norwich, United Kingdom, NR2 2LJ, March 1998

Saving lives

In 1996 nearly 3,600 people were killed on our roads and almost a third of a million injured. The latest Government figures give the lifetime probability of a child in the 1990's being seriously injured in a road crash as high as 1 in 14. What is more, the most vulnerable in our society bear an unfair share. The UK's cyclists have a casualty rate over **ten times** that of Denmark, where there has been a heavy emphasis on slowing traffic. Our record for child pedestrian safety is one of the worst in Western Europe. Yet the life-saving record of lower speeds is clear and beyond doubt. Official figures show that:

- At 40 mph (64,3 km/h) a pedestrian hit by a car has only a 15% chance of surviving
- At 30 mph (48,3 km/h) the figure rises to 55%
- At 20 mph (32,2 km/h) survival chances are 95%

A recent study of the Government's trial 20 mph zones provides overwhelming evidence of their benefits. Average speeds fell by 9.3 mph and casualties fell 60%. Child pedestrian casualties fell 70%.

Restoring freedoms

Improving safety through lower speeds is a major element in restoring some lost freedoms. Among these are the rights of residents to walk and talk in their local street, the freedom of children to walk and cycle unaccompanied, the right of communities to use local shops and other facilities without taking their life in their hands. Such rights should be important elements in new thinking about 'social inclusion'.

But speed can be a tyranny for drivers also. Too many firms set delivery patterns and visiting schedules that can only be met by driving too fast. Motorists who try to keep to speed limits find themselves intimidated by others. High speeds, acceleration and aggressive driving are major factors in stress, tension and 'road rage'.

A better environment

Lower speeds and steadier driving will help cut vehicle emissions. These are of several kinds, but one of the most important is Carbon Dioxide (CO_2). CO_2 is a major 'greenhouse gas', one of those responsible for climate change and global warming, and cars and lorries are the fastest growing source of UK emissions. At the 1997 UN conference in Kyoto the Government signed an international agreement with our EU partners to reduce CO2 emissions by 8% by 2010. To their

credit, our Ministers are still campaigning for a 20% cut. For both targets, changes in travel modes and travel speeds will be crucial, as vehicles produce more CO_2 at high speed. Lower top speeds are useful in reducing levels of toxic emissions from cars. Pollutants such as Carbon Monoxide (CO) and Nitrogen Oxides (NO_x) affect breathing and heart conditions, and under some conditions combine to form the choking pollution known as 'Smog'. Road traffic is responsible for half of NO_x emissions and over 90% of C0. Lastly, fuel consumption also worsens at high speeds. Calmer, slower driving brings personal and national benefits in terms of fuel economy, an environmental issue neglected in recent years.

A quieter land

Noise from road traffic is a major issue. The Royal Commission on Environmental Pollution found that complaints about this rose 30% in the early 1990s. Acceleration, high speed travel, and vibration from lorries disrupts sleep, disturbs households, and adds to general stress. Country areas, are also suffering. Our rural lanes were simply not designed for fast cars and lorries - and attempts to 'improve' them lead to greater danger and loss of amenity. Rural tranquillity is under threat, as are birds and animals from speeding traffic 'Calming the countryside' should be one of the main benefits of slower speeds.

Better Health

Fears over danger on the road have led to a sharp drop in walking and cycling. Yet the recent BMA report, 'Road Transport and Health', stresses that this kind of regular exercise is vital for physical health and mental well-being. Lower speeds would greatly improve parents' perceptions over safety on the road - and could thus lead to fewer 'couch potatoes', especially among children.

Saving money

In 1996 the Government calculated that 'the total cost-benefit value of prevention of road accidents was estimated to be £13.9 billion'. Although much of this was for intangibles such as estimates of 'personal grief and suffering', among the actual costs were:

- Hospital treatment
- Police time
- Loss of output at work

Furthermore, these figures exclude spending on the provision and maintenance of a national network of high speed roads, a network whose cost recent Governments have found increasingly insupportable. The perceived need for hundreds of expensive bypasses is likely to decrease when lower speeds are imposed on main roads. Furthermore, making long-distance freight and passenger travel more competitive in journey times should help traffic reduction plans. Full calculations have still to be done about actual cost savings of lower speeds, but the potential is considerable. Meanwhile the existing measures of speed control - such as traffic-calming and speed cameras are extremely cost-effective by official reckoning.

Altering The Balance

The 1994 report on Traffic Generation by the Government advisers SACTRA (Standing Advisory Committee on Trunk Road Assessment) discovered that at least half the time saved through increases in speed was used for additional travel. Other studies have confirmed this. We are not making more journeys, simply longer ones. Reducing speeds would therefore be a powerful tool within new policies which seek to:

- Encourage people to live nearer their work
- Use public transport more
- Reduce the need for further road-building

Lower speeds would also be an important means of lessening the public's perception of danger on the road. This, in turn, would help release the potential desire to walk and cycle more. People have been buying more and more cycles, yet using them less and less.

The journey to school is a classic example of a trend needing reversal. Frightened of traffic danger to their children, parents increasingly take them by car. As a result, nearly 20% of peak-hour traffic is now motorised 'escort trips', a serious factor in morning congestion.

Studies by the CTC have shown that reducing public worry about road danger has been a key Continental ingredient for dramatic increases in cycle use (e.g. Munich: 1976 6% of all journeys,1992 15%). A similar surge in use could happen here. It would be a vital component in achieving the targets of the National Cycling Strategy - to double the number of bike trips (on 1996 figures) by 2002, and double these again by 2012. Indeed, lower speeds are a central component of the successful integrated transport policies of some Continental neighbours. These have revitalised town centres, public transport and residential streets in a way which this country finds hard to imagine - but must be the vision for which new policies aim.

WHAT ARE THE SOLUTIONS?

The Initiative believes that there are six key elements in successfully cutting speeds:

1. Good quality traffic calming
2. A much wider use of speed cameras
3. Restoring traffic law enforcement as a police 'core function'
4. Changing the law
5. Changing the vehicle
6. Informing the public

1. TRAFFIC CALMING: high quality traffic calming is a crucial element in restoring neighbourhood freedoms from speeding traffic. Moreover, it does not ban motorised traffic, merely imposes speeds appropriate for the surroundings. But importantly it creates safety, equity and an enhanced environment.

Continental experience with traffic calming shows it can play a key part in urban regeneration. UK records show that 20 mph zones can reduce fatalities by up to 70%. Recently the Children's Play Council have launched a campaign for trials of 10 mph 'Home Zones'. We believe this to be a logical step in the development of correct speeds in the appropriate location.

Our only caveat is that traffic calming can be expensive. Ultimately we believe that our package of other measures should create a social climate where lower speeds occur without too many costly enforcement measures.

2. SPEED CAMERAS: Speed cameras can reduce road crashes by as much as 70%. They are also extremely cost-effective. Yet while the costs fall on the police and local authorities, the Treasury claims the fine revenue. The Initiative believes this is wrong. We hope current official discussions will allow the fines revenue to be treated as an 'administrative charge', so that at least some of the income can be retained locally and be invested in more cameras and better speed enforcement.

3. POLICE CORE FUNCTION: a great deal is currently said about 'zero tolerance' of crime and anti-social activity. Yet motoring offences are dealt with as if they are somehow not as serious as others. The media often perpetuates this situation, and portrays a false picture of relative dangers.

4. CHANGING THE LAW: most traffic offences are dealt with under the 1988 Road Traffic Act as amended. Even if someone is killed, the most likely charge that a speeding driver will face will be 'Driving without due care and attention.' Thus even those who kill children often escape with a small fine and no withdrawal of their driving licence. In fact in many cases of child pedestrian deaths no charges at all will be preferred.

Indeed, apart from the two offences of 'Causing death by dangerous driving' or 'Causing deaths by careless driving whilst impaired by alcohol or drugs' the courts are not required to consider the actual consequences of any offence.

Organisations like Road-Peace believe there is no justification to treat death and injury on the road differently from any other death or injury caused by a wrongful act and that therefore road death or injury must be the central issue of any charge.

Where no-one is hurt or killed, the penalties for speeding should be much higher to reflect the fact that the driver has taken a deliberate course of action which puts lives at risk.

More fundamental changes about placing the burden of responsibility onto drivers have made in a report from the Environmental Law Foundation.

5. CHANGING THE VEHICLE: there is something absurd about our current situation, when at considerable expense manufacturers produce very fast cars and at further, public, expense we devise ways for slowing them down. Car maker, EU officials and national Government need to start thinking now about future vehicles having much lower top speeds, less powerful acceleration and greater efficiency at lower speeds.

Technology already exists for fitting existing vehicles with variable speed limiters. Fixed limiters have already been applied to lorries and coaches. Trials with variable limiters should be undertaken for cars and could lead to lower speeds without the need for costly enforcement measures.

6. INFORMING THE PUBLIC: although public opinion is already enthusiastic about many aspects of lower speeds, the wider benefits have yet to be spelt out. These should be integrated into national and local transport policy, information campaigns like Travelwise and specific campaigns like the Government's own 'Kill your speed'.

Other campaigns- such as drinking and driving- show how public attitudes can alter. Furthermore, some elements such as good traffic calming can in themselves strengthen a desire for change.

SLOWING DOWN

- **Worldwide**

A survey of international experience in the Government's 'Killing Speed' publication states that 'a reduction in average speed of the order of 1 mph could save 5% of all injury accidents and 7% of all fatal accidents'

- **U.S.A.**

Following the 1973 'oil crisis' the United States imposed a 55 mph limit as a fuel conservation measure. However, its more dramatic savings were in lives. By 1975 the fatality rate on interstate highways had been reduced 50%. Writing to the President, the US Secretary of Transportation described the lower limit as: 'Perhaps the most important safety measure in modern times'.

When speed limits rose again in the 1980s fatalities subsequently increased.

- **'Gentle Mobility'**

One of the biggest 'slowing down' successes is in Austria. In 1992 the city of Graz adopted the slogan 'gentle mobility' for its traffic policies. City planners cut the speed limit to 20 mph on about three quarters of the 500-mile road network. On a few main roads into the city the planners set a higher limit of 30 mph, but cut this to 20 mph near schools.

The lower limits were a great success. The number of speeding motorists fell, and there were 24% fewer serious casualties overall. Eight out of ten people in Graz now support the lower speed limits, compared to less than five out of ten before the lower limits were brought in.(25) These changes were achieved without spending large sums on traffic calming. The keys to the city's success were tough enforcement by the police and a major publicity campaign.

- **Suffolk**

Over two years, the council cut the speed limit in 280 villages on main roads from 60 mph (96,5 km/h) to 30 mph (48,3 km/h). In 85 villages it was cut from 40 mph (64,3 km/h) to 30 mph, and in another 85 cases existing 30 mph limits were extended. The initiative cost about £2500 per village, and led to average speed reductions of seven miles per hour.

- **York**

York council has cut vehicle speeds on 28 miles of residential roads through traffic calming. Ten miles of these roads have 20 mph (32,2 km/h) speed limits. Now the council has drawn up a speed management plan. It intends to:

Review speed limits on busy main roads
Reduce speed limits near shops, schools and play areas to 20-25 mph
Introduce traffic calming and a 20 mph (32,2 km/h) limit in residential roads
Co-ordinate traffic lights to encourage smoother driving at lower speeds.

- **Automatic Halt**

On the main road to Aachen in Germany traffic lights at the edge of the village are linked to a system which measures the speed of approaching vehicles, and turn red automatically if the

limit of 30 mph (48,3 km/h) is exceeded. If the driver reduces speed sufficiently the lights change back to green, allowing the vehicle to proceed without coming to a halt. If the approach speed continues too high the lights keep at red, obliging the driver to stop. A second set of lights further through the village maintains the required speed.

- **But is it Popular?**

Concerns about traffic have dominated recent environmental opinion polls, even amongst motorists. The 1996 Lex Report on Motoring found nearly half of drivers worried about the safety of cyclists and pedestrians and 71% agreeing that 'Pollution is a major problem'. The last British Social Attitudes Survey found that 'No less than three-quarters of the public endorse the seemingly rather extreme statement that 'the amount of traffic on the roads is one of the most serious problems in Britain'.

Anecdotal evidence supports this. Local authorities complain that they are overwhelmed with requests for traffic calming. 'Safe Routes to School' has become a national issue in little more than two years. Demands for safe and pleasant travel - in urban and rural areas - has taxed the minds and resources of transport and land use planners.

Moreover the evidence from mainland Europe is that the more lower speed measures are put in place, the greater the public support and the more they are demanded. Popular opinions are changing fast on speed. It is imperative politician and planners are not left behind.

What the European Union should do

- Ensure (through construction and use regulations) that new vehicles manufactured for use in Europe have a top speed of no more than 120 kph and are fitted with variable speed limiters.
- Harmonise speed limits at lower levels.
- Allow individual countries to set their own speed limits below any future harmonised limits.

What national government should do

- Undertake a full, national review of speed limits covering all classes of road
- Enable local authorities to introduce very slow speed areas- such as Home Zones (10 mph areas with legal priority for pedestrians and cyclists) and Safe Routes to School
- Reduce the speed limit in built-up areas and country lanes, with exemptions where appropriate
- Run trials of lower speed limits on motorways and other major roads outside towns, as part of a review
- Increase the funding for local traffic calming and speed management schemes
- Use part of the money from speeding fines to pay for more speed cameras and better enforcement
- Making traffic policing a core police function
- Carry out trials of driver-operated speed limiters
- Ensure that lower speed technology is integrated into all "green car" programmes, such as 'Foresight'
- Work with the Advertising Standards Authority to ensure that car advertisements do not stress high speeds and acceleration
- Give slower speeds a central role within the current development of its road safety policy

- Press the case for speed management and lower limits on our EU partners
- Give a strong, positive lead on the benefits of lower speeds, so as to inform public opinion of the need for further progress.

What local authorities should do

- Develop Speed Management Plans
- Give such Plans a central role in future local transport planning
- Review speed limits on all roads, and reduce them in residential areas and near schools, shops and play areas
- Make greater use of traffic calming, on main roads as well as residential roads
- Carry out trials of 20 mph (32,2 km/h) zones without extensive traffic calming where there is local support
- Install speed cameras wherever vehicle speeds are significantly higher than the safe limit, and have them fully operational at all times
- Make slower speeds a central element of 'Travel-Wise' programmes.

CONCLUSION: LET'S SLOW DOWN

Lower speeds fit very well with the latest transport thinking. They encourage walking and cycling, and make public transport more competitive. They lessen discrimination against families without cars. They can be important components of policies to cut greenhouse gases and toxic pollution. Slower speeds already have a strong track record in reducing death and injury on our roads. We believe their wider use would reduce danger, stress and intimidation as well. 'Slowing down' is a great opportunity - to calm our town and country areas, to restore some lost freedoms, and to pioneer new technology in a forward-thinking way. The Slower Speeds Initiative is inviting all like-minded bodies to join us in pressing for positive change.

Annexure D

Study links higher speed limits to deaths

By Danny Hakim, New York Times, USA, 2001

DETROIT - A report from the Insurance Institute for Highway Safety says increased interstate speed limits led to nearly 1,900 extra deaths in 22 states from 1996 to 1999.

The report, which will be released Monday, says people in those states are adjusting to driving above the new limits.

"What happens is if you raise the speed limits, people go faster," said Susan Ferguson, a top researcher at the Insurance Institute, a safety group financed by car insurers. "It's not that more people follow the law."

In 1995, the federal government repealed its speed limits - 55 mph (88,5 km/h), or 65 mph (104,5 km/h) on rural interstates -- and sent authority back to the states.

Twenty-eight states almost immediately raised rural interstate speed limits to at least 70 mph (112,6 km/h). For a time, Montana had no daytime speed limits on some highways, requiring one to drive in a "reasonable and prudent manner." The state became something of a destination spot for motorists searching for an American version of the autobahn.

"We're happy for them to come here and vacation, but you can't come here and have a drag strip," said Col. Shawn Driscoll, who runs the Montana Highway Patrol. "Most of the Montana people knew if you ran 120 (193 km/h) or 130 (209 km/h) , you'd get stopped."

The state also found its "reasonable" approach open to legal challenge and has since imposed a 75 mph (120,6 km/h) interstate limit.

The Insurance Institute's report has several components. It highlights a recent study by the Land Transport Safety Authority of New Zealand, which appears to have done a more thorough study of the increased speed limits in the United States than the Transportation Department, which was essentially taken out of the speed business by Congress.

The study focuses on 22 states that raised their interstate limits to 70 or 75 mph almost immediately after the repeal of the federal cap and tries to isolate the effects. Those states are compared with trends in 12 states that kept their limits at 65.

The study found 1,880 more deaths on the interstates in those 22 states from 1996 to 1999, though the authors noted that geographical effects might have skewed the results because most of the states that went to 75 were in the West.

The institute's researchers also looked at trends in six states and five cities, some which raised limits and some that did not. The finding appears to show that drivers in states with higher speed limits drive faster.

In Maryland, where the interstate speed limit is 65 mph (104,6 km/h), the mean speed was 66 mph. About 1 percent of drivers exceeded 80 mph (128,7 km/h). By contrast, in Colorado, where the interstate speed limit is 75 mph, the mean speed was 76 mph. About a quarter of drivers regularly went over 80 mph.

"These are the fastest speeds we've ever observed," Richard Retting, the institute's senior transportation engineer, said in the report.

The insurance institute's report also criticizes the auto industry for continually ratcheting up horsepower and emphasizing the glory of speed in its advertising. It cites, among others, Pontiac advertisements that tell drivers to "unleash your nasty little urges" and Mercedes advertisements that promise "lightning under the hood."

Of course, much about accident prevention involves balancing safety with convenience. Many Americans feel comfortable driving 70 to 80 mph (112,6 – 128,7 km/h) without fear of the dreaded flashing red lights appearing in the rear-view mirror.

"I like to travel between 75 and 80," Matt Bielby, a 30-year-old talent scout, said in an interview on Friday. "I think it's safe and prudent but gets me there at a decent velocity." Bielby was near the end of a three-day road trip from Los Angeles and parked at a rest area outside Ann Arbor, Mich. He said he had been stopped three times, including twice in Arizona for speeding, without getting a ticket.

"When you go from a state that's higher to one that's lower, you feel like you're crawling," he said, adding that he would prefer 75-mile-an-hour (120,6 km/h) limits across the board.

Some see other driving issues as more important.

Csaba Csere, the editor of Car and Driver magazine, who drives test cars, noted how difficult it was to conduct studies that factored in everything but speed. Csere added that the police could do more good chasing drunken drivers and patrolling roads more dangerous than highways, which have divided traffic and no intersections.

"Driving on an interstate highway is more attractive when the speed limit is raised, and that draws more people to the highways," he said.

He was also skeptical of tests financed by the insurance industry.

"If you get a ticket, your rates go up," he said. "From their standpoint, the more tickets the better. You have to take what they say with a grain of salt."

The consensus of most traffic safety researchers is that raising speed limits is harmful.

"Speed is central to safety," said Leonard Evans, a safety researcher who worked for General Motors for more than three decades. "The largest yearly traffic fatality decline ever recorded in peacetime in the U.S. was in 1974, the first year of the nationwide 55 mph speed limit."

Evans noted that there were other factors involved, but "a major portion of the 16 percent decline, from 54,052 in 1973 to 45,196 in 1974, is related directly or indirectly to the speed limit change."

"Increasing speed limits reverses the process," he added.

Studies by the federal government have offered similar findings.

Of course, gauging the effect of any one issue on traffic fatality rates is not easy. For decades, death rates in the United States have been inching down as traffic safety has improved, though rates are not declining as quickly as some other leading nations. And nearly 43,000 people died last year in traffic-related accidents, more than any year since 1990, partly because the nation is driving more as the population increases and suburban sprawl grows.

There are various problems, from increases in drunken driving to the widely debated effects of sport utility vehicles. Perhaps the most potent factor is that 79 percent of Americans wear seatbelts, meaning 21 percent do not.

Although most researchers said raising speed limits has been bad for safety, Driscoll of the Montana Highway Patrol said that a speed limit that would be appropriate in New York City would not work in Montana.

"A lot of people go to the hospital in Billings," he said. "If you're in Sydney, Montana, and need to go to Billings, you have to go 270 miles. In New York, you probably have to go 2.7 miles to get to a hospital.

"You can lose a whole day going at 55 miles per hour (88,5 km/h)."

Annexure E

Making our Point

James J. Baxter, President, National Motorist Association (NMA), USA

The question, "Do speed limits matter?" hardly seems worthy of an answer. Insurance companies, police agencies, state transportation departments, and national safety organizations would have us believe that speed limits are a critical component of traffic regulation. Without those numbers on the signs and radar-wielding highway patrols, the entire system would self-destruct. This belief is based on several dubious precepts, none of which have ever been proven or justified.

The most basic of these precepts is that motorists, in the absence of speed limits, will drive in a manner that ignores their own welfare and that of fellow highway users. That without speed limits, they would drive at reckless irresponsible speeds without concern for the consequences. Does that sound like you and the people you know?

Another piece of speed limit folklore is that posted speed limits, given reasonable enforcement, can dictate traffic speeds. By extension, it is implied that raising or lowering posted speed limits will change the speed of traffic in that area. This notion has been thoroughly disproved on several occasions but the myth persists.

"Speed Kills" and "Slow is Safe" are well-entrenched slogans that have no basis in fact. Repeated long enough and loud enough, these slogans have taken on the aura of "truths."

I know what you are thinking, "This guy is blowing smoke in my ear. He doesn't know what he's talking about." Stay with me for a bit longer and maybe I can change your mind, or at least bring about a little scepticism when one of those Public Service ads floats across your T.V. screen extolling the virtues of speed limits.

Let's first look at the premise that drivers will go berserk if they are not confined by speed limits.

There comes a time when you know too much about a subject. A sure sign of this happening is when you're no longer able to answer a simple question on that subject without confusing the questioner. I've come to that point when it comes to talking about
speed limits and their effect on highway safety.

The signs are all there. Reporters that get a blank stare on their faces when I state our position. Interviewers that ask the same question six times and still don't grasp the answers. And, quotes in newspaper articles that don't remotely reflect what I said. It's tempting to blame the "messenger," but I'm the one with the message to sell and it ought to be packaged up in a way anyone can quickly grasp it. I suspect I am not the only NMA spokesperson with this problem. I've given this a lot of thought and the following is my attempt to boil down certain basic truths, concepts, and arguments to their essential elements. Some of these topics have broader application than just speed limits.

Fatalities versus fatality rates. Our opponents frequently use raw fatalities to bolster their arguments in favour of anti-motorist regulations. These are usually large numbers which impress the ill-informed and the ignorant. They are also relatively useless when it comes to analysing trends or "cause and effect" relationships.

Fatality rates based on 100 million vehicle-miles travelled (vmt) are the more legitimate way to measure trends and "cause and effect" relationships. Here's a simple way to explain this to a reporter or legislator. If we took 100 people who averaged 10,000 miles per year and the group experienced two fatalities, we would have a FATALITY RATE of "2" per one million miles travelled. If we doubled the number of people who also drove 10,000 miles and all else was equal, we would probably see 4 fatalities, but the fatality rate would remain at "2" per one million miles travelled.

Our opponents would argue that the world is about to end we have just experienced a 100% increase in highway fatalities! Of course this is nonsense and any reasonable person would recognize that fact.

Our highways are becoming more dangerous, especially with higher speeds. In the early 1920's, our highway accident fatality rate was estimated at 25 per 100 million vehicle miles travelled. If that rate prevailed today, we would experience 700,000 motor vehicle fatalities a year! Tell me we haven't made dramatic improvements on the highway safety front! Nevertheless, the self-appointed safety establishment persists in using fluctuations in annual fatalities to support their contentions. If the fatalities go up, it's because motorists aren't heeding their advice. If the fatalities go down, it's because their latest campaign was such a great success. In reality, most "safety campaigns" have little material impact on the rise or fall in fatalities.

I have said this before, but it merits repeating: *The overwhelming cause of the tremendous reduction in the highway fatality rate is better vehicles and better highways.* Consider this single example. In the 1930's, one-third of all fatal accidents were attributed to vehicle equipment failure, usually tires or brakes. Today, only one to two percent of fatal accidents relate to an equipment failure. Similar results can be witnessed when comparing the fatal accident rates on modern Interstates and the old two-lane highways they replaced.

Speed limits can and should be used to control overall traffic speeds. This myth haunts us like bad breath after a night of beer, pizza, and cigars. Speed limits have virtually no influence on regulating general traffic speeds. The only legitimate function of speed limits is to delineate at what point reasonably competent drivers exceed the safe speed for a given roadway. If the speed limit is properly set, it can serve as a useful form of information as well as a "trigger" for enforcement action. The speed limit will only function if it is set to reflect prevailing speeds. For too long we have suffered under the cart before the horse illusion that speed limits can dictate prevailing speeds. We have just concluded a 22-year-long experiment that has unequivocally proven that speed limits do not determine traffic speeds.

Forty years of brainwashing have made it exceedingly difficult to make this distinction clear and understandable. Rural speed limits did not come into wide use until after the Second World War. The early motivation was largely a desire to curtail true "high flyers" and to take some of the subjectivity out of speed enforcement. Reasonable and prudent has great allure until the local sheriff decides anything over 45 mph (72,4 km/h) is imprudent. Motorists wanted a benchmark almost as bad as did the police and the courts.

The ensuing expansion of speed limits was not a smooth and seamless process, but from it came research that is just as valid today as it was in the 1950's. The vast majority of drivers can be expected to travel at safe and reasonable speeds, regardless of posted speed limits. The faster group of drivers, still driving at reasonable speeds (i.e. the 85th to 90th percentile), will experience the fewest accidents per mile driven. Those drivers travelling significantly slower or significantly faster than the 85th percentile group experience far more accidents.

Here's the message to drill home: Speed limits should be based on the highest travel speeds of the vast majority of safe and reasonable motorists. The reverse, attempting to dictate travel speeds through the use of speed limits, has not and will not work, and will, in all likelihood, diminish traffic safety.

Annexure F

Commission of the European Communities

Brussels, 2.6.2003 COM(2003) 311 final

COMMUNICATION FROM THE COMMISSION
European Road Safety Action Programme (ERSAP)
Halving the number of road accident victims in the European Union by 2010:
A shared responsibility

Some relevant extracts from the above COMMISSION OF THE EUROPEAN COMMUNITIES **(ERSAP 2003)** document are given below:

Page 4:

"This action programmes aims to:

- encourage ***road users to improve their behaviour***, in particular through better compliance with the existing legislation, basic and continuous training for private and professional drivers and by pursuing efforts to combat dangerous practices,
- ……"

Pages 6-7:

THE CHALLENGES TO BE MET

Each year, more than 40 000 people die in the European Union (EUR-15) as a result of road accidents and 1 700 000 are injured. These accidents are the main cause of death in the under-45 age group and cause more deaths than heart disease or cancer in that group. The total cost to society has been estimated at more than €160 billion a year, which corresponds to 2% of EU GNP - an exorbitant price to pay given that relatively straightforward solutions which would be acceptable to the public are not used.

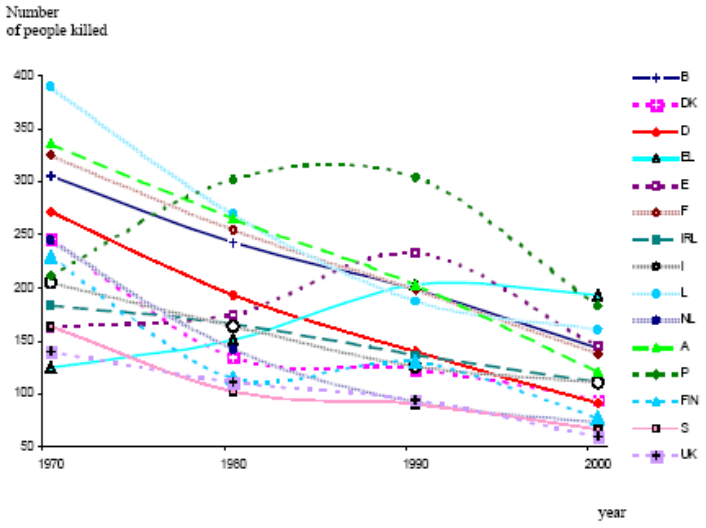


Figure 1a: Road accidents: Number of people killed per million inhabitants in each Member State, 1970-2000

(More detailed data, covering the last decade, are given in Annex 1)
Sources: CARE and national data

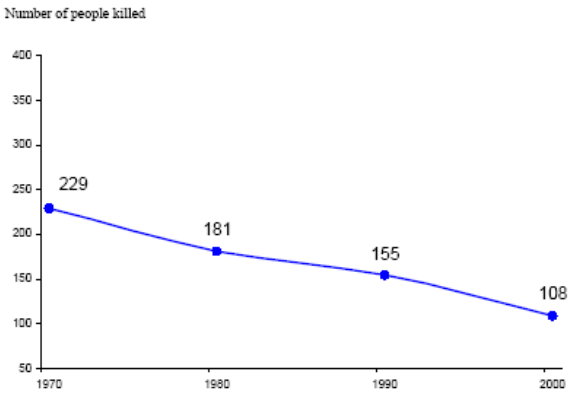


Figure 1b : Road accidents number of people killed per million inhabitants, EUR-15, trend 1970-2000

Improvements in road safety are understandably therefore one of the European citizen's greatest expectations. In order to meet this expectation, the Commission announced in its White Paper of 12 September 2001 that it would establish a targeted action programme containing a set of measures to be implemented by 2010. In order to be effective, these measures need to be coherent and coordinated with measures taken at other levels of responsibility. The Commission has consulted the parties concerned to identify the measures which are likely to produce the best results. These consultations show that there is a broad trend in favour of developing a European action programme. In Resolutions adopted in 2000 and 2001, the Council and the European Parliament have also confirmed the importance of adopting ambitious measures at European level to combat the scourge of road accidents.

In the past, there has been an enormous gap between the Member States' ambitious declarations of intent and the very modest provisions actually adopted, the principle of subsidiarity too often being invoked as a means of avoiding the adoption of specific measures at EU level. The Commission intends to apply the principle of subsidiarity in a strict manner so that everyone concerned, at all levels, can have a clearly identified framework of action in order to be able to play a full part. All the Member States are faced with the same road safety problems. The main causes of accidents have been clearly defined:

– ***Excessive and improper speed, the cause of about a third of fatal and serious accidents and a major factor in determining the severity of injuries.***
– The consumption of alcohol and drugs or fatigue. Drinking and driving is responsible for about 10 000 deaths each year. The problems of driving under the influence of drugs and fatigue are also increasing.
– Failure to wear a seat belt or crash helmet is a major aggravating factor in accidents. If the rate of seat-belt use could be increased everywhere to the best international rate, more than 7 000 lives would be saved each year.
– The lack of sufficient protection provided by vehicles in the event of an impact. Analysis of accidents shows that, if all cars were designed to provide protection equivalent to that of the best cars in the same class in the event of an accident, half of fatal and disabling injuries could be avoided.

– High-risk accident sites (black spots). Roadside design and street furniture can also play an essential part in reducing injuries in the event of a collision and may have a positive impact on behaviour.
– Non-compliance with driving and rest times by professional drivers.
– Poor visibility of other users or an insufficient field of vision for the driver. The lack of visibility in the blind spot towards the rear of vehicles alone causes 500 deaths a year.

Consequently, many of the road safety improvements proposed by the Commission could be achieved simply by complying with existing rules. It should also be mentioned that certain groups are particularly affected by road safety issues: young people between 15 and 24; vulnerable users; and the elderly, in particular pedestrians.

There are also the challenges which arise as the result of the forthcoming enlargement of the EU. In most of the new Member States road safety has evolved atypically on account, in particular, of the political, social and economic upheavals at the beginning of the last decade. As a general rule, the road safety situation at present is not as good as in the present EUR-15.

Adjusted to the population level, the number of people killed and injured is not higher, but the respective ratios are deceptive since they do not take account of the number of vehicles on the road or the volume of traffic, both of which are much lower. The risk exposure factors are therefore much greater. It will therefore be necessary to monitor the situation carefully, and the likelihood of the number of vehicles on the road and traffic levels increasing in these countries over the next few years will create a need for drastic measures to avoid an automatic increase in the number of road victims.

Page 10:

Most accidents ***are due to human error, failure to observe driving rules, and poor understanding or insufficient control of the vehicle.*** Since human beings frequently and inevitably make mistakes, the system of infrastructure, vehicles and drivers should be gradually adapted to protect users more effectively against their own shortcomings. This is the approach in other modes of transport and safety at work. ***Failure to comply with driving rules should be dealt with both by introducing measures to improve checks and the enforcement of effective, proportionate and dissuasive penalties*** at EU level and by developing technologies which make it difficult or impossible to commit the most serious driving offences.

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According to a study by the UK Transport Research Laboratory, ***a reduction in average speed of 3 km/h would save 5 000 to 6 000 lives each year in Europe, and would avoid 120 000 to 140 000 accidents, producing a saving of €20 billion.*** According to the UK's observations, the installation of automatic surveillance cameras reduces average speeds by 9 km/h. If such cameras were fitted everywhere throughout the European Union, it would be possible to avoid a third of accidents and halve the number of people killed. Seminar on "Killing speeds, Saving lives" organised by the Belgian Presidency of the European Union, 8 November 2001 in Brussels.

Annexure G

Historic overview of Speed Limits in South Africa during the 1970's and the effect thereof on Road Accidents

BACKGROUND

During 1970 and early 1971 the speed limits on urban and rural roads were 35 mph (56,3 km/h) and 70 mph (112,7 km/h) respectively. On 1 April 1971 the speed limits were metricated and adjusted upwards to 60 km/h in urban areas and 120 km/h on rural roads. The provinces by means of the Provincial Road Traffic Ordinances regulated these limits.

On 14 November 1973 OPEC countries reduced oil production, applied embargoes against certain countries, including South Africa, and increased the price of oil substantially. The Government reacted by introducing a number of fuel conservation measures, which included reducing the rural speed limit from 120 km/h and the urban limit from 60 km/h to 50 km/h respectively. These restrictions were imposed by means of regulations under the National Supplies Procurement Act, which took precedence over the Provincial Ordinances; they came into force on 14 November 1973.

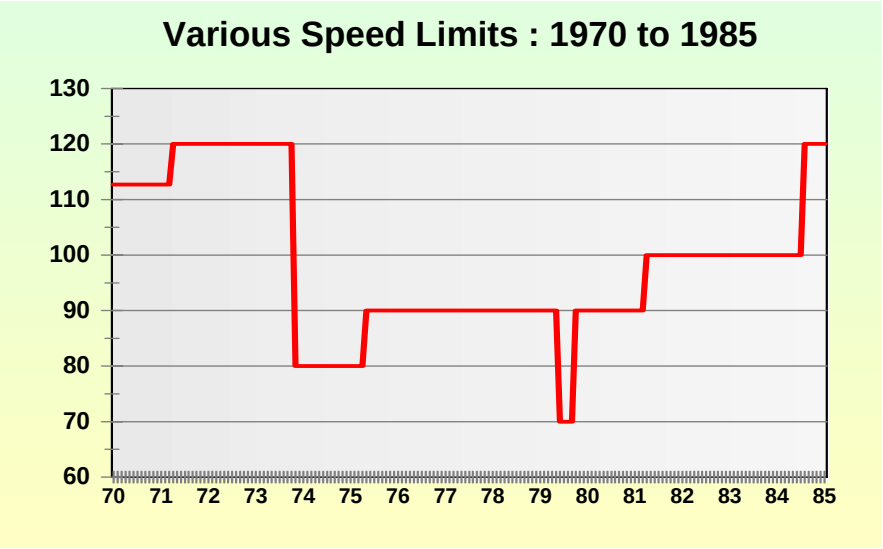
It was soon found that fuel consumption was increased as a consequence of the lower urban limit and on 25 January 1974 the urban speed limit was restored to 60 km/h; it has remained at this value since.

On 16 May 1975 the rural limit was raised to 90 km/h. It stayed at this level until 1979 when the Iranian civil war threatened the nation's oil supply again. On 8 June 1979 the Government imposed a 70 km/h speed limit on rural roads in designated magisterial districts surrounding the seven largest metropolitan areas. This restriction was very unpopular and the number of metropolitan areas to which the 70 km/h limit applied was reduced to three on 31 August 1979. On 28 September 1979 the 90 km/h speed limit was reinstated on all rural roads.

The rural speed limit was raised on 1 April 1981 to 100 km/h on rural freeways and the national road network; this limit was extended to the remainder of the rural system on 6 November 1981.

During the 1970s the provinces had reduced the maximum speed limit on non-freeway rural roads from 120 to 100 km/h - freeways remained at 120 km/h. These limits did not apply, of course, in view of the Government's fuel conservation legislation. On 1 August 1984 the Government was sufficiently confident that the country's fuel supplies were secure and removed speed limits from the regulations. The responsibility for speed limits reverted to the provinces, with the result that the limit on rural freeways increased from 100 to 120 km/h. During 1985 the speed limit was raised to 120 km/h on certain non-freeway rural roads.

The wide variety of different speed limits over the above described period of 12 years is schematically shown in the figure below.



RESEARCH OPPORTUNITIES AND MAIN FINDINGS

The different speed limits applicable over a period of about 12 years, from 1973 to 1984 allowed for extensive research and examination of the relationship between different rural speed limits and its influence on the occurrence of road accidents.

Amongst others, it was established that South Africa's road fatality rate is very high when compared to those of Western countries, and its urban and rural speed limits are above average. South African drivers are in favour of higher speed limits than are drivers from New Zealand, Finland and the USA. An analysis of twelve industrialized Western countries showed that their fatality rate could largely be explained in terms of their speed limits. Forty-eight speed limit changes in twelve countries were analysed and described, and three models relating the change in fatal, injury and total accidents with the change in mean speed have been developed. South Africa's accidents between 1972 and 1985 were analysed against a number of factors by multiple linear regression. The mean speed of rural traffic affects all categories of rural and urban accidents; and the urban speed limit affects all categories of urban accidents and rural fatal and injury accidents. It was concluded that a change of speed on part of the road network affects accidents elsewhere on the network.

It was estimated that the lower rural speed limits introduced between November 1973 and August 1984 saved about 12 500 lives and 140 000 accidents, which lead to the recommendation that the urban and rural speed limits be reduced to 50 and 90 km/h respectively.

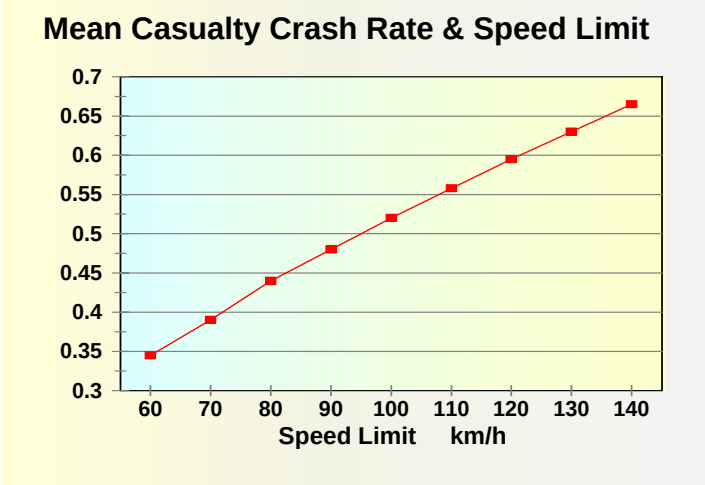
SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS FROM THE VARIOUS REPORTS

i) South Africa has a road accident fatality rate many times that of the United States of America and Western European countries.

ii) South Africa's speed limits are above average when compared with those of the USA and Eastern and Western European countries.

iii) The evidence that lowering the speed of traffic on rural roads reduces accidents is overwhelming. Similarly, increasing the speed increases the occurrence of accidents.

iv) The analysis of the information collected indicated that the change in the accident rate is an almost linear function of the speed limit, as shown in the graph below.



v) The mean speed on rural roads, the 85th percentile speed, and the standard deviation of the speed are highly correlated. The mean speed was found to be the best descriptor of speed.

vi) Changes in the speed limit affect the mean speed of traffic. The application of a high speed limit on a previously unrestricted road can result in an increase in mean speed.

vii) Changes in the mean speed have the greatest effect on the most severe accidents and the smallest effect on the least severe accidents

viii) The urban speed limit was also shown to contribute significantly to all categories of accidents in urban areas and to fatal and injury accidents in rural areas.

ix) The actual number of accidents for December 1973 and January to April 1974 were, compared with the predicted number, based on an extrapolation of the preceding four years' accidents. It was found that rural accidents decreased 40%,

with an estimated 20% reduction in rural travel during the same period, i.e. a 25% reduction in the accident rate.

x) A 1 km/h increase in the mean vehicle speed in rural areas was shown to result in an increase of 9 fatal accidents and 120 total accidents per month. The greatest increase in serious injury, slight injury and damage-only accidents occurred in urban areas.

xi) During the period November 1973 to August 1984 the government applied lower speed limits as fuel conservation measures and it was estimated that 12 500 lives and 140 000 accidents were saved in consequence.

xii) The estimated accident costs of a 1 km/h change in the rural mean speed is considerable, in the order of R19 million per annum.

xiii) Speed limit changes on part of the South African road network affect accidents elsewhere on the network. There is some evidence that the same phenomenon has occurred in other countries.

xiv) During the analysis period, a number of non-freeway rural roads have had their speed limits raised from 100 to 120 km/h, based on whether their geometric design is adequate for the higher limit. Such a policy does not take into account the fact that increasing the speed on part of the network increases accidents elsewhere.

xv) In South Africa, the change in the number of accidents brought about by a change in the rural speed limit is felt most in the urban areas. This suggests that urban authorities should be consulted when changes to the rural speed limit are being considered.

xvi) There are many factors that influence the number and severity of accidents. An upward or downward change in one of the factors that is, say, positively correlated with accidents, does not necessarily mean that the number of accidents will increase or decrease correspondingly; other factors may be exerting a more powerful influence in the opposite direction.

xvii) Although speed limits have been used for fuel conservation measures, their most important function was road safety and it has been shown that both the rural speed and the urban speed limits have a great influence on the number of accidents. In view of this country's high fatality rate compared with developed countries, it was recommended that there should be a national maximum speed limit of 90 km/h and an urban speed limit of 50 km/h. The United States of America, which has the lowest road accident fatality rate in the world, has a national maximum speed limit of 55 mph (88 km/h); many Western countries have 50 km/h urban speed limits.

REFERENCES

CSIR , National Institute for Transport and Road Research, **The 70 km/h Rural Speed Limit and Accidents**, Technical Report RF/4/80, November 1980, R Fieldwick and B E Fernie.

CSIR , National Institute for Transport and Road Research, **The Relationship Between Rural Speed Limit and Accident Rate**, Technical Report RF/1/81, January 1981, R Fieldwick.

CSIR , National Institute for Transport and Road Research, **Some Factors Influencing Raffic Accidents**, Technical Report RF/7/84, October 1984, R Fieldwick.

CSIR , National Institute for Transport and Road Research, **The Rural Speed Limit and Traffic Accidents**, Technical Report RV/26, January 1987, R Fieldwick and E J H de Beer

CSIR , National Institute for Transport and Road Research, **Rural Speed Limit Changes and Safety**, Technical Report RR 645, 1988, R Fieldwick and E J H de Beer

Annexure H-1

Number of Vehicles involved in Fatal Crashes : 2003-2004

2003	Number of Vehicles per Type Involved in Fatal Crashes									
Vehicle Type	GA	KZ	WC	EC	FS	MP	NW	LI	NC	RSA
Motorcars	1,549	920	763	392	377	473	496	396	147	**5,513**
Minibuses	109	105	62	56	37	59	41	36	17	**521**
Minibus Taxis	211	203	46	92	55	78	59	71	4	**820**
Buses	41	72	20	27	16	21	13	23	3	**236**
Motorcycles	87	26	32	13	16	19	10	9	6	**219**
LDV's - Bakkies	457	576	277	289	210	313	233	313	79	**2,746**
Trucks	177	272	144	115	124	171	86	124	44	**1,258**
Other & Unknown	320	445	199	106	99	151	154	132	38	**1,644**
Total	**2,951**	**2,619**	**1,542**	**1,091**	**933**	**1,284**	**1,092**	**1,106**	**338**	**12,957**
2004	Number of Vehicles per Type Involved in Fatal Crashes									
Vehicle Type	GA	KZ	WC	EC	FS	MP	NW	LP	NC	RSA
Motorcars	1,625	1,061	763	436	411	512	498	431	146	**5,883**
Minibuses	166	247	108	94	49	93	50	83	22	**914**
Minibus Taxis	152	163	30	79	34	37	61	47	7	**610**
Buses	30	60	26	23	19	27	16	20	0	**220**
Motorcycles	96	26	36	9	6	15	13	10	0	**211**
LDV's - Bakkies	403	478	254	293	204	282	264	266	95	**2,537**
Trucks	194	306	124	130	124	185	101	137	49	**1,350**
Other & Unkwn	385	389	198	92	102	175	142	125	41	**1,648**
Total	**3,050**	**2,729**	**1,538**	**1,155**	**948**	**1,326**	**1,144**	**1,119**	**361**	**13,372**
2003-2004	% Change in No. of Vehicles per Type Involved in Fatal Crashes									
Vehicle Type	GA	KZ	WC	EC	FS	MP	NW	LP	NC	RSA
Motorcars	4.97	15.36	-0.04	11.08	8.94	8.21	0.27	8.85	-0.40	**6.71**
Minibuses	52.65	135.69	75.17	68.96	32.09	58.14	23.91	133.34	31.04	**75.53**
Minibus Taxis	-27.87	-19.98	-33.72	-15.07	-38.63	-52.46	3.64	-34.80	74.72	**-25.66**
Buses	-27.31	-17.67	31.38	-15.31	21.42	29.74	21.68	-14.90	-100.00	**-6.73**
Motorcycles	9.91	-0.18	12.29	-29.43	-62.64	-20.25	26.55	6.38	-100.00	**-3.70**
LDV's - Bakkies	-11.92	-17.07	-8.25	1.13	-2.73	-9.96	13.28	-15.13	21.20	**-7.61**
Trucks	9.08	12.72	-14.16	12.78	0.15	8.05	16.62	10.32	13.64	**7.31**
Other & Unkwn	20.20	-12.57	-0.63	-13.39	3.11	16.00	-7.81	-5.65	6.77	**0.22**
Total	**3.37**	**4.21**	**-0.24**	**5.86**	**1.63**	**3.23**	**4.77**	**1.17**	**6.95**	**3.20**

Annexure H-2

Number of Fatalities per Vehicle Type : 2003-2004

2003	Estimated Number of Fatalities per Vehicle Type									
Vehicle Type	GA	KZ	WC	EC	FS	MP	NW	LI	NC	RSA
Motorcars	1,399	926	703	380	394	433	476	413	165	**5,288**
Minibuses	106	110	66	69	34	61	43	43	20	**552**
Minibus Taxis	226	245	50	135	71	110	77	65	11	**989**
Buses	31	66	36	42	73	17	8	23	2	**299**
Motorcycles	86	28	37	13	16	17	9	8	6	**220**
LDV's - Bakkies	377	554	292	322	210	280	225	300	83	**2,642**
Trucks	82	215	81	73	59	90	51	85	28	**764**
Other & Unknown	300	448	191	110	92	138	147	130	38	**1,594**
Total	**2,608**	**2,593**	**1,455**	**1,144**	**949**	**1,144**	**1,037**	**1,066**	**353**	**12,348**
2004	**Estimated Number of Fatalities per Vehicle Type**									
Vehicle Type	GA	KZ	WC	EC	FS	MP	NW	LP	NC	RSA
Motorcars	1,358	1,019	727	455	470	508	511	422	145	**5,616**
Minibuses	148	286	121	112	63	105	71	104	23	**1,033**
Minibus Taxis	169	195	37	96	40	93	60	71	9	**770**
Buses	14	109	9	35	10	16	8	20	0	**221**
Motorcycles	94	26	30	9	6	15	12	9	0	**201**
LDV's - Bakkies	324	480	207	336	196	300	249	236	100	**2,427**
Trucks	95	209	95	120	69	94	48	87	29	**847**
Other & Unkwn	371	380	195	92	94	166	135	123	38	**1,594**
Total	**2,574**	**2,705**	**1,421**	**1,255**	**947**	**1,298**	**1,095**	**1,071**	**344**	**12,709**
2003-2004	**Estimated Number of Fatalities per Vehicle Type**									
Vehicle Type	GA	KZ	WC	EC	FS	MP	NW	LP	NC	RSA
Motorcars	-2.94	10.14	3.47	19.70	19.41	17.52	7.34	2.26	-12.41	**6.20**
Minibuses	39.74	159.92	83.76	61.69	84.57	72.03	66.20	144.49	14.83	**87.32**
Minibus Taxis	-25.09	-20.62	-24.64	-29.04	-44.20	-15.60	-22.07	10.23	-19.62	**-22.21**
Buses	-55.14	64.30	-76.01	-16.06	-86.05	-1.70	-7.46	-14.86	-100.00	**-26.20**
Motorcycles	9.11	-5.00	-18.84	-29.60	-62.80	-9.89	29.27	6.43	-100.00	**-8.67**
LDV's - Bakkies	-14.07	-13.31	-29.25	4.53	-6.53	7.27	10.53	-21.41	20.72	**-8.11**
Trucks	16.79	-2.79	17.73	63.05	16.56	4.67	-4.81	2.11	6.00	**10.90**
Other & Unkwn	23.70	-15.35	2.39	-16.14	2.03	20.89	-8.10	-5.82	-1.12	**-0.02**
Total	**-1.29**	**4.33**	**-2.33**	**9.68**	**-0.13**	**13.46**	**5.56**	**0.44**	**-2.76**	**2.92**

Annexure H-3

Severity Rate per Vehicle Type : 2003-2004

2003	Estimated Number of Fatalities per Vehicle Type									
Vehicle Type	GA	KZ	WC	EC	FS	MP	NW	LI	NC	RSA
Motorcars	0.90	1.01	0.92	0.97	1.04	0.92	0.96	1.04	1.13	**0.96**
Minibuses	0.97	1.05	1.06	1.24	0.92	1.04	1.05	1.19	1.19	**1.06**
Minibus Taxis	1.07	1.21	1.09	1.46	1.28	1.41	1.31	0.90	2.50	**1.21**
Buses	0.78	0.92	1.82	1.57	4.65	0.79	0.61	1.00	0.67	**1.27**
Motorcycles	0.99	1.05	1.16	1.00	1.00	0.88	0.90	0.88	1.00	**1.01**
LDV's - Bakkies	0.82	0.96	1.06	1.11	1.00	0.89	0.97	0.96	1.05	**0.96**
Trucks	0.46	0.79	0.56	0.64	0.48	0.53	0.59	0.69	0.63	**0.61**
Other & Unkwn	0.94	1.01	0.96	1.03	0.93	0.91	0.96	0.98	1.00	**0.97**
Total	**0.88**	**0.99**	**0.94**	**1.05**	**1.02**	**0.89**	**0.95**	**0.96**	**1.05**	**0.95**
2004	**Estimated Number of Fatalities per Vehicle Type**									
Vehicle Type	GA	KZ	WC	EC	FS	MP	NW	LP	NC	RSA
Motorcars	0.84	0.96	0.95	1.04	1.14	0.99	1.03	0.98	0.99	**0.95**
Minibuses	0.89	1.16	1.12	1.18	1.29	1.13	1.41	1.25	1.04	**1.13**
Minibus Taxis	1.11	1.20	1.23	1.22	1.16	2.51	0.98	1.53	1.15	**1.26**
Buses	0.48	1.83	0.33	1.55	0.53	0.60	0.47	1.00	ERR	**1.00**
Motorcycles	0.98	1.00	0.84	1.00	0.99	1.00	0.92	0.88	ERR	**0.95**
LDV's - Bakkies	0.80	1.00	0.82	1.15	0.96	1.06	0.94	0.89	1.05	**0.96**
Trucks	0.49	0.68	0.76	0.92	0.55	0.51	0.48	0.63	0.59	**0.63**
Other & Unkwn	0.96	0.98	0.99	1.00	0.92	0.95	0.96	0.98	0.92	**0.97**
Total	**0.84**	**0.99**	**0.92**	**1.09**	**1.00**	**0.98**	**0.96**	**0.96**	**0.95**	**0.95**
2003-2004	**Estimated Number of Fatalities per Vehicle Type**									
Vehicle Type	GA	KZ	WC	EC	FS	MP	NW	LP	NC	RSA
Motorcars	-7.54	-4.52	3.51	7.76	9.61	8.60	7.05	-6.05	-12.05	**-0.47**
Minibuses	-8.45	10.28	4.91	-4.30	39.73	8.78	34.13	4.78	-12.37	**6.72**
Minibus Taxis	3.86	-0.80	13.71	-16.45	-9.08	77.53	-24.80	69.06	-53.99	**4.64**
Buses	-38.29	99.58	-81.74	-0.89	-88.51	-24.23	-23.94	0.05	0.00	**-20.87**
Motorcycles	-0.73	-4.84	-27.72	-0.25	-0.42	12.99	2.15	0.05	0.00	**-5.15**
LDV's - Bakkies	-2.44	4.52	-22.90	3.36	-3.92	19.14	-2.43	-7.39	-0.40	**-0.54**
Trucks	7.06	-13.76	37.15	44.57	16.38	-3.12	-18.38	-7.44	-6.72	**3.34**
Other & Unkwn	2.91	-3.18	3.04	-3.18	-1.04	4.22	-0.30	-0.18	-7.39	**-0.24**
Total	**-4.50**	**0.11**	**-2.09**	**3.61**	**-1.73**	**9.91**	**0.75**	**-0.72**	**-9.08**	**-0.27**

Annexure I

Human Factors Contributing to Fatal Crashes in RSA : 2001-2004

The table below indicates the various possible contributory factors to road traffic crashes. These individual factors are grouped under three main categories: ***Human, Vehicle and Road Environment.***

CONTRIBUTORY FACTORS TO ROAD TRAFFIC CRASHES		
Human factors	**Vehicle factors**	**Road and Environmental Factors**
Cell phone holding/usage	Bicycle: no rear reflectors	Animals: Stray/ Wild
Disregard for red traffic lights	Bicycle: no head lamp	Blind Corner
Disregard for stop sign	Brakes: Faulty	Blind Rise
Disregard for yield sign	Brakes: lights dirty	Lighting: Poor
Fatigue: Driver falling asleep	Chevrons: Dirty	Road Markings: Poor/ Inadequate /None
Follow Vehicle too closely	Chevrons / No reflective Stripes	Road Traffic Lane: Narrow
Hit-And-Run	Headlights: Blinding	Road Signs: Poor/Inadequate/None
Intoxicated Cyclist with Liquor / Drug usage	Headlights: Faulty	Road Surface: Poor
Intoxicated Driver with Liquor /Drug usage	Headlights: Not switched on	Road Surface: Wet/Slippery
Intoxicated Pedestrian with Liquor /Drug usage	Overload: Cargo	Road Works
Jay-Walking Pedestrian	Overload: Passengers	Sharp Bend
Overtook in face of oncoming traffic	Steering: Faulty	Traffic lights: Defective
Overtook across barrier line	Tyres: Burst prior to accident	Visibility: Poor
Speed too high for circumstances	Tyres: Smooth	Visibility: Smoke, fog, rain, etc
Turn in front of oncoming traffic	Other (describe)	Other (describe)
Illegal / Unsafe U-Turn		
Other (describe)		

The SAPS, in their reports to the National fatal Accident Information Centre at the Department indicate the possible contributory factors to each fatal crash.

For the purpose of this report, a summary of only the *Human Factors* reported for Fatal Crashes for the years 2001 to 2004 is provided in the tables under ***Annexures I-1 and I-2.***

Annexure I-1

Number of Fatal Crashes per Human Factor : 2001 to 2004

2001 - Total	GA	KZ	WC	EC	FS	MP	NW	LI	NC	RSA		
Human Factors in Fatal Crashes	Total	Total	Total	Total	Total	Total	Total	Total	Total	Urban	Rural	**Total**
Not Known	0	25	0	0	0	0	14	13	0	0	52	**52**
Pedestrian: Jay walking	1,092	724	317	204	290	313	198	132	0	1,291	1,978	**3,269**
Speed too high for circumstances	**546**	**549**	**296**	**156**	**152**	**223**	**127**	**119**	**97**	**625**	**1,640**	**2,265**
Overtook when unlawful / unsafe	91	50	85	36	55	74	42	13	16	121	342	**463**
Turned in front of oncoming traffic	23	175	169	36	69	30	28	0	16	118	428	**546**
Disregarded red traffic light / stop sign / yield	136	50	21	12	14	15	14	0	0	115	147	**262**
Followed too closely	68	50	42	12	0	15	28	26	0	105	137	**242**
Hit-and-run	23	50	0	0	14	15	0	26	0	40	88	**128**
Intoxicated Driver: Use of liquor or drugs	114	50	63	48	55	60	28	53	16	167	320	**487**
Intoxicated Pedestrian: Use of liquor or drugs	68	125	127	24	41	60	28	0	48	166	355	**522**
Fatigue / Driver falling asleep	45	75	85	72	69	45	57	40	16	35	468	**503**
Cell phone use / holding	0	0	0	0	14	0	0	0	0	0	14	**14**
Other	0	50	0	0	0	0	0	0	0	0	50	**50**
Total	**2,206**	**1,971**	**1,206**	**599**	**773**	**849**	**565**	**423**	**210**	**2,783**	**6,019**	**8,802**

2002 - Total	GA	KZ	WC	EC	FS	MP	NW	LI	NC	RSA		
Human Factors in Fatal Crashes	Total	Total	Total	Total	Total	Total	Total	Total	Total	Urban	Rural	**Total**
Not Known	233	272	160	72	85	96	73	68	36	340	754	**1,094**
Pedestrian: Jay walking	953	1,040	495	301	221	247	259	220	74	1,313	2,496	**3,808**
Speed too high for circumstances	**530**	**482**	**262**	**204**	**218**	**320**	**227**	**188**	**78**	**539**	**1,971**	**2,510**
Overtook when unlawful / unsafe	86	63	60	30	53	49	43	35	8	78	349	**427**
Turned in front of oncoming traffic	113	60	50	25	45	60	44	24	14	108	327	**435**
Disregarded red traffic light / stop sign / yield	71	29	15	6	15	12	25	4	1	90	88	**177**
Followed too closely	40	19	15	6	9	17	6	11	10	29	104	**133**
Hit-and-run	45	45	19	12	4	11	9	8	2	64	91	**155**
Intoxicated Driver: Use of liquor or drugs	58	29	38	30	41	44	22	24	20	85	222	**307**
Intoxicated Pedestrian: Use of liquor or drugs	33	29	44	10	20	6	15	4	13	47	126	**173**
Fatigue / Driver falling asleep	35	32	35	15	40	18	26	28	15	25	219	**244**
Cell phone use / holding	0	2	0	0	0	3	2	0	0	0	7	**7**
Other	99	89	61	37	25	68	47	57	18	74	428	**502**
Total	2,297	2,191	1,253	747	778	950	797	671	289	**2,791**	**7,182**	**9,973**

2004 - Total	GA	KZ	WC	EC	FS	MP	NW	LI	NC	RSA		
Human Factors in Fatal Crashes	Total	Total	Total	Total	Total	Total	Total	Total	Total	Urban	Rural	**Total**
Not Known	343	476	188	148	144	169	153	181	37	470	1,368	**1,839**
Pedestrian: Jay walking	1,033	1,034	538	360	213	319	320	293	62	1,504	2,666	**4,170**
Speed too high for circumstances	**538**	**398**	**264**	**214**	**186**	**248**	**196**	**240**	**86**	**497**	**1,873**	**2,370**
Overtook when unlawful / unsafe	59	64	45	32	25	42	46	43	6	74	289	**362**
Turned in front of oncoming traffic	87	55	58	27	36	47	44	25	16	120	275	**395**
Disregarded red traffic light / stop sign / yield	74	19	22	12	17	14	14	15	3	102	90	**191**
Followed too closely	20	6	4	4	4	12	5	8	2	13	53	**66**
Hit-and-run	1	5	7	0	0	1	0	0	0	7	7	**15**
Intoxicated Driver: Use of liquor or drugs	48	33	22	29	21	26	17	14	21	75	155	**231**
Intoxicated Pedestrian: Use of liquor or drugs	20	13	14	12	7	2	8	8	3	31	55	**86**
Fatigue / Driver falling asleep	22	16	14	10	33	20	16	18	12	13	148	**161**
Cell phone use / holding	0	0	1	1	1	1	1	0	2	1	7	**8**
Other	39	70	33	37	38	49	30	33	22	63	289	**352**
Total	**2,284**	**2,189**	**1,210**	**886**	**725**	**949**	**850**	**880**	**273**	**2,970**	**7,276**	**10,246**

2003 - Total	GA	KZ	WC	EC	FS	MP	NW	LI	NC	RSA		
Human Factors in Fatal Crashes	Total	Total	Total	Total	Total	Total	Total	Total	Total	Urban	Rural	**Total**
Not Known	162	166	92	69	60	56	70	58	14	247	499	**746**
Pedestrian: Jay walking	1,068	1,180	590	412	209	320	371	352	87	1,671	2,918	**4,589**
Speed too high for circumstances	**666**	**658**	**351**	**310**	**303**	**404**	**303**	**344**	**124**	**821**	**2,643**	**3,463**
Overtook when unlawful / unsafe	49	54	41	32	44	40	31	27	5	67	257	**324**
Turned in front of oncoming traffic	95	40	59	27	36	37	43	24	13	118	256	**374**
Disregarded red traffic light / stop sign / yield	78	22	11	9	5	19	10	4	4	95	66	**161**
Followed too closely	23	5	2	2	3	9	2	4	3	12	41	**53**
Hit-and-run	36	63	15	12	8	3	17	5	3	73	90	**163**
Intoxicated Driver: Use of liquor or drugs	44	32	24	17	13	19	14	17	10	79	112	**191**
Intoxicated Pedestrian: Use of liquor or drugs	21	13	9	15	3	10	2	5	0	29	50	**78**
Fatigue / Driver falling asleep	19	16	17	21	14	15	13	19	19	14	139	**153**
Cell phone use / holding	1	0	0	0	0	0	1	0	0	0	2	**2**
Other	34	40	29	21	19	28	13	31	10	28	197	**224**
Total	**2,296**	**2,288**	**1,240**	**947**	**718**	**959**	**891**	**892**	**292**	**3,253**	**7,270**	**10,523**

Annexure I-2

% of Fatal Crashes per Human Factor : 2001 to 2004

2001 - %	GA	KZ	WC	EC	FS	MP	NW	LI	NC	RSA		
Human Factors in Fatal Crashes	%	%	%	%	%	%	%	%	%	Urban	Rural	Total
Not Known	0.00	1.27	0.00	0.00	0.00	0.00	2.50	3.13	0.00	0.00	0.88	0.62
Pedestrian: Jay walking	49.48	36.71	26.32	34.00	37.50	36.84	35.00	31.25	0.00	46.43	32.26	36.38
Speed too high for circumstances	**24.74**	**27.85**	**24.56**	**26.00**	**19.64**	**26.32**	**22.50**	**28.13**	**46.15**	**22.14**	**26.98**	**25.57**
Overtook when unlawful / unsafe	4.12	2.53	7.02	6.00	7.14	8.77	7.50	3.13	7.69	4.29	6.16	5.61
Turned in front of oncoming traffic	1.03	8.86	14.04	6.00	8.93	3.51	5.00	0.00	7.69	4.29	6.74	6.03
Disregarded red traffic light / stop sign / yield	6.19	2.53	1.75	2.00	1.79	1.75	2.50	0.00	0.00	4.29	2.05	2.70
Followed too closely	3.09	2.53	3.51	2.00	0.00	1.75	5.00	6.25	0.00	3.57	2.35	2.70
Hit-and-run	1.03	2.53	0.00	0.00	1.79	1.75	0.00	6.25	0.00	1.43	1.47	1.46
Intoxicated Driver: Use of liquor or drugs	5.15	2.53	5.26	8.00	7.14	7.02	5.00	12.50	7.69	6.43	5.87	6.03
Intoxicated Pedestrian: Use of liquor or drugs	3.09	6.33	10.53	4.00	5.36	7.02	5.00	0.00	23.08	5.71	5.87	5.82
Fatigue / Driver falling asleep	2.06	3.80	7.02	12.00	8.93	5.26	10.00	9.38	7.69	1.43	8.50	6.44
Cell phone use / holding	0.00	0.00	0.00	0.00	1.79	0.00	0.00	0.00	0.00	0.00	0.29	0.21
Other	0.00	2.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.59	0.42
Total	100	100	100	100	100	100	100	100	100	100	100	100

2002 - %	GA	KZ	WC	EC	FS	MP	NW	LI	NC	RSA		
Human Factors in Fatal Crashes	%	%	%	%	%	%	%	%	%	Urban	Rural	Total
Not Known	10.12	12.44	12.73	9.60	10.96	10.07	9.17	10.17	12.35	12.03	10.43	10.87
Pedestrian: Jay walking	41.48	47.46	39.49	40.25	28.42	25.99	32.44	32.77	25.50	46.82	34.18	37.66
Speed too high for circumstances	**23.09**	**22.00**	**20.91**	**27.24**	**28.08**	**33.72**	**28.49**	**28.06**	**27.09**	**19.40**	**27.74**	**25.44**
Overtook when unlawful / unsafe	3.77	2.87	4.79	4.02	6.85	5.11	5.36	5.27	2.79	2.81	4.94	4.35
Turned in front of oncoming traffic	4.94	2.72	3.97	3.41	5.82	6.28	5.50	3.58	4.78	3.91	4.61	4.42
Disregarded red traffic light / stop sign / yield	3.09	1.32	1.17	0.77	1.88	1.31	3.10	0.56	0.40	3.26	1.22	1.78
Followed too closely	1.73	0.88	1.17	0.77	1.20	1.75	0.71	1.69	3.59	1.05	1.45	1.34
Hit-and-run	1.98	2.06	1.52	1.55	0.51	1.17	1.13	1.13	0.80	2.26	1.24	1.52
Intoxicated Driver: Use of liquor or drugs	2.53	1.32	3.04	4.02	5.31	4.67	2.82	3.58	6.77	3.16	3.18	3.18
Intoxicated Pedestrian: Use of liquor or drugs	1.42	1.32	3.50	1.39	2.57	0.58	1.83	0.56	4.38	1.70	1.75	1.74
Fatigue / Driver falling asleep	1.54	1.47	2.80	2.01	5.14	1.90	3.24	4.14	5.18	0.90	3.15	2.53
Cell phone use / holding	0.00	0.07	0.00	0.00	0.00	0.29	0.28	0.00	0.00	0.00	0.10	0.07
Other	4.32	4.05	4.91	4.95	3.25	7.15	5.92	8.47	6.37	2.71	6.02	5.11
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.0	100.00

2003 - %	GA	KZ	WC	EC	FS	MP	NW	LI	NC	RSA		
Human Factors in Fatal Crashes	%	%	%	%	%	%	%	%	%	Urban	Rural	Total
Not Known	15.01	21.74	15.56	16.71	19.85	17.78	17.96	20.60	13.62	15.75	18.72	17.87
Pedestrian: Jay walking	45.22	47.25	44.42	40.61	29.33	33.57	37.60	33.33	22.57	50.52	36.53	40.55
Speed too high for circumstances	**23.55**	**18.19**	**21.80**	**24.15**	**25.68**	**26.08**	**23.11**	**27.30**	**31.52**	**16.79**	**25.84**	**23.24**
Overtook when unlawful / unsafe	2.59	2.92	3.68	3.66	3.46	4.44	5.39	4.86	2.33	2.50	4.00	3.57
Turned in front of oncoming traffic	3.81	2.52	4.81	3.05	4.92	4.91	5.15	2.89	5.84	4.05	3.81	3.88
Disregarded red traffic light / stop sign / yield	3.26	0.86	1.84	1.34	2.37	1.52	1.68	1.71	1.17	3.45	1.23	1.87
Followed too closely	0.86	0.29	0.31	0.49	0.55	1.29	0.60	0.92	0.78	0.44	0.74	0.65
Hit-and-run	0.05	0.23	0.61	0.00	0.00	0.12	0.00	0.00	0.00	0.24	0.10	0.14
Intoxicated Driver: Use of liquor or drugs	2.09	1.49	1.84	3.29	2.91	2.69	2.04	1.57	7.78	2.62	2.14	2.28
Intoxicated Pedestrian: Use of liquor or drugs	0.86	0.57	1.13	1.34	0.91	0.23	0.96	0.92	1.17	1.07	0.75	0.84
Fatigue / Driver falling asleep	0.97	0.74	1.13	1.10	4.55	2.11	1.92	2.10	4.28	0.44	2.03	1.57
Cell phone use / holding	0.00	0.00	0.10	0.12	0.18	0.12	0.12	0.00	0.78	0.04	0.10	0.08
Other	1.73	3.20	2.76	4.15	5.28	5.15	3.47	3.81	8.17	2.10	4.00	3.46
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.0	100.00

2004 - %	GA	KZ	WC	EC	FS	MP	NW	LI	NC	RSA		
Human Factors in Fatal Crashes	%	%	%	%	%	%	%	%	%	Urban	Rural	Total
Not Known	7.05	7.28	7.38	7.25	8.39	5.82	7.81	6.49	4.87	7.57	6.87	7.09
Pedestrian: Jay walking	46.50	51.56	47.60	43.52	29.14	33.38	41.67	39.52	29.65	51.15	40.05	43.50
Speed too high for circumstances	**29.01**	**28.76**	**28.29**	**32.77**	**42.16**	**42.11**	**33.98**	**38.61**	**42.48**	**25.30**	**36.38**	**32.94**
Overtook when unlawful / unsafe	2.14	2.36	3.32	3.37	6.18	4.13	3.52	3.02	1.77	2.04	3.51	3.05
Turned in front of oncoming traffic	4.12	1.73	4.80	2.85	5.08	3.83	4.82	2.71	4.42	3.70	3.55	3.60
Disregarded red traffic light / stop sign / yield	3.39	0.97	0.86	0.91	0.66	1.99	1.17	0.45	1.33	3.02	0.92	1.57
Followed too closely	1.02	0.21	0.12	0.26	0.44	0.92	0.26	0.45	0.88	0.38	0.58	0.52
Hit-and-run	1.58	2.77	1.23	1.30	1.10	0.31	1.95	0.60	0.88	2.21	1.23	1.53
Intoxicated Driver: Use of liquor or drugs	1.92	1.39	1.97	1.81	1.77	1.99	1.56	1.96	3.54	2.47	1.54	1.82
Intoxicated Pedestrian: Use of liquor or drugs	0.90	0.55	0.74	1.55	0.44	1.07	0.26	0.60	0.00	0.89	0.69	0.75
Fatigue / Driver falling asleep	0.85	0.69	1.35	2.20	1.99	1.53	1.43	2.11	6.64	0.43	1.96	1.48
Cell phone use / holding	0.06	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.04	0.03
Other	1.47	1.73	2.34	2.20	2.65	2.91	1.43	3.47	3.54	0.85	2.69	2.12
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.0	100.00

Annexure J

Estimated Total Distance Travelled per Province – Million Vehicle Kilometres : 2003-2004

Est. Total Dist. Travelled per Vehicle Type per Province – Mil.Veh.Kms										
Year 2003	**Est. Total Mil-Veh-Kms driven per Vehicle Type per Province**									**Total**
Month	**GA**	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
Motorised Vehicles - All Fuel Types										
Motorcars	25,256	10,909	11,003	5,063	3,611	4,470	3,814	3,748	1,341	**69,214**
Minibuses	2,511	1,096	1,100	506	365	454	386	376	137	**6,931**
Buses	241	193	150	73	83	117	89	64	44	**1,054**
Motorcycles	603	274	270	125	94	118	99	94	37	**1,714**
LDV's - Bakkies	9,063	4,846	4,421	2,071	1,801	2,384	1,914	1,642	812	**28,954**
Trucks	2,245	1,787	1,392	673	764	1,081	817	594	409	**9,762**
Other & Unknown	56	45	35	17	19	27	20	15	10	**245**
Total Mil.Veh.Kms	**39,974**	**19,150**	**18,371**	**8,528**	**6,737**	**8,651**	**7,138**	**6,533**	**2,791**	**117,875**
Year 2004	**Est. Mil-Veh-Kms driven per Vehicle Type per Province**									Total
Month	**GA**	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	RSA
Motorised Vehicles - All Fuel Types										
Motorcars	26,396	11,136	11,259	5,264	3,696	4,600	3,903	3,725	1,339	**71,317**
Minibuses	2,625	1,119	1,126	527	374	467	394	374	137	**7,145**
Buses	261	203	162	80	88	122	81	67	45	**1,110**
Motorcycles	632	281	277	130	97	122	100	94	37	**1,770**
LDV's - Bakkies	9,566	5,012	4,607	2,205	1,882	2,467	1,860	1,667	816	**30,080**
Trucks	2,429	1,880	1,498	745	815	1,124	750	621	413	**10,275**
Other & Unknown	61	47	38	19	20	28	19	16	10	**258**
Total Mil.Veh.Kms	**41,968**	**19,678**	**18,967**	**8,970**	**6,973**	**8,931**	**7,106**	**6,564**	**2,797**	**121,954**
% Change 2003 to 2004	**% Change in Mil-Veh-Kms driven per Vehicle Type**									**Total**
	GA	**KZ**	**WC**	**EC**	**FS**	**MP**	**NW**	**LI**	**NC**	**RSA**
Motorised Vehicles - All Fuel Types										
Motorcars	4.51	2.08	2.33	3.97	2.38	2.91	2.32	-0.61	-0.15	**3.04**
Minibuses	4.56	2.15	2.42	4.09	2.51	2.95	2.01	-0.50	-0.11	**3.08**
Buses	8.25	5.27	7.65	10.75	6.70	4.02	-8.30	4.63	0.90	**5.28**
Motorcycles	4.75	2.43	2.79	4.58	2.98	3.08	0.84	-0.05	0.05	**3.25**
LDV's - Bakkies	5.55	3.41	4.21	6.45	4.45	3.48	-2.81	1.53	0.45	**3.89**
Trucks	8.18	5.24	7.58	10.66	6.66	4.02	-8.21	4.57	0.90	**5.25**
Other & Unknown	8.16	5.23	7.55	10.63	6.65	4.01	-8.18	4.55	0.90	**5.24**
Total Mil.Veh.Kms	**4.99**	**2.76**	**3.24**	**5.19**	**3.50**	**3.23**	**-0.46**	**0.47**	**0.20**	**3.46**