Sida Evaluation 96/43

Botswana Road Safety Improvement Project

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Department for
Infrastructure and
Economic Cooperation

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THE BOTSWANA ROAD SAFETY IMPROVEMENT PROGRAMME

EVALUATION PROJECT

1. INTRODUCTION

Following discussions in 1983 between the Government of Botswana (GoB) and the Swedish International Development Authority (SIDA) concerning the rapidly deteriorating traffic accident situation in Botswana, it was agreed that funds would be provided by both parties to address this problem.

Ultimately the programme has comprised three main phases and a fourth "phasing out" stage. Details of the SIDA financial inputs are summarised in Table 1.1 below. (The Botswana Government inputs to the Road Safety Programme are discussed in Section 6 of this Report).

TABLE 1.1

Stage No.	SIDA SEK (M)	PE IOD From	To
I	5.7	OCT. '85	DEC. '87
II	5.0	MAY '88	NOV. '89
III	5.0	JUN. '90	JUN. '92
IV	2.0	JUL. '92	JUN. '95
TOTAL	17.7		

SUMMARY OF SIDA FINANCIAL INPUTS TO BRSIP

The **main objective** of the programme was to decrease the number of traffic accidents and their economic and social consequences. It was hoped that the programme would eventually result in a 20-40% reduction of the accident rate.

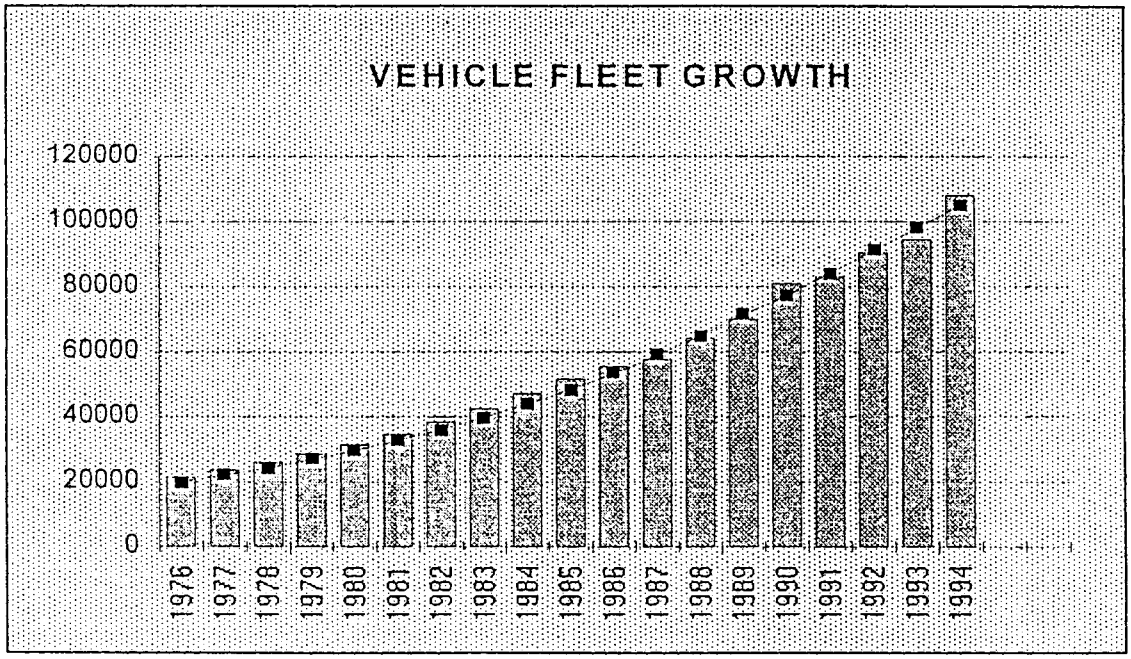
The annual cost of road accidents in 1994 has been estimated at about P275 million - representing approximately 2,7% of the Gross Domestic Product (GDP) for that year (P10 300M)

The number of cars in Botswana is increasing rapidly - from 34 700 in 1981 to 108 000 in 1994, i.e. the vehicle population has more than trebled in this 13 year period. The chart in Figure 1.1 (next page) illustrates this growth and shows that growth rate since 1990 has been increasing at an accelerating rate, with the fleet currently growing at just under 7000 vehicles per year.

The hoped-for reduction in the rate of accidents, particularly those involving death and injury, has not so far been achieved. Figure 1.2 illustrates the continuing growth in the numbers of accidents. However the rate of increase of the numbers of all categories of accidents has leveled off since about 1991 and the provisional figure for accidents in 1995, which has been obtained from the Police, shows a reduction over the numbers of accidents in the previous year.

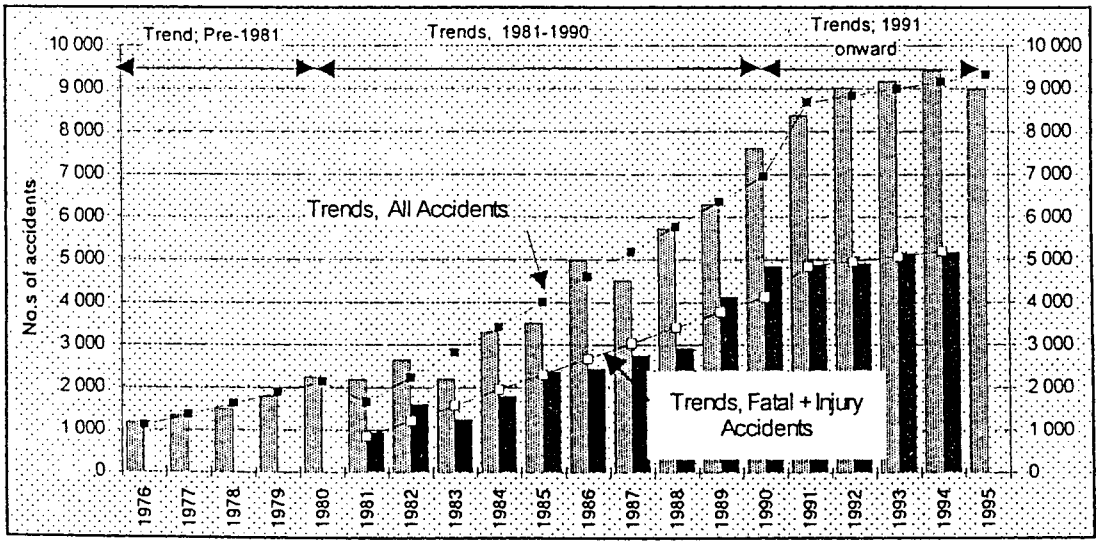
Bearing in mind the increasing numbers of vehicles in the country, the increase in population, the increase in the numbers of drivers and the greatly expanded high-speed inter-urban and urban road networks it is perhaps not surprising that the numbers of accidents has continued to escalate. A better indication of the success of the Road Safety Programme might be obtained by comparing the rates of accidents per 10 000 vehicles and per 10 000 population. These comparisons (refer to Figure 1.3, page 3) show that the rate of accidents per 10 000 vehicles has increased from 68 in 1985, when the Road Safety Programme commenced, to 87 in 1994 and the rate of accidents per 10 000 population has grown from 32 to 63 in the same period, i.e. they have increased by 28% and 94% respectively. (Insufficient data is available to extend these comparisons to 1995). However, the plot of numbers of accidents and of accidents per 10 000 population and per 10 000 vehicles (Figures 1.2 and 1.3) has begun to show some signs of leveling off - showing that the progressive introduction of the new safety measures is beginning to take effect.

FIGURE 1.1



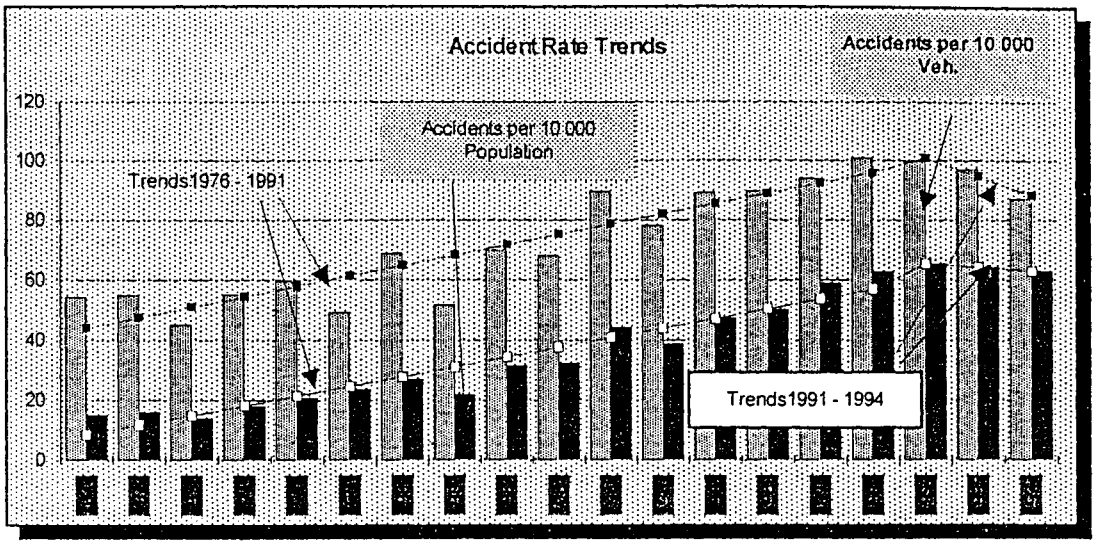
VEHICLE FLEET GROWTH

FIGURE 1.2



ANNUAL TRAFFIC ACCIDENTS IN BOTSWANA

FIGURE 1.3



ACCIDENT RATE TRENDS

(ALL CATEGORIES)

The results of the above analyses appear disappointing at first look and it has to be asked whether the BRSI Programme has achieved worthwhile results. This evaluation attempts to respond to this question in detail .

Other objectives of the evaluation are to identify and assess the **relevance** of the programme **objectives**, the **extent** to which they have been met, the **methodologies** applied to achieve these objectives and the **efficiency** with which these methods were applied, to assess the overall **impact** of the programme on Botswana society and, finally, to examine the **sustainability** of the programme infrastructure which has been established on the basis of its operating from within Botswana's resources of skills and equipment. The evaluation is also intended to identify those areas where further inputs are required for the improved operation of the traffic safety infrastructure and to **recommend measures for their achievement.**

The consultant team with the responsibility for undertaking the evaluation exercise comprises a Zimbabwean Team Leader with extensive experience in traffic engineering and traffic safety work, a Botswana uman Relations consultant with special responsibility for the assessment of the organisational changes and training inputs and the provisions for ongoing training and operational requirements. She is also responsible for assessing the impact of the Road Safety Programme in the context of Botswana's social structures and values.

The team has been assisted by inputs from a Gaborone-based Civil Engineer, who has been responsible for making an analysis of the returns received from the inputs of money and skills resources during the whole of the ten year programme.

2. THE PROGRAMME OBJECTIVES

The terms of Reference prepared by SIDA for each of the four phases of the Road Safety Programme define the goals and objectives in some detail.

"Goals" may be taken to be represented by a general statement of what it is aimed to achieve and, such a statement may not always be in specific terms, e.g., the overall goal of the BRSIP is "to reduce accidents". In order to make an evaluation of the extent of satisfaction (or non-achievement) of this goal, it is necessary to select more specific **objectives** and **criteria** by which their accomplishment can be gauged. Achievement of these objectives can then be planned by use of certain **methodologies** and **activity plans / implementation plans.** Using the above definitions, the Terms of Reference (TOR) for the various development phases propose the following goals -

2.1 Phase I

2.1.1. To provide the Government of Botswana with professional assistance and suitable equipment to initiate road safety work.

2.1.2. To build up a local capacity to continue the implementation without further Swedish support after the two year period.

2.1.3 To develop and strengthen the administration of road safety in Botswana, with a particular focus in liaising with all the relevant bodies - the National Road Safety Committee, Roads Department, the Police, Ministry of Education, etc.

2.1.4 To co-ordinate the technical assistance and advise on areas that require further inputs.

2.1.5 To develop education curricula.

2.1.6 To organise training courses for traffic police and vehicle inspectors.

2.1.7 To design an appropriate vehicle inspection system.

2.1.8 To propose a system for financing road safety activities.

2.1.9 To review Road Traffic Regulations and the Highway Code.

2.1.10 To propose an accident reporting system.

2.1.11 To advise town and district councils on the traffic environment implications of new developments

2.1.12 To advise on defects in the design of existing traffic environments.

2.1.13 To prepare guidelines for road signs, road markings and road junctions (signals, traffic circles, etc.).

2.1.14 To advise on measures to promote pedestrian and cyclist safety.

2.1.15 To advise on parking and traffic flow in general in urban areas.

2.1.16 To advise on public transport issues.

2.1.17 To propose the future aim and direction of road safety work in Botswana.

These objectives were further detailed in a description of the "scope of services" which were to be provided by the consultant responsible for developing the programme.

2.2. Phase II

The Phase 1 project was insufficient to cover all of the needs for improvement of the nation's road safety / traffic accident responsive infrastructure and it was agreed that a second phase would be required in order to further develop these organisations and enhance their effectiveness. The specific Terms of Reference for the Phase 2 project have not been located, but it is assumed that this was a continuation of Phase 1 with much the same goals and objectives.

2.3 Phase III

Overall objectives are -

2.3.1 to decrease the number of traffic accidents and their effects in the form of human suffering and strain on the country's economy.

2.3.2 A more specific objective is to develop the administrative and organisational resources that are necessary to lead and co-ordinate the efforts in the road safety improvement sector.

The scope of the work which was to be undertaken by the consulting engineer in this phase of the programme is shown below)

project co-ordination; on-the-job training of National Road Safety Officers, especially in analysing the road safety situation and drawing up plans and strategies for the road safety work, development and introduction of new driver training and licensing systems.

information and education; introduction of training and educational material produced within the programme and, when feasible, with the SATCC road safety traffic programme.

legal advice; to introduce new traffic laws and regulations.

law enforcement; advice on reorganisation and training of traffic police.

continued **on-the-job training** in accident analysis, training of traffic police in accident reporting, development of the analysis system and proposals for an integrated information system.

advice on a new **driver training and licensing system.**

advice on the establishment of **vehicle inspection stations.**

advice on the drawing-up of **guidelines for a programme to collect data on the effects of various road safety measures** and the establishment of a small scale programme for scientifically sound research on road safety related matters.

2.4 Phase IV

The final ("winding-up") phase of SIDA assistance in the road safety programme, in support of the previously identified objectives, was for completion of the following activities -

- driver training and licensing ;
- vehicle inspection ;
- staff training (Road Safety Division) ;
- Accident Information System ;
- a study of the viability of commercialisation of some road safety activities ;
- project coordination.

It will be seen that the overall goal of the various phases has a common thread - **the reduction of traffic accident impacts in Botswana in terms of human suffering and personal and national cost to their lowest practical level without undue forfeiture of personal liberties and within tolerable expenditure levels.**

Consideration of the specific objectives identified for each phase of the programme implementation reveals that these can be conveniently grouped into areas of responsibility which fall under those Government and other organisations which are involved in the provision of traffic safety measures (including traffic engineering applications), traffic regulations, traffic control, traffic surveillance, traffic accident response systems (including accident attendance and rescue services) and traffic accident follow up measures (information recording and prosecution).

Most of the interim objectives have been concerned with the improvement of the pre-project organisational and operational systems and are therefore focused on organisational structures, staffing and skill requirements, the training of key personnel and the establishment of on-going training programmes, the provision of appropriate equipment and the training of operating personnel in the use of such equipment. These objectives are good but it must be remembered that they only represent means to an end. **When the new systems are fully developed and new tools are in place they must be applied to the maximum in order to achieve the end goal of minimising the numbers and effects of traffic accidents.**

3. THE RELEVANCE OF THE BOTSWANA ROAD SAFETY IMPROVEMENT PROGRAMME AND ITS OBJECTIVES

Traffic accidents represent a wasteful expenditure of any nation's national resources, be they productive human resources, loss or damage of material resources, including imported cars (bought from the nation's foreign currency reserves), national and personal medical costs, administrative costs, legal costs and other costs.

Statistics available for 1994 for Botswana show that, of a total of 3340 deaths from all causes 352 were from the result of motor vehicles accidents, i.e. 11 % of the total. A further 4749 accidents resulted in injuries. These figures make a sorry picture, largely affecting the productive sector of the country's work force. (In 1994 50% of fatalities from traffic accidents involved people in the age group 20 to 40 years - the most productive of the community, largely comprising educated individuals holding key positions in workplaces). To a considerable extent these figures, represent human suffering , bereavement, grief and loss for reasons which, in the majority of cases, are avoidable. In money terms, current estimates of the cost of traffic accidents in Botswana amount to P275 million - 2,7% of the Gross Domestic Produce for 1994, which could have been used for more productive purposes.

To give scale to the above statistics it may be of interest to note that the Civil Registration Office of the Ministry of Home Affairs reports 576 AIDS-related deaths in the same year (i.e. a further 17% of deaths from all causes). The Ministry has commented that actual figures of death from AIDS-related causes are believed to be higher than the quoted figure, because not all deaths are reported and because medical reports sometimes note the illness at the time of death and not necessarily the AIDS factor.

The incidence of traffic accidents in this country appears to compare badly with some other African countries, as shown in Table 5.5 (p.29), and is inordinately high when compared with figures for the western world, (e.g. Sweden), especially considering the relatively high levels of development, education, employment and prosperity in Botswana, biut there is every reason to anticipate that further improvements can be achieved.

One possible factor contributing to this high rate may be that the average travel per vehicle in Botswana could be higher than elsewhere in Africa because Botswana is a large, spread out country with a relatively prosperous population and people tend to travel long distances at weekends to their home villages. This could be confirmed by comparison of average petrol consumption per vehicle in various countries, however it has been difficult to obtain information on fuel consumption in other countries.

Other factors relating to the high accident rates arise from the explosive growth of the Botswana economy in the recent past. These factors are more fully discussed in Section 5 of this report.

There can be no doubt of the relevance of the BRSI Programme to Botswana as a whole. The specific objectives for achievement of the goal of reduced accident rates are the necessary building blocks and aim at the provision of an improved, more appropriate, more responsive infrastructure for the monitoring and prevention of accidents through the application of proven techniques in the fields of public education, the updating of traffic regulations to respond to existing conditions, improved traffic enforcement methods and the undertaking of appropriate traffic engineering improvements and designs in order to minimise driving hazards which might arise from poor road layouts, poor traffic controls or poor road-signing.

This evaluation (Section 6) finds that the Road Safety Programme has already borne fruit far in excess of the input costs and has the potential to still further improve its performance, thus demonstrating the high relevance and practicality of such a project to Botswana.

Investigation of the existing organizations which are involved in procedures for the avoidance or reduction of traffic accidents and those which must respond to the occurrence of such accidents has been progressively carried out in the various development phases of the programme and has ensured that all the relevant elements of the system have been catered for, although not all the necessary changes are yet complete and not all the altered systems are yet fully operative.

The goal stated in the Phase III Terms of Reference (paragraph 2.3.1 of this report) "to decrease the **number** of traffic accidents" is unrealistic, bearing in mind the continuing increase in vehicle numbers, vehicle usage and population.

4. METHODOLOGY

Accepting the feasibility of achieving most of the specified targets and goals and the practicality and relevance of the objectives stemming from these, it is necessary to consider what **methods** may best be applied to achieve the objectives. It is also necessary to evaluate how **efficiently** the methods have been applied.

As previously remarked, in order to attain the goals of reducing traffic accident rates, it has to be necessary to examine methods to improve the infrastructure and operation of those organisations which carry responsibilities for the prevention of, reaction to, and follow up of traffic accidents, to identify where improvements are needed, to recommend how the improvements should be achieved and to implement the agreed proposals.

The evaluation team held a series of interviews with representatives of those Government Departments and other organisations which carry responsibility for these aspects of traffic safety and the findings from these interviews are discussed below.

Organisations with which discussions were held were -

(i) The Ministry of Works Transport and Communications (MWTC) - Department of National Transport and Communications (DNTC) and the Road Safety Division (RSD) of that Department

(ii) The Traffic Police Branch of the Botswana Police Force;

(iii) The Ministry of Local Government, Lands and Housing ;

(iv) The Ministry of Education;

(v) Private Sector Organisations, including
- Public Transport operators
- Commercial Sector Transport operators

(vi) A representative of the Public Health Services

(vii) Representatives of the District Road Safety Committees

Of these organisations, those most importantly involved are the Departments of the MWTC, to wit the DNTC and the Roads Department. The DNTC incorporates the Road Safety Division (RSD) and the Registration and Licensing Division. The RSD coordinates the meetings of the policy-making National Road Safety Committee Other key players are the Police Traffic Branch which carries vital responsibilities for enforcement and surveillance of traffic and the urban authorities which are responsible for implementation of traffic engineering control and accident remedial measures in their areas.

The Government and other organisations listed above have responsibility for carrying out the proposals made for the achievement of improved ways of responding to the traffic accident situation in Botswana, and have in many instances undergone organisational changes in order to address the problem more efficiently. The methods by which the improved traffic safety infrastructure has been achieved are described below.

4.1THE NATIONAL ROAD SAFETY COMMITTEE

The Principle Officer of the Road Safety Division is also Secretary of the National Road Safety Committee, which is a policy-making body and includes representatives of other Government organisations involved in traffic safety, such as the Traffic Police. By statute it is required to meet not less than four times a year, but usually meets more often than this. It is responsible for traffic safety policy formulation on a national scale. The National Road Safety Committee was in operation prior to the commencement of the BRSIP and has proven to be a valuable tool.

There are also a total of 27 District Road Safety Committees, generally headed by the appropriate District Commissioner and including the local Chief of Police, together with representatives of commerce and industry and, from time to time, ad-hoc members to advise on issues of local concern.

These Committees provide a valuable link with issues of local and national public concern and provide assistance in the preparations of safety campaigns relating to National Traffic Safety Day and prior to the major holiday periods (Easter, President's Day weekend, the Independence Day celebrations and over the Christmas period).

Extensive discussions were held with head of the RSD, who, as Secretary, has represented the views of and information concerning the NRSC.

4.2 THE MINISTRY OF WORKS TRANSPORT AND COMMUNICATIONS

The Ministry has been reorganised to establish the **Department of National Transport and Communications (DNTC)**. This became operative in 1989.

Also housed in this Ministry are the Roads Department and the Central Transport Organization (CTO).

4.3 THE ROAD SAFETY DIVISION

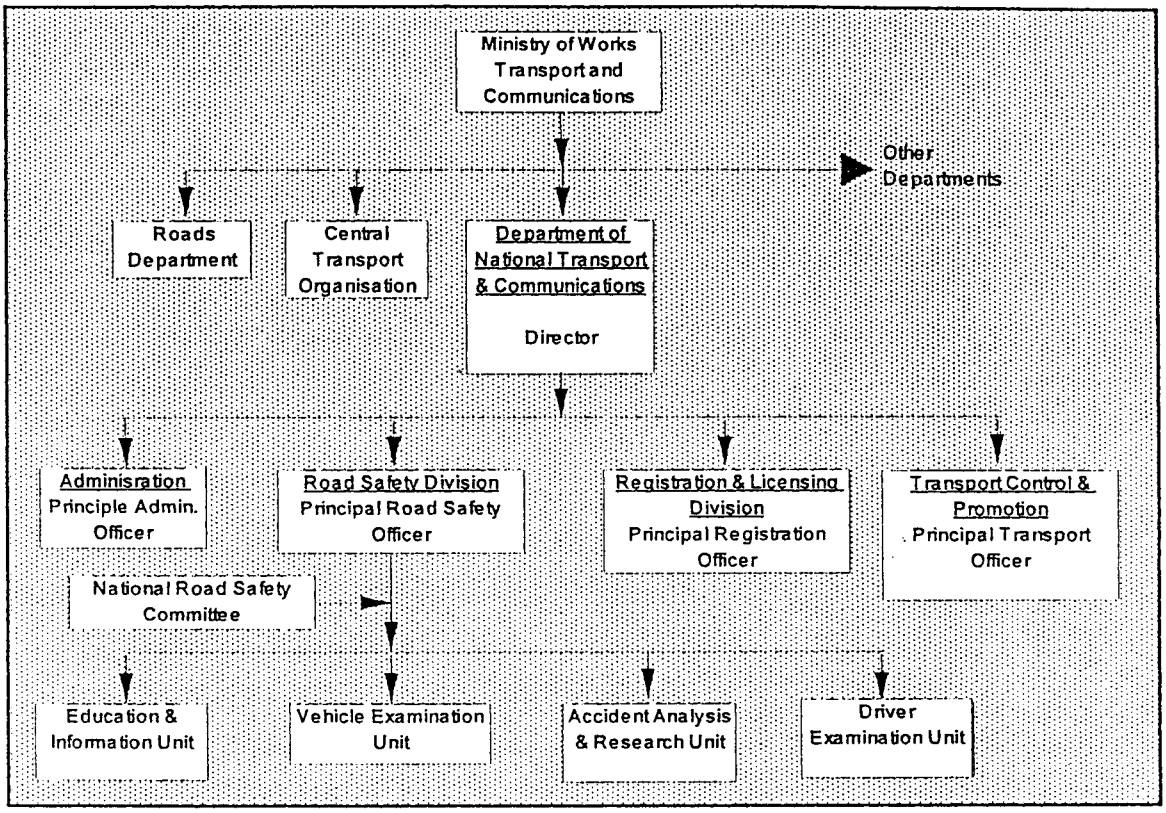
Within the DNTC the Road Safety Division (RSD) has been formed. The new Division also began operations in 1989 and is headed by the Chief Road Safety Officer. The organizational structure is illustrated in Figure 4.1 (next page).

The functions of the Road Safety Division are clear from the organisation chart, however discussions reveal that the Road Safety Division structure no longer includes provision for a Traffic Engineer. This change from the Consultants' original recommendations arises because the traffic engineering inputs required in response to accidents are seen to be the responsibilities of the appropriate authorities within which the accidents occur, e.g. the Department of Roads, the municipal engineers' departments, etc.

Unfortunately, these authorities do not at present have traffic engineering staff either, e.g. the Roads Department have a staff member currently undergoing an MSc course in Traffic Engineering in the United Kingdom and who will not be available to the Department until 1997. Currently the Roads Department tackles traffic engineering improvement through its Maintenance Division. In recognition of the lack of capacity by municipalities or local authorities to respond to traffic accident remedial works requirements, Government is about to implement the recommendations of a National Maintenance Study which calls for more engineering expertise, which amoungst other things, will enable the Division to assist councils in traffic engineering and other engineering areas. Thus it is seen not to be necessary for the RSD to employ traffic engineering staff of its own.

The Gaborone City Engineer's Department has sent a staff member on a post-graduate course in traffic engineering to Australia and he will not be back in service until 1997.

FIGURE 4.1



DNTC ORGANISATION CHART

The Gaborone City Engineer has said that he would look to DNTC for help in the traffic engineering sphere if he felt the need, but it appears that such help would not currently be available. Another route might be to seek help from consulting engineers, but neither the City Engineer's Department nor the Roads Department have sufficient funds to take this route.

The net result is that at the present time the drive for identification of blackspots and execution of traffic safety engineering improvements on Botswana's main road system and in its urban areas has lost impetus. This situation is exacerbated by delays in obtaining relevant traffic accident data and a listing of accident "blackspots" from the RSD (refer to paragraph 4.3.3 on page 16) and this situation must be rectified as quickly as possible if a continuing return is to be received from the investments in and on-going costs of the road safety programme. Thus it is to be hoped that early and effective actions will be taken to meet the current short-term needs of the Roads Department, the municipalities and the local councils.

It is suggested that budget provision should be made by the Roads Department and by the local authorities for the long-term funding of small scale cost-effective "Traffic Improvements" in successive financial years.

Training provision for RSD staff is discussed under the relevant Sections below.

4.3.1. The Vehicle Examination Section

This Unit has responsibility for

(i) enforcement of vehicle safety regulations involving programmed off-road inspections when public service and heavy goods vehicle operating permits are renewed and roadside inspections, with the support of the Police.

(ii) Checking all accident-involved vehicles for defects.

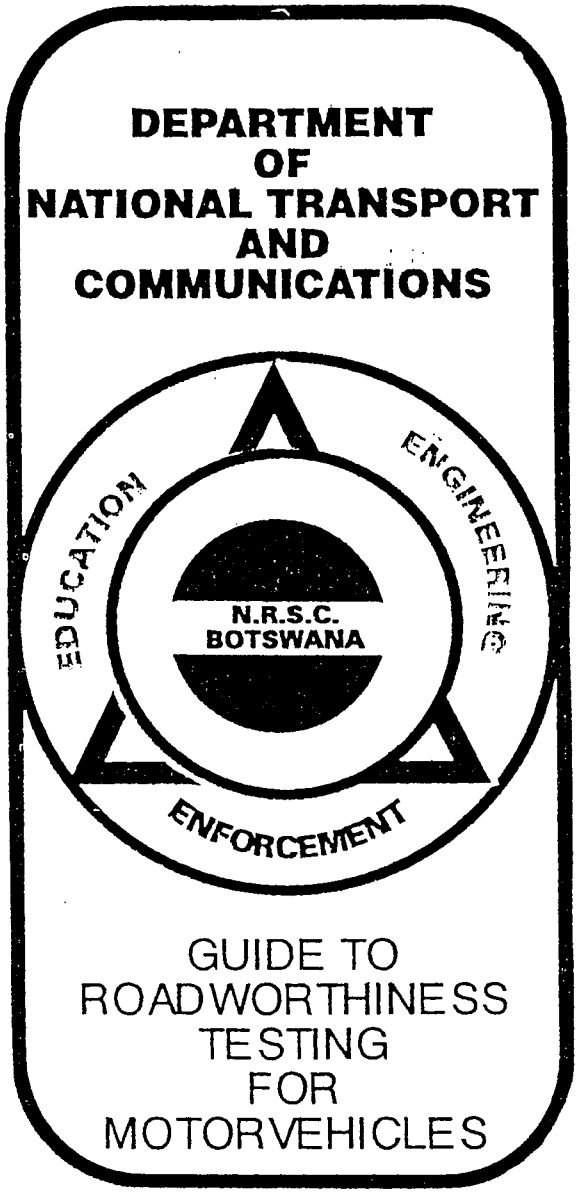
Vehicle inspections are carried out throughout the country. A new Vehicle Inspection Depot is under construction in Francistown and one will shortly be commenced in Gaborone. The MWTC's Central Transport Organisation (CTO) assists in vehicle inspections in the smaller centres. Roadside checks are carried out by mobile inspection units.

Whilst construction on the new vehicle inspection depots is well behind programme, good progress has been made in the training of staff for the carrying out of the improved vehicle inspection procedures and in the use of the new equipment, which is ready to be installed as soon as the new Depots are completed. Provision has been made for an increase in technical inspection staff by the appointment of 15 apprentices who are currently undergoing motor mechanics' courses and will subsequently be trained as vehicle inspectors.

It is planned to appoint a further 10 apprentices in 1996.

Although a good level of co-operation exists with the CTO, it is frequently found that there is a clash of priorities when requiring CTO staff to undertake vehicle inspection work. Thus it is necessary to plan to extend the Vehicle Inspectorate coverage over most of the country. As an interim step, there are plans to use trainee VID staff to bolster the CTO strength, thus reducing the nuisance of having to deflect mechanics from urgent repair work to vehicle inspection.

Discussions have revealed that there is very little information about vehicle defects shown in the traffic accident statistics summary. Thus it is difficult to assess the number of accidents where "vehicle defects" (e.g. worn tyres, defective brakes, steering) were a main or contributing factor. **This omission should be rectified.**



The Vehicle Examination Section have been responsible for production of an excellent "Guide to Road-worthiness Testing for Motor Vehicles" for the assistance of the public. This sets out a simple description of road worthiness requirements in layman's terms.

Once the new vehicle registration system is fully operative, it will be easier to ensure that vehicles which have been found to be defective during the course of inspection are brought back for re-inspection after the required repairs have been made. (The current manual registration systems make this easy to circumvent). Thus the improved system will contribute significantly to the overall road safety situation in Botswana.

Plans for compulsory inspection of all vehicles over progressively shorter age limits and of new vehicles, will be brought into operation once the re-formed Vehicle Examination Section is fully operational and the necessary legal machinery is in place.

The net effect of these improvements will be to minimise accident risks arising from vehicle defects, although there must be a continuing need for random roadside checks by the Vehicle Examination Section, as well as the Police, on such basic requirements as good tyre condition, brakes, steering and lights.

4.3.2 The Information and Education Unit

Information aims are to provide adult-directed traffic safety campaigns on the basis of needs detected from a study of the traffic accident data or arising from concerns voiced through the Road Safety Committees, or other public bodies, frequently reflecting the grass-roots level concerns of the public.

Currently campaigns are based on the preparation and dissemination of publicity leaflets, brochures, an annual newsletter, Christmas cards, calendars, slogan-bearing trinkets (e.g. key rings) and by Officers giving road safety talks on suitable occasions. The campaigns extend to drivers of Government vehicles, who are given the opportunity of attending film-based courses on defensive driving, using an excellent Australian produced series.

Although a few private firms have occasionally run road-safety courses and defensive driving courses for their drivers, there is no such on-going system available to the public at large.

Suggestions were made that courses of this nature, inclusive of the defensive driving films and instruction to the level required to prepare candidates for the professional drivers licence test, should be run for senior pupils at secondary schools during at least one term of the year.

The Information Unit is claimed to be understaffed and would benefit from access, possibly on a consultant-retainer basis, to support staff, such as graphic artists for campaign preparation.

An annual activity plan is used to plan the Unit's programme. **Future publicity campaigns could include encouragement for the motoring public to undergo first-aid training courses and to carry fire extinguishers in their vehicles. A campaign pointing out the hazards to which passengers in the back of trucks and of bakkies are subject would be worth considering.**

Radio Broadcasting : The broadcasting unit is part of the Information Unit's activities. Three different radio programmes are operated, through which efforts are made to reach drivers in particular and, form time to time, pedestrians. Broadcast programmes include -

- a 15 minute weekly Road Safety Programme, broadcast on Saturday mornings following the 7 a.m. news.
- "On the Road" - a programme mounted a week or two prior to peak holiday periods and involving panelists involved in road safety, including the Police, DNTC, etc.
- Occasional opportunities to participate in a popular phone-in programme.

No TV information / advertising is undertaken because of the high cost and shortage of funds. The possibility of bringing some pressure on the TV studios to consider this part of their debt to society should be explored. Any TV material must be competently prepared to a high standard if it is to be effective.

<u>Education</u> activities are aimed at developing effective levels of traffic conscientiousness in school children.

- **For primary schools** 3 booklets - "My Traffic Book - 1, 2 and 3", and a teacher's manual have been prepared. These are distributed by the Ministry of Local Government, along with other traffic awareness educational material.

Whilst the Road Safety Division and the Ministry of Education are both aware that **the booklets need revision and updating,** this has not been initiated. No attempts have been made to assess their relevance to or impact on pupils. The required manpower resources are not available for this and the Ministry of Education is not motivated to devoting manpower resources to this because of pressures for other needs. It is felt that the value of the three little booklets, which cannot occupy more than a few minutes of even the slowest readers attention and which are intended to be distributed to children during their progression from Grades 1 to 6, is strictly limited. A lot more input is required if the children are to be prepared to survive the modern day rigours of motorised society.

The RSD Information and Education Section plans to draw up a development programme and to specify the resources required in support of such a programme, but this plan has not been commenced.

- A video film has been prepared for Secondary School pupils and these pupils are addressed by members on Road Safety Committees, the Police and others from time to time. However, it is felt that current efforts are insufficient to prepare these incipient drivers-of-tomorrow for their participation in the life-and-death business of driving, walking and surviving in today's motorised society. An unparalleled opportunity of inculcating careful behaviour and right attitudes is being missed and must be urgently tackled.

The suggestion made above for inclusion of traffic-safety / driving courses into senior pupils study curricula and for increased and improved traffic safety awareness in primary schools, needs to be considered by the Traffic Education and Ministry of Education authorities together and cohesive plans for both primary and senior schools need to be drawn up. **Driver training instruction courses should also be made available to university students.**

Provision should also be made at both junior and senior school levels for encouraging the formation of individual School Safety committees, incorporating representatives of parents, teachers, the traffic police, local authorities and other appropriate persons (and, at secondary schools, one or two top senior pupils). **These committees should** be run on specified guidelines and **be responsible for drawing up realistic school safety programmes, systems of safe routes and, under the guidance of the Education Unit and the Police, setting up Scholar Patrols. Senior school pupils and/or parents could take some part in assisting the safeguarding of junior school pupils en route to and from school.**

The establishment of School Safety Committees and development of Safety Programmes and Scholar Patrols is seen to be an important step in bringing the responsibility for traffic safety to the door of those who need it most. It has to be accepted that it will never be feasible for the Police to provide sufficient manpower to provide patrols at all schools as well as simultaneously undertake general traffic surveillance duties in the busier urban areas and an alternative system developed on these lines would be welcomed by them.

Another option with a good potential for traffic safety at schools is to utilise National Service participants in the provision of school patrols. Preparatory training courses with inputs by the Traffic Police and RSD officers would be required to ensure their competence for such duties.

The mode of operation of School Safety Committees, and Scholar Patrols will need to be developed. An easily understood procedure manual should also be prepared and the introduction of these suggestions would require large-scale publicity.

The establishment of "school zones" to regulate traffic on the roads adjacent to schools is another safety measure worth considering. Traffic speeds on minor local roads could be regulated by use of speed humps ("sleeping policemen"), built to a standard specification and installed in compliance with agreed warrants, and in support of School Zone speed limits.

In summary it is found that the importance of traffic safety education on awareness-building at schools is substantially under-played at present. A larger establishment and a bigger budget may be required to enhance its effectiveness.

4.3.3 The Accident Analysis and Research Unit

Fundamental to any campaign for the reduction of traffic accidents is the collection, analysis and dissemination of traffic accident information aimed at detecting the numbers and seriousness of accidents occurring over a specified time in the whole country, a region of the country, a town or city, right down to individual locations on the road network. It is also important to be able to detect common features of such accidents, so as to know what countermeasures are needed in order to reduce the frequencies of accidents e.g. the summaries of accident data in Botswana have revealed high proportions involving drunken driving, unlicensed drivers and domestic animals in the road (mostly cattle).

Summaries of traffic accidents occurring at particular locations often reveal common features which suggest appropriate remedial measures, e.g. the style of traffic control, or the need for engineering measures to alter the road layout or improve sight distances or other features. Traffic accident data summaries are also used to detect those locations where the monthly or annual rate of accidents is high and these places can then be examined to establish what the reasons for this may be.

With these goals in mind, the Road Safety Division adopted the British Transport and Road Research laboratory (TRRL) Micro-computer Accident Analysis Package (MAPP), incorporating special modifications for Botswana, in 1986 and the accident data summaries are made by the Accident Analysis Section using this programme.
The data input information is collected by the Police, using a purpose-designed standard proforma, which is completed by the attending officer for all traffic accidents. The information on individual proformas is then summarised by the Police onto a computer file and the summarised information is then passed to the Accident Analysis Section of the RSD, where it is checked for errors and copied into the national traffic accident data base for that year.

All actual and potential traffic accident locations on the national road system, or within urban areas, have coded reference numbers and accidents occurring at these locations are progressively logged as the information is received. Thus the system can be used to identify the locations of "blackspots" where large numbers of accidents occur, to give information regarding the relative seriousness of such accidents (numbers of fatal, serious injury, slight injury or damage-only accidents) and to detect common features which may be of relevance. (The interpretation of the analysis and the design of remedial measures, including analysis of anticipated cost-effectiveness, is the work of others).

The accident data are used to compile annual global / regional / urban summaries of traffic accident statistics for Botswana, analyzing accidents by seriousness in categories of age-groups, vehicle types, by Police district, by accident site description (e.g. straight road, on bends or at various types of junction), by junction control types, by road quality, by time and time-of-year, by collision type and by vehicle manoeuvre. These summaries are produced by the Accident Analysis and Research Unit and are made available on a wide scale to all Members of Parliament, of the House of Chiefs, of all Road Safety Committees, to all Permanent Secretaries, Town, District and City Engineers, to the Commissioners of the Botswana Defence Force and the Police, the Officers Commanding at Police Districts and all Police Stations, to the Government Statistician, The Department of Information and Broadcasting and to the Roads Department.

The labour involved in drawing up summaries of and collating the input data for this publication and then in overseeing its production and distribution appears to be quite substantial and **it is worth considering off-loading the production aspects of this work to a more appropriate Government Department if this is the case, so as to enable the Unit to get on with its prime task.**

In addition to the generalised traffic data discussed above, it will be appreciated that **the receipt of regular more specific information about the accidents which occur in their areas of jurisdiction will be of vital importance to all those authorities which bear responsibility for undertaking measures to prevent or mitigate the effects of traffic accidents. These should include the Traffic Police headquarters, each district and local Police Headquarters, the Roads Department headquarters and all Regional / District Roads Engineers and the engineering departments of every urban authority.**

The information required by each of these authorities should include -

(i) a listing of the total numbers of accidents occurring at each traffic accident location reference with breakdown of seriousness (F, SI, I, D);

(ii) identification of the most serious accident locations ("blackspots") by numbers of accidents and by seriousness; and

(iii) analysis of the characteristics of accidents occurring at the worst 'blackspot' locations (and at other nominated locations) by application of "stick diagrams" (produced by the MAAP program)..

Regrettably **discussions reveal that this information is not being sent to the user-authorities, nor is it being asked for by them.** (It is understood that the last "stick diagrams" - analysing the worst accident spots in each jurisdiction were sent out in 1992, relating 1991 accidents). Reasons for the slow production of accident data summaries are given as "workload / manpower" problems.

The effort expanded in gathering and processing traffic accident data is worth very little if it is not being timeously received by the "user" authorities and nothing at all if the users do not apply this information, however late received, to seeking out reasons and remedies for accidents which take place in their areas of responsibility. **Urgent action must be taken to ensure that the specific data concerning accidents in each local administrative area is made available not later than three months after the end of the year.** (In the longer term it should be the aim to produce quarterly summaries of accidents in each area).

An important issue revealed by the reorganised accident data system is level of hazard to which passengers are exposed when riding in the rear of open trucks and "bakkies". The statistics show that 93% of passenger fatalities occur in these vehicle classes, whilst the balance of only 7% relate to public transport vehicles. **The use of goods vehicles for passenger transport is widespread and important to society in Botswana, but it is clear that this means of transport is dangerous and it is suggested that a study be made with a view to finding ways of reducing the hazards attaching to this practice.**

The Accident Information Section also carries responsibility for traffic accident research - aimed primarily at non-academic, locally relevant issues. Owing to workload pressures, **however, no research is currently being undertaken.** This is a pity. Whilst the SADC region, particularly South Africa, has excellent capabilities for in-depth research in areas of high relevance to traffic accidents in Southern Africa, it is important that nationally-based investigations also be undertaken. Suggestions could include -

- traffic accident costs in Botswana
- reasons for the high proportions of single vehicle accidents in Botswana
- follow-up studies of traffic improvement projects
- studies of the effects on driver observance of the introduction of increased speed limits on some urban roads, if this is agreed, and the continuing replacement of "Stop" signs by "Yield" signs in appropriate situations.

4.3.4 The Driver Training and Examination Unit

The importance of ensuring that. new drivers are adequately trained for their complex task of guiding potentially lethal motor vehicles through increasingly complex traffic situations cannot be over stressed. Thus it is disappointing to have learnt that the Driver Training and Examination Unit is not yet fully operative because of delays in enacting the necessary legislative amendments, which will standardise learner driver training and driving school.standards requirements, as well as ensuring greater uniformity in driver examination procedures.

The administration of the theoretical part of the test is handled by RSD officials based at headquarters in Gaborone, who travel to the respective centres to administer the tests. This has been done to minimise the numbers of people having access to the theory tests. RSD examiners, based in each of the towns and major villages of the country, carry out the practical tests. Low demand areas are served by a roving examiner.

At this stage driving schools are not subject to licensing and instructors do not have to pass a proficiency test. However the first driving instructor course was run this year and was attended by 72 instructors. Driving instructor manuals have been completed and are in use on a voluntary basis.

Learner drivers are not at present required to attend driving schools. To some extent Government learner drivers are being instructed in terms of the new driver training mode. The Central Transport Organisation instructors made up part of the 72 who attended an instructors training course in 1995.

There are no immediate plans for commercialisation of learner driver examinations, nor has the suggestion that Government learner drivers receive instruction from private driving schools been pursued.

The existing Instructor's Manual and Driver Training Hand Book, incorporating driver examination procedures, are currently in use. However there has not been any progress in the development of manuals for higher class licenses.

The proposed new computer-based driver licence registration system is not yet fully designed and is not expected to in service until 1997. Ultimately this system will be interlinked with the vehicle registration and road service permit systems.

One of the reasons for the delay in proceeding with this has been because of the need to coordinate the new Botswana requirements and system with those of the SADC countries. Other reasons for the delay lie in enacting the necessary legislative amendments and in financial constraints.

4.4 THE VEHICLE AND DRIVERS' LICENCE REGISTRATION DIVISION

4.4.1 Vehicle Registration

A completely new networked micro-computer-based system has been developed for Botswana's vehicle registration needs and is currently being progressively extended to serve a total of 22 stations throughout the country. Six stations are on line at present and some 6000 of the nation's estimated total vehicle fleet of about 110 000 vehicles are entered on the new system.

In order to combat forgery and car theft, a tight security system is in operation to protect the confidentiality of the vehicle data. Only individual operators with their personal secret access code can obtain information from or add to the register and their operations are logged by the computer so that individual accountability is retained. There are several other tamper-proof security features which will make misuse of the system difficult.

Only specified staff within the Registry and the Police have full access to the vehicle records, whilst other users, including the Income Tax Department and Ministry of Foreign Affairs, have limited access so as to be able to match registration numbers with owners.

No information can be transferred from the old card system to the new record without the essential details of vehicle description, engine and chassis numbers first being checked and details of ownership being updated. Owner's details are interfaced with National Registration (OMAG) details.

Changes may be made voluntarily where the computerised system is locally available when re-licensing the vehicle. Compulsory re-registration will be required when the installation is complete towards the end of 1996.

Whilst commissioning of the computerised registration system is up to schedule, it will not be until March 1977 before all re-registrations are complete and the new registers are fully operative.

The revised registration system will, hopefully, have impact in reducing incidences of car theft, but its immediate effects on traffic safety will be minimal. Easy and accurate traceability of accident-involved car owner details will help in after-accident follow up procedures.

4.4.2 Driver Licence Registers

Measures for introduction of a new driver licence registration system on similar lines to that for vehicle registration are not yet in place and the system is still under design.

The existing manual (card) system is subject to the same disadvantages as the old-style vehicle registration system. Forged licenses are in widespread circulation and the circumventing of licence endorsements by their too-easy replacement makes a mockery of justice. It is hoped that the new system will begin operation in 1997.

The new licensing registration system will correlate strongly with the vehicle registration system and with National Registration details. The driver licence classes (and driving test requirements) will be amended to match the SATCC standards.

Completion of the updated drivers licence records, together with the recently introduced requirement for drivers to have their licenses available at all times, will significantly contribute to the reduction of accidents caused by unlicensed drivers. **(It was reported in the Traffic Accident Statistics for 1994 that no less than 38% of all fatal accidents involved unlicensed drivers). This indicates the urgency attaching to making the new procedures operative as soon as possible.**

Training

Vehicle registry staff have received training in the operation of the new system. The training is undertaken at the Government Computer Bureau and does not require staff to be sent out of the country. A certain amount of "in house" training is undertaken by one of the Registry's officers.

4.5 THE ENGINEERING RESPONSE - Improvements to the Road Environment

As described above, one of the aims of the still-recently established Road Safety Division in the DNTC is to provide others in the road-safety hierarchy with traffic accident information which can be used to identify **at what times** and **where** traffic accidents are happening in their areas of responsibility and to identify common features of the accidents which happen at certain locations with a view to detecting **why** they happen.

It is the engineers' responsibility to review the traffic accident data received from the RSD, to examine the schedule of leading blackspots **(preferably weighted by seriousness)**, to review the characteristics of the accidents occurring at each of these locations, if possible to determine the **rates** of accidents per 1 000 vehicles per annum (or per 1 000 vehicle-kilometers per annum), so as to further prioritise the "blackspot" list, and to then carry out an inspection of the leading blackspot sites. This should preferably be made with other technical experts and representatives of the traffic police and of the appropriate Road Safety Committees, to attempt to identify reasons for the high incidence of accidents and what steps could be taken to reduce their numbers and seriousness.

It is important that the responsible engineer should have at least some grounding in traffic safety remedial measures, including the cost-effectiveness of alternatives. A manual and procedural check list would be of assistance in this inspection. He must be objective in this assessment so as to utilise those resources which are available to him to best effect and conscious of the tendency of non-technical persons to view many accident situation in emotional terms. Nevertheless there is value in involving such persons in the site visits, as their awareness of local issues and local traffic situations will frequently be of value. It is worth remembering that a preponderance of accidents occur in a relatively small number of places and to endeavour to find why they are happening and what can be done to eliminate or reduce them.

After widespread discussions with the relevant authorities in the DNTC, its Road Safety Division and with the engineering "users" in the Roads Department and the Gaborone City Engineer, it is concluded that **the road safety programme is unlikely to be fully effective until there is a much improved dissemination of traffic accident "blackspot" information to the enforcement and engineering sectors. A higher level of commitment to respond to this information, including the provision of funds for undertaking localised "traffic improvements" and of engineering personnel with some degree of traffic-engineering training and awareness is required.**

Discussions have revealed that both the Roads Department and the Gaborone City Engineer's Department currently have staff away on overseas MSc courses in traffic engineering and who will not be back in service for a year or more. **In the meanwhile neither authority is effectively geared towards responding to traffic accidents in their areas, and neither have prepared a traffic safety programme or blackspot counter-measures programme.** It seems also that funding for such programmes has not been sought or provided. It was not established whether steps have been taken to provide any kind of infrastructure, such as technical support staff, for the return of the traffic-engineering trained staff, but the impression is that this is not the case so far.

As previously commented the Road Safety Division no longer employs a traffic engineer. The net result is that at present there is no traffic engineering staff available to any of these authorities. The Roads Department tackles traffic engineering improvement schemes through its maintenance division and is about to implement the recommendations of a national roads maintenance study which calls for the increased engineering expertise within the Roads Department so as to be able to assist urban councils. Provided the increased engineering staff includes the necessary traffic engineering resources this may, in time, provide the capability of responding to the information received regarding traffic blackspots

The situation in Gaborone will improve somewhat when the City Engineer's trainee returns, provided it is accepted that back-up staff and implementation funding must be provided.

Overall **it is concluded that the measures currently being taken for engineering responses to traffic accident information are inadequate and need substantial strengthening.** The selection of only three sites in the whole country (one of which has had to be abandoned) for remedial works on a trial basis is also indicative that this important aspect of the traffic accident countermeasure programme has not been given sufficient attention.

4.6 LAW ENFORCEMENT -The Botswana Police Traffic Branch

The other major user of traffic accident information should be the **Traffic Police Branch.** Their annual "Activity Plan" preparation should be responsive to local and global situations and trends revealed in the Road Traffic Accident Summaries, or in the more detailed 'blackspot' and other traffic accident data listings sent to each district police station. Thus it is important that they receive the traffic accident data which concerns each police district as soon as possible. The Police have been able to react quite positively to concerns about drunken driving and driving by unlicensed drivers now that the appropriate legislative / regulatory amendments are in place.

The general organisation and operations of the Traffic Police is more fully discussed below.

(a) Organisation

The Traffic Branch is headed by an Assistant Commissioner (Traffic) and his Deputy. The Branch operates through two Divisions - Divisional Traffic North and Divisional Traffic South and these in turn work through a total of 13 District stations.

The Traffic Branch organisation includes the following:-

- **An Accident Investigations Unit**
- **A Traffic Surveillance Group** (which is also responsible for the National Highway Patrol)
- **A Disposal and Crime Section**
- **An Administrative Section**

(b) Operations and Staffing

The Traffic Branch of the Botswana Police Force was established as a semi-autonomous body in May 1994 on the lines suggested by the BRSIP consultants, having previously operated as the Traffic Section of the Botswana Police Force. The Traffic Police establishment has grown from 162 in 1993 to 362 in 1995 (223% growth).

The numbers of cases recently handled by the Traffic Police are tabulated below:

TABLE 4.6.1

Description	1993	1994	1995*
Total Accidents	9 169	9 420	8995
Drunken Driving	199	237	471
Careless Driving	1 576	1 954	2 736
Driving w/o Licence	1 171	3 339	4 005
Other offences	35 304	27 383	32 994
SUM	47 417	42 333	46 998

CASES HANDLED BY THE POLICE

*Provisional Figures For Review

These figures indicate that the overall level of activity of the police appears to have dipped in 1994 as compared with 1993 and 1995 (because of a drop in the numbers of "other offences" in 1994) however, subject to confirmation of the figures, these also show that the numbers of accidents in 1995 has dropped significantly as compared with the previous year. Further, the numbers of prosecutions for drunken driving rose by almost 100%, prosecutions for careless driving increased by 40% and for unlicensed driving by 20%. These figures suggest a substantial increase in the effectiveness of the Traffic Police as they have settled into the new system and it appears that this is reflected in the reduced total numbers of accidents in 1995.

The Assistant Commissioner (Traffic) has commented that, notwithstanding the recent increased establishment, the Traffic Accident Investigations Unit needs additional staffing, the Surveillance Group, which, for example, provides 2 to 3 traffic police at each Police station in Gaborone (there are four such stations), also needs expansion in this and most of the major towns.

In addition, the Disposal / Crime Section, which is responsible for follow-up procedures after accidents, after apprehending drivers suspected of driving under the influence of alcohol, driving without being licensed to do so, driving carelessly or recklessly and a host of other offences, is inundated with the pressure of work and the staff of four persons per station also needs to be increased. Current slow-moving manual procedures and the poor levels of service afforded by the old-style vehicle and driver licence registration systems result in serious constraints to productivity in this Section.

Administration duties falling on the member-in-charge at Traffic Police Headquarters includes the preparation of prosecution documentation for every case which is to be taken to court and results in an overwhelming work load which urgently needs to be relieved by the provision of additional support staff (e.g. one station member-in-charge is reported as having to deal with 800 cases).

On the basis of the comments received, it is suggested that an overall review of organisational arrangements, workloads and manpower, equipment, skills and training requirements may be warranted, even at this early stage in the history of the new Traffic Branch, if it is to be fully responsive to the demands made on it.

(c) **Training**

Several middle-order to senior Police officers have been sent on overseas training courses in various aspects of traffic surveillance, traffic control and traffic management and it appears that they have responded well to this. Additional trained personnel would be returning from overseas shortly and would be used to set up a specialised accident investigation team.

Incoming recruits to the Police Force receive 9 months basic training at the Police Training College and personnel for the Traffic Branch are subsequently recruited from this pool. (The one-time requirement of 2-years post training college experience has been suspended for the present). After transfer to the Traffic Branch recruits are sent on a two week induction course on the duties methods and strategies of traffic policing. They are then posted to various stations.

Officers from the general Police Force are also taken through the two week induction course (up to 24 at a time) and some are given specialised training in accident and rescue management and other appropriate subjects.

In response to queries regarding the desirability of making increased use of regional rather than overseas training facilities, the Police said that, although some of the training had taken place in Sweden, because funds had been provided for this, they had sent some personnel for training in Zimbabwe and were exploring opportunities for training at the Police College in Pretoria and other SATCC countries. Furthermore, a new Police Training College, which will also cater for the needs of the Traffic Police, is planned for construction outside Gaborone.

(d) **Other Concerns**

Other concerns discussed with the Police relate to -

(i) **Reporting of defects** found in vehicles which are involved in accidents: It was agreed that **provision should be made for information regarding vehicle defects in the Traffic Accident Report Form (TARF) and in the Traffic Accident Summary formats.**

The Police also supported the suggestion that **all accident-involved vehicles should be required to undergo a vehicle-inspection check after they have been repaired and before being allowed back on the road.**

(ii) **Reporting of "Apparent Cause of Accident":** Whilst it is sometimes difficult for the investigating officer to ascertain the cause or causes of a traffic accident, it is frequently quite easy to do this. The Consultant expressed the view that there was value in recording "apparent causes", as provided for in the TAR **and that this information should be reflected in the traffic accident summaries.**

(iii) **Rural Road Driver Aids:** The suggestion, made by others, for the provision of (e.g. **solar-powered radio-telephones** for the use of motorists in case of breakdown or accident on little-trafficked rural roads, was supported by the Police. It was also suggested that **additional vehicle lay-bye bays** should be provided on such roads so that vehicles may safely pull off the road.

(iv) **Disaster response system:** In response to an enquiry regarding the capability of the nation's administration to respond to a large scale disaster, such as a major bus accident or passenger plane crash, the Police advised that provision existed for the Police Control Room to alert other rescue services, including the Public Health ambulance and hospital services, Med. Alert, appropriately located fire brigades and the army. **It was agreed that the need for ensuring adequate co-ordination of these systems should be pursued.**

The Highway Patrol has a few ambulances and rescue equipment attached to it directly under their control and would like to increase the number, but financial stringency seems to rule this out in the short-time future.

(v) **Bill Board Advertising:** From discussion with the Police and the RSD, it appears that bill-board advertising is an accepted norm in Botswana and is even used to promote road safety slogans. However in many other countries, this style of advertising does not find favour on the grounds that bill board advertisements are are specifically intended to divert the driver's attention from his driving and on environmental grounds. **It is suggested that policies in this area be revised, including the type and maintenance of the advertising material.**

(vi) **Traffic Control at Signal Controlled Junctions:** Arising from comments made by the City Engineer and from casual observation of traffic behaviour in Gaborone, the police were asked to comment on the widespread practice by motorists of driving through the late amber and early red phases of traffic signals. In reply the Police said that they were doing what they could to remedy this practice and had on a previous occasion placed observers with radios at the signalised junctions to alert enforcement personnel. However, it was not feasible to carry out a sustained campaign with their current manpower levels. (There are 102 traffic police in Gaborone). It was the Police view that the solution lay in the provision, by the City, of traffic-actuated cameras which would detect all such violations. The City had not responded to this suggestion.

The Gaborone City Engineer has agreed that the level of-service provided by the existing traffic signals and monitoring by the City of their functioning was inadequate. However, it is understood that consultants have been appointed to design an improved system.

It was also agreed by the Police that an improved liaison with municipal authorities on traffic issues was required. It is suggested that **"Traffic Liaison Committees" embodying officers of the Police, the Municipality, the RSD, transport operators and commerce and industry be established** with a brief to meet regularly to liaise on traffic control and road safety issues. (The relationship of the suggested Committee to local Road Safety Committees and the need to avoid an overlap of functions would need to be considered).

(vii) **Traffic Control Signs:** The police agreed that there was a need for improvement in the provision of traffic control signs, at least within the Gaborone urban area, and accepted that vandalism of these signs was a problem. However, they said that the municipal authorities were slow to respond to police notification of traffic sign needs and the standard of maintenance of these and other road furniture items was insufficient.

The Consultant suggested that, subject to agreed criteria, **the widespread provision of "Yield" traffic controls at road junctions in place of "Stop" should be considered.** In general "Stop" controls should only be used in locations of poor visibility or proven hazard.

(viii) Commenting on the query regarding the possible need for a **Municipal traffic police** force, at least in Gaborone, the officer commanding said that he did not believe this was necessary, although the introduction of parking wardens might be helpful when metered parking is in operation (it is planned to commence the introduction of parking meters in the near future).

(ix) **Domestic Animals on Roads:** 13% of accidents in 1994 involved collision with domestic animals, (+3% wild animals). Asked for their views, the police said that the issue of cattle and other animals in main and rural roads needed firm action by those people who were employed to prevent this. These people needed a better level of supervision to ensure that they did their job (including minor repair work and removal of roadside litter). The same situation applied in urban areas, but the inadequate penalty levels in the towns need to be increased to match the P1000 fines now applying on the main road system.

Effective steps to prevent accidents and nuisance from domestic animals on the roads, including improved supervision, the repair of gates and fences and a uniform level of penalties in urban and country areas are required.

(x) **Traffic Improvements at Blackspots:** The police were asked to comment on the adequacy of response by the authorities to traffic accident information, including the identification of "blackspots". In reply they commented that the Gaborone City Engineer's Department was generally unresponsive or slow to react to suggestions on engineering-based "traffic improvements". **It is believed that suggestions for involvement of District Road Safety Committees or urban Traffic Liaison Committees and the development by these committees of traffic safety programmes, would be helpful in improving priority levels for any necessary engineering-based remedial works, in urban and rural areas.**

(xi) **Speeding:** It is reported that more than 50% of all accidents are single-vehicle accidents and that they account for about 70% of fatalities and 66% of injuries. The inference drawn from this is that speeding (and drunken driving) is likely to be playing a significant role in the accident toll. Thus **the continuing enforcement of speed limits, particularly on the country's main road network, is seen to be a worthwhile activity on the part of the police.** It was, however, suggested to the police that motorists would be more responsive to 60 km/hr speed limits in urban areas if provision were made for 70, 80 and 100 km/h speed limits on those roads and in those places where higher speeds were safe because of the nature or location of the roads (e.g. dual carriageways with few crossroads or junctions and little pedestrian cross traffic; e.g. peri-urban/rural-type roads such as that to Gaborone Airport where population levels are small). **It is recommended that, subject to agreed criteria, increased speed limits be considered on appropriate urban roads.**

(xii) **Enforcement against drunken driving:** The recent introduction of the legal amendments permitting the use of breathalysers have allowed the police to be far more effective in this area and statistics show much increased activity in this area (Number of prosecutions in 1993: 199, number in 1995: 471). The use of breathalysers made prosecution much more feasible than the previous requirements for a doctor's examination and for blood tests.

It was commented that the courts and legal practitioners needed some instruction regarding the veracity of breathalyser reports and arrangements had been made for magistrates and attorneys to attend a demonstration and lectures by the manufacturers. It was expected that the improved ability to act against drunken driving and the increased enforcement levels will begin to take effect in the next year or two.

Steps initiated in the Road Safety Division for the formulation of a "National Policy on Alcohol Abuse and Road Safety" should also help in curbing the present high incidences of drunken driving - one of the main contributing factors to traffic accidents in Botswana.

It has been pointed out that the largest numbers of fatalities from accidents occur to those in the age group 21 to 40 years and that 40% of these involve alcohol abuse.

The following table shows alcohol-related accidents during the period 1991 to 1994 and suggests that increased levels of enforcement may already be paying off.

TABLE 4.6.2

Year	No. of Accidents	No of Fatalities	No. of Injuries
1991	274	27	157
1992	156	17	120
1993	111	19	77
1994	73	14	56

ALCOHOL RELATED ACCIDENTS

(xiii) **School Safety:** In response to the reported comment by others that the police supervision of school traffic was "inadequate" the police accepted that this was the case and stated that this was largely because of under-staffing. The Assistant Commissioner was warmly responsive to suggestions of School Safety Committees, School Safety Programmes, "Safe Route" plan developments, scholar patrols, the use of National Service participants in the provision of scholar patrols and for improved traffic awareness training of school pupils - all as discussed under para. 4.3.2. above. If these systems are carefully planned and implemented, they would make a worthwhile contribution to road safety and will reduce the demands on the police for school safety duties.

(xiv) **Driver Training/Driving Schools:** The programme for improved and uniform driver training and driver license examinations was supported by the police. The planned revised driver licence registration system would help ensure the reduction of accidents involving unlicensed drivers.

(xv) **Vehicle Registration:** The new vehicle registration system now being progressively introduced would end previously experienced problems in tracing owners and in reducing car theft.

(xvi) **Legislation:** The delay in revision of legislation and regulations e.g. for the introduction of a fixed penalty system was impeding the police and the courts in the efficient handling of their duties and had been taken up with the Registrar of the High Court. **Means must be found to avoid unnecessary delays in the introduction of the remaining legal measures so as to allow the improved operation of the traffic enforcement section.**

5. THE ACHIEVEMENTS AND IMPACTS OF THE ROAD SAFETY PROGRAMME

What have ten years of the Botswana Road Safety Improvement Programme achieved?. What impact has this had on Botswana society? How effective has the SIDA contribution of funds and technology been? To answer these questions on the basis of a comparison of the "before and after" statistics in terms of what the accident numbers and accident rates were and are now gives what at first looks like a discouraging picture. However it is necessary to look deeper to assess what has been achieved in terms of the development of more effective mechanisms for the furtherance of traffic accident preventive measures and, if possible, to compare the present and future situations with what conditions may have been like had there been no action to curb traffic accidents. It is also necessary to consider how the expanded and improved organisational structures and operational methods applied within the relevant organisations - those falling under the Ministry of Works, Transport and Communications and the national Police Force - have contributed to containing the national accident rates and to attempt to assess how much more effective they will become once their development stages are fully complete.

The previous sections have been devoted to describing the methods applied through the BRSI Programme to achieve a more effective traffic safety / accident-responsive system in terms of providing better infrastructure resources and appropriate personnel training and equipment. They have included some assessments of how effective these changes have been in terms of addressing the traffic accident situation by the provision of information and educational facilities, a more appropriate traffic accident data analysis process and improved policing. It also made some assessment of what further inputs or changes are still needed to complete the establishment of a safer traffic environment in Botswana. This section focuses more sharply on the achievements and impacts of the road safety programme.

The "with and without" (the BRSIP) analysis suggested above is necessarily speculative and made more so by the rapid rate of growth of motorisation in Botswana - unprecedented in other countries - and the parallel large growth in national and urban populations during the period under examination.

Figures 1.1, 1.2 and 1.3 (pages 1 and 2) illustrate the increases in the national vehicle fleet and of traffic accident rates (per 10 000 vehicles and per 10 000 population). As previously remarked these charts reveal a still-deteriorating situation and, 10 years after the commencement of the Road Safety Programme, there is no room for complacency when viewing these high traffic accident rates. **However the charts also show that the rate of increase of traffic accidents has dropped significantly since 1991. Altough the recent accident levels are still at an unacceptably high level, this drop in the rate of increase represents a very worthwhile achievement and it is shown in Section 6 that the nation has received excellent value for the money it has invested in the Road Safety Programme, with a promise of even better performance to come once the re-structured road safety system is fully operational.**

5.1 Comparisons With Other Countries

Table 5.1 (next page) compares traffic accident rates in Botswana with those in Namibia, Lesotho, Malawi, Zimbabwe and Sweden and shows that the rates of accidents - particularly fatal accidents - in Botswana are substantially higher than in some other African countries and very much greater than in the developed world, as exemplified by Sweden. The comparisons are not entirely valid however because of the unreliability of the data in respect of some of the countries listed (e.g. in respect of national vehicle populations, where frequently part of the nominal vehicle fleet includes scrapped or accident damaged vehicles which are no longer on the road) and because of very different levels of vehicle ownership, road development and rates of growth. During the period under consideration the

Botswana vehicle fleet has more than trebled, the number of drivers (including unlicensed drivers) may have quadrupled, the road network has doubled with a very large increase in the proportion of high speed roads and in travel speeds and the population has increased by almost 50%. These factors must surely be unique and make it difficult to find a valid basis for comparison with other countries. The comparisons of fatalities per 10 000 vehicles and per 10 000 population are probably the best information available however.

TABLE 5.1

Country	Population Millions	M.Veh. Thousands	Killed 1992	Killed & Injured	M.Veh / 1000 Population	Fatalities / 10 000 Population	Fatalities / 10 000 Vehicles
Botswana	**1,38**	**90**	**368**	**5277**	**65,56**	**2,67**	**40,71**
Namibia	1,52	150	335	1736	98,68	2,20	22,3
Lesotho('94)	1,93	27	276	2002	13,97	1,43	102,2
Malawi	9,0	60	1092	5339	6,7	1,21	182,0
Swaziland ('94)	0,85	63	233	1414	74,20	2,74	36,92
Zimbabwe	10,41	423	1086	13825	40,681	1,04	25,6
Sweden	8,64	3944	759	21486	456.48	0,88	1,9

COMPARISON OF TRAFFIC ACCIDENT RATES IN OTHER COUNTRIES (1992)
(Based on SIDA Traffic Safety Course 1993 Tabulation, corrected for Zimbabwe. Malawi figures obtained from Malawi National Road Safety Council)

5.2 Trends

As previously mentioned analysis of the Botswana accident data for the pre-BRSIP era and for the BRSIP development period reveals that, whilst the accident rates are still increasing, the **rate of increase** is now declining, as compared with the pre BRSIP situation where the rate of increase was becoming steadily greater.. Figure 5.1, below, and Table 5.2 (next page) illustrate these points. This drop is encouraging, considering the unique and explosive rate of development in the Botswana car fleet, licensed driver numbers, roads and economic prosperity. International experience would lead to predictions of continued increase in accident rates in these conditions, but the analysis above reveals that the situation has been contained and even improved . **This can only be attributed to the Road Safety Improvement Project.**

FIGURE 5.1

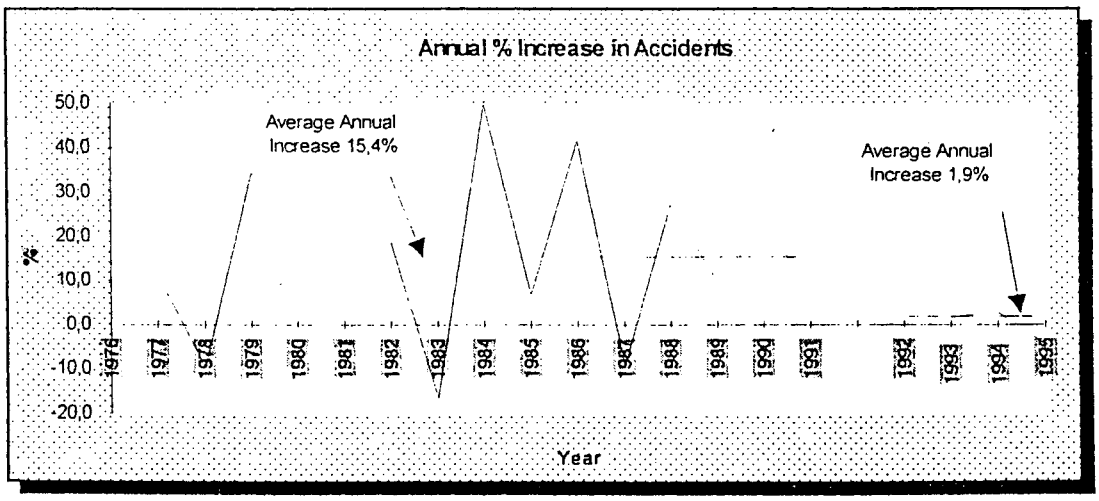


TABLE 5.2

Year	Accidents	Acc. growth rate/yr.%	Increase in acc./ yr	Acc./ 10 000 people	Growth rate/10 000, %	Acc./ 10 000 vehicles	Growth rate/10 000, %	Fatalities	Fatals growth / yr, %	Increase in fatals./ yr	Fatal Acc. /10 000 veh.	Fatal Acc. /10 000 pop.	Deaths from all causes	Petrol consumed, (Ml)	Fuel used / veh.(l)	Annual incr. fuel/veh.	No. of vehicles	Growth in vehicles	% Increase in veh.	Population	% incr. in population	Gross incr. in pop'ln.
1976	1176							54			*30,4	*1,28										
1977	1307	11,1	131					84	55,6	30	*40,6	*1,04										
1978	1180	-9,7	-127					92	9,5	8	*38,9	*1,00										
1979	1586	34,4	406					106	15,2	14	*41,1	*1,12										
1980	1881	18,6	295					116	9,4	10	*36,6	*1,38										
1981	2231	18,6	350	18,2		49,4		93	-19,8	-23	26,80	0,99		52	1498,6455		34698			941027		
1982	2648	18,7	417	27,1	48,9	68,9	39,5	130	39,8	37	33,81	1,33		59	1534,4204	2,4	38451	10,8	3753	975628	3,7	34601
1983	2205	-16,7	-443	21,8	-19,6	51,9	-24,7	176	35,4	46	41,43	1,74		64	1506,8268	-1,8	42479	10,5	4028	1011388	3,7	35760
1984	3300	49,7	1095	31,5	44,5	69,9	34,7	168	-4,5	-8	35,60	1,60		74	1568,0524	4,1	47192	11,1	4713	1048245	3,6	36857
1985	3521	6,7	221	32,4	2,9	68,1	-2,6	198	17,9	30	38,31	1,82		85	1644,8005	4,9	51678	9,5	4486	1086139	3,6	37894
1986	4983	41,5	1462	44,3	36,7	89,6	31,6	182	-8,1	-16	32,73	1,62	1496	97	1744,4788	6,1	55604	7,6	3926	1125008	3,6	38869
1987	4515	-9,4	-468	38,8	-12,4	78,2	-12,7	191	4,9	9	33,10	1,64		115	1992,8949	14,2	57705	3,8	2101	1164893	3,5	39885
1988	5741	27,2	1226	47,6	22,7	89,3	14,2	262	37,2	71	40,75	2,17		125	1943,9822	-2,5	64301	11,4	6596	1205834	3,5	40941
1989	6299	9,7	558	50,4	5,9	89,9	0,7	295	12,6	33	42,12	2,36	2035	144	2056,2616	5,8	70030	8,9	5729	1247771	3,5	41937
1990	7614	20,9	1315	59	17,1	94,1	4,7	314	6,4	19	38,79	2,43	2507	168	2075,2782	0,9	80953	15,6	10923	1290642	3,4	42871
1991	8381	10,1	767	62,8	6,4	100,9	7,2	349	11,1	35	42,02	2,62	2696	196	2360,0809	13,7	83048	2,6	2095	1334386	3,4	43744
1992	9017	7,6	636	65,4	4,1	99,7	-1,2	368	5,4	19	40,71	2,67		223	2466,6777	4,5	90405	8,9	7357	1378993	3,3	44607
1993	9169	1,7	152	64,4	-1,5	97,1	-2,6	379	3,0	11	40,13	2,66		239	2530,7073	2,6	94440	4,5	4035	1424502	3,3	45509
1994	9420	2,7	251	63	-2,2	87,2	-10,2	352	-7,1	-27	32,58	2,35		237	2193,5711	-13,3	108043	14,4	13603	1494840	4,9	70338
1995*	8995	-4,6	(Provisional)																			

* The accident rates shown for 1976 - 1980 are ESTIMATES based on backward regression estimates of population and numbers of vehicles.

BOTSWANA TRAFFIC ACCIDENT , POPULATION, VEHICLE & FUEL USAGE DATA ; 1976 - 1994

5.3 Increase in Accident Risk Exposure

The data in Table 5.2 reveals that there have been substantial increases in the national population, the national vehicle population and in fuel usage over the period under consideration (1981 - 1994). Examination shows that petrol usage per vehicle has increased from 1499 litres in 1981 to 2194 litres in 1994 - a 46% increase, i.e. it can be assumed that the amount of travel per vehicle has increased by 46% during this period (Whilst much of the nation's vehicle fleet is diesel powered, the consumption of **petrol** against the total national vehicle fleet will still give a picture of relative travel per vehicle. Diesel consumption is not taken into account as much of this fuel is used for non-road-transport purposes e.g. on the railways for agriculture and for powering static engines). This reflects the rapid expansion of the national road network during this period (refer to Figure 5.2 overleaf), coupled with the increased levels of economic activity and the estimated four-fold increase in the numbers of (licensed and unlicensed) drivers.

Another factor which will have had an important impact on travel patterns in Botswana has been the dramatic change in population *distribution,* illustrated in Figure 5.3 (page 31). Less than10% of the population lived in urban centres in 1971, compared with nearly 16% in 1981 and almost half the population in 1994. Regrettably however there is no information available to suggest what proportion of travel takes place in urban vs rural areas. Thus for the purpose of this analysis a 50-50 split has had to be assumed.

FIGURE 5.2

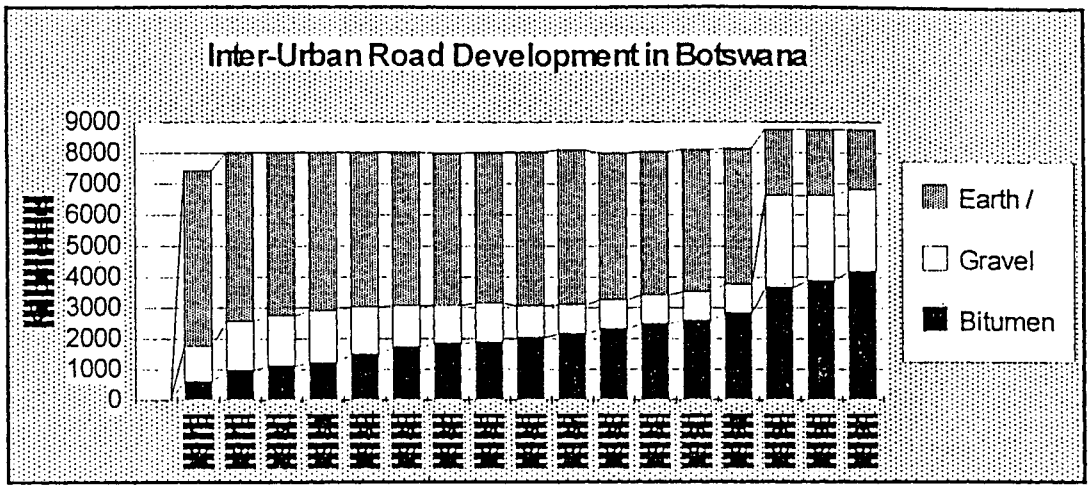
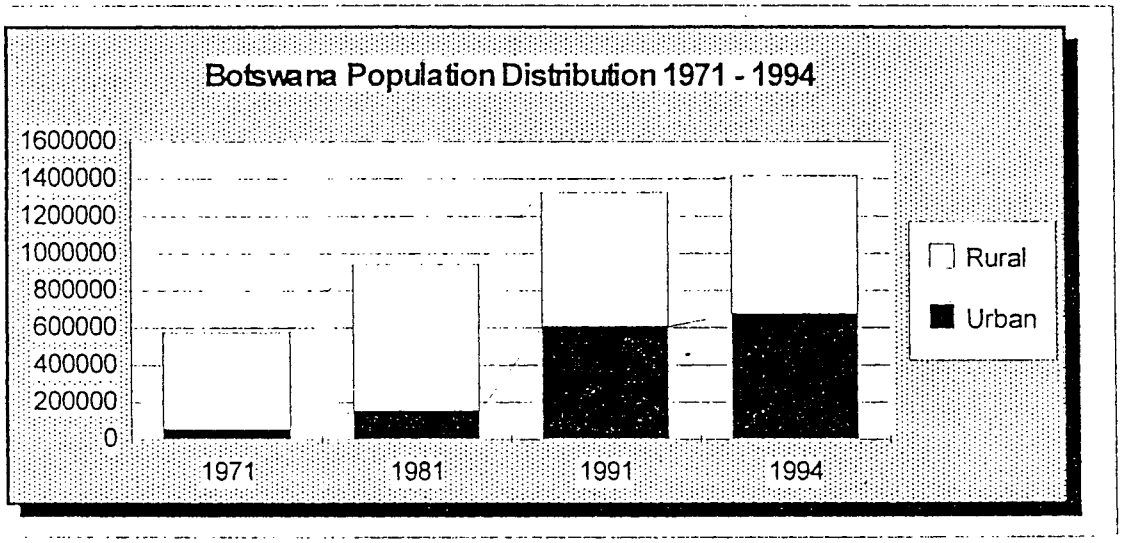


FIGURE 5.3



These changes have resulted in substantial increases in the levels of exposure of the population to the risk of traffic accidents.

1. Increased risk resulting from increased average travel per vehicle = x 1.46

2. Increased risk resulting from population increase and distribution changes.

   (a) Urban Areas
   Population increase from 150021 in 1981 to 70745 in 1994 (increased by 447%)
   Increased accident risk in urban area Increased Population x travel increase
   = 4,47 x 1,46 = 6,5

   (b) Rural Areas
   Population decrease from 791006 in 1981 to 754669 in 1994 (decrease of 5%)
   Increased accident risk in rural areas decreased population x travel increase
   = 0,95 x 1.46 = 1,4

Unless information can be obtained regarding the urban/rural travel split however it will be necessary to work on the overall national average.

National Average increased exposure = Increased population x increased travel
= 1,51 x 1,46 = 2,2

Thus in order to compare the national 1981 accident rates with those for 1994 on the common base of equal risk factors the raw rates for 1994 must be reduced by a factor of 2,2. This analysis is set out in Table 5.3

TABLE 5.3

Year	Fatalities per 10 000 Vehicles	Fatalities per 10 000 Population
1981	26,8	1,0
1994	32.6 /2,2 = 14,8	2,35 / 2,2 = 1,1

COMPARISON OF 1981 & 1994 ACCIDENT RATES,
ADJUSTED FOR INCREASED TRAVEL AND INCREASED POPULATION

Actually traffic accident risks are also likely to have increased somewhat because of the increased travel speeds resulting from the improved road systems, in both rural and urban areas. This may be part of the reason why the analysis set out in Table 5.3, which gives an estimate of what accident levels might have been in 1994 if the average travel per vehicle and the national population level had remained as they were in 1981, shows a slightly increased rate of fatal accidents per 10 000 population in 1994.

5.4 A "With and Without" Comparison

It will be seen from Table 5.3 that if the adjustments are made for the relative extent of exposure to accidents before and after the road safety programme commenced, it could be argued that the rate of fatalities per 10 000 vehicles would actually have shown a substantial **decrease** It will also be seen that the rate of fatalities per 10 000 population would still have increased, but only by about 10%. It may be possible to refine this argument somewhat if comparisons of the total numbers of operational petrol-powered and diesel-powered vehicles are available on a year by year basis, and if information regarding the relative extent of urban and rural travel were available, but it is an encouraging indication that **the rates of accidents have been far more responsive to the BRSI Programme than first suggested by an examination of the statistics.**

5.5 Road Safety Improvements Resulting From Organizational Changes

Although it is not possible directly relate the results of organisational changes to the changes in the accident rates discussed in Section 4 of this Report, it is worth making another brief summary of the organizational changes stemming from the BRSI Programme, so as to illustrate the contribution of these changes to an improved traffic safety environment in Botswana.

5.5.1 **The Department of National Transport and Communications**

The reorganization of the Ministry of Works, Transport and Communications, as exemplified in Figure 4.1 on page 11, to allow the formation of the DNTC and the **Road Safety Division and the Vehicle and Drivers' Licence Registration Division**, with a complement of about 50 full time staff to maintain and strengthen contacts with the National and District Road Safety Committees, and respond to the road safety needs of the nation.

Sections within the RSD comprise the **Traffic Accidents Information and Research Section, the Information and Education Section and the Vehicle Safety Section.** These changes to the Ministry organisation will make a vital contribution to increased safety on the roads when fully operational, but, seemingly, this will not be the case for some years yet.

5.5.2 **The Police**

Acting on the recommendations of the BRSIP consultants the Police Force has been reorganised to establish a semi-autonomous **Traffic Branch**.. This arrangement is still relatively new, but is an improvement over the previous Traffic Section arrangement, allowing the development and retention of more specialised manpower skills.

Delays in the adoption of legislative and regulatory amendments to increase the effectiveness of the police have hampered their work, but recent measures legalising the use of breathalysers to combat drunken driving and the requirement for all drivers to have their driving licenses with them are already bearing fruit.

5.5.3 **The Engineers**

No substantive changes have yet resulted from the BRSIP, although both the Roads Department and the Gaborone City Council have professional staff away on overseas training courses. **There is an urgent need for the Roads Department and Local Authorities to be more fully alerted to their role in combatting traffic accidents by examining the accident records in their areas of jurisdiction and by preparing a programme of traffic engineering requirements identified through the traffic accident analysis system.**

5.6 SUMMARY

Whilst the numbers and rates of traffic accidents have continued to escalate through the period of development of the Road Safety Programme there are good indications that, once they are fully developed, the application of all the new resources will make further inroads on these figures. The reason for the increase appears to be that the level of exposure to accidents has increased substantially due to increased travel on the extensively expanded and improved urban and rural road networks and the national population increase of more than 50%, aggravated by an unprecedented degree of population movement to the urban centres during the period of the programme. The recent drop in the rate of increase of traffic accidents represents a commendable achievement in the face of these vast changes.

The road safety programme has delivered a much more effective traffic safety system, but despite 10 years of money, skills, training and equipment inputs this has not yet achieved its full potential However there are no reasons why, once all the new systems are fully operational, an improved effectiveness cannot be achieved from within the resources which the nation has now acquired from these inputs and continuing pressure must be brought to bear to ensure that this happens.

6. COMMENTS ON ECONOMIC ASPECTS OF THE PROJECT

6.1 GENERAL

This chapter attempts to answer the following questions raised in the consultancy Terms of Reference:

- Has the Programme and Project been carried out in accordance with the budget?
- Has the SIDA expenditure on the Project been effectively utilized?
- What are the tangible achievements resulting from this expenditure?
- What is the impact on the economy of traffic accidents and of the Project?

6.2 BUDGET EXPENDITURE

6.2.1 Expenditure by SIDA

SIDA expenditure has been disbursed over the ten year Project duration in four distinct phases. The only figures provided to the Consultant to date have been budgetary, rather than actual expenditure figures. It has therefore not been possible to compare programmed expenditure against actual expenditure, although it is understood that few departures were made from the budget figures. The budget disbursements over the Project were as follows:

TABLE 6.2.1

PHASE	AMOUNT (SEK)
1 (Oct 1985 - Dec 1987)	5 500 000
2 (Apr 1988 - Nov 1989)	5 000 000
3 (Jun 1990 - Jun 1992)	5 000 000
4 (Jul 1992 - Jun 1995)	2 000 000

SIDA BUDGETED EXPENDITURE, PHASES 1 - 4

A breakdown analysis of the expenditure in each Phase is provided in Table 6.2.2.
It should be noted that the above listed figures are disbursements at the time of each Phase of the programme. In order to sum the total value of SIDA expenditure to 1995 values, the above figures must be inflated to 1995 values. An average annual inflation rate of 12% has been used for this purpose. The results of this exercise are shown in Table 6.2.3 overleaf.

TABLE 6.2.2

Breakdown of SIDA Programmed Expenditure

(All figures in Swedish Kroner)

Phase (Date)	Total SIDA Programmed Exp. (SEK)	Expatriate Staff Salaries Wages & Fees	Batswana Staff Salaries Wages & Fees	Travel & Transport	Accom and Subsistence	Other Staff Costs	Equipment Purchases	Training of Batswana	Other Costs and Contingencies	Total Inflated to 1995 values
Phase 1 (10/85 - 12/87)	5 505 400	2 482 000	10 000	902 000	1 021 000	77 400	500 000	350 000	160 000	15 206 908
Phase 2 (04/88 11/89)	4 955 900	2 541 900	50 000	761 100	485 000	0	590 000	310 000	214 900	9 702 068
Phase 3 (06/90 06/92)	5 000 000	2 147 667	112 000	711 726	668 373	0	133 333	233 333	693 567	7 867 507
Phase 4 (07/92 06/95)	2 000 000	2 000 000	0	0	0	0	0	0	0	2 508 800
Total	17 461 300	9 171 567	172 000	2 377 826	2 177 373	77 400	1 223 333	893 333	1 068 467	
Total Inflated to 1995 values (at 12%) ie. Net Present Value	35 425 372	18 260 292	302 056	5 129 430	4 048 615	214 036	2 260 097	1 949 617	1 959 209	35 425 372

Notes

1 Breakdown of Phase 4 expenditure has not yet been provided. The entire expenditure has therefore been allocated to foreign consultancy fees above.
2 Expenditures were inflated to 1995 values using an estimated 12% nominal annual inflation rate.

TABLE 6.2.3

PHASE	Dates	1995 EQUIV. VALUE (SEK)
Phase 1	10/85 - 12/87	15 000 00
Phase 2	4/88 - 11/89	10 000 00
Phase 3	6/90 - 6/92	8 000 00
Phase 4	7/92 - 7/95	2 500 00

1995 EQUIVALENT VALUE OF SIDA EXPENDITURE

The net result is that the total value of SIDA expenditure on the Project (at 1995 values) is approximately SEK 35.5 Million (i.e. approximately P14 Million).

Of this total, approximately 80% has been spent on foreign staff costs, 7% on Batswana staff costs and training, 7% on equipment purchases and the balance on other costs.

6.2.2 Expenditure by Department of National Transport and Communications (DNTC)

Table 6.2.4 summarises expenditure by the DNTC over the Programme period. Specific expenditure on Road Safety during the Project phases has been estimated from figures provided by DNTC.

The figures have all been inflated to 1995 values to allow an assessment of the current total investment in the Programme for comparison purposes. It is estimated that DNTC have spent approximately P9.3 Million on road safety projects during the course of the BRSIP. This figure represents some 28% of the DNTC's total operating budget during the Programme period.

TABLE 6.2.4

Estimate of Expenditure by DNTC during Road Safety Improvement Programme

(All figures in Botswana Pula)

Phase	(Date)	Total Est. DNTC Opr. Costs for period	Operating Costs @ 1995 values	Specific Exp. on Rd. Safety Projects	Exp. @ 1995 Values
Phase 1	(10/85 12/87)	900 000	2 495 771	500 000	1 386 539
Phase 2	(04/88 11/89)	1 200 000	2 368 587	750 000	1 480 367
Phase 3	(06/90 06/92)	6 000 000	9 441 116	1 750 000	2 753 659
Phase 4	(07/92 06/95)	15 000 000	18 816 000	3 000 000	3 763 200
Total		23 100 000	33 121 474	6 000 000	9 383 765

Notes

1. Expenditures were inflated to 1995 values using an estimated 12% nominal annual inflation rate.

6.2.3 Expenditure on the Establishment of the Police Traffic Branch

It has not proved possible in the time available to obtain sufficient information to clearly determine the additional Capital and Running Costs arising from the establishment of the Police Traffic Branch.

Staff numbers increased from **162** in 1992/3 to **362** in 1994/5 (223%) and staff costs in almost the same proportion from P2 158 597 to P4 714 905.
Capital Expenditure increased as below (Table 6.2.5)

TABLE 6.2.5

Expenditure on	1992/93	1994/95
Transport	4 757 019	7 706 600
Equipment	355 255	1 146 655
Staff Accom.	9 000 000	21 550 000
TOTAL	**14 112 274**	**30 403 255**

EXPENDITURE ON ESTABLISHMENT OF POLICE TRAFFIC BRANCH

However it has not been possible to obtain the total "before and after" running costs or to ascertain whether all the capital costs in 1994/95 were a consequence of the establishment of the Traffic Branch.

6.2.4 Combined Total Investment in BRSI Programme

An estimate of the total investment in the Programme, at 1995 values, may be obtained by adding the total SIDA expenditure to the DNTC expenditure on road safety related projects over the Programme duration. This combined figure amounts to P14M + P9.4M = P23.4 Million at 1995 values. The Capital costs of establishing the Police Traffic Branch in 1994/5 amounted to a further P30,4M (Table 6.2.5), i.e. Total Capital costs amounted to approximately P54M

Not included in these estimates is the cost of recent road works incorporating modern traffic safety engineering in urban locations (especially in Gaborone) and on inter-urban routes, but these works have been undertaken primarily on the basis of their need as part of an improved communication network and their cost has been justified on those grounds.

6.3COST OF ACCIDENTS TO THE ECONOMY

The BRSIP Phase 1 Report outlines the twofold need for an estimate of the current cost of traffic accidents to the economy of Botswana:

6.3.1 The need to apportion and allocate all motoring costs to the road user. i.e. the user-pays principle.

6.3.2 The need to determine appropriate levels of investment in road infrastructure hence the cost to the economy.

In addition to these two needs, the following could also be added:

6.3.3 The need to place the cost of accidents and the accident problem in perspective with regard to the national economy.

Accident costs are built up from data covering, interalia:

- Loss of output
- Property damage costs
- Medical costs
- Administrative costs
- Legal costs

No attempt is usually made to quantify the intangible costs of accidents such as pain, suffering, grief, stress, "inconvenience" etc. (The 1988 Phase 1 report, however, estimates the annual Loss of Human Value" at P2M - P18M).

The variable costs (resource costs) listed above may therefore be regarded as the minimum estimated cost to the economy.

For the purposes of estimating the current (1995) annual cost of accidents to the Botswana economy, the following procedure has been adopted:

(i) Adopt 1992 CSIR reported unit accident costs for South Africa.

(ii) Inflate the 1992 unit costs to 1995 values.

(iii) Convert the 1995 unit costs from Rand to Pula.

(iv) Calculate the corresponding cost of accidents in Botswana using unit costs obtained from (iii) above.

The result of the above analysis indicates that the 1995 cost of accidents to the Botswana economy is in the region of P275M. This calculated figure compares closely with estimates recently undertaken by DNTC and others.

6.4 IMPACT OF THE PROJECT ON THE BOTSWANA ECONOMY AND VALUE RECEIVED FOR MONEY

It is hypothesised that the Project has had an impact on the economy of Botswana in the following two areas:

6.4.1 Value of Reduction in Rate of Growth of Accidents

Indications are that the annual rate of growth of accidents has slowed over the past three years from an average of 15,4% per annum (period 1986-1991) to an average of 1,9% per annum from 1992 to 1995. (Refer to figure 5.1 on page 29).

On the basis of 6.3 above, it has been estimated that a 1% reduction in the rate of growth of accidents will save the Botswana government approximately P2,75 Million per annum (at 1995 prices). If current trends continue, the Botswana economy would enjoy a saving of almost P43 M ([15,4% - 1,9%] x P2,75M = P42,6M) annually over what the situation might have been without the benefit of the Programme.

6.4.2 Return on Investment

In terms of value received for the money invested, if one attributes the trend in reduced accident rates solely to the effects of the Programme, the figures suggest that the whole of the DNTC Road Safety Division costs for the last ten years (P23,4 M), plus the Police Capital costs for 1994/5 (P30,4M), i.e. a total of P53,8M, would have been be recouped in less than two years - a good return by any standard. The rate of return on the investments already made is anticipated to become even better as the new Traffic Safety systems are progressively completed and brought into service.

It must be accepted however that the revised DNTC and Police Traffic Branch establishments entail substantially increased operating costs. Whilst it has not proved possible to fully document these in the time available, it will be seen that these will be small in relation to the accident cost savings being achieved through the Road Safety Improvement Programme.

6.4.3 Creation of Employment

The programme funding has indirectly helped to create employment for approximately 50 employees through the establishment of the Department of National Transport and Communications and in an increase of the numbers of Police personnel. (The SIDA funding expenditure itself, however, would have had little direct effect on employment in Botswana due to the predominant expenditure on foreign manpower and travel).

7. THE SUSTAINABILITY OF THE PROGRAMME

7.1 Aims of the Project

One of SIDA's goals for the Road Safety Improvement Programme has been "....to build up a local capacity to continue the implementation (of the Programme) without further Swedish support .....".

To this end the programme has included a substantial training element aimed at establishing abilities to operate and extend the new traffic safety system, to pass on skills and training to those involved in its operation and to establish an on-going, self-perpetuating system which is capable of functioning at a high level of competence without being dependent on external support. To a large degree this goal has been achieved. To quote from a recent letter to the Evaluation Consultant by the Director of National Transport and Communications

"The Road Safety Improvement Project Consultancy expired in 1994 which means Swedish support was phased out. However, following expiry of the project the Road Safety Division has continued the work and it is clear that the programme is now sustainable and road safety is now integrated in the entire policy development and implementation of the road transport sub-sector".

7.2 Bids by the Department of National Transport and Communications

The Road Safety Division boasts a total establishment of about 50 full-time staff carrying out the various functions of information and educational campaigns for public awareness, driver training , testing and licensing, traffic accident research and statistics, vehicle testing and policy development. About P1,5 million per annum is expended on personnel emoluments in the Traffic Safety Division.

Nevertheless, the Director points to several areas where the Traffic Safety Division is in "desperate need of further technical support" and lists the following areas as the most critical and having the highest priority:

i. <u>Driver training and licensing for all licence categories</u>

- training manuals to standardise tests
- regulation of driving schools
- procedures for administering tests
- staff training-development of video

ii. <u>Vehicle Testing</u>

- management of the depots
- staff training
- development and testing manuals and procedures
- construction of some depots in other areas

iii. Education and Information

- development of manuals for schools and pre-schools
- development of mini-traffic schools
- staff training

iv. Accident Research and Information

- integration of accident research data basis to be used in the analysis of accident patterns and trends for sophisticated information

v. Computerisation of Driving Licence Register

- replace current driving licence with one that would be difficult to forge

The other key players - the **Police Tràffic Branch** and the **Roads Department** - have not voiced similar bids for on-going assistance.

7.3 Comments

Following extensive discussions and consultation with the authorities responsible for the operation of the up-graded traffic safety system in Botswana, the net finding is that **SIDA has been successful in achieving its objective, i.e. it has assisted in the establishment of a system which can now be largely self-sustaining.** "Largely" is a necessary qualification because, whilst now almost fully developed, there are several areas which, as previously remarked, are not yet completely "up and running". These include many of those listed by the Director of the DNTC. Detailed comments are set out below:

7.3.1 **The Department of National Transport and Communications**

i. **Driver Training & Licensing**

Delays in the full establishment of the up-graded and standardised driver training and licensing systems are impeding progress in the achievement of a safer traffic environment. The major impediment appears to be the need for revision of the controlling legislation. However, the evaluation study has established that effective steps have been taken towards the training of driver training and driver examination personnel, the preparation of training manuals and driver testing procedures and in the preparation of provisions for the regulation of driving schools. **It is believed that sufficient progress has been made in all these areas for them to be completed from within the authority's own resources, possibly backed up by short-term localised consulting services in certain areas if the in-house manpower situation makes it impossible to find time for the completion of these development activities.**

A staff training video would be of assistance to the on-going training requirements of this Unit, however it is felt that in this area also the need should be met from in-house and locally or regionally available resources.

ii. **Vehicle Examination Unit**

The vehicle examination unit is not yet fully established, but extensive personnel training has been undertaken on a "one-off" basis and for the provision of an in-house training programme for incoming and existing personnel. Well thought-out arrangements have been made for the induction and technical training of future inspection staff by training of apprentices at a local technical college and, later, in their duties as vehicle inspectors.

Although the major current impediments to the operation of this unit lie in the delayed provision of the necessary vehicle inspection facilities and in the promulgation of the required legislative measures, **there appears to be an adequate foundation from which the unit will be able to complete its establishment and operations with a minimum of further external support, except during the initial establishment period whilst until the new system becomes fully operational.**

iii. **Education and Information**

Whilst this unit is somewhat overwhelmed by the volume of work for which it is responsible, it is felt that the information and broadcasting elements are reasonably well developed and not in need of additional outside direction, although **it may be worthwhile considering a organisation-and-methods type review of present arrangements.** However, it has been found that the opportunities of instilling a high level of traffic awareness and of personally responsible attitudes towards traffic which are available in schools are being missed and insufficient is being done to ensure traffic safety at schools. This must be urgently addressed. Although the RSD and this unit have the necessary expertise to develop an improved programme for school safety, including the design of mini-traffic training facilities, it appears that the day-to-day workload is such as to make it difficult to provide the necessary manpower resources for this. **Thus it is suggested that consultant assistance be sought for the development of an enhanced school safety programme.**

iv. **Accident Research and Information**

As commented in paragraph 4.3.3 above, the performance of the Accident Research and Information Section is below par, not it seems because of inadequate training or expertise, but because of insufficient manpower support. The technicalities of operation of the Traffic Accident Analysis package seem to be well understood, but the requirement for large-scale publication and distribution of generalised accident data, rather than location-specific data has resulted in the sharply reduced effectiveness of this unit and has resulted in the non-delivery of traffic accident data to the user authorities, thus frustrating much of the purpose of the improved accident responsive systems. It has also meant that no research of Botswana conditions is being undertaken. These situations need to be corrected and **it is believed that a first step must be to undertake an organisation and methods study to see if there is a more effective way of deploying the already available resources and where additional staff may be required. Consulting assistance would be required for such an investigation, possibly utilising locally or regionally available expertise and covering at least the Information and Education Unit's activities as well**

v. **Computerisation of Driver Licence Register**

The Vehicle Registration and Drivers' Licence Registration Division is well organised and the personnel in the Vehicle Registration Unit seem to have been adequately trained for their duties. Whilst the great bulk of existing records are still based on the manual card system, the progressive installation of the new registration system is up to schedule and the first 6 000 vehicles have been registered on the new record base. Staff training requirements are being provided "in-house". No additional inputs are required in this area at present. However, the Driver Licence Registration Unit is still tied to the old manual card system. with all its weaknesses of missing or incorrect information and its propensity to corruption. The new computer-based system, which will be linked to the nation-wide networked vehicle registration system is currently under design by Consultants and it is planned to train staff in the up-dated system once this is operative (in 1997). Thus **there does not appear to be any need for further outside assistance for this Division once the new system is fully designed and operative.**

7.3.2 The Roads Department and the Municipal / Local Authorities.

There are weaknesses in the abilities and readiness of the engineering authorities to respond to any needs for remedial works at locations highlighted by the Traffic Accident Information Section data output. However in recognition of these weaknesses, steps are being taken by the Roads Department to provide for increased maintenance staff and for the inclusion within this of some traffic engineering expertise. With this arrangement it is intended that the Department will be able to undertake blackspot remedial works and to act in an advisory capacity to any local authorities which are unable to provide their own expertise in this area. **It is hoped that this can be done in the near future in order to meet the urgent need for action in this area.**

The effects of this proposal must be carefully monitored and in due course it may be necessary to provide for some enhancement of the traffic engineering inputs if the monitoring reveals an unsatisfactory situation. **However no immediate consultancy input is sought or proposed.**

7.3.3 The Police Traffic Branch

Discussions with the Traffic Police have revealed that this organization is now responding well to the traffic enforcement and monitoring needs of the country, but is somewhat impeded by the large volumes of paperwork which current procedures entail. Hopefully this situation will be somewhat eased when the remaining legislative measures are brought into effect, possibly by mid-1996, but it is suggested that consideration must be given to ways of streamlining the Police administrative work in order to obtain a stronger presence on the road. **A consultant-based organisation and methods study is suggested, using locally or regionally available expertise.**

8. ASSESSMENT OF THE PROJECT EFFICIENCY AND APPLICABILITY TO OTHER COUNTRIES

8.1 The Project Efficiency

The original concept of the Project envisaged the offer of short-term aid, aimed at re-directing the traffic safety authorities in Botswana with the purpose of reducing the then escalating rates of traffic accidents.

It is clear from a study of the Phase I terms of reference that a short-term (two year) involvement had been envisaged. The introductory paragraph states: "It is presumed that after a two year period the future funding of the project will be the sole responsibility of the Botswana Government".

In the event, SIDA assistance has comprised four stages, totaling loans of SEK 17,7M - more than three times the original estimated requirement - and has covered a ten year period, rather than the originally conceived two. Successive stages have followed each other on the basis of the need for continued technical support in various aspects fields of traffic safety.

When assessing the "efficiency" of the project and in the light of the above track record it must be asked whether the initial stages of project identification and assessment of local skills resources was carried out in sufficient depth, resulting in the need for repeated additional project stages. Future similar projects should provide for improved project identification procedures.

In terms of the efficiency and effectiveness of the programme expenditure, it is believed that the substantial expenditure on consultancy services, could have been reduced by using regional consulting and research services (i.e. from South Africa, Zimbabwe and Botswana), rather than mainly international consulting services. However the political climate vis-a-vis South Africa would not permit this for most of the period of the Safety Programme. Whilst there can be no question regarding the high standards and excellent performance of the Swedish road safety engineers in minimizing traffic accidents in European conditions, it is evident that the SweRoad Consultants, who were responsible for the detailed design and implementation of the BRSI Programme, would not have had the opportunity of being familiar with the considerable reservoir of Southern Africa regional resources, largely because of the political situation in South Africa. The political situation has now changed however and **it is suggested that future projects of this nature should endeavour to use regional resources wherever possible**. This is because of the liklihood of finding a greater affinity with local philosophies, cultural practices, understandings and demographic and climatic conditions. Increased use of regionally available expertise and resources would also result in worth while cost savings.

Table 6.2.2 indicates that approximately 30% of the SIDA expenditure on the project was spent on Travel and Accommodation for international staff. (Although, this figure must also be viewed against the relatively lower direct cost of the staff employed by SIDA to undertake the consultancy, as compared with commercial consulting rates).

Whilst it is appreciated that during the years of the Programme implementation, South Africa was not recognised as a acceptable source of products or provider of services, it is suggested that with the recent political developments in South Africa, there may be scope in future for greater utilisation of the significant level of expertise and resources available in that country.

Notwithstanding the above comments however and as discussed under Section 6 above, the indications at this stage are that the Programme has already rendered good value for money in terms of reduced accident rates and that the returns will further improve as the new system becomes more fully developed and applied.

8.2 The Applicability of the Project to Other Countries

Table 5.1 (Section 5 above) compares the 1992 traffic accident situations in a number of countries in the southern Africa region and suggests that there may be scope for similar projects in some of these, or in similar countries in other regions.

This evaluation of the Botswana Road Safety Improvement Project suggests that, whilst it appears to have been successful and has prospects of becoming even more so, some changes to the project structure should be made when considering its applicability in other countries. Thus it is suggested that future projects should be conceived as requiring a three stage approach.

Stage I: Project Identification

i) fully assess the current national and local urban traffic accident situation and its potential for improvement.

ii) identify the existing Government organizations and key personnel with responsibility for traffic accident monitoring, traffic safety regulations, traffic safety education, traffic safety engineering and traffic enforcement and assess the strengths and weaknesses of these organisations and the potential for increasing their effectiveness by re-structuring, training and equipping.

iii) identify the needs for providing in-depth training for key personnel at top and middle management levels, with a view to these persons in turn being responsible for their training their subordinates and supervising their performance.

iv) identify appropriate training facilities and opportunities with the aim of making maximum use of locally and regionally available resources.

v) assess the time, costs requirements and methodologies for undertaking the Stage II investigations and preparation of proposals, with some preliminary estimates, for advance budgeting purposes, of possible Stage III implementation costs. Separate estimates of national and SIDA inputs will be required.

Stage II Detailed Investigations and Preparation of Proposals

The objectives will include

i) establish mechanisms (organisations / structures) for an improved local capacity to undertake road safety work from within locally and regionally available resources and to advise on ways of improving the national administration of road safety work.

ii) to propose training courses for key personnel involved in traffic safety direction and in the educational, enforcement and engineering aspects of traffic safety with a view to establishing "in house" training capabilities for support staff.

iii) where appropriate to design systems for vehicle inspection, vehicle registration, driver licence training, examination and registration, traffic accident reporting and analysis, public awareness / education, traffic accident site remedial measures designs, traffic engineering standards for road design and traffic control.

iv) to review Traffic Laws and Regulations, to review Highway Codes and local traffic and parking by-laws

v) to assess and recommend methods for the financing of traffic safety measures

vi) to assess equipment needs and costs for the establishment of improved traffic safety facilities

vii) Other local needs.

Detailed estimates of the implementation costs and time requirements, including consultant inputs, will be required. As before, the national and SIDA cost estimates will need to be separately identified.

Stage III Implementation

It is envisaged that the responsible authorities will need Consultant assistance during the implementation stages, so as to provide for an integrated overall development of an improved traffic safety system. The national and local authorities should be encouraged to participate in all implementation and operational procedures to the fullest extent possible, with the aim of being fully responsible for the on-going operation and further improvement of the new system by the end of this Stage.

9. RECOMMENDATIONS

In the course of discussions in Gaborone with most of the critically-involved Government organizations which are concerned with road safety in one way or another it has been evident that giant strides have been made in the setting up of well-designed traffic safety responsive systems. Inevitably some needs for the completion of the establishment of these systems and for their further improvement have come to light and the following recommendations are made with these purposes in mind. The recommendations are grouped under the names of the respective authorities

9.1 The National Road Safety Council

That the National Road Safety Committee be asked to instruct all of the District Road Safety Councils to draw up Annual Road Safety Programmes for their respective areas for submission to and approval by the Road Safety Division and to provide the RSD with annual reports on progress made in the completion of these programmes.

(It is felt that these requirements will give a clearer focus to the work of the Road Safety Councils. It is envisaged that the District Road Safety Councils will require guidance in the formulation of practical, achievable annual programmes which must be related to the work programmes of the other authorities in each area. It will be necessary for them to liaise with the Roads Department and/or Local Authorities and the Traffic Police in their areas to do this and these authorities must be briefed in preparation for this).

9.2 The Department of National Transport and Communications; Road Safety Division

i. That the Road Safety Division be asked to prepare proposals for the establishment of "Traffic Liaison Committees" embodying officers of the Police, the respective regional or local authorities, the RSD, transport operators and commerce and industry in the nations larger urban centres with a brief to meet regularly to liaise on traffic control and road safety issues.

ii. Guidelines should be drawn up by the Road Safety Division for the establishment at both junior and senior schools of individual School Safety Committees. These committees should be responsible for drawing up realistic school safety programmes, systems of safe routes and, under the guidance of the Education Unit and the Police for setting up Scholar Patrols, when procedures for these are available.

iii. Appropriate consultants be asked to submit proposals for the establishment of "school zones" to regulate traffic on the roads adjacent to schools and for the operation of scholar patrols, including the preparation of manuals for the use of the schools and patrol personnel. Terms of Reference should be drawn up for such a project, including provision for appropriate training of patrol personnel and preparation of a training manual. The Terms of Reference should also make provision for the consideration of senior school pupils and/or parents and National Service participants (TSP) taking part in such patrols. The Information and Education Unit should be asked to prepare an intensive and on-going publicity campaign in support of such measures for enhanced school safety.

iv. The use of goods vehicles for passenger transport is widespread and important to society in Botswana, but it is clear that this means of transport is dangerous and it is suggested that a study be commissioned with a view to finding ways of reducing the hazards attaching to this practice.

v. An organisation and methods study should be undertaken in the Road Safety Division with a view to reducing the levels of administrative work undertaken by technical personnel and to permitting the undertaking of research investigations which are appropriate to Botswana conditions.

vi. Bill Board Advertising: It is suggested that policies in this area be reviewed, and that the Road Safety Division be asked to prepare a report on the desirability from the point of view of road safety and from the environmental aspect of this type of advertising, including the type and maintenance of the advertising material should it be considered that Bill Board advertising be continued.

vii. The Road Safety Division should be instructed to commission the preparation of a manual and procedural check list for the assistance of the responsible Engineer or technician in his appraisal of traffic accident locations, the assessment of cost-effective countermeasures and the monitoring of post-remedial works performance.

ix. That the Road Safety Division be asked to coordinate the preparation of standardised warrants for the widespread provision of "Yield" traffic controls at road junctions in place of "Stop" where conditions permit..

x. That the Road Safety Division be asked to propose effective steps to prevent accidents and nuisance from domestic animals on the roads, including improved supervision, the repair of gates and fences and a uniform level of penalties in urban and country areas are required.

(a) The Vehicle Examination Section

All accident-involved vehicles should be required to undergo a vehicle-inspection check after they have been repaired and before being allowed back on the road. (This measure cannot be fully enforced until the current re-registration exercise is substantially advanced).

(b) The Information and Education Unit

i. Future publicity campaigns should include encouragement for the motoring public to undergo first-aid training courses and to carry fire extinguishers in their vehicles.

ii. A campaign pointing out the hazards to which passengers in the back of trucks and of bakkies are subject should be mounted.

iii. The booklets provided for traffic awareness training at primary schools ("My Traffic Book" 1, 2 & 3) need revision and updating and the whole basis of such training needs reviewing.

iv. Plans to draw up a development programme for school traffic awareness training and to specify the resources required in support of such a programme should be urgently pursued.

v. Suggestions for inclusion into senior pupils study curricula of traffic-safety, defensive driving courses, preparation for provisional driving test examination and for increased and improved traffic safety awareness in primary schools, should be followed up by the Traffic Education and Ministry of Education authorities together. Driver training instruction courses should also be made available to university students.

vi Consideration should be given to the preparation of a TV series illustrating in-car video recordings of traffic behavior and slow-motion shots of the effects on unbelted dummy passengers, particularly children, during collision, with appropriate commentary.

(c) The Accident Analysis and Research Unit

i. Provision must be made for the reporting of defects in vehicles involved in traffic accidents and this information must be included in the statistical summaries.

ii. That consideration be given to the re-introduction of provision for reporting of the "apparent cause of accident" in the traffic accident Report Form and Statistical Summary. (Whilst it is sometimes not feasible for the attending police detail to assess the cause of the accident, it is frequently quite clear. In cases of doubt this section of the proforma should not be completed. However the information can be of assistance to the analyst when assessing the characteristics of accidents occurring in particular locations).

iii. Whilst it has a necessary commitment to providing the required information, data, analyses and comments, the publication and distribution of the Annual Road Traffic Accident Summary should not be undertaken by the Accident Analysis and Research Unit, so as to enable the Unit to get on with its prime tasks.

iv. Urgent action must be taken to ensure that the specific data about the accidents which occur in their areas of jurisdiction is received by those authorities which bear responsibility for undertaking measures to prevent or mitigate the effects of traffic accidents in each local administrative area is made available not later than three months after the end of the year. (These should include the Traffic Police headquarters, each district and local Police Headquarters, the Roads Department headquarters and all Regional / District Roads Engineers and the engineering departments of every urban authority).

The information should include the listing of all locations where accidents have occurred in each of these areas during the specific time period and the identification of "blackspots", both on a numbers basis and on a weighted severity basis and "stick diagrams" for such blackspot locations.

9.3 The Engineering Authorities

i, That it be noted that the road safety programme is unlikely to be fully effective until there is a much improved dissemination of traffic accident "blackspot" information to the enforcement and engineering sectors. A higher level of commitment by the works authorities to respond to this information, including the provision of funds for undertaking localised "traffic improvements" and of engineering personnel with some degree of traffic-engineering training and awareness is required.

ii. That it be noted that neither the Roads Department nor the Gaborone City Council is currently effectively geared towards responding to traffic accidents in their areas, that neither have prepared a traffic safety programme or blackspot counter-measures programme and that these authorities be encouraged to make provision for a more responsive system when drawing up future budgeting proposals, including provision for adequate traffic engineering staffing and of funds for an on-going traffic improvements programme for expenditure at the discretion of the responsible engineer.

iii. Suggestions by the Police and others for the provision of additional rural road driver aids, e.g. solar-powered radio telephones for the assistance of motorists on isolated roads and the provision of off-road vehicle lay-byes at regular intervals should be considered by the responsible authority.

iv. That the Director of Roads, in collaboration with the RSD and the Engineers' Departments of the larger Local Authorities in Botswana be requested to prepare Guidelines for traffic control at road work zones in rural and urban locations, so as to provide clear and positive guidance to drivers approaching and traversing such work areas and that, when approved, the implementation of protective measures, inclusive of the provision of all the necessary traffic signing and equipment, in accordance with the recommendations of the Guidelines be made mandatory at all locations where roadworks for any purpose are undertaken. (It has been observed that road work zone deviation and protective measures tend to be inconsistent and inadequate)

9.4 The Botswana Police Traffic Branch

i. That the Traffic Police be made responsible for drawing up proposals for the establishment of a Disaster Response System to be activated in case of a major road (or other) accident.

ii. That the Police be asked to continue to enforce speed limits, particularly on the country's main road network.

iii. That every effort be made to overcome the delays in the introduction of the remaining legal measures, so as to allow the more efficient operation of the traffic enforcement section.

iv. A consultant-based organisation and methods study of the Traffic Branch organisation is suggested, with a view to reducing police involvement in administrative procedures, so as to permit the Branch an increased presence on the road. The study could be made using locally or regionally available expertise.

Department for Infrastructure and
Economic Cooperation

Appendix 1

September 1995

EVALUATION OF THE ROAD SAFETY IMPROVEMENT PROJECT IN BOTSWANA

TERMS OF REFERENCE

1. Background

In 1984 the Swedish consultancy firm Swedish National Road Consulting AB, SweRoad, a subsidiary of the Swedish National Road Administration, at the request of the Government of Botswana, GoB, drafted a five-year programme for road safety improvement in Botswana. GoB accepted the programme and in June 1985 requested Swedish financial support for the implementation of a project based on the programme. In October 1985 SIDA decided to approve the requested support and allocated an amount of SEK 5 700 000 for a first two year phase of the project. SIDA engaged SweRoad to coordinate the implementation. A number of Swedish and Danish institutions were engaged for various sub-projects.

The project was carried out during the period October 1985-December 1987 and a final report was presented in October 1988 covering the following sub-projects: Economy of Road Safety, Vehicle Safety, Information Education, Driver Training and Licensing, Accident Report System, Environment, Law Enforcement.

In November 1987 GoB requested Swedish support for a second phase of the project. In a SIDA decision an amount of SEK 5 000 000 was allocated for the purpose. The project, which was carried out during the period April 1988-November 1989, covered the following subjects: Vehicle Safety and Registers, Information and Campaigning, Education in Schools, Driver Training, Accident Analysis, Traffic Engineering and Environmental Improvements, Law Enforcement.

In preparation for a possible third phase of the project SIDA engaged the Norwegian consultancy firm Institute of Transport Economics, TOI, to evaluate what had been accomplished so far. TOI found that although the number of accidents had not decreased during the two phases the project had started several processes in what is in Botswana a preparatory phase of a long-term engagement. TOI also found that progress was far behind schedule. This was partly due to cuts in funding by the Ministry of Finance. The lack of progress in the legislation work had also been hampering work in other fields, such as law enforcement, vehicle testing and driver training. However, TOI recommended continued Swedish support to a third phase so as not to cause undue loss of experience and continuity.

In September 1989 SIDA received a request for support for the third phase comprising sub-projects at an estimated cost of SEK 13 000 000. SIDA pointed out that as this would be a final phasing out project the cost should not exceed that of the two preceding projects. Botswana and

Sweden finally agreed on a project estimated at SEK 7 500 000 out of which Sweden would finance two thirds and Botswana one third. An agreement to that effect was signed between Sweden and Botswana on June 1, 1990.

The third phase of the project was concluded on June 30, 1992 and a final report was submitted by SweRoad in September 1992.

In order to enable Botswana to contract consultancy services for follow-up activities SIDA has allocated MSEK 1,0 for each of the fiscal years 1992/93 and 1993/94. A prolongation for one year (94/95) within the budget of 2 MSEK was agreed during 1994..

In conclusion, the SIDA support has been governed by 4 different agreements namely;

Agreemt no	MSEK	Period	Source
I	5.7	8510-8712	Consultancy fund
II	5.0	8804-8911	-"-
III	5.0	9006-9206	-"-
IV	2.0	9207-9506	-"-
Total	17.7	8510-9506	-"-

The main objective of the programme/project was to decrease the number of traffic accidents and their economic and social consequences. It was hoped that the programme would eventually result in a 20-40% reduction in the traffic accident rate.

The annual cost of road accidents in Botswana is estimated at MPula 250 which represents approx 2 % of GDP.

The number of cars in Botswana is increasing by approximately 10 % per year. In 1991 there were 93,000 cars representing 72 cars/1,000 inhabitants. The number of accidents is, however, increasing with 18 % per year and was in 1991 12,600. In 1981, on the average 1 out of 17 of all vehicles was involved in an accident, a number that in 1991 had increased to 1 in 7. The reason behind this deteriorating situation is not fully known.

2. Objectives of and reasons for the Evaluation

After almost ten years of programme support there is a need for summing up before phasing out the donor-financed activities.

The main objective of the evaluation is to assess the relevance of programme objectives, and to which extent they have been met; further efficiency, effectiveness, impact and long term sustainability of the support.

The evaluation is also expected to meet the global objective to give Sida feed-back on the relevance and efficiency of this type of assistance to traffic safety and its applicability on similar projects in other countries.

Another objective of the evaluation is to arrive at recommendations for the continued work at the Department of National Transport and Communications, DNTC, in the short, medium and long-term perspective, as well as to assess DNTC's capacity (financial, manpower

and material) in implementing such work. Such assessment should identify priority areas of need for external technical assistance.

3. Scope and focus of the work

The review shall analyse the Botswana Road Safety Improvement Programme (hereinafter referred to as the Programme) and the Swedish support to it (hereinafter referred to as the Project).

The following issues shall be covered. Any deviations from planned activities or expected outputs shall be commented on and, wherever applicable and possible, explained.

3.1 Relevance

- Have the Programme and Project activities been relevant to set objectives? To general objectives of SIDA assistance?

- Has the focus on Human Resources Development within DNTC as a tool to achieve the objectives been relevant?

3.2 Project Efficiency

- Has the Project concept in general been adequate for the achievement of the Programme objectives? Has the Project concept been adhered to?

- Have the Programme and Project inputs been appropriate and sufficient for the activities to be carried out?

- Have the activities been carried out as planned and have they been completed by the end of the Project?

- Have training activities been successfully carried out? Is the trained personnel working as planned within the Programme?

- Have local counterparts and trainees been provided and properly trained within the Project?

- To what extent have information campaigns and road safety education in schools etc been successful?

- Are the accident report and accident information systems working?

- To what extent have projects such as law enforcement, driver training, vehicle testing etc been delayed by the slow progress on the legislation side?

- Has the chosen model for foreign support (mainly short-term assignments and institutional support) been successful? What are the advantages or disadvantages compared to other models, such as long-term expatriate support?

- How have different project inputs (personnel, scholarships, material, equipment etc) been used and what are the results in relation to the targets?

- Have the concerned parties completed their commitments?

- Have institutional arrangements for the Programme and the Project been satisfactory? Did the co-operation between different authorities and institutions work and is it working today?

- Have the Programme and Project been carried out in accordance with the budget?

- Have measurable performance indicators been applied in the reporting. Could they be improved?

3.3 Impact

- How has the different project activities (vehicle inspection, traffic regulation, law enforcement, information campaigns, drivers training, physical improvements of road design) influenced the number of traffic accidents? What are the correlations between project activities and impacts?

- What is the impact on the economy of traffic accidents and of the project?

3.4 Sustainibility

- The review shall specifically analyse the human resources aspect and the long term sustainability of the road safety organisation, within and outside DNTC. One obvious acid test is whether and in what form training of traffic police, driver instructors and inspectors etc are going on today.

3.5 Reporting and monitoring system

- Have the monitoring and reporting systems been able to provide all parties concerned with relevant information?

4. Methodology, Timetable and Evaluation Team

The approach of the evaluation shall be more developmental than descriptive. The mission shall critically assess the present traffic safety plans and give recommendations on how the Directorate could improve the effectiveness and efficiency of the different efforts and the balance between them. Furthermore, the need for future resources and the mobilisation of the same should be analysed.

The following documents have been guiding the project in the course of implementation:

- Plans of Operation, Agreed Minutes etc.

- Evaluation of the project, Transportokonomisk Institutt (TOI), 1988

- Final Report, SweRoad, 1992

The evaluation shall be based on

- written material above produced during the planning and implementation phases of the project,

- written material and statistics on the various aspects of road safety available in Botswana,

- interviews with persons at all levels concerned with various aspects of road safety.

The evaluation shall take place during a maximum of 4 weeks (including travel time) during April-May 1995, tentatively one week of preparatory work, 2 weeks' field-study and 1 week for compilation of report.

The evaluation team should comprise expertise in the following fields;
A, Team Leader, expatriate: Road safety issues in general, traffic planning, and information technique.
B: Human Resources. This specialist will be hired locally in Botswana.
Although each member of the team is responsible for his/her inputs, the consolidation and editing of the final report shall be the responsibility of the Team Leader.

Each member of the team should be very proficient in English, both written and spoken. A minimum level of 4 in the Nordic standard language test is required for the expatriate Consultant.

6. Reporting

A draft report in English shall be submitted to Sida in 5 copies within 4 weeks of the conclusion of the field mission and a final report shall be submitted to Sida in 5 copies within two weeks of the receipt of comments on the draft report.

The increased demand on Sida to present measurable results from the development assistance necessitates improved reporting and monitoring procedures.

The mission report shall therefore include a proposal for a systematic monitoring framework, in the Logical Framework Analysis format. On the vertical axis is then found from top to bottom: Objective, Immediate Objective, Output, Input; and along the horizontal axis: Indicator(s), Assumption(s), Results, and Comments on all levels of the hierarchy. A sample matrix is attached.

The completed matrix may thereafter be used as a tool for systematising the evaluation.

INEC-TRP BUDGET Appendix 2

11/9/95

FEES				
	R.T Davey		SEK	38,687.50
	G.P van Hoffen		SEK	14,953.13
	TOTAL FEE		**SEK**	**53,640.00**
REIMBURSABLES				
	Daily Allowance		SEK	3,682.00
	Accomodation		SEK	7,152.58
	Transport	Allowance	SEK	5,233.59
		Milage	SEK	1,744.53
		Total	SEK	6,978.12
	Air Fare		SEK	2,182.81
	Other expenses		SEK	800.00
TOTAL REIMBURSABLES			**SEK**	**20,795.51**
PROJECT TOTAL			**SEK**	**74,435.51**

Sida Evaluations - 1995/96

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Department for Democracy and Social Development

95/2 Agitators, Incubators, Advisers - What Roles for the EPUs? Joel Samoff
Department for Research Cooperation

95/3 Swedish African Museum Programme (SAMP). Leo Kenny, Beata Kasale
Department for Democracy and Social Development

95/4 Evaluation of the Establishing of the Bank of Namibia 1990-1995. Jon A. Solheim, Peter Winai
Department for Democracy and Social Development

96/1 The Beira-Gothenburg Twinning Programme. Arne Heileman, Lennart Peck
The report is also available in Portuguese
Department for Democracy and Social Development

96/2 Debt Management. (Kenya) Kari Nars
Department for Democracy and Social Development

96/3 Telecommunications - A Swedish Contribution to Development. Lars Rylander, Ulf Rundin et al
Department for Infrastructure and Economic Cooperation

96/4 Biotechnology Project: Applied Biocatalysis. Karl Schügerl
Department for Research Cooperation

96/5 Democratic Development and Human Rights in Ethiopia. Christian Åhlund
Department for East and West Africa

96/6 Estruturação do Sistema Nacional de Gestão de Recursos Humanos. Júlio Nabais, Eva-Marie Skogsberg, Louise Helling
Department for Democracy and Social Development

96/7 Avaliação do Apoio Sueco ao Sector da Educação na Guiné Bissau 1992-1996. Marcella Ballara, Sinesio Bacchetto, Ahmed Dawelbeit, Julieta M Barbosa, Börje Wallberg
Department for Democracy and Social Development

96/8 Konvertering av rysk militärindustri. Maria Lindqvist, Göran Reitberger, Börje Svensson
Department for Central and Eastern Europe

96/9 Building Research Capacity in Ethiopia. E W Thulstrup, M Fekadu, A Negewo
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96/10 Rural village water supply programme - Botswana. Jan Valdelin, David Browne, Elsie Alexander, Kristina Boman, Marie Grönvall, Imelda Molokomme, Gunnar Settergren
Department for Natural Resources and the Environment

96/11 UNICEF's programme for water and sanitation in central America - Facing new challenges and opportunities. Jan Valdelin, Charlotta Adelstål, Ron Sawyer, Rosa Núnes, Xiomara del Torres, Daniel Gubler
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96/12 Cooperative Environment Programme - Asian Institute of Technology/Sida, 1993-1996. Thomas Malmqvist, Börje Wallberg
Department for Democracy and Social Development

96/13 Forest Sector Development Programme - Lithuania-Sweden. Mårten Bendz
Department for Central and Eastern Europe

96/14 Twinning Progammes With Local Authorities in Poland, Estonia, Latvia and Lithuania.
Håkan Falk, Börje Wallberg
Department for Central and Eastern Europe

96/15 Swedish Support to the Forestry Sector in Latvia. Kurt Boström
Department for Central and Eastern Europe

96/16 Swedish Support to Botswana Railways. Brian Green, Peter Law
Department for Infrastructure and Economic Cooperation

96/17 Cooperation between the Swedish County Administration Boards and the Baltic Countries. Lennart C G Almqvist
Department for Central and Eastern Europe

96/18 Swedish - Malaysian Research Cooperation on Tropical Rain Forest Management. T C Whitmore
Department for Research Cooperation, SAREC

96/19 Sida/SAREC Supported Collaborative Programme for Biomedical Research Training in Central America. Alberto Nieto
Department for Research Cooperation, SAREC

96/20 The Swedish Fisheries Programme in Guinea Bissau, 1977-1995. Tom Alberts, Christer Alexanderson
Department for Natural Resources and the Environment

96/21 The Electricity Sector in Mozambique, Support to the Sector By Norway and Sweden. Bo Andreasson, Steinar Grongstad, Vidkunn Hveding, Ralph Kårhammar
Department for Infrastructure and Economic Cooperation

96/22 Svenskt stöd till Vänortssamarbete med Polen, Estland, Lettland och Littauen. Håkan Falk, Börje Wallberg
Department for Central and Eastern Europe

96/23 Water Supply System in Dodota - Ethiopia. Bror Olsson, Judith Narrowe, Negatu Asfaw, Eneye Tefera, Amsalu Negussie
Department for Natural Resources and the Environment

96/24 Cadastral and Mapping Support to the Land Reform Programme in Estonia. Ian Brook
Department for Central and Eastern Europe

96/25 National Soil and Water Conservation Programme - Kenya. Mary Tiffen, Raymond Purcell, Francis Gichuki, Charles Gachene, John Gatheru
Department for Natural Resources and the Environment

96/26 Soil and Water Conservation Research Project at Kari, Muguga - Kenya. Kamugisha, JR, Semu, E
Department for Natural Resources and the Environment

96/27 Sida Support to the Education Sector in Ethiopia 1992-1995. Jan Valdelin, Michael Wort, Ingrid Christensson, Gudrun Cederblad
Department for Democracy and Social Development

96/28 Strategic Business Alliances in Costa Rica. Mats Helander
Department for Infrastructure and Economic Cooperation

96/29 Support to the Land Reform in Lithuania. Ian Brook, Christer Ragnar
Department for Central and Eastern Europe

96/30 Support to the Land Reform in Latvia. Ian Brook, Christer Ragnar
Department for Central and Eastern Europe

96/31 Support to the Road Sector in Estonia. Anders Markstedt
Department for Central and Eastern Europe

96/32 Support to the Road Sector in Latvia. Anders Markstedt
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96/33 Support to the Road Sector in Lithuania. Anders Markstedt
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96/34 Support to the Maritime Sector in Latvia. Nils Bruzelius
Department for Central and Eastern Europe

96/35 Sida/SAREC's Marine Science Programs. Jan Rudengren, Per Brinck, Brian Davy
Department for Research Cooperation, SAREC

96/36 Support to the Development of Civil Aviation Administration in the Baltic States. Johan Svenningsson
Department for Central and Eastern Europe

96/37 The Opening of the two Road Sectors in Angola. C H Eriksson, G Möller
Department for Infrastructure and Economic Cooperation

96/38 Statistikproduktion i Nordvästra Ryssland. Lennart Grenstedt
Department for Central and Eastern Europe

96/39 Sri Lankan - Swedish Research Cooperation. Nimal Sanderatne, Jan S. Nilsson
Department for Research Cooperation, SAREC

96/40 Curriculum Development in Ethiopia, A Consultancy Study for the Ministry of Education in Ethiopia and for Sida. Mikael Palme, Wiggo Kilborn, Christopher Stroud, Oleg Popov
Department for Democracy and Social Development

96/41 Sida Support to Environmental Public Awareness and Training Projects through The Panos Institute, Gemini News Service and Television Trust for the Environment. Leo Kenny, Alice Petren
Department for Democracy and Social Development

96/42 Concessionary Credits in Support of Economic Development in Zimbabwe. Karlis Goppers
Department for Infrastructure and Economic Cooperation

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