

**FEASIBILITY STUDY TO DETERMINE THE POTENTIAL FOR THE
PRIVATIZATION OF ROUTINE ROAD MAINTENANCE IN SWAZILAND**

BY

ISHMOND MKHITSIKO FAKUDZE

Submitted in fulfillment of a part of the requirements for the degree

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Study Leaders: Prof E. Horak and Mr. G. Basson

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DECLARATION

I declare that this research is my own, un-aided work, except where otherwise stated and referred to.

This treatise is being submitted in partial fulfillment of the requirements for the degree of Master of Science in Project Management to the Faculty of Engineering, Built Environment and Information Technology, of the University of Pretoria.

This work has not been submitted before for any degree at any University.

Ishmond Mkhitsiko Fakudze

November 2005

DEDICATION

To my sister Nonhlanhla, who has been of such great help and inspiration to me for as long as I can remember.

Thank you “sisi”, God has indeed used you to make great things happen.

ACKNOWLEDGEMENT

My sincere gratitude goes to Prof. E. Horak, my study leader for his invaluable guidance, advise and mentoring throughout the entire research. As I meandered through the journey in search for the truth, Prof. Horak has been like a guiding light. Thank you Professor.

I would also like to thank Mr. G. Basson who has been the co-leader as well as the overall study leader for the whole Masters Degree program at the Department of Construction Economics, Faculty of Engineering, Built Environment & Information Technology during my two-year presence when taking structured lectures. You have been a source of inspiration.

Furthermore, gratitude goes to Ms. Alta Lotz who has played a telling role by her administrative skills, pulling everything together showing us the ropes so we could get well integrated into the University life. She has kept us well informed of the status on the program, given us timely updates and generally being the life-blood of the Department.

Finally, I would also like to acknowledge the many contractors who have sacrificed their valuable time in filling the questionnaires. Without their assistance, this research would not have been this successful.

ABSTRACT

Title of Treatise: Feasibility Study to Determine the Potential for the Privatization of Routine Road Maintenance in Swaziland.

Name of author: Ishmond M. Fakudze

Name of Study leaders: Prof. Emile Horak and Mr. Gert Basson

Institution: Department of Construction Economics, Faculty of Engineering, Built Environment and Information Technology, University of Pretoria.

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Developing countries have spent, and are spending millions of dollars annually in providing road infrastructure as a means of opening up the countryside to foreign investment and thus stimulating the economy for a better future for their citizens.

Unfortunately, most of this developmental work is under a threat of deterioration due to inadequate maintenance work that, in turn, is caused by a host of challenges such as poor funding, improper work methods, lack of qualified local contractors on maintenance work, to name but a few of these challenges.

This research provides an overview of what developing countries (using Swaziland as an example) can gain from experiences that have been implemented in some parts of the world in trying to address the issue of road maintenance. Several countries, including some in Latin America and Australia, have started to invest in ways of contracting out road maintenance. To this end,

the commonly called Performance-Based Road Management and Maintenance Contracts hold some promise in addressing the question of effective road maintenance and safeguarding the enormous investment undertaken by many developing country's Governments. The treatise intends showcasing, using Swaziland as an example, what and how developing countries in Africa stand to gain by privatizing routine road maintenance.

Finally, the research proposes a roadmap that can be used specifically in developing countries, for upgrading local contractors to the level where they can play a meaningful role in road maintenance.

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LIST OF ABBREVIATIONS

BMMP	Building Maintenance Management Program
BS	British Standard
BSI	British Standard Institute
COLTO	Committee for Land and Transportation Officials
CSIR	Council for Scientific and Industrial Research
CSRA	Committee for State Roads Authority
DBFO	Develop, Build, Finance and Operate
EOI	Expression of Interest
FAR	Fixed Asset Register
FHWA	Federal Highway Administration
FIDIC	International Federation of Engineers and Consultants
GDP	Gross Domestic Product
HRI	Roughness Index
ICAMM	International Conference on Asset Maintenance & Management
IFMA	International Facility Management Association
MMS	Maintenance Management System
MPWT	Ministry of Public Works & Transport
NDS	National Development Strategy
OBC	Outcome Based Contracting
ODA	Overseas Development Administration
PFI	Private Finance Initiative
PPP	Public Private Partnership
PSMCs	Performance Specified Maintenance Contracts
RFP	Request for Proposals.
RMI	Road Maintenance Initiative
RMS	Road Management System
ROBMARC	Road Outcome-Based Maintenance & Rehabilitation Contract.
SACII	Southern Africa Construction Industry Initiative
SADC	Southern Africa Development Community
SARCIC	Southern Africa Regional Construction Industry Council
SATCC	Southern Africa Transport & Communications Commission
SANRAL	South African National Roads Agency
SAPET	South African Property Education Trust
SMME	Small Medium & Micro Enterprise
UK	United Kingdom
VDOT	Virginia Department of Transport

Chapter 1

THE PROBLEM AND ITS SETTING

1.1 INTRODUCTION

Many countries in the world today, especially the developing countries, are struggling to maintain the country's infrastructure to satisfactory levels compatible with set standards. As such, the infrastructure deteriorates to such levels where it becomes extremely expensive to remedy, requiring exorbitant capital fund injections if the situation would be slowed down, halted and subsequently reversed in the form of major rehabilitations.

1.2 THE PROBLEM AND ITS SUB-PROBLEMS

This research examines the status of the maintenance management of the Roads Department of the Kingdom of Swaziland with a view to compiling and formulating a contractor development programme that can result in an efficient maintenance strategy through the privatization of road maintenance in Swaziland.

1.2.1 First Sub-problem

The first sub-problem is to determine and compile the current status of road maintenance in Swaziland by gathering and analyzing a three-year period of road maintenance.

Is the current maintenance strategy sufficient in addressing the needs of an efficient road management program?

1.2.2 Second Sub-problem

The second sub-problem is to profile the existing private sector contracting firms to ascertain their capacity and to assess their needs towards fulfilling a meaningful role in road maintenance of the Roads Department's network in Swaziland. Are there competent construction companies that can undertake cost-effective and efficient road maintenance in Swaziland?

1.2.3 Third Sub-problem

The third sub-problem is to develop a contractor development programme with the aim of attaining privatization of road maintenance in Swaziland. What then can be done to deliver an efficient road maintenance strategy for Swaziland?

1.3 THE HYPOTHESES

1.3.1 The current road maintenance system in Swaziland is unsatisfactory in meeting the developmental needs of the country.

1.3.2 The existing private contracting firms are small and incapable of undertaking road maintenance unaided.

1.3.3 A contractor development program is needed and has to be formulated, adopted and implemented to improve efficiency in road maintenance in Swaziland.

1.4 THE DELIMITATIONS

This Treatise will not attempt to profile all contracting firms in Swaziland, but only those with civil engineering orientation and registered with the Roads Department.

1.4.1 The Treatise will be limited to those contracting firms within the Mbabane – Manzini corridor, the hub of serious construction works.

1.4.2 The study will be limited to the Ministry of Public Works & Transport's road maintenance and not those undertaken by other agencies.

1.4.3 The study will focus on a three-year window of maintenance program as covered by the years between 2002 and 2004.

1.5 THE DEFINITIONS OF TERMS

1.5.1 Developing Country: One whose majority of the population is lacking in essential infrastructure such as roads, electricity and the like. (Anderson et al., 1991)

1.5.2 Maintenance: Work undertaken in order to keep or restore every facility, i.e. every part of a site, building and contents to an acceptable standard. (Property Management, 2001)

1.5.3 Planned Maintenance: This is "maintenance organized and carried out with forethought, control and the use of records to a predetermined plan" (BSI 1984)

1.5.4 Preventative Maintenance: Work directed to the prevention of failure of a facility in order to ensure its continued operation within the anticipated life of the facility. (Paraphrase, Property Maintenance:10)

1.5.5 Scheduled Maintenance: Maintenance carried out to a predetermined interval of time, distance, number of operations, etc.

1.5.6 Condition Based Maintenance: Maintenance initiated as a result of knowledge of the condition of a facility.

1.5.7 Corrective Maintenance: Work undertaken after failure has occurred and intended to restore an item to a state in which it can perform its intended function.

1.6 THE ASSUMPTIONS

1.6.1 Developing countries are struggling to cope with essential road maintenance.

1.6.2 The involvement of the private sector in developmental works enhances the efficiency of the Public sector.

1.7 THE IMPORTANCE OF THE STUDY

Infrastructure development, especially the road infrastructure, is a catalyst for economic development in the society. With good and well-maintained roads, comes increased investment in the society. Investors can move raw material and their products faster from and to the markets and thus earn their desired profits.

Consequentially, investments by their nature entail the provision of employment opportunities to many people who would otherwise remain unemployed and probably then engage in criminal behavior in society.

Criminal activities are somewhat higher in developing countries than in the developed world precisely due to the fact that unemployment is higher in Developing Countries than the Developed world. The saying “ the devil makes use of idle hands” becomes quite applicable as a consequence.

With increased employment, hopefully crime can decline and thus more funds would be available for further developmental work rather than using it in fighting crime. Therefore, there is a need to develop an efficient road delivery and maintenance system that will safe-guard the already existing investment, provide more job opportunities for the many unemployed and to increase efficiency in general in the infrastructure development of many developing countries.

Swaziland, being one such developing country, desperately needs to improve efficiency in road maintenance so that most of the country could be accessible for improved development of all the communities.

Chapter 2

REVIEW OF RELATED LITERATURE

2.1 INTRODUCTION

The main theme of this review is to demonstrate how privatization of maintenance works has been utilized to the benefit of many developing countries in order to stimulate economic growth, sustainable development and realizing value for money spent in undertaking developmental projects.

The review will look into three areas namely:

- Background information on maintenance work in general
- Case studies
- Contractor development programs

2.2 BACKGROUND INFORMATION

Developing Countries have been mobilizing funds through International Technical Assistance to improve their road networks. However, many of these developments turned out to be unsustainable due to a general lack of attention to the effective management of highway maintenance (Paul Larcher, 1998)

In 1991, the World Bank estimated that 50% of the rural roads in Sub-Saharan Africa were in “poor” condition. Generally, most of the maintenance work

undertaken in developing countries is done on an ad hoc basis because of lack of funding to maintain sustainable maintenance programs (Reversion et al, 1991)

Most countries, in general, suffer from a shortage of funds for roads, both for investment and maintenance. Low investment results in high congestion, often intensified by the frequency of lane closures because of the need to repair deteriorating pavements and structures. The initial impact of shortage of funding for road maintenance has been to increase road transport costs, in terms of travel time; vehicle operating costs; road conservation; pollution; and road accidents. On the other hand, the long-term impact has been to reduce commercial and agricultural competitiveness in international and regional markets and consequently slow overall economic growth. Without an adequate and stable flow of funds, road maintenance policies will not be sustainable (Heggie & Vickers, 1998).

Yet again, Heggie and Vickers (1998) observe that in developing and transitioning economies 60 to 80 percent of all passenger and freight transport moves by road, and roads provide the main form of access to the mostly rural communities. Yet, most of the 11 million kilometers of roads in these countries are poorly managed and badly maintained. Developing nations, by their nature, try to spread their already thin resources to cater for the many demands they have to address such as education, health, social services and many others. In the process, the road infrastructure finds itself the first to be sacrificed when it

comes to resource allocation. Left unattended for a long time, the roads deteriorate to such an extent that future maintenance becomes high. Stated below is what Seeley (1987) found, pertaining to building maintenance work and what Heggie & Vickers (1998) found pertaining to road maintenance:

*“During the mid- 1980’s, Britain was spending about 10 billion pounds per annum (or 4% of the estimated replacement value of the building stock) on the **maintenance of buildings**, while more than 50% of the building labor force was engaged on this class of work. “The total estimated backlog in housing repairs and maintenance in Great Britain in 1986 was in the order of 45 billion pounds. It was calculated in 1972 that arrears of housing maintenance in Great Britain could amount to eight or nine times the volume of work actually carried out each year, and there was ample evidence of neglect in other classes of building” (Seeley, 1987)*

*“By comparison, in 1996 a survey conducted by the U.K. Institution of Civil Engineers found that in Great Britain there was a \$5.61 billion maintenance backlog on local **government roads** (96% of the total public network)” (Heggie & Vickers, 1998)*

To this, Webb (1990) concurs by observing that the situation in South Africa is even worse, with only about 1.5% of the estimated replacement value being spent on building maintenance annually. “It, therefore, follows that neglect of the effective management of this enormous investment is costing the country a great deal of money and because, like an iceberg, only a small part of the whole is visible, its financial and other implications are only partly appreciated” (Webb,

1990) The situation could be no less true when it comes to the question of road maintenance. In fact, the situation could be worse due to the fact that the provision of road infrastructure may even be more costly than that of the building industry. Actually, Heggie and Vickers (1998) note that in terms of assets, employment, and turnover, roads are truly big business. They argue that for some developing and transition countries roads are their largest assets, with replacement costs amounting to well over \$500 billion.

In fact, “Road Infrastructure Management may be described as big business in terms of capital investment, as well as maintenance and operational budgets. Road authorities and roads agencies are internationally often compared with Global 500 companies in these terms” (Construction and Road Maintenance Directorate, Gauteng, 2001). Unfortunately, (Harral and Faiz 1988) as quoted by Heggie and Vickers (1998) observed that, in 85 countries that had received World Bank assistance for roads, allocations for maintenance had been so low that a quarter of the main paved roads outside urban areas and a third of the main unimproved roads had to be reconstructed. In fact, what has been observed is that most roads in developing countries are managed and financed by bureaucratic road departments in the same way that social services are managed and financed. No wonder then that in the 85 countries mentioned above, maintenance had been so low that nearly 15% of the capital invested in main roads – roughly \$43 billion had been eroded. To this end, the following observation by Seeley (1987) is worth noting:

“Maintenance work unfortunately, possesses little glamour; unlikely to attract very much attention and is frequently regarded as unproductive”, and yet many of the managerial and technical problems are more demanding of ingenuity and skill than those of new works” (Seely, 1987).

Incidentally, maintenance expenditures in virtually all countries are well below the levels needed to keep road networks in a stable condition for the long term. In many countries, these expenditures are less than half the amount required, and in some cases, less than a third. (Heggie & Vickers, 1998)

To compound this problem further, the flow of these funds is erratic. Budget allocations are often cut at short notice in response to difficult fiscal conditions, funds are rarely released on time and actual expenditures are often well below agreed allocations. As a result, road agencies are unable to plan works effectively, contractors are not paid on time and thus some go out of business, short-term “patch and mend” work replaces appropriate road conservation, rural roads regularly become impassable during rainy seasons, and the large backlog of road rehabilitation continues to grow. (Heggie & Vickers, 1998)

2.2.1 MAINTENANCE IN GENERAL

According to Cloete CE (editor, 2001), Maintenance comprises three separate components; servicing, rectification, and replacement. Servicing is essentially a cleaning operation undertaken at regular intervals of varying frequency.

Rectification arises from shortcomings in design, inherent faults in or unsuitability of components, general wear of components, and damage of goods in transit or installation. Replacement, on the other hand, is a direct consequence of age of a structure. Quite often the need for replacement stems not so much from physical breakdown of materials or elements as it is from deterioration of appearance or change in state.

2.2.2 OBJECTIVES OF MAINTENANCE

Efficient maintenance management starts with the establishment of a clear objective, which is compatible with the overall objectives of the organization. Cloete CE (2001) asserts that, once the objectives of management have been determined, the maintenance manager can then consider the information and techniques necessary to achieve these objectives. The issues to be considered include the following:

- Asset records
- Expenditure records
- Establishing maintenance requirements
- Estimates and budget information
- Budgetary control
- Methods of execution and
- Decision making about the execution of maintenance.

Furthermore, Cloete (2001) declares that the maintenance requirements of a property portfolio depends on the type of organization to which it belongs and its financial resources. To this end, a distinction has to be made between profit-oriented and non-profit oriented organizations. In non-profit organizations, the object of maintenance will be to maximize the economic life of an asset subject to users' satisfaction and the availability of finance. By contrast, in profit-oriented organization the object is the maximization of long-term profits. The duty, as it were, of the maintenance manager is therefore to maintain assets and services so that the organization can function efficiently.

One very important question common to all maintenance managers is "How much money should be spent on maintenance?" To which Cloete CE (2001) declares that, in the final analysis, maintenance must be a compromise between a number of related and yet sometimes conflicting factors. These factors include the users, age, construction, type of service provided, the environments, the future use of the property, standards, and exposure conditions, to name but a few.

2.2.3 MAINTENANCE CONTRACTS

These may be carried out either by directly employed labor or by private contracts. What needs to be done is to compare both the cost and service provided by an outside contractor with that provided in-house.

There are both advantages and challenges in outsourcing work of any type. The International Facility Management Association (IFMA) has enlisted a number of advantages accruing from outsourcing, namely:

- Reduced personnel costs
- Better access to specialty skills
- Better adjustment to workload fluctuations
- More flexibility in staffing
- Reduced equipment expenditures
- Better control of services
- Improved quality
- Improved productivity.

In addition, Cloete CE (2001) adds the following advantages of outsourcing;

- It may be cheaper than in-house, especially in a competitive market
- Better cost control and cash flow planning as the contract amount is fixed
- Supervision and control done by an outside party
- Labor relations are the problem of the contractor.

Contrast this with the advantages of in-house maintenance, which according to Cloete CE (2001), are:

- Full control of operations facilitating quick response, flexibility and direct quality control.
- A sound standard of workmanship is provided by well-known and tested craftsmen

- A stable complement of labor, which can be relied upon for deployment to meet requirements as and when they arise.
- Enables the maintenance manager to introduce and control an incentive scheme appropriate to the organization. Emergency maintenance can be done effectively.

From the foregoing, there seem to be more advantages from outsourcing than there are in utilizing in-house staff.

2.2.4 OVERVIEW OF MAINTENANCE

Maintenance can broadly be classified as either planned or unplanned (see figure1). Both types are generally encountered on a regular basis in road infrastructure management. Maintenance, therefore, has to be planned for if effective maintenance management is to be realized.

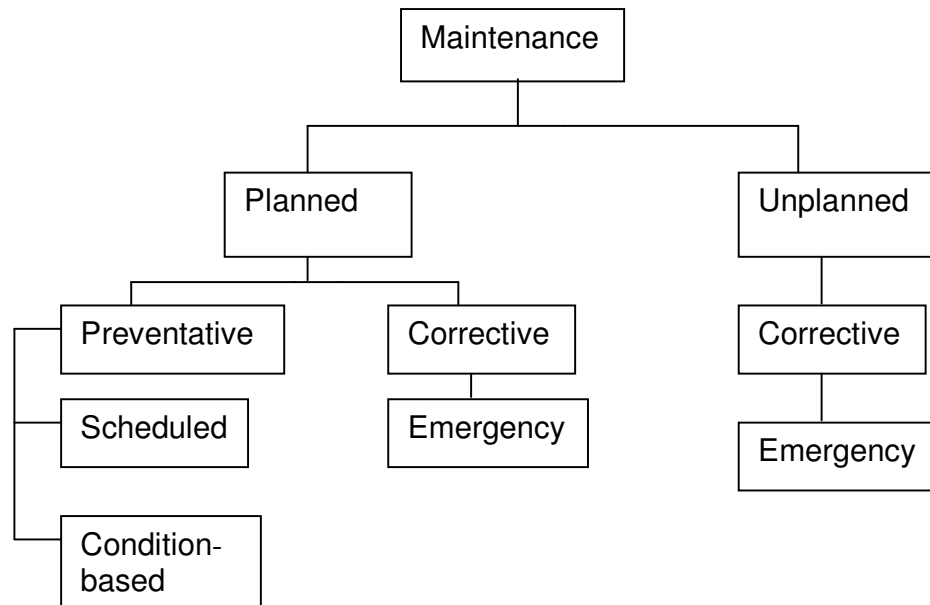


FIGURE 1: TYPES OF MAINTENANCE (Seely, 1987:2)

Planned Maintenance

This is the maintenance organized and carried out with forethought, control and the use of records to a predetermined plan. (BSI 3811, 1984)

Unplanned Maintenance

The maintenance carried out to no predetermined plan. (BSI 3811, 1984)

Preventative Maintenance

The maintenance carried out at predetermined intervals or corresponding to prescribed criteria and intended to reduce the probability of failure or the performance degradation of an item. (BSI 3811, 1984)

Scheduled Maintenance

The preventative maintenance carried out to predetermined intervals of time, number of operations, mileage, etc. (BSI 3811, 1984)

Condition-based Maintenance

The preventative maintenance initiated as a result of knowledge of the condition of an item from routine or continuous monitoring. (BSI 3811, 1984)

Corrective Maintenance

The maintenance carried out after failure has occurred and intended to restore an item to a state in which it can perform its required function. (BSI 3811, 1984)

Emergency Maintenance

The maintenance that is necessary to put in hand immediately in order to avoid serious consequences. (BSI 3811, 1984)

Planned maintenance systems will have higher overhead costs than an unplanned system but should, if properly devised, lead to lower maintenance expenditure in the long term. Figure 2 below illustrates this comment.

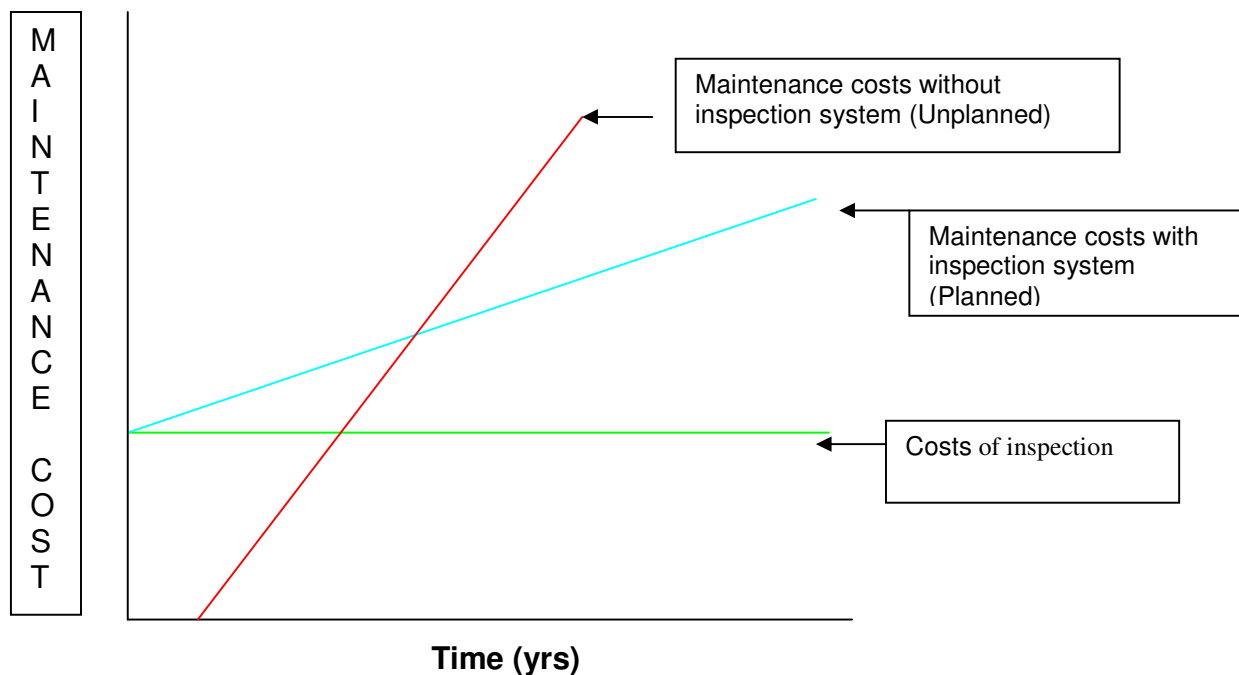


FIGURE 2: COST RELATIONSHIP BETWEEN PLANNED AND UNPLANNED SYSTEMS (Seeley, 1987:4)

Heggie and Vickers (1998) argue that, there is generally a lack of clearly defined responsibilities that adds to maintenance problems. It is often not established which agency is responsible for managing different parts of the road network, controlling overloading, managing urban traffic, improving road safety or reducing the adverse environmental impacts associated with road traffic. Responsibility for roads is often diffused among several central government ministries and local government agencies, leading to duplication, confusion and a lack of coherent management policies. In addition, road classification systems are often out of date. New roads may not have been listed and changes in functional class of existing roads may not have been accompanied by the appropriate reassignment

of responsibilities. And still, the problem is even more acute in rural areas where roads may never have been formally assigned to a legally constituted highway authority. In short, national and local road agencies may not know which roads they are supposed to maintain.

To this end, figure 3 on the next page, ***Infrastructure Management Maintenance Management Process***, aids in putting the process in perspective in order to alleviate the problems associated with management problems.

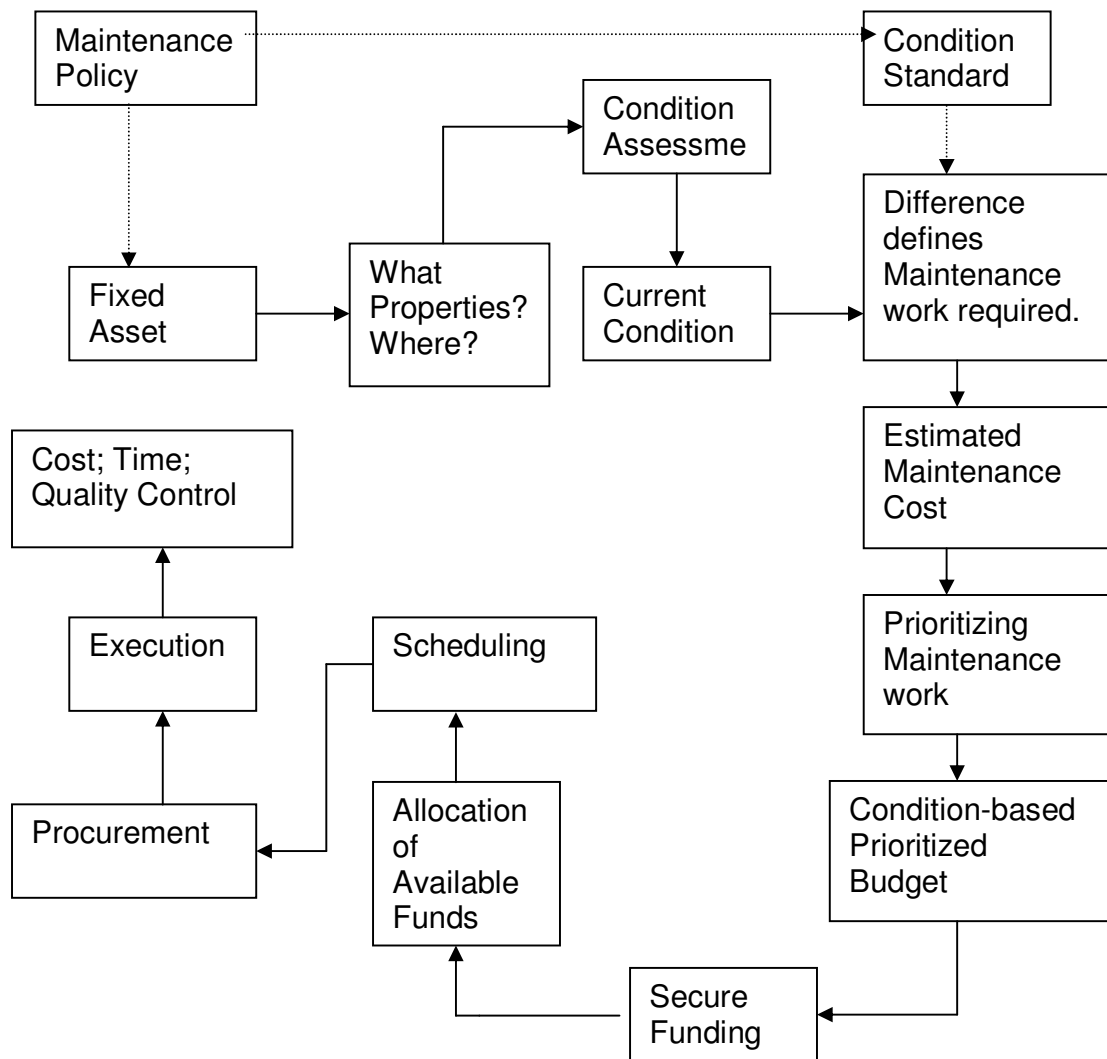


FIGURE 3: INFRASTRUCTURE MAINTENANCE MANAGEMENT PROCESS (McDuling, 2004)

The Fixed Asset Register (FAR) is the cornerstone of effective management of infrastructure as it provides the key data for integrated property and fixed asset management. As a minimum, McDuling (2000) suggested, it must provide for the following:

- Facility Identification & Description
- Property Management
- Property Development and
- Property Maintenance.

Everything else follows from that. The flow diagram as indicated by figure 3 shows the interrelationship of activities and events starting with the maintenance policy which informs and guides the maintenance process, through condition assessments, finding the current condition and comparing it with standards in order to gain perspective of the amount of maintenance requirements. From then on, estimation of maintenance costs are conducted followed by the prioritizing of the maintenance work. A budget is produced which guides the next process of securing funding, then allocation of those funds leading up to scheduling of the work.

The final stages involve the procurement processes, whether in-house or outsourcing, execution with close monitoring and control of the three fundamental aspects of any construction project: Time, Cost, and Quality.

A few of these events need some attention.

Condition assessment: The current condition of a facility and the maintenance work required to restore it to the desired condition, primarily determine the cost and timing of the maintenance. Regular, accurate and consistent condition assessments are essential for effective facility management. This is because the deterioration of the fabrics and materials is a varying and on-going process. Thus inspections are required to update the system with current information and capture any significant changes in the condition before they impact on the performance of a facility (McDuling, 2001) This assessment, needs to be undertaken by the duly sanctioned authority for that particular infrastructure.

Allocation of Funds: The allocation of available funds for maintenance work requires a multi-dimensional approach and assessments should be provided for the collection of the following information, among others:

- The applicable standards
- The condition of the fabric, element or facility
- The type and extent of maintenance work required
- The risks associated with the postponement of the required maintenance work and
- The suitability of the fabric, element or facility for the use, application and/or environmental conditions.

Condition Standards: Very few, if any, property owners can afford to maintain all assets in their portfolio in an ideal “as new” condition all the time. The reason simply being that, it costs too much. It becomes necessary, therefore, to establish acceptable norms or standards for each category or type of facility to which the condition of the facility must comply. Lee, 1987 developed a relationship between standards and cost as shown in the figure 4:

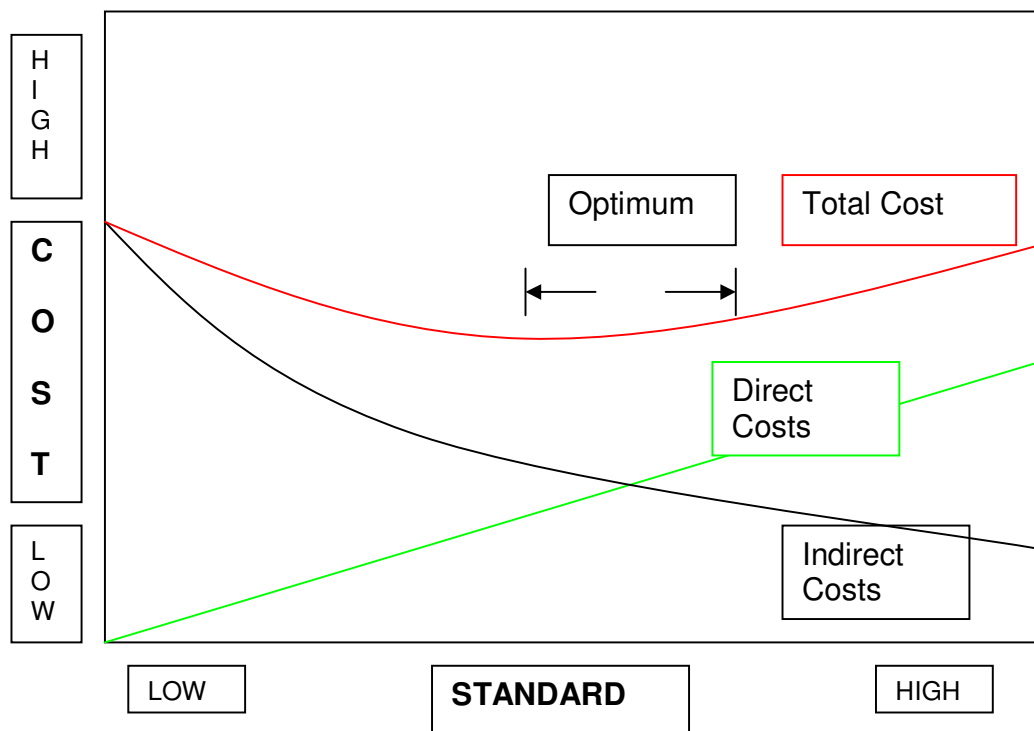


FIGURE 4: RELATIONSHIP STANDARD vs. COST (Lee, 1987)

As can be seen in figure 4, total cost is the sum of direct and indirect costs. Direct costs are associated with planned maintenance whereas indirect costs are a result of unplanned maintenance.

Whereas some facilities like bridges and inter-urban roads need to be maintained in the best possible condition at all times because of their highly sensitive functions or profile, others can be allowed to be below average. In addition, there needs to be a conscientious decision to strike a balance between standard and cost. Too low a standard creates problems due to high indirect costs to maintain.

On the other hand, too high a standard may result in a similar situation but for a different reason. There is an optimum point that is reached whenever standards are improved beyond which any attempt to increase standards further will result in increase in cost to maintain. When that happens, there is not much value for the additional funds spent on the facility.

The Queensland Department of Public Works (as cited by McDuling, 2000) has developed a five-point rating scale to be used in setting and/or assessing condition standards for facilities and buildings. This five-point scale is shown in table 1:

Rating	Condition Standard	Performance Standard
5	<p>Best</p> <p>Asset to be in the best possible condition.</p> <p>Only minimal deterioration to be allowed</p>	Highly sensitive functions with critical results.
4	<p>Good</p> <p>Asset to be in good operational & aesthetical condition</p> <p>Benchmark against industry standards.</p>	Operations require good public presentation & high quality working environments.
3	<p>Reasonable</p> <p>Fully meeting operational requirements.</p>	Functionality focused at utility level.
2	<p>Minimum</p> <p>To meet minimum operational requirements only.</p>	Functions are ancillary only, with no critical operational role.
1	<p>Holding</p> <p>Condition can be allowed to deteriorate but to comply with statutory requirements.</p>	<p>Functions have ceased.</p> <p>Asset is dormant or on hold pending disposal.</p>

TABLE 1: THE FIVE POINT RATING SCALE (McDuling, 2000)

This rating system aids assessors to arrive at almost similar results when conducting an assessment. In other words, it helps in providing a tool that when used can foster consistency of the assessments. From a maintenance point of view, it becomes important to relate the condition of the asset to the type of maintenance required. Hence, McDuling (2000) suggests that technical people who are at the lower level in the organization's management structure and who should think of condition in terms of the required maintenance work must be the ones to conduct conditions assessments.

To this end, Seeley (1987) states *“Effective building maintenance requires the correct diagnosis of the defects, & implementation of the correct remedial measures, all based on sound technical knowledge, otherwise there can be additional waste of material, labor and money since the work in all probability have to be done again. Observing and rectifying a defect at an early stage is likely to reduce repair costs.”*

The above observation by Seeley could very well be applicable to road infrastructure. Effective road maintenance can benefit greatly from correct diagnosis and the application of the correct remedial measures.

ASSESSMENT CYCLES

The assessment cycles are determined by a wide range of factors such as maintenance policies, the type and quality of the fabric, material or element used, its application and use, the quality of workmanship, environmental exposure, vandalism, etc. (McDuling, 2000)

Furthermore, there exists a general tendency, for example, in the built environment to refer loosely to a building's or facility "maintenance cycle" such as a 5-year cycle or a 7-year cycle. In developing countries, government departments seldom have sufficient funding available for the maintenance of all the assets they are responsible for and thus "maintenance cycles" are used mainly to ensure that all the assets are attended to at least once within a prescribed timeframe. (McDuling, 2000)

2.2.5 GLOBAL STATUS OF THE ROAD SECTOR

According to Heggie & Vickers (1998), road business is massive in terms of human-made assets, investment and revenues. In response to the rapid traffic growth, countries expand their road networks considerably. New roads are built to open up more land for development.

The 1998 figures put the African road network coverage at some 1.5 million kilometers, Central and South America at some 3 million kilometers and 2.6 million kilometers in Asia (excluding China and India), just under 1 million

kilometers in the former Soviet Union, and around 500,000 kilometers in the Middle East. Cost-wise, recent estimates put the value of the African road network at more than \$150 billion, the network in Latin America and the Caribbean at more than \$200 billion, and Indian highway network alone at \$15 billion.

The World Bank has supported more than \$5.5 billion of highway and rural road projects between the periods 1994 to 1997. Spending on roads can absorb as much as 5 to 10 per cent of a government's recurrent expenses and 10 to 20 per cent of its development budget. Many of the poorest countries in the world continue to subsidize road transport through the general budget. To this end, it has been found that a significant portion of many a developing country's governments' disbursed and outstanding debt is loans made for roads.

Furthermore, the road sector also absorbs a great deal of grant finance, mainly for procuring construction plant and maintenance equipment.

Unfortunately, as has been mentioned earlier, roads in many parts of the world are poorly managed and badly maintained, usually by bureaucratic government road departments. And the poor state of the road network is reflected in the large backlog of deferred maintenance. In Africa alone, it would cost nearly \$43 billion to fully restore all roads that are classified as in poor condition. In summary, countries have been spending far too little on routine and periodic maintenance. (Heggie & Vickers, 1998)

2.2.6 COST OF NEGLECT

Heggie and Vickers (1998) observe that most of the developing countries who had received financial assistance from the World Bank spent far too little on capital investment and routine and periodic maintenance. Instead, these countries were consuming their assets. Restoring only the roads for which it is economically justified to do so and preventing further deterioration could require annual expenditures of at least \$5 billion over the next 10 years (1998 figures). Another \$5 billion could be needed to expand and modernize congested road networks and to improve road safety, they further observe.

The cost of poor road maintenance and inadequate road financing are borne primarily by the road users. In rural areas, where roads often become impassable in bad weather, agricultural output suffers. When a road is allowed to deteriorate to a poor condition, each dollar deferred on road maintenance increases vehicle-operating costs by about \$2 to \$3. Poor road maintenance also raises the long-term costs of maintaining the road network. For example, as Heggie & Vickers (1998) argue that, maintaining a paved road for 15 years costs about \$60,000 per km. However, if the road is allowed to deteriorate over the 15-year period, it will cost about \$200,000 per km to rehabilitate it. In other words, rehabilitating paved roads every 10 to 20 years is more than three times as expensive, in cash terms, as maintaining them on a regular basis and 35% more expensive in terms of net present value discounted at 12% per year. (Heggie & Vickers, 1998)

They cite a yet unpublished transport sector review for the Republic of Kazakhstan which, when analyzed, show how the absence of periodic maintenance, due to insufficient funds, affected the national road network. The analysis demonstrated that if periodic maintenance were to be deferred for four years on 7,000 km of roads, the government would save \$180 million per year in maintenance costs, but would have to spend \$1.05 billion reconstructing the roads. Thus the net loss would be at least \$330 million. (Heggie & Vickers, 1998)

A similar pattern was observed to hold true for gravel roads. Maintaining a gravel road for 10 years costs between \$10,000 and \$20,000 per km, depending on climate and traffic volume. But leaving it without maintenance for 10 years will cost about \$40,000 per km for needed rehabilitation. Rehabilitating gravel roads every 10 years is thus twice as expensive, in cash terms, as regular routine and periodic maintenance. In rural areas, where roads often become impassable during bad weather, poor road maintenance profoundly affects the economy. Lack of maintenance can seriously impair people's lives in social terms, when roads become so impassable that communities can no longer access markets and public services, particularly emergency health care (Heggie & Vickers, 1998)

However, there has been a global fundamental change in attitude towards the role of the state and the enormous demand for resources in the road sector that has forced governments to turn to the private sector to finance a small but significant portion of the total road investment (Heggie & Vickers, 1998)

To this end, the Africa Road Maintenance Initiative (RMI), has shown that indeed roads are poorly managed and under financed because of weak institutional frameworks. Road construction and finance are not market-driven and there is no clear price for roads, as road expenditures are usually financed from general tax revenues. Moreover, Heggie and Vickers (1998) observe that:

- Roads are procured through appropriations and compete against other claims
- There are poor terms and conditions of employment
- There is a lack of clearly defined responsibilities
- There are ineffective and weak management structures and
- There is little managerial accountability.

(Heggie & Vickers, 1998)

Consequently, Heggie & Vickers (1998) suggest that a compelling remedy is real or surrogate market discipline, in the form of competition, that can motivate roads agency managers to cut waste, improve operational performance and allocate resources efficiently. Hence the strategic mechanism for promoting competition being commercialization: bringing roads into the marketplace, putting them on a fee-for-service basis and managing them like a business.

In addition, they highlight four other complementary building blocks for the effective and efficient transformation process as being:

- Clarifying responsibility by assigning roles definitively,

- Creating ownership by involving road users in the management of roads to encourage better management, winning public support for road funding, and constraining spending to what is affordable;
- Stabilizing road financing by securing an adequate and stable flow of funds; and
- Strengthening management of roads by introducing sound business practices and improving managerial accountability (Heggie & Vickers, 1998)

2.2.7 INTERNATIONAL TRENDS

Overview

As part of the World Bank Development Report (World Bank, 1994) a survey of 44 countries that had received World Bank loans was conducted to highlight their most common infrastructure problems. Financial and wage-labor problems were the leaders, followed by unclear goals and lack of management autonomy and accountability (Heggie & Vickers, 1998)

The institutional framework within which roads are managed has been found to contribute substantially to the problems of poor road maintenance policies. They are not managed as part of the market economy with its formidable pricing dynamic. Roads are managed like a social service with multiple goals. While road users pay taxes and user charges, the proceeds, however, are treated like general tax revenue. Roads are thus financed through budget allocation determined as part of the annual budgetary process. To this end, there is little

relationship between these allocations and the underlying needs or users' willingness to pay. Consequently, road users are not "forced" to choose whether and how to make a journey knowing full well they do not directly pay for the road (Heggie & Vickers, 1998)

Compounding this problem is the fact that governments rarely provide clear objectives, managers face few incentives to cut costs, there are few sanctions, and staff cannot easily be disciplined and managers are rarely penalized for poor performance. Not to mention the human resource constraint where in quite a large number of staff employed by the roads agencies is unskilled workers. Morale is generally low, primarily because of low salaries that compare poorly with those of the private sector. Rewards are not given for exceptional performance. Hence, Heggie & Vickers (1998) retort, "One cannot manage a road agency with a demoralized, poorly trained and part-time staff that has little incentive to work effectively or efficiently".

Engineers in the private sector generally earn more than twice as much as their public sector counterparts. Even the "perks" that are sometimes availed in some agencies are not enough to compensate the difference so much so that "daylighting", "moonlighting" and pilfering becomes the order of the day in some agencies. The problem cannot be solved through training, bonded studentship and improved allowances. There is no point in training staff that spend only a fraction of their time on the job. Likewise, bonded graduates have no interest in

making a career in the roads department and leave as soon as their bonding periods end. Improved allowances are ineffective in that they are not bankable, that is, cannot be used as security for mortgages and other loans. Staff in many a roads department, are still not held personally responsible or accountable for their work. Typically, workers do not have any job specification to guide them or, if they do exist, they do not relate well to the reality of the post. Staff do not know what is expected of them, which decisions they should make and which to pass up or down the hierarchy. This uncertainty not only paralyzes decision-making but also stifles initiative and detracts from the job satisfaction (Heggie & Vickers, 1998)

Overstaffing is yet another big problem. Having a large number of staff doing work in-house means that, in the face of the ever-diminishing funds, the payroll takes up a growing share of total expenditure, leaving less available for actual works. To this, the World Bank's Sub-Saharan Africa Transport Policy Program has proposed and outlined important developments in the area of road maintenance. According to Anne Balcerac de Richecour and Ian Heggie (1995), the rehabilitation of road networks and the build up of institutional and financial capacity for their maintenance are the single most important challenges confronting the transport planners and policy makers in Africa.

Road Maintenance Initiative

The Road Maintenance Initiative (RMI) has, since 1998, been undertaken to develop awareness about the importance of road maintenance and has thus supported country level programs designed to identifying the root causes of the problem and to initiate the actions needed to set the management and financing of roads on a sustainable long-term footing. One of the key building blocks for the RMI approach is the establishment of a reliable source of finance. This would comprise of the following:

- Road tariffs with the proceeds deposited in a special account or Road Fund
- Putting the Road Fund under the authority of a Roads Board with representation of road users and private sector organizations
- The effectiveness of the Road Funds and their sustainability dependent on the specific legal and administrative arrangements under which they operate.

The below stated were highlighted as the essential design elements of an efficient and sustainable Road Fund:

- The Fund should be fully funded by the user fees rather than transfers from tax revenues
- An independent board comprising representatives of road user groups, who are selected by the organizations they represent, should manage the Fund
- The Board should be free to set the level of the tariff based on a fuel levy, license fees, and/or bridge and ferry tolls, in response to changing road expenditure needs, currency devaluations and inflation

- The tariff components should be deposited directly into the Road Fund
- The Fund should be managed according to sound commercial principles- with a commercial accounting system, clear disbursement procedures and independent financial audit and selective technical audit.

Different countries in Africa have used different modalities in the allocation of funds between their different Road Agencies in those countries where there is more than one. Ghana and Tanzania, for example, initially allocated 80% of the revenue for main and regional roads while allocating 20% for urban and rural district roads. The situation, however, changed in Ghana as soon as the Department of Urban Roads was established. Then allocation changed to 50% for trunk roads, 30% for rural roads and 20% for urban roads. Tanzania has opted for a method that is based on a simple formula that incorporates population density, road density and stage of development in their allocation of funds.

In South Africa, a well-developed system is in place for the allocation of funds between the different road schemes and the different road authorities. Economic criteria are used for all schemes involving rehabilitation, improvement and new investment while maintenance funds are allocated using maintenance unit rates. As for the maintenance funds, a distinction is made between the different road types (depending on volume of traffic), routine and periodic maintenance is divided into separate maintenance activities and an allowance is made for

differences in rainfall (and hence maintenance requirements). The system deals explicitly with the impact of restricted funding levels.

In addition, the Department of Transport hopes to replace this method with a Maintenance Management system that would enable each road agency to base its maintenance requests on objectively measured road conditions. The South African system uses standard unit rates for each routine and periodic maintenance activity; classified by type of road surface and volume of traffic. To this end, the rates are then multiplied by the length of maintainable road under the jurisdiction of each road agency to arrive at the total maintenance budget required by an agency.

In conclusion, de Richecour and Heggie (1995) observe the following:

- It is advisable to split funds at the source, even though the allocation may be a little arbitrary, to ensure that each road agency gets a reasonable share of the revenue
- The allocations should be flexible enough and be capable of being periodically adjusted to reflect changing volumes of traffic and road network conditions and
- Formula-based allocation methods probably offer the most transparent and objective way of allocating the funds.

Management Structures

According to Heggie and Vickers (1998), central governments usually manage the main road networks in one of four ways listed below:

- As part of a combined ministry of works, transport, and communications, such as in Hungary, the Netherlands, Sri Lanka, and Tanzania
- As part of a more narrowly focused ministry of works or transport, such as in Chile, Indonesia, Jordan, the Philippines, Zambia, and (Swaziland- author's input)
- Under a sharply focused ministry of roads and highways, such as in pre-1997 Ghana
- As an arm's-length road agency reporting to any type of parent ministry, such as in Argentina, Ghana and the United Kingdom.

The model of a typical management structure of a ministry of Works and Transport as illustrated in figure 5 shows how cumbersome, and in practice, largely ineffective a framework for promoting a more commercial approach to road management this structure is.

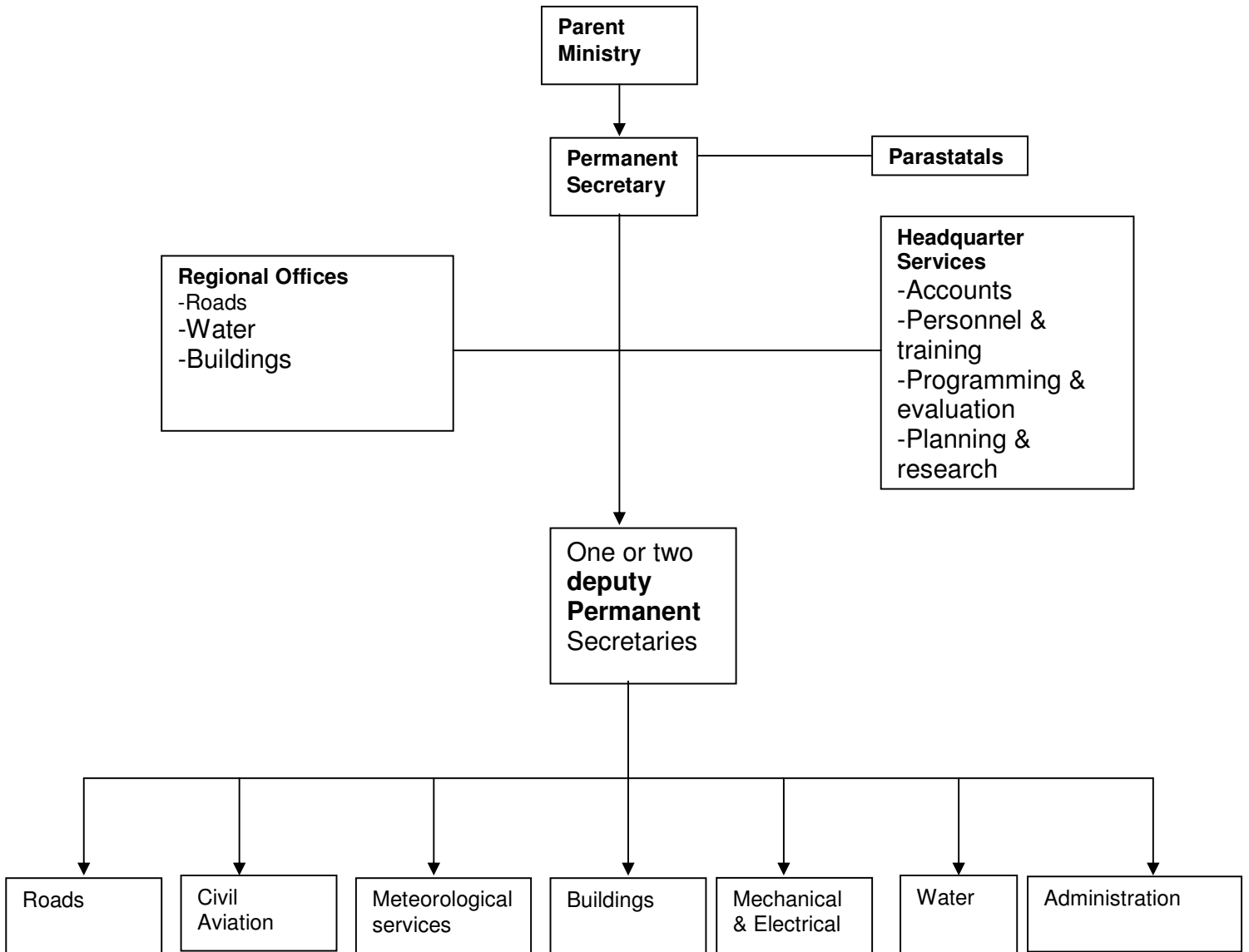


FIGURE 5: TYPICAL MANAGEMENT STRUCTURE OF A MINISTRY OF WORKS AND TRANSPORT

Regional engineers often report directly to the permanent secretary instead of through the director of roads, for example, and the structure is lopsided. The management structure of most roads agencies date back to the time when the ministry of public works spent about as much time on roads as it did on

maintaining public buildings and procuring government vehicles. Times have changed and today roads departments, typically, account for more than 70% of the ministry's total expenditures and manage more assets than either the railways or the national airline. A more focused ministry would overcome some of the problems associated with poor management structures since reporting lines would be more direct and better inter-modal coordination would exist.

At local government level the situation tends to be confused. There often is no roads department with the finance committee taking care of the responsibility of roads, making it difficult to identify who is responsible for what. Usually, staff are demoralized, underpaid, inexperienced, poorly skilled and unmotivated. Local government entities are typically small and lack both the technical capacity and the resources to manage their road networks effectively. Local governments are too small to justify hiring people with the skills needed to plan and manage road networks acceptably.

Management Systems

Effective management requires timely collection and analysis of both physical and financial information. Yet, many road departments do not possess even the most rudimentary management information systems. Consequently, most road departments cannot tell how much they spend on routine and periodic maintenance, since some periodic maintenance costs are charged to the recurrent budget and some to the capital budget. They cannot discern the

breakdown of costs among overhead, labor and equipment, or the unit costs of shoulder repairs, Regravelling and cleaning drains. Such poor accounting systems make it difficult, if not impossible, for managers to establish consistent spending priorities.

Numerous attempts have been made to introduce management information systems, but with little success. Many fail as soon as the consultants who have installed them leave. The most recent World Bank review of road management systems showed that basic roads inventory data were valid or complete in only 10 to 25 per cent of countries in Africa, Latin America and the Caribbean and Asia and 50% in the Middle East and North Africa. Data on pavement condition, surface roughness and pavement strength were virtually nonexistent in 30 to 50 per cent of the countries surveyed in Africa and Asia. Timely and accurate traffic counts, essential for informed road planning, are often incomplete, with road agencies conducting surveys on unrepresentative, irregular or nonexistent lengths of road networks (Heggie & Vickers, 1998).

Although donor-financed lending programs have, typically, included maintenance management system, only 10% of the countries surveyed in Africa and 30 to 50 per cent elsewhere, had a functioning routine maintenance management system. Even then performance was variable. Likewise, economic evaluations of road maintenance interventions were still uncommon. The use of bridge management systems was even less common. Many countries do not have functioning

maintenance management systems to determine network-wide maintenance priorities (Heggie & Vickers, 1998).

Work Methods

Few roads agencies manage their resources well enough to achieve reasonable value for money. The most common practice is delivery of poor quality service – the result of meager annual budgets, characterized by undue reliance on work done using in-house staff and equipment, inefficient operation of government plant pools and lack of interest in labor-based work methods. A considerable portion of maintenance is still carried out using in-house staff and equipment, even though its quality is variable and costs usually higher. In-house work exposed to private sector competition nearly always dramatically increases efficiency, with costs falling by as much as 30%.

Contract maintenance can also improve quality. A recent review of experience with contract maintenance in six Latin American countries concluded that such practices had helped to solve or at least alleviate, inefficient resource use. Road agencies, however, are still reluctant to relent the power that comes from managing large in-house labor units. Nevertheless, contracting out will be effective only when procurement procedures are straightforward. There must be a healthy and competitive local construction industry and a stable flow of funds to pay the contractors. The road agency must also have enough qualified staff to

process contracts, supervise work, and deal with arbitration issues (World Bank, 1996)

Inefficient government plant pools are another symptom of weak market discipline. Most roads agencies own millions of dollars worth of heavy plant and equipment, much of it procured under loans from international donors or furnished on a grant basis by bilateral donors. Utilization rates for this equipment often drop to between 20 to 30 per cent, compared to 80 to 90 per cent in the private sector. The economic losses associated with low utilization rates can amount to millions of dollars per annum. The reasons for low utilization rates can range from, among others, poor management and accounting systems, lack of standardization, shortages of fuel and spare parts to lack of stable workload and political interference.

In addition, lack of interest in labor-based work methods is also symptomatic of weak market discipline. Not only are labor-based methods sometimes cheaper, they are often more reliable because government plant pools are in disarray. However, labor-based methods raise difficulties. Government procurement procedures, at times, discourage the letting of small contracts, particularly to one-person contractors who cannot be expected to follow standard bidding procedures. Complicating the issue further are the policies donors insist must be met in procuring goods and services. Donors emphasize international

competitive bidding and the preference for financing foreign exchange expenditures.

Finally, according to (Stock 1996) as quoted by Heggie and Vickers (1998), evidence from a recent survey in Ghana points to two principal problems. Large contractors have less incentive than small firms to employ labor-intensive work methods, since they do not want their costly plant to stand idle. In addition, contractors with relatively small wage bills handle the frequent delays in payments better, since payments for other inputs can more easily be deferred. Delays in paying wages quickly lead to strikes. Hence, the expectation of delays in payment for works dissuades prospective contractors from using labor-based methods.

2.2.8 THE FOUR PILARS IN MAINTENANCE MANAGEMENT

Assigning Responsibility:

This entails creating a consistent and coherent organizational structure with clearly assigned responsibilities for managing different parts of the road network, including road traffic. Responsibilities to be assigned include, among others, operations, maintenance, improvements, road network development, traffic management, accident and claims resolution and assessment of environmental impacts (Heggie & Vickers, 1998).

The main road is usually managed through a central government department, typically, the roads department of the ministry of works. Rural road networks are usually the responsibility of local governments. However, local governments are small and often lack both technical capacity and resources. Lately, rethinking the role of the main road agency has led to the establishment of a growing number of semi-autonomous road agencies that manage the main road network on a commercial basis to mitigate for the ever-rising costs of building and maintaining the roads. Urban areas, typically, have total responsibility for their own road networks, only receiving varying inputs from government (Heggie & Vickers, 1998).

Creating Ownership

According to Heggie and Vickers, this entails active participation of road users in order to help win public support for secure and stable road funding. This ensures that users pay for the roads willingly. In this respect, road management boards can play a significant role.

Stabilizing Road Finance

Most governments cannot increase budget allocations, given present fiscal conditions. Thus, improved means for mobilizing revenue are essential. Several countries are addressing this issue by separating road financing from the government's consolidated budget. To this end, a road tariff consisting primarily of vehicle license fees and a fuel levy have been introduced. The tariff is

generally set to cover the full cost of operating and maintaining urban and rural roads (Heggie & Vickers, 1998).

Sound Business Practices

This is vital to ensure that value for money is attained in the delivery process. Thus, it is expected that there is a clear, unambiguous corporate mission and a strategy to separate planning and management of road works from implementation. This, more often than not, may involve outsourcing the implementation to the private sector, learning effective ways of contracting out, recruiting and paying capable staff and building sound management structures and appropriate management information systems (Heggie & Vickers, 1998).

2.2.9 CHALLENGES IN MAINTENANCE

There seem to be a fairly good degree of correlation between what happens in buildings and roads infrastructure maintenance management as can be attested by the findings of Seeley and Heggie & Vickers as discussed in section 2.1 of this study. To this end, what McDuling (2000) has identified as the three most pressing common problems in building maintenance in the provincial government sector of South Africa can, by extension, be somewhat applicable to road maintenance. These problems are:

- Lack of accurate and reliable information on the current condition and maintenance requirements of building fabric and element (roads might as well be added)

- Inaccurate budgeting for and under-funding of maintenance work, and
- Technical and financial considerations are often neglected in the prioritizing of maintenance work.

These are not only common problems faced by the provincial governments in South Africa, but governments in general, especially the neighboring countries to South Africa in the SADC region and most of the developing world as a whole. The foregoing discussion paints a very gloomy picture of maintenance work. No wonder then that, over the past decades, there has been a growing international interest in utilizing private contractors to improve efficiency and reduce the cost of road maintenance. Unfortunately, two main problems immediately crop up in applying this approach:

- Lack of resourceful and competent local road maintenance contractors.
- Government departments in charge of road maintenance are organized on a “force account” basis and have little or no experience in contract administration.

2.3 CASE STUDIES

2.3.1 PAST EFFORTS AT REFORM

Most reform efforts sought to strengthen road management, improve policies governing user charges and increase allocations for road maintenance. However, these were mostly unsuccessful due to lack of a comprehensive vision focused on technical rather than institutional solutions (Heggie & Vickers, 1998).

Most reforms, it has been observed, concentrated on reducing work done using in-house staff and equipment, introducing maintenance management systems and restructuring government plant and equipment pools. Little effort, however, has been made to deal with the weaknesses in the organizational structures of road departments.

On a complementary basis, the above-mentioned reforms were accompanied by attempts to simplify government procurement procedures so as to facilitate the use of local contractors, strengthen the local construction industry, introduce maintenance and equipment management systems and strengthen axle-weight enforcement to reduce the damage overloaded vehicles inflicted on the road pavement (Heggie & Vickers, 1998).

The most successful reforms, it has been observed, are those that dealt with the work done by in-house staff and equipment, simplifying procurement procedures and strengthening the local construction industry.

2.3.2 THE SOUTHERN AFRICAN DEVELOPMENT COMMUNITY (SADC) TRANSPORT SECTOR.

Road transport is, arguably, the most pervasive of all economic activities in the SADC region and carries eighty percent of the region's total trade in goods and services. It also accounts for about 20 percent of the region's formal cross-border trade and provides the only form of access to most rural communities. Thus, a

well-maintained road network is of paramount importance to the economy of the region (Pinard et al, 1999).

Infrastructure

The SADC regional road network, excluding that of the latest to join as members (Democratic Republic of Congo & Seychelles), comprises over 930,000 km of roads (courtesy of Pinard et al) is as reflected in Table 2.

Main Roads		Rural Roads (Km)	Total Road Network (Km)	Regional Trunk Roads (Km)
Paved (Km)	Unpaved (Km)			
105,122	395,900	431,185	931,685	47,583

TABLE 2: INVENTORY OF SADC REGIONAL ROAD NETWORK (Pinard et al, 1999)

A regional Trunk Road Network of some 47,583 km has been defined which links the capital cities, major ports and industrial areas. Most of this network is paved and is in a fairly good condition. The current SADC road network is one of the region’s biggest assets with a replacement cost estimated at US\$50 billion (1999 figures) and as such roads are far more important than either railways or airlines (Pinard et al, 1999).

In addition, Pinard et al (1999) observed that in terms of traffic flows, most of this regional network rarely exceeds traffic volume of 2,000 vehicles per day (vpd) except near urban areas. Instead, traffic volumes are in the order of 1,000 vpd, except in South Africa where up to 120,000 vpd are found on dual carriageways near metropolitan areas and of the order of 60,000 to 80,000 vpd between major cities.

In terms of condition, about 50 percent of the paved main road network is in good condition, with the remainder classified as fair or poor. Botswana, Lesotho and Namibia have particularly good road standards and about two-thirds of South African and Zimbabwean roads are in a good condition. In Tanzania, Swaziland and Malawi about 55 percent of the roads are in good condition. This proportion is somewhat lower in Zambia at some 40 percent. Road maintenance had been neglected in Mozambique and Angola for quite some time, not surprisingly though because of the political situations that had prevailed for quite some time in these countries. Table 3 summarizes the network condition as follows:

Main Roads	Road Condition (Weighted Average)		
	Good (PSI 2.5-3.0)	Fair (PSI 2.0-2.5)	Poor (PSI 1.5-2.0)
Paved	49	36	15
Unpaved	38	31	31

TABLE 3: CONDITIONS OF MAIN ROADS IN THE SADC REGION

(Pinard et al, 1999).

A Performance Smoothness Index (PSI) is used in classifying the condition of the roads

Good: PSI 2.5-3.0: Substantially free of defects and requiring only routine maintenance. Unpaved roads need only routine grading and spot repairs;

Fair: PSI 2.0-2.5: Having significant defects and requiring resurfacing or strengthening. Unpaved roads need reshaping or re-gravelling and spot repair of drainage;

Poor: PSI 1.5-2.0: Having extensive defects and requiring immediate rehabilitation or reconstruction. Unpaved roads need reconstruction and major works.

Finally, Pinard et al (1999) declare that estimates indicate that US\$1.7 billion per annum (about 1% of regional Gross Domestic Product, (GDP)) needs to be spent on regular maintenance of the region's road network, including a cycle of reseals and rehabilitation of paved roads. However, just a little more than one-half of this amount is allocated on an annual basis (see Table 4).

GDP (1995)	Actual Annual Expenditure	Estimated Annual Requirement	Annual Shortfall	Backlog Maintenance
165,277	961,6	1,761.3	809.2	6,396

**TABLE 4: MAINTENANCE BACKLOG ON SADC MAIN ROAD NETWORK
(US\$ MILLION) (Pinard et al, 1999)**

It is necessary to bring the roads back to a maintainable condition as failure to do so inevitably will result in ever increasing road transport cost, impacting negatively on the net cost of the economy of the region and of individual member states. Consequently, existing trade is performed at a very high cost, and instead of promoting development; road transport is actually stifling such development due to its high operational cost (Pinard et al, 1999).

After numerous discussions conducted through workshops under the SADC Transport Protocol and the Transport and Communications Integration Study, the widely held views that:

- Roads are public goods which must, necessarily, be provided free of charge by the State because the mobility they provide is deemed a right by all citizens and
- That the best way to provide roads is through the public administration, were all rejected.

It was concluded that the endemic problems associated with inefficient and ineffective management of road networks – weak programming and budgeting, undue emphasis on force account work, reliance on inefficient plant pools – were all symptoms of a deeper problem. This deeper problem being weak or unsuitable institutional arrangements for managing and financing of roads, together with the impact this has on staff incentives, staff motivation and managerial accountability. It has become apparent that:

Until the institutional framework is improved and a secure source of funding is established, it is almost impossible to overcome the numerous technical, organizational and human resource problems which hamper attainment of efficient and effective management of road networks in the SADC region (Pinard et al, 1999).

To this end, the SADC Protocol on Transport, Communications and Meteorology (SATCC, 1998) is one of the main policy documents behind the policy reform process in the SADC region. The protocol incorporates some of the RMI principles, which are well documented by the World Bank (Heggie and Vickers, 1998).

The protocol stresses the need to commercialize the management and financing of roads to allow them to become self-sustaining and to reduce dependence on outside assistance and protect the investment made.

2.3.3 THE AUSTRALIAN EXPERIENCE

Australia is among the leaders in change management as far as road maintenance is concerned. They have formulated what they call a “Ten-year Contracting Strategy” with the sole aim of achieving the following results:

- To enable Main Roads to focus more strongly on its core business of managing the road network

- To manage and maintain the road network to a standard that meets customer requirements and that
 - Contributes significantly to annual saving that can be re-invested into the road network
- (Logie & Avery, 1998)

The key outcomes of this Contracting Strategy were identified as follows:

- 100% of road maintenance services to be provided through the competitive tendering process
- Eight (8) Term Network Contracts to be established, each of which would of 10-year duration
- Five (5) of the contracts to be fully Outcome Based Contracts commonly called Road Outcome Based Maintenance & Rehabilitation Contracts (ROBMARCs).
- The three (3) remaining contracts to be a combination of Outcome Based and Client Scheduled works.

According to Logie & Avery (1998), the introduction of such strategy was envisaged to deliver a saving of between 15% and 35% in road maintenance cost without compromising on the quality of the works. However, on the down side, Main Roads was to reduce staffing by almost half. It appears such is the trend associated with transformation of this nature. It can be expected to happen. In mitigating such redundancies, those affected would either be deployed to

successful contractors or re-trained in order to better prepare them for the change.

Essentially, what can be learnt from the Australian experience is that the traditional role of Main Roads changes from that of being a provider and builder of roads to a manager of the road network. This paradigm shift appears very essential in realizing efficiency in the provision and management of assets. To this end, Cloete (2001), enlist the following as reasons why organizations outsource, namely;

- To improve business focus
- To reduce or control operating costs
- To free resources for other purposes
- To improve business flexibility, to name but a few of the reasons to outsource.

In order for the strategy to succeed, the private sector has to play a pivotal role in providing a significant amount of personnel and high quality services to Main Roads. On the other hand, Main Roads has to shed excess personnel, and sell surplus plant, equipment, land and properties. That is one way in which the above-stated reasons for outsourcing could be realized (Logie & Avery, 1998).

The focus of this treatise is Road Maintenance Management which is a three-tier system comprising the following; **asset ownership**, **asset management** and **maintenance service delivery**. Asset ownership continues to be a Main Roads

function, which essentially includes direct and full responsibility for managing the road asset and long term planning. Asset management on the other hand, while principally undertaken by Main Roads, can have some components, such as short-term planning, design and scheduling for maintenance treatments transferred to the private sector, through a competitive tendering strategy. In addition, maintenance service delivery, which for a long time had been performed using in-house and publicly tendered contracts, would be transferred to the private sector. The key results of the Term Maintenance contracts have been:

- Creation of a robust, local road maintenance industry
- Improved database of maintenance history
- Acceptance within Main Roads of the ability of the private sector to deliver a quality road maintenance service.

Furthermore, Logie & Avery (1998) contend that the concept of ROBMARCs has been used widely in other parts of the worlds as well, albeit called by different names such as Total Facility Maintenance Contracts, Asset Management Contracts, or Outcome Based Contracts. In the road industry, such contracts are commonly referred to as Performance Specified Maintenance Contracts (PSMCs). The State of Virginia Department of Transport (VDOT), for example, awarded a PSMC to a private contractor way back in 1997. The offer was made after a careful evaluation of the benefits and costs of two unsolicited offers. VDOT expected a 15% saving on its maintenance costs. New Zealand, on the other hand, called for expressions of interests for two ROBMARCs in 1998.

These were to be awarded for the State Highway as well as for the Auckland Harbor Bridge. The experience of the Rail Access Corporation, New South Wales had been that the cost to administer the Outcome Based Alliances has reduced to 3% of the contract value from 10% to administer the previous schedule of rates type of contract due to the adversarial nature inherent in those types of contracts (Logie & Avery, 1998).

Finally, the scope of work covered by the ROBMACs is wide, including all routine and periodic road maintenance, road rehabilitation works, routine bridge and traffic structure maintenance and those improvement works that have a budget of up to \$1.5 Million. The more detailed scope of work includes things such as:

- Asset management including planning, programming and scheduling
- Routine and periodic road maintenance including regulatory signs and road markings
- Routine (non-structured) maintenance of Main Roads' bridges including pedestrian overpasses and underpasses.
- Rehabilitation works
- Minor improvement works
- Call-out and attendance to emergencies.

It has been pointed out, though, that the scope of works shall not include the following:

- Collection of network asset condition data, other than for the contractor's own purposes
- Installation and maintenance of traffic signals, lighting, barrier gates and associated signals and variable message signs, emergency telephones.
- Structured maintenance of bridges
- Maintenance of projects constructed by others and which are the subject of a defects liability period.

2.3.4 IMPACT ANALYSIS

Table 5 lists the impacts on governments of these types of contracts.

Impact	Proposed Approach
Regional development	<ul style="list-style-type: none"> - Contractors will acquire local personnel, equipment and material. - Evaluation criteria to evaluate impact on local employment - Terms & conditions to require Contractors to establish a permanent workforce in the region
Customer focus	<ul style="list-style-type: none"> -Contractors to be required to develop effective working relationships with customer, understand their needs. - Develop, improve & maintain the road network to meet requirements -Main Roads to continue ensuring that customer needs are identified & met.
Market capacity	<ul style="list-style-type: none"> - Main Roads to continue supporting the building of contractors' capacity - Contracts to be staged such as to minimize the impact of capacity constraints - A competitive pool of contractors to be maintained
Loss of expertise within Main Roads	<ul style="list-style-type: none"> - Key skills to be identified & maintained as appropriate - Some loss of skill is an inevitable result of the Contracting Strategy.
Safety of the road user not compromised	<ul style="list-style-type: none"> - Appropriate performance measures to be established & enforced -Contractors to be required to meet or exceed relevant standards.
Political sensitivities and priorities	<ul style="list-style-type: none"> - Contractors to be required to meet performance measures -Any changes to its program will impact on its planning process & outcomes will have a financial impact.

TABLE 5: IMPACT ANALYSIS

(Logie and Avery, 1998)

2.4 CONTRACTOR DEVELOPMENT

2.4.1 INTRODUCTION

Case studies undertaken in five African Countries, namely, Ghana, Lesotho, South Africa, Tanzania, and Uganda, by the United Kingdom's (UK) Overseas Development Administration (ODA) revealed that there currently is no definitive answer to the design of a contractor development program. Experience in designing such programs is currently fragmented and poorly documented. However, it is worth noting that the overriding factor, which seems to be the backbone for the success of such programs, has been the commitment of government. This commitment and support has had to be available at all levels from central government, the Ministry responsible for roads, down to local level.

To this end, Pinard et al (1999) emphasize that it is necessary to obtain the unequivocal commitment to the reform process at the very highest levels of government. If such commitment is not forthcoming, there is little hope of the motivation trickling down through the system. They argue that it is, therefore, necessary to obtain a formal declaration of intent by the concerned ministries to establish a Roads Authority and/or Road Fund to drive the process of change (Pinard et al, 1999).

2.4.2 IMPLICATIONS FOR SWAZILAND

Swaziland, being a developing country, is in dire need of new and improved methodologies of addressing the issues of infrastructure development, especially

that of road construction and maintenance. The various programs undertaken by some of the developing countries, as depicted by the above-mentioned case studies, serve as an eye opener for Swaziland. This research proposes to unleash the potential of using private contracting firms within Swaziland in road maintenance works.

It must be mentioned though that most contractors in Swaziland are small and emerging and as such they need support from both the government and financial institutions if they will grow to play a meaningful role in maintenance management. Again, according to (Stocks 1996) as quoted by Heggie and Vickers (1998), small contractors in developing countries face, among others, the following problems:

- Lack of finance for working capital
- Experience long delays in receiving payments
- Lack of equipment to hire or buy
- Standard contract documents and tendering procedures are complex for them
- Lack of work continuity and
- Continuous lack of financial and business management skills.

There is therefore, a need for contractor development projects whose overall goal is to improve the private sector capacity for undertaking construction and, especially, maintenance projects resulting in a number of beneficial effects for the country concerned, for example increased employment opportunities.

In the contractor development project undertaken in Lesotho, Miles (1996) suggests that five tasks should be addressed when designing a contractor development program, namely:

- Defining the new role for the government road departments and changes that would be required to operate as a contract supervisory agency
- Assessment and planning for long-term market prospects
- Determining the size of the project
- Determining the role of Secondary Institutions e.g. equipment suppliers, financial organizations and trade organizations and
- Training provision.

For a start, such projects could receive some form of International assistance, for example, from the African Development Bank, World Bank and other Funding Agencies. This assistance could either be financial or technical, depending on the needs at the time, so declares (Miles 1996) as quoted by Heggie and Vickers (1998).

To this end, projects to foster private sector involvement have been designed and implemented through international technical assistance with a varying emphasis on financial, training and other support in order to achieve a workable market.

2.4.3 SHADOW TOLLING

Shadow tolls, the per vehicle amounts paid to a facility operator by a third party such as a sponsoring governmental entity or private sector developer, and not by the facility users can be used as some form of financing for road construction and maintenance. Under shadow tolling, the following functions are undertaken:

- Collection of funds from one or more non-user sources by a project administrator
- Administration of such funds and
- Disbursement of the funds to a facility design/build/operate entity.

The funding sources should include “value capture” techniques, whereby beneficiaries of the project contribute in rough proportion to the benefits they receive. Usually shadow tolls are based upon the type of vehicle and the distance traveled. Payments do not begin until traffic begins and thus, an incentive exists for the provider to open the road as quickly as possible.

(<http://www.fhwa.dot.gov.innovativefinance/stchap2.htm>)(Access: 21 Sep.2005)

Shadow tolls “can be an element of a highway finance approach wherein a public or private sector developer/operator accepts certain obligations and risks – such as construction, operations and specifically traffic – and receives periodic shadow toll payments in place of, or in addition to, real or explicit tolls paid by users.” The concept of shadow tolls is particularly applicable to public/private partnerships (PPPs). This is so particularly because it permits the dual

advantages of tax-exempt financing and private sector efficiencies to be realized. A project is typically defined as a PPP when two or more phases of the overall project development/operations process are the responsibility of the private sector. If only one phase is the responsibility of the private sector, then it is often termed “privatization” or “outsourcing”.

(<http://www.fhwa.dot.gov/innovativefinance/stchap1.html>) (Access: 21 Sep. 2005)

The reasons, advanced by the United States’ Federal Highway Administration, that shadow tolls may appeal to governmental units are that:

- Traffic risk can be transferred to a developer/operator
- Traffic levels are not impaired by real tolls or toll increases
- Multiple sources of revenue can be drawn upon to contribute to a shadow toll fund and
- Project cost obligations to the public sector sponsor (capital, maintenance and operations) can be reasonably known in advance and guaranteed for a particular traffic level.

Thus far, eight shadow toll projects have been signed with private consortia in the UK, but have not begun operations yet. However, the use of shadow tolls in Great Britain has been part of a larger program developing PPPs – the “Private Finance Initiative (PFI)” – which has extended across many departments of the Government. In the transportation sector, the PFI has taken the form of “Develop, Build, Finance and Operate” (DBFO) concessions that have actually long been

used to develop projects in various parts of the world, but in all cases thus far, the concessionaires' revenues have been earned through real, user-paid tolls. Because real tolls continue to face strong political resistance, the UK Government has two major objectives in using shadow tolls:

- To obtain better value for money by incentivizing the DBFO company to consider life-cycle cost and
- To cultivate a private sector highway operating industry that will be prepared for real tolls when they are implemented.

Use of the private sector can lead to innovations in construction and financing that would create savings, mainly through speeding up the construction schedule and allowing for earlier openings. Furthermore, since payments are pegged to traffic for the duration of the concession, the company responsible for operations also has reason to ensure that the road will need a minimum of disruptive repairs during that time. In addition, use of a DBFO arrangement can allow the Government to shift economic risks to the private sector. In fact, the UK Highways Agency claims that the contracts signed thus far will shave an average of 15% off of total costs compared to what the public sector would have paid under traditional arrangements. In addition, the Agency claims to be satisfied with the final arrangements to transfer risk to the DBFO companies. However, at the moment, any quantification of savings is arbitrary as it involves attaching net present monetary values to unknown risks.

(<http://www.fhwa.dot.gov/innovativefinance/stchap2.htm>)(Access: 21 Sep. 2005)

Finally, shadow tolls promise to provide an alternative to the usual tolls in that they can be used to the benefit of many a country's transportation industry as a source of funding when real tolls are unacceptable and the project structure requires some or all traffic risks to be borne by a developer. Considerations influencing the viability of shadow tolls for a particular set of circumstances may include, among others,

- The creditworthiness of a project, which is dependent upon the quality, and possibly diversity of the underlying funding sources used to meet required shadow toll payment levels
- Whether tax-exempt interest rates can be obtained
- If shadow toll project debt is issued by a private sector entity, other advantages or incentives may compensate for the taxable interest rates that would prevail
- If traffic risk is borne by the investors, can the higher cost of capital due to this additional risk be justified and
- Shadow tolls can be a method to encourage environmentally or socially desirable goals such as subsidized high-occupancy vehicle lanes on a toll road; with the state paying a portion of the foregone toll on behalf of the motorist, the toll agency can meet restrictive terms of its bond covenant and still implement the desirable improvements.

(<http://www.fhwa.dot.gov/innovativefinance/stchap2.htm>) (Access: 21 Sep. 2005)

2.4.4 PROCUREMENT STRATEGY

In order to effectively implement the envisaged contract strategy, there is a need to have a division of the national road network into a number of manageable networks as was done in the case of Main Roads Australia.

Appropriate standards for maintenance and rehabilitation have to be clearly defined, based on “fit for purpose” and commensurate with the available budget. Roads condition will definitely improve assuming a level of annual funding equal to current levels. What is good about the envisaged strategy is the prospect of a longer-term commitment to maintenance funding (Logie & Avery, 1998).

From the experience of Main Roads, Australia, a three-staged procurement method seems the best option to emulate. This methodology works as follows:

- An expression of interest (EOI): to identify the applicants most suitably qualified to undertake the Outcome-Based Maintenance Contracts
- Short-listing about 3 to 4 applicants: to be invited to respond to the Request For Proposals (RFPs)
- RFPs, which include the specifics of the contract, invite the short-listed applicants to submit detailed proposals including their work plan, staffing, cost and proposed risk allocation.

Logue & Avery (1998) further advise that due diligence and contract negotiation measures be clearly established and exercised if effective contract administration

is to be realized. Further, the award of contracts should be restricted such that not more than two contracts will be awarded to any one contractor or consortium. This is to preclude the establishment of a monopoly in maintenance service delivery and to mitigate the adverse consequences of a contract termination, they contend.

2.4.5 ASSESSMENT CRITERIA & PROCESS

The importance of assessment criteria cannot be overemphasized. They are indispensable in actually ensuring that the appropriate long-term partner is selected for a particular job. The most significant criteria for the EOI, according to Logie & Avery (1998), are the following:

- Relevant experience
- Past contract experience
- Management systems
- Approach to partnering and innovation.

Furthermore, the proposed criteria for the RFPs are:

- Methodology to achieve performance measures
- Personnel
- Regional development
- Risk allocation and
- Cost.

In addition to all this, a formal Quality Plan has to be prepared for the design and implementation of these contracts. Such a plan should define the EOI and proposal evaluation process, document management, probity controls, and the roles and responsibilities of the Assessment Committee and Probity Auditor. Of note here is the importance of having an Assessment Committee with such skills as: independence, technical competence and the ability to assess compliance with Main Roads needs (Logie & Avery, 1998).

2.4.6 CONTRACT ADMINISTRATION

One of the critical success factors of contract management is contract administration. Some of the more important contract management tasks, according to Logie & Avery (1998), are:

- Monitoring the contractor's compliance with the quality plan
- Development of a quality plan for on-going contract management, to include annual review of the results of the contracts
- Assignment of full-time senior managers with appropriate skills to monitor and manage the contract.
- Accessibility to specialist advisors as required, and
- Establishment of a Contract Management Board, to monitor the results of the contracting strategy against its objectives and key performance indicators.

2.4.7 LESSONS FROM SOUTH AFRICA

Horak E. et al (2003) declare that paradigm shifts of significant magnitude are occurring worldwide in the broad field of infrastructure delivery. Traditional methods of road construction and maintenance delivery are increasingly coming under threat and are being replaced with more effective and efficient delivery mechanisms. Many governments around the world have embarked on a course of road authority reform with the objective of improving accountability and efficiency and reducing government involvement in service delivery.

Within South Africa, the National Department of Transport (NDoT) has investigated various innovative ways to meet the need for new road construction and the increasing backlog in maintenance and rehabilitation. Hence the NDoT embarked on a strategic commercialization drive, which culminated in the establishment of the South African National Roads Agency (SANRAL) (DoT, 1996). At the other end of the scale, partnering for the government also meant forging a new relationship with civil society. The NDoT and SANRAL identified road maintenance by contract as an ideal area where small, medium and micro enterprise (SMME) emerging contractors can be empowered (Horak, et al, 2004).

The NDoT and SANRAL never had their own work force looking after routine road maintenance, and instead, they used the various provincial road authorities' routine road work forces prior to the privatization and contracting out. However, the Gauteng Provincial Department of Transport and Public Works (Gautrans),

always had their own workforce and traditionally did their own routine road maintenance (Horak and Emery, 2000).

Gautrans did not opt for converting into a provincial road agency opting instead to establishing the Directorate Construction and Road Maintenance. This Directorate, together with the Gauteng Provincial Department of Transport and Public Works, commissioned an investigation into routine road management. The objective of such an investigation was to achieve improvement of productivity and empowerment of the workforce by exploring the potential of development of SMME's in the form of small contractor development (Horak et al, 2004).

Lessons of note from the South African experience are the following:

- It is possible to convert one's work force to viable contractors in various ways and thus increase productivity and lower costs significantly. The experience elsewhere in the world indicates that there is a clear scope for the promotion of SMMEs and contractor development in a sustainable fashion (Horak et al, 2004).
- An appropriate number of technically qualified staff is needed in a road maintenance division if contracting out or commercialization is considered, (Horak et al, 2004).
- A sound management structure, where in some cases changes in roles means a restructuring of the organization in order to ensure the correct mix of staff skills are present or retained (Horak et al, 2004).

- Appropriate management information systems are in place. Such a functional Maintenance Management System (MMS), which identifies, costs and monitors routine road maintenance work on an ongoing basis and which is used and supported by staff at all levels, is seen as an important support mechanism (Horak et al, 2004).
- Appropriate financial accounting systems and, (Horak et al, 2004).
- Procedures for controlling quality of road works. Quality control systems are in place in most reformed road agencies with a tendency to adopt the ISO 9000 series of quality control system. Standards and specifications of road works, therefore, also need to be converted to enhance control and contracting out practices (Horak et al, 2004).

The most important outcome from the Gauteng case study was the development of the Kubakhi program. This program evolved to a mature level where a management plan was developed which spells out the principles and support philosophy and that was increasingly linked to budgets to ensure stronger sustainability. The focus, as it were, in the Kubakhi program, was on entrepreneurship training and used as part of the selection criteria for participants. Technical training for skills development was also done, even though this did not form part of the main focus to promote entrepreneurship. The Kubakhi program became a vehicle for SMME and Small Business Unit development in the routine maintenance field as well (Horak et al, 2004).

2.4.8 BENCHMARKING

It is standard practice to compare routine activities with those done elsewhere and to compare it to best practices identified (Austroads, 1999) as quoted by Horak et al (2004).

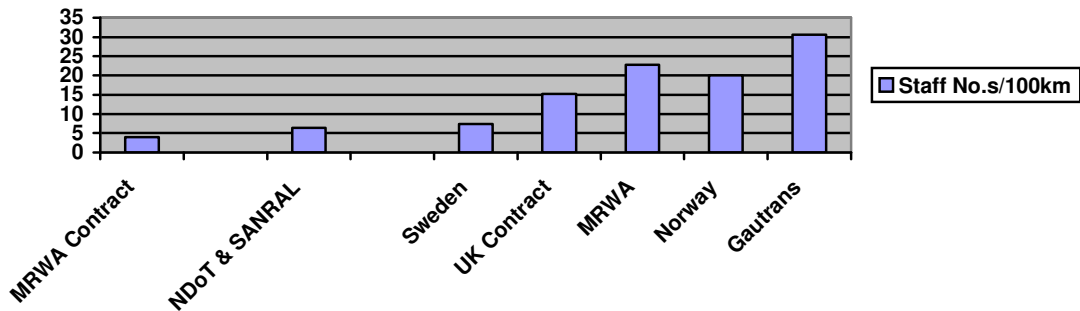


FIGURE 6: STAFF NUMBERS PER ROAD AUTHORITY BENCHMARK

(Horak et al, 2004)

Legend: MRWA=Main Roads Western Australia
MRWE(contract)= Main Roads Western Australia (contract works)
NDoT=National Department of Transport
SANRAL=South African National Roads Authority

As can be seen from figure 6, Gautrans has a high ratio of staff/100 km as compared, say, to NDoT and SANRAL.

When it comes to smooth travel exposure, figure 7 shows just how Gauteng compares with the rest of the world.

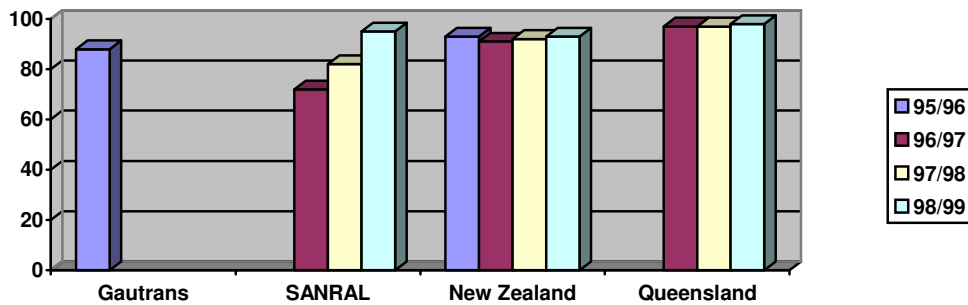


FIGURE 7: SMOOTH TRAVEL EXPOSURE. (Road roughness less than 2.8 HRI) (Horak et al, 2004)

The smooth travel exposure for the users of Gautrans roads was good, but it is not as good as national or international standards. In the case illustrated in figure 7, an Australian measurement (HRI) (Austroads, 1999) was used as the basis for the comparison (Horak et al, 2004). Finally, the comparison of road maintenance effectiveness indicated that Gautrans was notably lower than the road authorities of Australia and New Zealand as illustrated in figure 8.

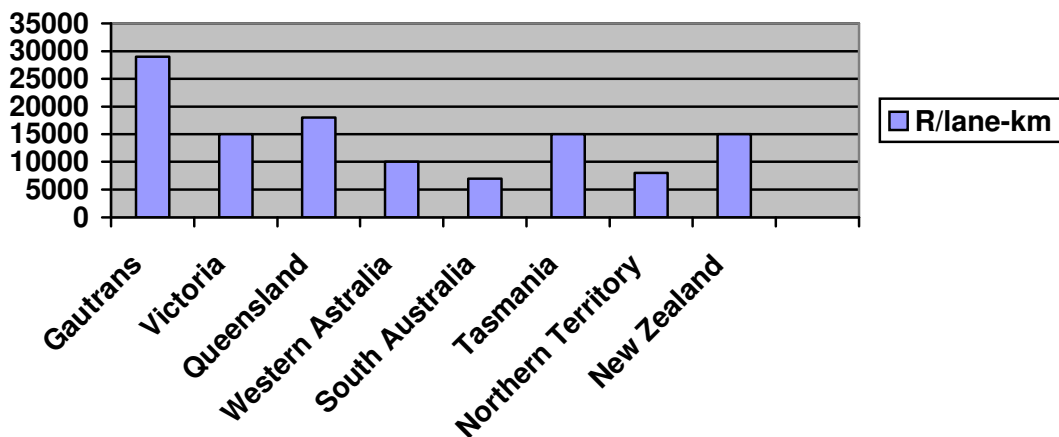


FIGURE 8: ROAD MAINTENANCE EFFECTIVENESS. (Horak et al, 2004)

2.4.9 OPTIONS FOR IMPROVEMENT

Several options for improvement have been developed and are summarized in Table 6.

Option 1	Status Quo of own workforce (Base case)
Option 2	Own workforce-day labour (force account) with improved productivity.
Option 3	Own workforce with improved productivity and reduced administration.
Option 4	Partly Small Business Units (SBUs) and partly own workforce with management support.
Option 5	Complete SBUs with no special support.
Option 6	Contract maintenance (schedule of rates)
Option 7	Contract management and maintenance (typically Performance Based Contract)

TABLE 6: IMPROVEMENT OPTIONS FOR CONSIDERATION

(Horak et al, 2004)

2.4.10 SUMMARY

Having looked at the background of maintenance from the perspective of facility management, worked through case studies conducted abroad and in the Continent of Africa, the following stand out as important observations:

- Globally, Road Departments are seeking ways and means of improving efficiency in maintenance management.
- One strategy so far that has been identified as having the potential in assisting in such improvement is the Outcome Based kind of Contracting (OBC).
- The private sector has a significant role to play in this paradigm shift.
- Substantial savings in maintenance costs can be realized in the application of OBCs
- Capacity building for emerging small contractors needs to be strengthened.

CHAPTER 3

THE DATA AND THE TREATMENT OF DATA

3.1 INTRODUCTION

This treatise examines the impact of privatization of road maintenance in developing countries using Swaziland as an example of how this could be realized.

It also establishes the fundamental relevant issues that needs to be addressed in terms of contractor development strategy as most of the contractors in developing countries are only emerging, small and lacking in capacity to undertaking work of this nature unaided.

3.2 DATA, SOURCES AND METHOD OF COLLECTION

The Ministry of Public Works and Transport has a wealth of information on past contracts for road maintenance works undertaken under its auspices. Such data is readily available in the form of contract documentation and financial records that are compiled annually for the maintenance of the country's road networks. In addition, the Ministry of Public Works and Transport is currently in the process of registering civil engineering contracting firms with the view to improving the quality of work rendered by these firms. The firms are well known and therefore information on them is readily obtainable through their registry within the Ministry.

To this end, data were obtained from the following sources:

➤ INVENTORY OF GEOMETRIC CHARACTERISTICS AND VISUAL ROAD
CONDITION SURVEY – RESULTS AND ANALYSIS

This document presents the total inventory of the assets of the roads under the auspices of the Department of Roads in the Ministry. It also covers the introductory note on the Road Management Systems and Databases in use.

➤ MINISTRY OF PUBLIC WORKS AND TRANSPORT – MEDIUM TERM
BUDGET

This document presents a three-year annual working budget for maintenance work that helps in forecasting and control purposes.

➤ MINISTRY OF PUBLIC WORKS AND TRANSPORT: ROAD MANAGEMENT
SYSTEM – ANNUAL MAINTENANCE AND REHABILITATION REPORT

This document gives an in-depth application of an annual survey undertaken to update the system for purposes of annual budgetary submissions to the Ministry of Finance's - Budget Office.

➤ ROAD SECTOR REFORM IN SWAZILAND.

This is a policy document in line with the Southern Africa Development Community's Protocol on Road Sector Reform in Transport, Communications and Meteorology.

➤ SWAZILAND NATIONAL CONSTRUCTION INDUSTRY POLICY

The government's 25-year National Development Strategy (NDS) has identified the construction sector as a priority area to impact on, in improving the social and economic development of the country. This document takes stock and maps a policy framework for the improvement of the industry's overall effectiveness and efficiency.

3.3 THE RESEARCH METHODOLOGY

As this study is intended to compile and formulate a contractor development program necessary to achieve privatization of road maintenance in Swaziland, it has been necessary, first of all, to undertake a desk study of the existing road maintenance program currently employed by the roads department of the Ministry of Public Works and Transport.

The above-listed documents (section 3.1) are obtainable from the Ministry of Public Works and Transport and were perused for relevant information to assist in the assessment and determination of the current status.

As pertaining to the assessment of the existing contracting firms, their capacity and proposed needs in playing a meaningful role in road maintenance, a questionnaire is to be used in gathering additional information on their status. In addition, verbal interviews where needed, are to be employed in augmenting and complementing the information already gathered from the questionnaire. The

reason for this approach simply being that in Swaziland, there are a lot of emerging contracting firms who may have difficulty in understanding the nature of civil engineering road maintenance work, yet more of them have recently shown some interest in diversification from purely building works and now into civil engineering. The verbal interviews can unlock much information assisting the researcher gain a proper perspective of the different needs of these small and diverse contracting firms.

The participating firms are to be chosen randomly from a sample of those listed in the Ministry's register.

3.4 THE SPECIFIC TREATMENT OF THE DATA BY SUB-PROBLEM

3.4.1 First Sub-problem

The determination and the compilation of the current status of road maintenance in Swaziland.

a) Data needed to address this sub-problem:

Past road maintenance records perused for type of maintenance undertaken, location, name of contracting firm who undertook the works, amount paid for the works, time taken to complete the works, and frequency of the periodic maintenance.

b) Analysis of the data

The data is tabulated to reveal the strengths and weaknesses of the Department, aspects such as, whether or not required funding is available, whether or not allocated funding is utilized for intended purposes and any other trends worth noting e.g. maintenance cost increasing or decreasing, how frequency of maintenance compares with standard requirements, and similar issues. The data was then subjected to further statistical analysis to reveal some underlying trends and meaning to make it possible to draw meaningful conclusions as to the nature of the existing program.

3.4.2 Second Sub-problem

The profiling of existing private sector contracting companies in order to ascertain their capacity and assess their needs for effective participation in road maintenance.

a) Data needed to address the sub-problem is:

The existing contracting firms are to be surveyed for information pertaining to the nature of the works they are currently engaged in, size of their firm, capacity, experience, financial strength, technical expertise, typical problems facing their trade, familiarity with standard contract documents used in civil engineering field and similar issues.

b) Analysis of the data

The data is analyzed by comparing responses to what other case studies, in some developing countries, have revealed about the nature of problems facing emerging contractors. Such comparison aids in gaining access and understanding of the current status of the contracting firms. The data reveal some strengths and weaknesses; the underlying meanings of which is to be exposed and thereby pointing towards common factors that need to be addressed in assisting the private sector to play a meaningful role in road maintenance in the country.

3.4.3 Third Sub-problem

The formulation of a contractor development program for attaining privatization of road maintenance in Swaziland.

a) Data needed to address the sub-problem is:

The data as depicted from the two sub-problems described above is to play a vital role in mapping out the bigger picture.

b) Analysis of the data

The needs of both the Government Roads Department and the private sector contracting companies emerging is to be combined into some snag list for further scrutiny. Certain factors stand out as the most common that need proper

measures to be addressed in order to map out a development program for the contracting firms.

Thus, a program is to be formulated as a means of addressing the pressing issues that are a hindrance towards attaining meaningful private sector involvement in road maintenance in Swaziland.

CHAPTER 4

PRESENTATION AND INTERPRETATION OF DATA

4.1 INTRODUCTION

This chapter covers three main sections namely: the status of the Roads Department's Maintenance, the status of the contracting community and the proposed contractor development programme to address the loopholes and challenges presented by the first two sections.

4.2 THE ROADS DEPARTMENT: MAINTENANCE PROGRAM

The Roads Department of the Ministry of Public Works and Transport is responsible for some 1115 km of paved road and about 3100 km gravel road throughout the Country. This road network has been divided into Main Road denoted (MR) and District Roads denoted just (D). In addition, there are minor roads that are the direct responsibility of the Roads Department, these are Feeder and Access roads found in local communities. Urban roads fall under the auspices of the various Town Boards and City Councils.

Table 7 presents Swaziland's road network categories, which altogether totals about 5 000 km including both gravel and bituminous surfaced roads.

Item	Paved (km)	Unpaved (km)	Total (km)
Main Roads	850	600	1450
District Roads	65	1540	1605
Urban Roads	200	188	388
Feeder Roads		1500	1500
Total	1115	3828	4943

TABLE 7: SWAZILAND ROAD NETWORK (Roads Department, 2005)

Maintenance of this national asset is crucial to the overall operations of the Department hence the following Mission, ***“To provide, maintain and improve a safe, reliable and environmentally sustainable road network that will stimulate socio-economic development, job creation and reduce road user costs”***, guides the Roads Department.

4.2.1 ADMINISTRATION

Management of the Department comprises of the following: Head Quarters, Districts Units and, finally, Maintenance Units that are spread out across the country.

(Appendix 5).

4.2.2 MAIN PLANNING PROCESS

The planning process for Government projects involves four main parties, namely the Ministry of Economic Planning and Development, the Ministry of Finance, the concerned Ministry (in this case the Ministry of Public Works and Transport) and then the Legislative arm of government i.e. Parliament through appropriation sanctioning.

The Ministry of Economic Planning and Development ensures that any developmental project undertaken by government agencies is in line with national strategy lest there be divergence of efforts which might prove counter-productive.

The Ministry of Finance, on the other hand, sources funding for government projects from either the treasury or international funding agencies and monitors the processes on a sound monetary and fiscal basis.

The Ministry of Public Works and Transport undertakes the detailed planning for the execution of major works that have received government sanctioning. The process starts with the planning section of a particular department. The Ministry of Public Works and Transport has four main departments, namely: the Roads, Buildings, Meteorology and Transportation.

4.2.3 SECTIONS IN THE ROADS DEPARTMENT

There are three sections under the roads department: planning, construction and maintenance.

The planning section is responsible for the planning of all new works to be undertaken by the department from Inception, Conceptualization, Feasibility,

Design and Documentation and up to Tendering. The Construction section deals with the management of all on-going construction projects. The Maintenance section plays a supervisory role on the management and general implementation of maintenance programs. Feedback is given to Planning from the other sections as work progresses. For example, maintenance updates planning on expenditure incurred while maintaining the road infrastructure so as to inform planning of any red flags that might pin-point the need for upgrade requirements, motivation for budget increases or any other related requirements.

Once the need for a new project has arisen, for example, the Department undertakes preliminary investigations to verify the propensity for admissibility with government overall developmental goals by inter-alia looking at the National Development Strategy (NDS) which is government's road map for development for the next 25 years. Once top management deems it fit for further investigation, the planning section then proceeds with its functions.

Projects are scrutinized to estimate their magnitude. With small projects, an "in-house" team of design professionals starts to perform the necessary planning, investigations and design. "In-house" construction units would, once funding has been sourced, undertake the implementation of the project.

For major works, consultants are engaged to do the feasibility and detailed designs to enable proper estimation of construction costs. This is desirable because such major works often necessitates the sourcing of funds outside of government coffers. The funding agencies, usually, demand detailed feasibility studies and cost estimates based on detailed designs before they can release funding for such works. Furthermore, in the interest of efficiency and effectiveness, most governments the world over, are using private consultants more and more in the delivery of such major infrastructure developments. The private sector has proved to be efficient in this regard. The in-house team of

professionals then work on a “project management” basis seeing to it that work gets done in time, within budget and at the desired performance or quality.

Once the team of specialists have finished their investigations, preliminary designs and estimates, they submit a report to the client Ministry for deliberations to map a way forward. It is at this juncture that the Ministry would either give a go ahead to detailed designs and documentation or refocusing the whole process in a different direction depending on the preliminary findings. Should the study yield a feasible solution, detailed designs are begun in earnest which culminates in detailed designs including detailed drawings, specifications, a model contract document and cost estimates. These are used by the Ministry as a basis for the application for capital expenditure from government.

The Ministry submits the application with the Ministries of Economic Planning and of Finance. A budget committee, comprising all the relevant departments and Ministries, deliberates on the submitted requests in the light of the government’s current and future expenditure forecast. Allocations are made and a national budget is compiled, which is submitted to cabinet for deliberation and submitted to Parliament for sanctioning. Once the whole process of approval has been obtained, procurement can begin.

It is at this stage that the maintenance budget is allocated to the deserving road projects for the upcoming year’s maintenance program. To aid the process of allocation of funds, a Road Management System is utilized to inform the planners on how best to distribute the allocated funds.

4.2.4 ROAD MANAGEMENT SYSTEM

The Road Management System (RMS) annually provides information required for the strategic planning of the maintenance, rehabilitation and upgrading actions.

To improve the selection process of economically viable road maintenance, the Department relies on the output from the RMS, which is staffed by trained

assessors. The assessors carry out an annual visual condition survey for the entire network, feed results into the RMS, process it and then a report is printed for use in the strategic planning of maintenance works. Some of the items addressed by the RMS include items like; cracking, rutting, deformation, raveling, etc.

Strategic level analysis using the Highway Development Management 3 (HDM-III) and pavement deterioration models within the Deighton Total Infrastructure Management System (dTIMS) software provides, among others, the following:

- Identification of historic road condition trends
- Motivation for funding to maintain the road network
- Predictions of the future economic consequences of the expected funding
- A preventative maintenance and rehabilitation programme.

As an example, table 8 is an abstract showing some trend emerging from the application of the RMS for two consecutive years.

RMS – 2004 REPORT	RMS – 2005 REPORT
<ul style="list-style-type: none"> ➤ Over the past 2 years, proportion of roads in good condition has remained unchanged. ➤ Average 5-year annual budget for Current Scenario stood at E63.8 million. ➤ Average 5-year annual budget for Minimum Standard stood at E98.8 million ➤ Average 5-year annual budget for Optimum Standard stood at E110.2 million ➤ The current total replacement asset value is E2.52 billion. 	<ul style="list-style-type: none"> ➤ Projections over next 5 years indicate substantial deterioration. ➤ Average 5-year annual budget for Current Scenario stands at E94.6 million ➤ Average 5-year annual budget for Minimum Standard stands at E177.6 million ➤ Average 5-year annual budget for Optimum Standard stands at E267 million ➤ Total replacement asset value is estimated at E3.439 billion.

TABLE 8: TWO-YEAR COMPARISON OF RMS APPLICATION

What stands out clearly from this comparison is the fact that, the more the maintenance funding falls short of the required amount to maintain the network to minimum standards, the more it will cost to rectify the situation, as indicated by the projection from E98.8 million to E177.6 million.

The total increase replacement asset value of about E1 billion is due to additional capital projects that have since been undertaken which have dramatically increased the asset portfolio. Unfortunately, funding has always been a problem. In recognition of this, the Consultants that have been employed by the Department to run the system have tabled three different funding scenarios as shown in table 9.

Current Funding Scenario	Minimum Standards Scenario	Optimal Funding Scenario
<ul style="list-style-type: none"> ➤ Subjective funding scenario determined by the planning section based on available funding, e.g. 2005/2006 is E 94.6 million ➤ May change from year to year depending on allocated funds. ➤ This will cover the following; blading, regravelling, reseals & rehabilitation. 	<ul style="list-style-type: none"> ➤ Aims to determine the minimum required funding levels to ensure that all roads comply with minimum standards over a 20-year period. ➤ Requires an average annual budget of E 177.6 million over the next 5 years. ➤ The entire network is maintained by selecting the most cost-effective maintenance strategy on each road, whilst adhering to minimum standards. 	<ul style="list-style-type: none"> ➤ Aims to determine the unconstrained funding level where all roads are maintained to generate the maximum benefit for the road users and the Department. ➤ Requires an average annual budget of E 267 million over the next 5 years. ➤ All roads are maintained using the most cost-effective maintenance strategy.

TABLE 9: FUNDING SCENARIOS (Africon Swaziland, 2005)

Table 9 clearly shows that there is a shortfall in funding allocated to current maintenance. This trend, however, has been similar for the past couple of years and there are no signs of change in the foreseeable future as long as funding comes from the common pool. Particularly worrying is the fact that the length of paved road has been gradually increasing in the past couple of years, yet the maintenance budget has remained stagnant. Soon, the network will deteriorate to

such a point where it will be extremely expensive to maintain as a result of the backlog.

Figure 9 shows how the value of an asset (in this case a roads) deteriorates with time when maintenance funding is deficient.

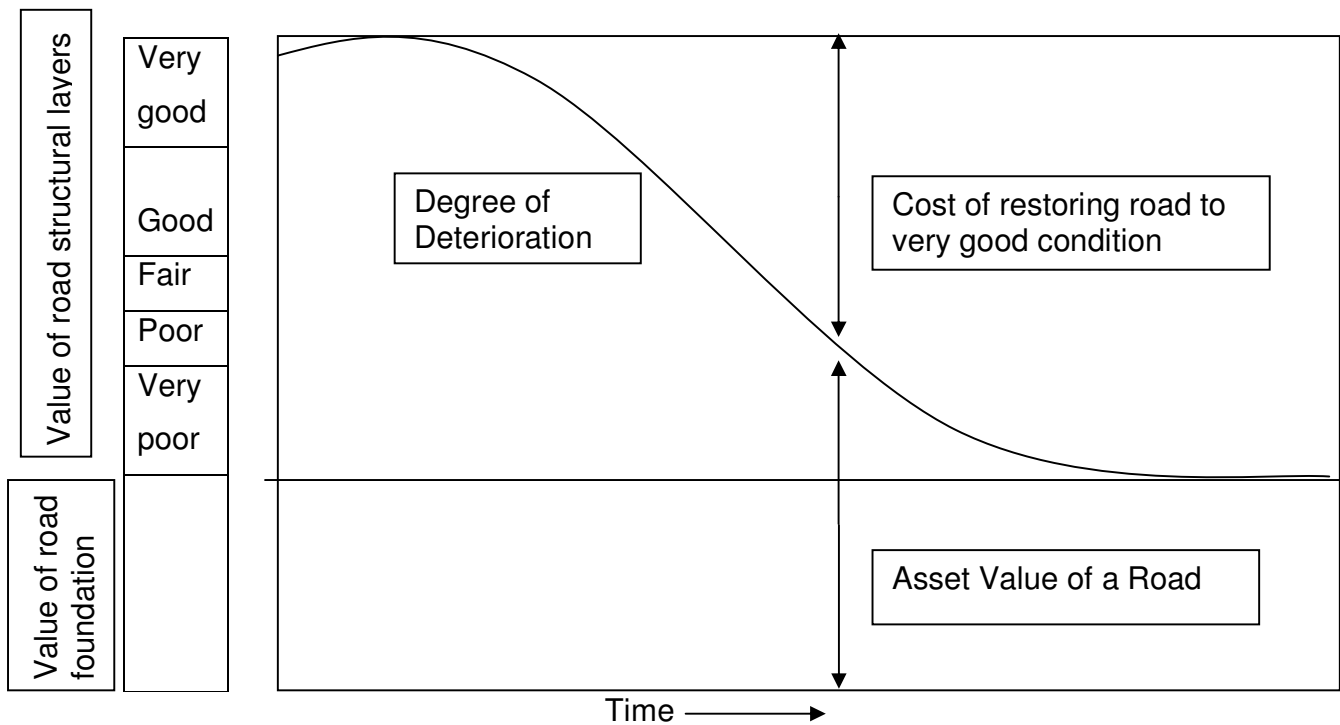


FIGURE 9: ASSET VALUE (Africon, 2005)

Asset value is a measure of how well a network is preserved. For paved road, this comprises of the following:

- The cost of the ground preparation work and
- The cost of the road structure (paved layers and ancillary works).

For unpaved roads, it comprises of the gravel wearing course and foundation layers. As roads deteriorate, the structural layers or gravel material decreases. The current asset value of the road is the value if it were new less the cost of taking present condition to very good condition. According to the latest RMS report, the current asset value of paved roads in Swaziland is E 3.287 billion

while the current asset value of unpaved roads is approximately E 152 million. This is almost half of Government's annual budget. This figure though excludes bridges, culverts, road signs, etc.

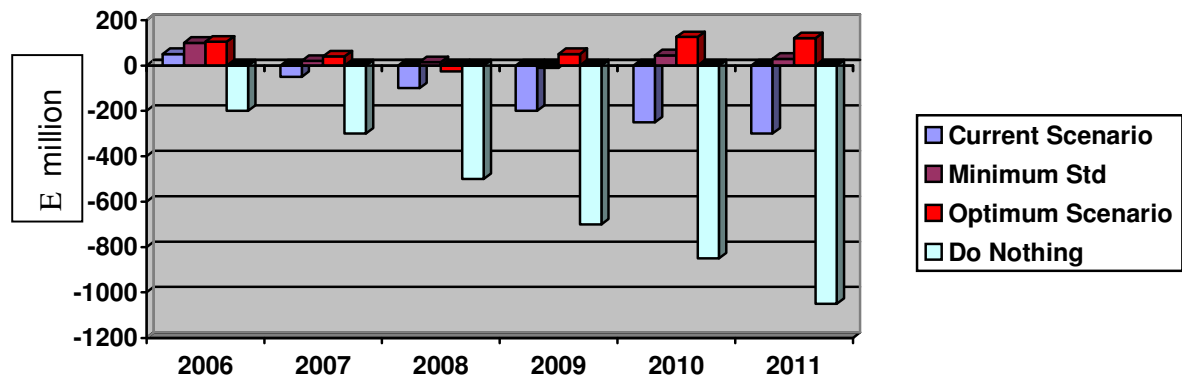


FIGURE 10: FIVE-YEAR MAINTENANCE PREDICTION

(Africon, 2005)

The asset value shown in figure 10 includes value added by upgrading some unpaved roads to a paved standard.

It is apparent from figure 10 above that for the Current Scenario, there will be a loss in asset value of some E250 million (7% of the current asset value) on the combined paved and unpaved road network in the next 5 years. On the other hand, the Minimum and Optimum standards Scenarios will increase asset value by about E40 million and E100 million respectively.

Finally, Africon (2005) highlights the following observations:

- The proportion of the surfaced road network that does not comply with minimum standards has increased from 2.5% in 2003 to 7.3% in 2005.
- With the current funding, the proportion of the paved network not complying with the minimum standards will increase to almost 40% within the next 10 years.

- The current funding will not be adequate to fully comply with the minimum standards on unpaved roads.
- The current funding will result in a loss in asset value after 5 years.
- However, if the funding necessary to achieve minimum standards is received, the potential savings in vehicle operating costs on the road network could be substantial over the next 5-year period.
- By not increasing the funding, the road users are ultimately paying the price and economic development is hindered.

In a nutshell, current funding is not satisfactory to meet the maintenance needs of the country's road network. Hence, the first hypothesis is supported.

4.2.5 MAINTENANCE RECORDS

Table 10 is an extract from the Medium-term Recurrent Budget for three consecutive financial years 2004/5 to 2006/7. While the total budget is increasing from year to year, such an increase is not easily predictable. Furthermore, Head Quarters takes up the largest portion (81.0%) from this budget, and this mainly for personnel costs. The District Units and Construction Units, which at the moment are supposed to be carrying out most of the maintenance works, are getting a paltry 15% of the budget. No wonder the infrastructure is rapidly deteriorating for lack of funding.

Category	2004/5 E 000's	2005/6 E 000's	2006/7 E 000's	Average Percentage
Head Quarters	106,340	147,193	144,975	81.0
Training Center	1,986	1,304	1,435	1.0
District Units	13,986	15,385	16,923	9.5
Construction Units	8,239	9,063	9,970	5.6
Bitumen Unit	2,018	2,204	2,424	1.4
Bridge Unit	376	677	1,218	0.5
Sign Factory	889	978	1,076	0.6
Pipe Factory	289	318	349	0.2
Total	134,123	177,122	178,370	99.8
% Increase		32.1	0.7	

TABLE 10: THREE-YEAR MAINTENANCE RECORD BY CENTRE (MPWT, 2004)

The overall maintenance budget is set to increase annually for the next three-year period under review. However, there is no predictable percentage increase in the funding available from year to year. It would appear that, the increase is based on the previous year's budget whereupon a small and arbitrary percentage increase is then applied. There is no relation of this budget to the RMS's findings whatsoever. However, for the Roads Department to function effectively and efficiently, it is imperative that the output from the RMS should inform the budget process as best as can be, and must be reflected thereon; otherwise, the projections so illustrated in section 4.2.4 will become a reality and thus accelerates the deterioration of the Country's road infrastructure.

Table 10 also shows a declining support or commitment on training. This is an unfavorable condition indeed since this goes against the sentiments as espoused in the Road Sector Reform Initiative of the Ministry. Training, according to this initiative, must play a pivotal role in assisting the Ministry's personnel earmarked for downsizing get some reorientation. Such personnel, has to be trained in entrepreneurial and business skills, assisting them to start their own businesses as the reform process unfolds.

Finally, it appears that the budgeting process is unpredictable, and as such, no proper planning can be formulated to efficiently allocate the resources in undertaking the maintenance management of the Country's road infrastructure. This is further proof that the current maintenance-funding plan is deficient in

addressing the maintenance needs of the Roads Department; hence, some adjustments are needed.

4.2.6 PROCUREMENT AND DOCUMENTATION.

Having looked at the inventory, the current structure and internal operations of the Roads Department, it is fitting to conclude this section by taking a look at the current procurement method in use for service acquisition. This will serve both as a base and a departure point for proposing a better system geared towards improving maintenance management. Currently, different procurement documents are in use.

Professional services

For new and major works, first to be prepared and disbursed is the Request for Proposals (RFP) seeking consultancy services for feasibility studies, design and documentation and supervision of the works.

The Ministry only prepares the scope of works to be used as a guide by those seeking to prepare and submit proposals. Aspects like date and time of submission, technical and professional requirements, grading system for successful proposal etc. usually attached to assist the consultants to prepare a sound and competent proposal.

The professional services usually required include items like geotechnical services for ground condition assessment and soil characteristics identification, topographical surveys, feasibility studies, architectural services, engineering, quantity surveying and many more.

Construction and Maintenance

Currently, most construction works involve either the upgrade from gravel standards to bitumen surfaced standards or re-gravelling of rural main and

district roads. Most of this work involve huge amounts of money, and is funded either through capital budget or a combination of Government and Donor funding. The standing policy, at the moment, is to have only competitive bidding when undertaking works of this nature.

The scales however, tip in favor of the large Contractors who are well established and have the necessary expertise, experience and capacity. Most of the emerging small Contractors find that they have to confine themselves to road reserve maintenance works. All they have ever done has been grass cutting, drainage cleaning, removal of litter etc.

In addition, for the construction and maintenance works, the widely used documents for procuring services from contractors are the standard contract documents. Such documents, in all likelihood, are based on some industry wide standard documentation with standard clauses governing the relationships between the various players in that particular field. The predominant ones in road construction are COLTO/CSRA and FIDIC. These documents are usually modified slightly to cater for very specific project conditions and client/contractor relationship. Most emerging contractors have very little knowledge of and experience with these documents.

4.2.7 TENDER PROCESSES AND PROCEDURES.

Currently, the Ministry employs three main methods in soliciting tenders. These are competitive bidding, pre-qualifications and negotiating with specialty contractors, depending on the nature of the works to be undertaken.

Before a strategy is utilized for acquiring the services of any of the prospective bidders, the following issues are scrutinized in order to present a clear picture as to which method would best yield the desired result:

- Complexity of project demands an experienced contractor

- Size in monetary value demands a well established company with a good track record of successful completion of big jobs
- Budgetary constraints necessitating a contractor with manageable overheads etc.

The process commences soon after the professional team has submitted their final design report, which contains the standard contract documentation. Invitation for bids is issued to all prospective bidders via the newspapers in the case of competitive bids or sent to a selected number of pre-qualified contractors, in case of specialty works. Under normal circumstances, government allows for a three months tender period which provides all prospective bidders with enough time to study the contract documents, ask clarifying question and prepare their best offers to undertake the works.

All prospective bidders are issued with copies of the contract documents upon payment of a non-refundable deposit that covers the production cost of the copies. Completed tender documents, specifically the bills of quantities and tender form are submitted by a certain date and time stipulated in the information for bids. Any tender that arrive late is automatically disqualified.

Opening of the tenders in the presence of all who tendered follows immediately after the dead line for submission and their bottom line bid price is read out.

Following such an opening, the bidders are notified that evaluation and adjudication of the submitted bids would immediately commence and upon completion the successful bidder would be invited for negotiations. They are also reminded about one of the important disclaimers almost always included in the tender documentation i.e. "...government is not obliged to accept the lowest or any tender at all".

The responsible team, either client or design professionals or both, then undertakes the evaluation processes. Arithmetic errors are rectified and whichever bidder needs to be consulted for concurrence is consulted. The technical and financial qualifications are then ascertained and the bidders are ranked in a certain order for the opening of negotiations.

Once the negotiations are successful, the other bidders are informed that the client has concluded a contract with the successful bidder and the process comes to an end.

This whole procurement process unfolded in this section is somewhat laborious, time consuming, costly and cumbersome to many an emerging contractor. Currently, it is a process suits well-established contractors that have experience, capacity and are financially stable. The small contractors are extremely disadvantaged.

4.3 CONTRACTING COMPANIES

4.3.1 INTRODUCTION

The Government of the Kingdom of Swaziland, through its 25-year National Development Strategy (NDS) has identified the construction sector as a priority area to impact on improving the social and economic development of the country. In recognition of this, there was a need to develop a sound national policy framework for the industry to improve its overall effectiveness and efficiency. Fundamental to the policy and in line with the NDS, would be the empowerment of local Swazis within the industry to maximize their participation and consequent impact on the local economy.

In April 2002 a Construction Industry Policy document was produced. According to this policy document, as far back as 1993, the Government, through the then Ministry of Works and Construction (now the Ministry of Public Works and Transport) took the initiative to organize the Southern Africa Construction Industry Initiative (SACII) on behalf of ten countries of the Southern Africa Development Community (SADC) region. The overall objectives of the initiative, at that time, were to:

- Identify constraints to the development of local construction industries in each participating country within the region
- Identify specific policy reform to improve an enabling environment for local construction industry growth and development and
- Implement reforms in member countries with government and donor commitment to local construction industry development.

In general, the main aim of the initiative was to create work opportunities, develop local capacity and empower indigenous companies in the construction industry. While Swaziland has remained an active member of the regional Initiative and the subsequent Southern Africa Regional Construction Industry Council (SARCIC) that was formed to drive the construction industry within the SADC region, it has nonetheless fallen behind in fulfilling some of the fundamental reforms required as part of the Initiative. (Swaziland National Construction Industry Policy, 2002)

The policy framework has come about as a result of a joint effort between the public sector, led by the Ministry of Public Works and Transport, and the private sector through a steering committee set up to coordinate the effort. Key stakeholders in the industry were tasked to oversee the policy development and implementation process.

In addition, and in line with the overall mission of the Ministry, the overall vision for the construction industry in Swaziland is: ***“To maximize local participation”*** and is guided by this mission statement ***“To empower Swazis and develop local capacity to create a vibrant self-sustaining construction industry”***

Finally, while in the past Government’s role has been to act as regulator and, in some cases, provider of physical infrastructure, the focus now is changing to that of policy and strategy formulation and regulating the industry with a reduced direct involvement in the provision of infrastructure and services. This implies that the capacity of the local private sector be developed to undertake some of the services previously carried out by Government. To this end, the policy recognizes the need for:

- Improving the competitiveness of the local construction industry through capacity building and training
- Promoting the use of local labour within the industry
- Encouraging the increased participation of women in the industry to redress the gender imbalances and
- Promoting the local manufacture and use of construction materials.

To this end, the Roads Department then called upon small and emerging contractors to submit company profiles which would form a data bank from where categorization could be formulated assisting the department in breaking down the work to suit most small contractors. Section 4.3.2 gives an overview of the contractor registration and categorization.

4.3.2 CONTRACTOR REGISTRATION AND CATEGORIZATION

The Roads Department has a database of all the Contractors who have an intention to undertake some of the projects on offer at the Department. Prospective Contractors are required to submit a company profile that states or demonstrates, among other issues, previous work experience, expertise, human resources capacity, plant and equipment owned, value of work undertaken thus far, etc. It is from this information that the Contractors are categorized as shown in Table 11.

Specialty	No.	Category	Value of work (E'000)
➤ Specialist work only.	3	1	>20,000
➤ Specialist work only.	3	2	>10,000
➤ Maintenance work. ➤ Specialist's projects in areas where there is little expertise in lower categories. ➤ Not eligible to tender for routine works such as pothole patching, fencing, etc.	2	3	>5,000
➤ Specialist's project where there is sufficient expertise and experience. ➤ Not eligible to tender for routine works such as pothole patching, fencing, etc.	7	4	>1,000
➤ Specialist's project where there is sufficient expertise and experience. ➤ Eligible to tender for all road reserve maintenance contracts.	13	5	>500 but <3,000
➤ Entry level, only road reserve maintenance.	83	6	<500
Total	111		

TABLE 11: CONTRACTOR REGISTRATION (*Appendix 2 contains a complete list of the Contractors.*)

Of note from table 11 is that contractors in categories 1, 2, and 3 constitute some 7% of the total number. These are essentially well established contracting companies with the necessary expertise and experience in undertaking work of a specialist nature. They are thus limited, in so far as the value of work they can tender for; so that they do not, unfairly, push the emerging contractors out of business.

Category 4, which constitute about 6% of the total available contracting companies, is also restricted in as far as competing with the lower category contractors is concerned when it comes to routine maintenance.

Category 5, can easily be called the lower middle group and constitute about 12% of the total population of registered contractors in the department's registry. This category, together with category 4 seems to represent the target group in as far as developmental work is concerned. This is where a mixture of some expertise, entrepreneurial aspirations and potential are found. These two groups constitute the bulk of the small and emerging contractors who have, at least, been exposed to some road maintenance. They can thus present a better picture of the status, the strength, the weaknesses, and the opportunities inherent in mapping a way forward as far as the re-positioning of maintenance work is concerned.

Category 6, while constituting the majority, i.e. 75% share, is mostly only “one-man” shows. This category, at best, represents pure ambition, which can either grow or just plainly fade away as soon as it emerges. At worst, it represents a mere attempt at getting rich fast. In this research, focus mainly is on categories 4 and 5.

4.3.3 STATUS OF CONTRACTING COMPANIES

A questionnaire (sample questionnaire included as appendix 1) was sent out to a randomly selected sample from the list of small contractors. The questionnaires were sent to almost 30 contractors the majority of which were of category 4 and 5 but with a few from category 6. Thirteen of these companies responded in time to have their input influence this Treatise. Two responded after the results had been compiled and analyzed. In short then, the response rate was about 43%. The questionnaires yielded the following results herewith presented in the next couple of pages:

Table 12: Summary of the Results on Contractor Survey

a) The Company Profile

%Local Shareholding	Years in Business	Schedule of Staff & Workers (Number)						Highest Qualification	Highest Value of Work (E'000)	Duration (Months)	Owned(O)/Hired (H)/Intension to Buy(IB)	
		Technical	Clerks	Artisans	Semi-skilled	Un-skilled	Total Workers				Plant	Equipmnt
		Local Foreign	Local Foreign	Local Foreign	Local Foreign	Local Foreign						
4	3	1	-	-	1	1	3	Dip. Construction	1200	18	O	O
4	3	-	-	-	-	1	1	O' Level	20	24	-	O
4	2	1	1	2	4	8	16	Certificate III	72	1	O	O
4	4	2	1	3	4	10	20	Dip. in Business Studies	1900	18	O+H	O
4	2	-	1	1	1	1	4	-	1911	4	O+H	-
4	4	1	1	1	1	-	4	Diploma	800	12	O+H	-
4	3	2	2	2	2	22	30	Certificate in Mechanical	905	18	O	-
2	4	12	2	3	9	24	53	Grade Test	4000	24	O	-
4	2	1	1	1	2	10	15	-	900	18	-	O
4	4	2	1	1	4	8	16	Dip. Civil Eng.	4572	6	O+H	-
4	3	3	1	10	5	5	24	Dip. QS	989	18	-	O
4	4	2	1	2	4	6	15	Diploma	650	12	O+H	-

b) The Plant & Equipment (either owned, hired or intended to be bought)

LDV(s)	Tractor(s)	Grader	TLB	Rollers/ Compactor	Mixer	Truck(s)	Water Tanker	Excavator/ Backhoe	Miscellaneous Hand Tools
X						X			X
									X
					X				X
X	X								X
X		X	X			X	X		
X		X	X				X		
X									X
X						X			X
								X	X
X		X		X		X	X	X	
X	X								X
X			X	X	X	X			

Miscellaneous Hand Tools: Slashes, Brush Cutters, Bush Knives, Jackhammers, Chain Saws, Rakes, Shovels, etc.

c) Contracting

Familiarity with Contract Documents & Terminology						Familiarity with current Tendering Process	Won any Tender Yet? 1=No 2=Yes	Payment Experience 1=Always late 2=Most of time late 3=Mostly on time 4=Always on time
FIDIC	COLTO	CSRA	BOQ	Tendering	Labour Based Methods			
3	4	4	4	4	3	4	2	2
1	1	1	1	4	1	2	1	-
1	1	1	1	4	4	4	1	-
3	4	4	4	4	4	4	2	2
3	3	3	4	4	4	3	2	1
3	3	3	4	4	4	4	2	1
2	2	2	2	4	4	4	2	2
2	2	2	4	4	4	4	2	2
1	1	1	4	4	4	3	2	1
4	4	4	4	4	4	3	2	1
1	1	1	1	3	2	3	2	2
1	4	3	4	4	4	4	2	2

1= Not familiar 2= Sort of not familiar 3= Sort of yes familiar 4=Quite familiar: **FAMILIARITY WITH TERMINOLOGY.**

1= Poor 2= Moderate-understanding 3= Fair 4=Quite Good: **FAMILIARITY WITH TENDERING.**

d) Financing & Access to the Market

Need of Financing before Payment	Financing Easily Obtainable?	Reasons for Difficulty in Obtaining Funding				Solution to Market Access				
		1=No 2=Yes	1=No 2=Yes	Lack of Collateral	High Risk of Failure to Service Loans	Instability of the local Construction Industry	Other Reasons	Amalgamation		Proportioning of Available Jobs to Satisfy everyone
2	2	-	-	-	-				X	
1	-	X		X					X	
-	-	-	-	-	-				X	
2	2	-	-	-	-				X	
2	1		X	X	<i>Gov Involved*</i>	X				
2	1		X	X	<i>Gov Involved*</i>	X				
1	-	-	-	-	-		X			
1	-	-	-	-	-	X				
2	1				<i>Gov Involved*</i>				X	
2	2						X			
2	1		X						X	
1	-	X		X		X				

Summary of Additional Comments

1. Re-Tendering without stating reasons should be done away with; otherwise Tenderers must be refunded their deposits.
2. Privatization can help reduce tender period and payments should be timely.
3. Give every company a chance to work and instead of disqualifying them, give them assistance.
4. Transparency, accountability and professionalism should rule the day in the Tendering process.
5. Favoritism should be expunged and Government Officials should not be involved in the same jobs they are supposed to monitor.
6. Cost savings could be realized in that the private sector can recover cost of damage as a result of negligent driving from those involved in accidents.
7. Joint Venturing of small locally owned companies with experienced contractors can develop capacity of local contractors.
8. An independent body free of interference must be set up to verify that all works paid for have actually been completed to the required standard.

The following observations stem from table 12:

Table 12 (a) & (b)

- Over **90%** of the small and emerging contractors are **locally owned** (1st column).
- The average age of these companies is **3.46 years**
{Ave=(3yr*4co)+(1.5yr*3co)+(5yr*5co)}/12 (2nd column).
- Of the locally owned companies, the majority of their employees are either Artisan, semi-skilled or just plain unskilled. Almost one-half (**1/2**) of the labor force is **unskilled** (3rd column).
- Of the technical staff, only about one-third (**1/3**) have **qualifications relevant** to the construction industry (4th column).
- Almost **90%** of these randomly sampled contractors are in the range **categories 4 and 5** (5th column – highest value of work is between E500, 000 and E3 million).
- The simple **average duration** of the projects was **14 months** (6th column).
- While most of these contractors own some kind of equipment, the majority relies on plant-hire in undertaking some of their works.
- The type of equipment **they own** comprises the following: *Light Delivery Vehicles (LDVs)*; **trucks**; and a host of **miscellaneous hand tools** mainly slashes, brush cutters, bush knives, rakes, wheel barrows, etc.
- Finally, almost all of these contractors **do not own** the necessary **plant** like tractors, Tractor Loaded Backhoes (TLBs), Rollers/Compactors, Excavator/backhoes and water tankers.

It would appear that most of these contractors are small, emerging, lacking in expertise, skill and experience. Furthermore, they are lacking in equipment and plant.

Table 12 (c) and (d) reveal the following additional observations:

- While most of these contractors are familiar with some of the fundamental terminology in construction such as Bill of Quantities (BOQ), Tendering and Labor Based Methods, many of them are not so familiar with the mostly used standard contract documentation.
- Almost all of the 80% of them that have at least won a tender with Government reported to have experienced delays when it comes to receiving payment for services rendered.
- About 60% of those that have won a tender indicated that they actually had, had a need of some financial assistance in carrying out the works before they got paid.
- From those that had sought for financial assistance, about 57% disclosed that getting financing was not easy owing to a host of challenges. Chief among these challenges was instability of the local construction industry, followed by lack of confidence (on bank's side) of funding works where Government is the client, because Government is prone to late payment.
- Finally, in addressing the question of access to the market, because competition is so high for the few available projects, 50% would rather have the Client(s) using a rotational assigning system to allocate the jobs to all in the market. 33% are of the view that there is need for the small contractors to amalgamate, forming few bigger contractors so as to pull together and share the resources and profits.

On the other hand, 17% are of the view that it would be better to proportion the available project to all the contractors on a pro rata basis.

In summary, the standard contract documents and tendering is somewhat complex for some of them, there is a dire lack of finance for working capital, contractors experience long delays in receiving payments and there is generally a lack of work continuity.

4.4 CONTRACTOR DEVELOPMENT STRATEGY

4.4.1 INTRODUCTION

The Contractor Development Strategy must take cognizance of developments already undertaken by the Roads Department, as Government's effort in streamlining and generally improving the delivery process. Some major works are already underway, one of which manifests itself in the form of the Road Sector Reform Initiative.

4.4.2 CREATING A CONDUCIVE ENVIRONMENT THROUGH ROAD SECTOR REFORM

Throughout the world, road management and financing entities are experiencing specific constraints in fulfilling their mandates. This has necessitated road sector reform, which has been implemented widely and to variable extents in different countries. Swaziland, however, has had shortcomings linked to the following issues:

- The Road Department has been carrying out policy, planning as well as executing activities, some of which could normally be carried out by the private sector.
- Many functions that may readily be out-sourced competitively are being carried out in-house.
- The Department is obliged to make use of Public services, (e.g. Central Transport Administration) which do not perform commercially.
- There is virtually no consultation with the road users.
- There is no dedicated source of funding, and as a result roads compete with other functions for the national budget, hence level of funding is not stable.
- All Roads Department staff is under the Public Service regulations and thus there is a lack of managerial autonomy, as well as a lack of incentives encouraging improved performance.
- There is a large proportion of staff per road length in Swaziland when benchmarked to other countries, hence the low rates of productivity.
- Finally, there is intermittent political interference into the affairs of the Department such as to seriously disrupt effective management of resources earmarked for maintenance.

To this end, Road Sector Reform promises to play a meaningful role in addressing most of these shortcomings.

The activities that generally contribute to the establishment and maintenance of roads were concisely summarized in the *Swaziland Road Sector Reform* as follows:

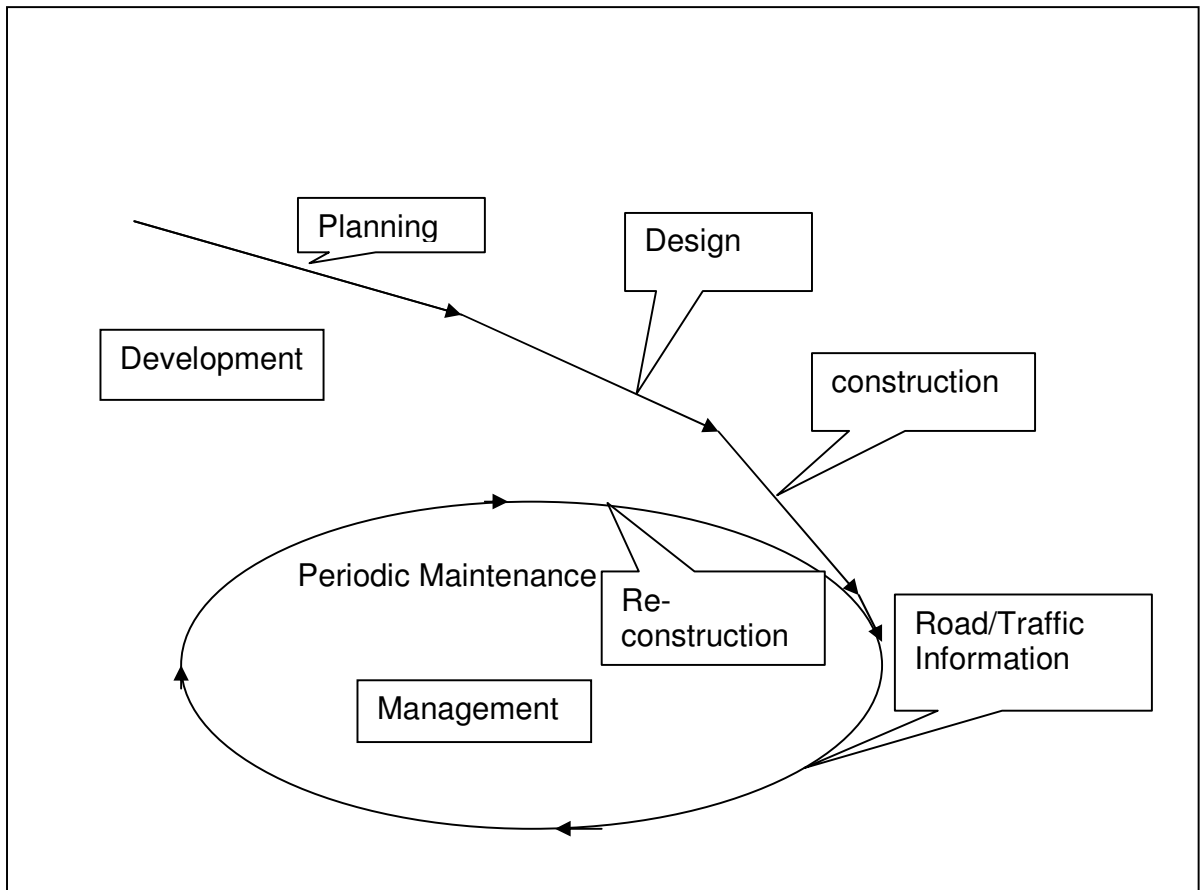


FIGURE 11: PROCESS OF ESTABLISHMENT AND MAINTENANCE OF ROADS (Swaziland Road Sector Reform, 2004)

In concrete terms, the major considerations (commonly known as, “the four basic building blocks”) highlighted in that report that should be addressed in undertaking Road Sector Reform are the following:

1. Proper definition of the scope of activities to be retained within the public sector and those to be assigned to more commercially oriented service providers. In other words ***establishing responsibility for managing roads***
2. An independent and more commercially oriented institutional arrangement must be made. In short, ***creating ownership of the roads***
3. A dedicated and stable funding mechanism must be established. That is to say ***stabilizing road finance*** and
4. A competitive contracting environment must be cultivated. Essentially, ***strengthening management of roads*** by introducing sound business practices and managerial accountability.

Based on the basic building blocks just mentioned above, the current preferred end-state model for road sector reform in Swaziland has been developed as shown in figure 12:

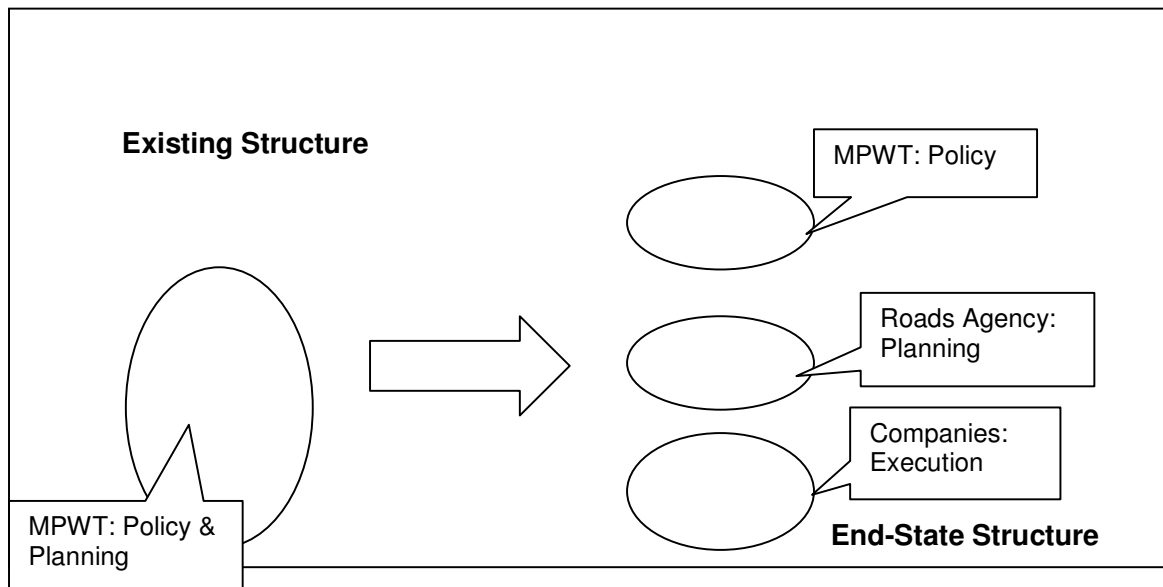


FIGURE 12: END STATE MODEL OF REFORM

(Swaziland Road Sector Reform, 2004)

Under the current end-state model, there will be three main role players in the provision and maintenance of the road infrastructure namely; the Government, the Roads Agency and the Companies/Contractors.

The contractor development strategy will be dealing exclusively with the third and last role player mentioned above, thereby addressing the fourth consideration, *i.e. cultivating a competitive contracting environment* thus strengthening management of the road network. Core to this effort will have to be the re-

positioning of the in-house “force account” by aligning them with private contracting firms either through integration or as stand alone emerging contractors.

Currently there are five in-house units, as mentioned earlier on, these being: the District Maintenance Units, the Construction Units, the Bitumen Units, the Bridge Units and the Pipe Factory. The proposed move is to initially convert some of these units into stand-alone pilot contractor companies, and then into multiple smaller contractor companies who will be trained in the business skills required to carry out work on a proper commercial basis. To this end, arrangements would have to be made to transfer such resources (including plant, machinery, and staff) which relate to the maintenance of roads as may be required by the pilot contractor(s) under commercial terms.

Finally, to develop a competitive environment, a support program is envisaged for these new and emerging contractors. The main components of such a program would be the following:

- a) A Contractor development program (in entrepreneurial and managerial skills)
- b) Training and support (for technical, tendering, financial management, record keeping, etc.)
- c) Access to funding

- d) Minimum local content (Swazi employment) in the agencies procurement procedures and
- e) Access to Contracts (tender set-aside procedures, negotiated contracts, or preference margin on tenders).

4.4.3 THE CONTRACTOR DEVELOPMENT PROGRAM

As mentioned in section 2.3, to date there is no definitive answer to the design of a contractor development program. However, the overriding factor was identified to be the commitment of Government in the transformation process. To this end, the Swaziland Government has shown some commitment in that a Construction Industry Policy Document has been drafted and is now in the early stages of implementation as a national guiding document. In addition, Government is in the process of adopting the Road Sector Reform that will give rise to the establishment of, among others, the following entities: the Road Agency; the Roads Fund; a pool of skilled Contractors; and a “new” Re-oriented Roads Department.

4.4.3.1 MPWT - ROADS DEPARTMENT

It is envisaged that the Ministry of Public Works and Transport (MPWT) will continue to be the Agency responsible for road transport with the power to set policy and standards. Most of the powers for managing the road network will be delegated to the Roads Agency. The MPWT will, among others, carry out the following specific functions:

- a) Set the road infrastructure policy, prioritize road infrastructure against other transport modes and sectors;
- b) Report to Parliament on sectoral events;
- c) Carry out international and regional liaison and co-ordination; and
- d) Establish the legal environment and carry out enforcement of standards set therein.

4.4.3.2 ROADS AGENCY

The Roads Agency will be responsible for all roads that form part of the national routes. Key functions of the Agency will, among others, include the following:

- a) The overall management and strategic planning of the roads network;
- b) Preliminary feasibility analysis of road projects;
- c) Maintenance of the roads management and information systems;
- d) Advice and assistance to the MPWT on any matters relating to the planning, design, construction and maintenance of the roads.

4.4.3.3 ROAD FUND/ROAD BOARD

Key functions of the Roads Fund will be the following:

- a) Management of the road fund;
- b) Determination of the levels of and collection of road user charges;
- c) Shadow tolls may also be considered under this set-up;
- d) Prioritizing and approval of amount of funding for roads;
- e) Determination of the manner in which funds shall be made available;

- f) Ensuring that allocated funds are used efficiently; and
- g) Setting of road user charges and management of the affairs of the Road Fund so as to ensure its long-term solvency.

The above-mentioned entities, especially the Roads Agency and the Road Fund have been identified by Pinard et al, (1999) as core requirements to serve as an engine to drive the process of change.

4.4.3.4 CONTRACTORS

According to Stock (1996) small contractors in developing countries face among others the following challenges:

- Lack of finance for working capital;
- Experience long delays in receiving payments;
- Lack of plant and equipment for hire or to buy;
- Lack of work continuity;
- Lack of financial and business management skills; and
- The standard contract documents and tendering procedures are complex for them.

Most of these challenges have been confirmed through the results of the questionnaire conducted in this research. Therefore, a contractor development strategy has to address these challenges if there will be a meaningful impact to

the economy by the reform process. Key components of the development program include the following:

- *Training and*
- *Defining the role of secondary Institutions.*

Table 13 gives a general overview of the envisaged contractor development program.

ITEM	RESPONSIBILITY	TIME FRAME	ISSUES ADDRESSED	ASSISTANCE FROM
Training	Ministry of Public Works and Transport	As Needed	<ul style="list-style-type: none"> ➤ Technical ➤ Managerial ➤ Entrepreneurship 	Colleges of Technology & Business
Procurement	Ministry of Public Works and Transport	As and when need arises	<ul style="list-style-type: none"> ➤ Contractual matters ➤ Job Security ➤ Strategies/Models 	
Plant & Equipment	Private Sector	Permanent	<ul style="list-style-type: none"> ➤ Empowerment ➤ Capacity Building ➤ Relief 	
Funding	Financial Institutions		<ul style="list-style-type: none"> ➤ Working Capital ➤ Cash Flow Stability 	
Research Unit	Ministry of Public Works and Transport	Permanent	<ul style="list-style-type: none"> ➤ General support ➤ Materials ➤ Performance Monitoring 	CSIR
GUIDING VISION	ALL	Permanent	<ul style="list-style-type: none"> ➤ Outcome Based Performance 	

TABLE 13: THE CONTRACTOR DEVELOPMENT PROGRAM

The overriding factor in the success of a Contractor Development Program is the commitment of Government in the transformation process. Fortunately, in the case of Swaziland, Government has shown this through the drafting of a Construction Industry Policy Document, which serves as a national guiding policy in support of the small and emerging contractors to develop to such a level where they can play an increasing role in maintenance management. Furthermore, Government is in the process of adopting a Road Sector Reform that will give rise to the establishment of among others the following entities: the Roads Agency which will be responsible for the overall management and strategic planning of the road network; the Roads Board which oversee the administration of the road fund and determine tariffs as and when needed. Table 6 gives an outline of the Development Program.

Training in technical, managerial and entrepreneurial skills should form the base of this program in order to assist realign and assists the contractors refocus on the essentials of maintenance management and to foster entrepreneurship, i.e. to run maintenance management as business. Procurement, as has been found in the research, is deficient in some respect to the point where most emerging contractor are unaware as to the requirements. Therefore, as new contractors are added to the database, seminars would have to be organized to inform them of the essential elements of Procurement. The private sector needs to be encouraged to avail plant and equipment for hire to ease the pressure off contractors of owning and maintaining such needed items. Financial Institutions

must be roped in to provide the necessary working capital once the contractors have secured the projects from the Client. This would ensure adequate cash flow exist until payment is received from the Client. Finally, a standing Research Unit must be established to monitor performance, suggest improvements and encourage the use of locally available materials after extensive investigations have been conducted.

CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 SUMMARY

This study examines the role that privatization can play in improving efficiency and effectiveness of maintenance programs in developing countries using Swaziland as an example.

There is, generally, a global move towards more utilization of the private sector in the maintenance of road networks away from the traditional role that Government Departments of Roads have been doing all along. The study indicates just how, in other parts of the globe, such strategies have yielded positive results in that savings have been realized in maintenance cost, which savings have been re-injected towards improving efficiency and effectiveness of the maintenance programs.

The study commences with the general introduction on the nature of the problem with its inherent sub-problems, which clearly indicates that current maintenance of roads is inadequate. Privatization is one way that promises to unleash potential in so far as improving the condition is concerned.

Chapter two deals with the literature review, highlighting important findings by others in the field of privatization of maintenance in road network management. An overview of maintenance is unfolded, the objectives of which are highlighted and then followed by a brief exposé of some maintenance contracts. Globally, roads agencies are undergoing major reforms geared towards improving maintenance management. A major component of this paradigm shift is the increasing use of the private sector in playing a critical role in the provision and maintenance of road networks. Various strategies are emerging that are assisting in the restructuring process. Most relevant among the many strategies, it appears that there is a need for a paradigm shift from the way maintenance work has all along been conducted. The private sector must be empowered to play an increasingly bigger role. The nature of the future contracts must be based on an *Outcome Based Performance basis*.

The cost of neglect is just too much to ignore. Road infrastructure is big business, sometimes compared to Global 500 companies, with asset value running into billions of dollars. It is, therefore, important not to turn a blind eye to maintenance management of such an enormous investment. Restructuring of the way business is done is quite essential if this asset will be preserved. However, there are so many challenges in road maintenance so as to warrant an in-depth scrutiny with a view to finding a remedy if sustainable growth must be realized.

Finally, sustainable programs have to be devised if the deterioration of road infrastructure is to be slowed down, stopped and eventually reversed. Private sector involvement promises to deliver just that, if only it can increasingly be allowed to play a major role in this regard.

Chapter three provides a brief summary of the research methodology and data collection processes. The Ministry of Public Works and Transport has supported this study with invaluable information in so far as establishing the status of the current Maintenance Management program is concerned. The Government, in line with the Country's long-term National Development Strategy, has conducted various studies. Among the most important ones, which have a bearing on this research, are the Road Sector Reform and the Construction Industry Policy. These two studies have really provided invaluable information in as far as providing the bigger picture is concerned. The Ministry has also provided a springboard for undertaking an in-depth look at the status of the small and emerging contractors through the contractor registry.

Chapter four then presents the data and unfolds the important findings inherent in them. The more relevant among these findings are the following:

- a) The current maintenance management system is inadequate in meeting the needs of maintaining the country's road infrastructure to acceptable levels;

- b) The current funding is erratic, unpredictable and generally prone to political interference to the detriment of sustainable infrastructure maintenance management;
- c) The present small and emerging contractors are incapable of playing any substantial role in maintenance management un-aided.

The three findings just mentioned above do support the hypotheses as presented in chapter one of the study.

Finally, a contractor development program has been formulated, as has been the intention of the study. Such a program entails six main components namely: Training, Procurement Strategic Planning, Plant and Equipment Provision, Funding Solicitation, Research Unit Establishment and a Vision Statement.

5.2 CONCLUSION

The sample used in this research represent the core of the locally owned, small contractors that are targeted for development and empowerment so as to help them play an increasing, yet effective, role in the maintenance of the country's road network. Most of these contractors have, so far, demonstrated that indeed they can deliver the goods and services when given a chance to do so. This is evident in the manner they have performed the various projects they have tendered for thus far. Most of them have performed and delivered on time, within budget and to a reasonably satisfactory standard, albeit they have only mainly

been doing road reserve maintenance projects. Given a chance, and with proper training and guidance, these contractors possess potential to play an important role in the privatization of the road maintenance process.

Privatization, as has been used elsewhere, has greatly improved road maintenance management. This promises to be the way of the future, especially for developing countries that have spent so much investment in this infrastructure.

5.3 RECOMMENDATIONS

5.3.1 ROAD SECTOR REFORM

The findings of the Road Sector Reform Initiative must be adopted and implemented without delay, as that would create an enabling environment for sustainable development in the construction industry. The sooner the move towards the creation of the three bodies, as envisaged by the reform process, i.e. the Roads Agency, the Roads Fund and the Independent Contractor(s), the better the prospects of unleashing the potential that privatization of road maintenance possesses.

The recommendations of the road sector reform process present the backbone of the overall re-orientation program. A key factor of the reform process is top management support. Without the active and conscientious support from top

management of the reforms, the less likely would it be that any substantial improvement could be realized.

5.3.2 CONTRACTOR DEVELOPMENT PROGRAM

It is recommended that explorations be undertaken in earnest, setting up the framework of the structures as proposed in the contractor development program of this study.

To start with, the Ministry must compile a training program that would essentially cover the basic technical aspects of the works, envisaged as core business, to be executed by the private sector contracting community. Inherent in this would be the re-positioning of key technical personnel within the department earmarked for deployment as the department downsizes in response to the reform effort. Such personnel could very well form the backbone of the contractor empowerment initiative. The training program must incorporate education on managerial and entrepreneurial skills as well, since the move to privatize demands that business be conducted in businesslike manner.

Secondly, the procurement process as it exists could do with a major overhaul as it has demonstrated to be inherently biased, resulting in only a few companies obtaining contracts while others are running themselves into the ground. Ways and means must be found that would level the playing field.

Concurrently, there is a need to explore the possibility and feasibility of opening a plant pool that will be staffed by the private sector, which pool will provide a plant and equipment for hire to these emerging contractors. It is extremely expensive to own plant and equipment, especially when it will not be utilized to its full capacity. Opening such a facility in Swaziland would greatly relieve the burden of the contractors so that they can concentrate on what they should be doing better, i.e. constructing and maintaining the road network. This would greatly enhance performance and consequently efficiency in maintenance management.

The Ministry must begin liaison with financial institutions with the view to assisting the small contractors by availing to them capital for stimulating growth and sustenance of cash flow by generously providing overdraft facilities. The ministry could very well act as surety, once a contract has been signed with that particular contractor.

On the question of a research unit, it is imperative that such an independent body be established for the very reason of affording support to the contracting community. Furthermore, such a unit could very well be undertaking research on local materials in collaboration with such esteemed councils such as the CSIR with the view to encouraging the use of locally available materials, which could further improve efficiency by reducing transport cost of hauling material from far away places. Finally, the unit could play a meaningful role in performance

monitoring, compiling lessons learnt with a view to sharing better construction techniques with the rest of the contracting community.

Finally, the vision for all the stakeholders in the provision of road maintenance must be guided by a paradigm shift towards Outcome Based Performance contracting. This has played a major role in improving efficiency in countries like Australia. Developing countries can gain tremendously by embracing such important change.

5.3.3 FUTURE STUDIES

There appears to be a lot of problems concerning the current procurement process. From the survey, most of the emerging contractors, especially those in category 6 (Entry Level) are not getting enough opportunities to engage in gainful tendering for the scarce jobs on the market. A trend appears to be emerging whereby only a handful of the contractors are obtaining more and more of the contracts while many keep tendering without success.

It is recommended that a study on procurement be conducted to establish exactly what needs to be done and how, in order to level the playing field and thus afford as many, of the small contractors, as possible a chance to get into gainful employment.

Finally, the role of financial institutions in the whole development of locally owned small contractors needs to be identified, established and harnessed in order to

stimulate growth in the construction sector. Government cannot do it alone, the private sector has to be roped in to provide the necessary capital and generally stabilize the industry.

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APPENDICES

**THE POTENTIAL FOR THE PRIVATIZATION OF ROUTINE ROAD
MAINTENANCE IN SWAZILAND**

**P.O. BOX 5106
MBABANE
H100**

The Manager

Dear sir/madam

Re: Privatizing Routine Road Maintenance in Swaziland

Successful privatization of road maintenance promises to deliver efficiency and effectiveness in the maintenance management of road infrastructure if what has been experienced elsewhere in the world is anything to go by.

Australia, New Zealand and part of South America and Europe have been doing pilot programmes on the privatizing of their road maintenance management units with resounding success. There have been, in some cases, savings up to 15% realized from current maintenance budgets as a consequence of privatization rather than utilizing Government force-accounts. The driving force towards privatization has been the realization that, in general, maintenance budgets are almost always insufficient in meeting the growing demand of maintaining the national assets to acceptable standards. Privatization has unlocked potential in these countries and at the same time helped in strengthening the private sector capacity.

Could you please take a few minutes of your time and help me by answering the attached questionnaire that is part of a research being conducted to identifying the critical factors that could help unearth the potential of privatization in Swaziland.

The information given will be treated with the highest standard of confidentiality and will only be used for the purposes of this research and nothing else.

Should you have any queries, please do not hesitate to contact Mr. I. Fakudze at the following: **416-2907 (H)** or **602-2049 (C)**.

Yours truly,

Ishmond M. Fakudze

THE POTENTIAL FOR THE PRIVATIZATION OF ROUTINE ROAD MAINTENANCE IN SWAZILAND

QUESTIONNAIRE

COMPANY PROFILE:

1. Name of your company:.....
2. What is the local % of shareholding in the company?
 - 1).....Less than 10% Swazi.
 - 2).....Between 10% and 30% Swazi.
 - 3).....Greater than 30% but less than 50% Swazi.
 - 4).....Over 50% Swazi.
3. How old is your company?
 - 1).....Less than a year old
 - 2).....1-2 years
 - 3).....2-4 years
 - 4).....5 years and above
4. In the table below, list the schedule of your staff and workers?

Category	Number		Qualification (if any)
	Local	Foreign	
a) Technical			
b) Clerks			
c) Artisans			
d) Semi-skilled			
e) Unskilled laborers			

Technical = some college level education, degree or diploma holders.

Clerks = employed in office to keep records or accounts and undertake routine administrative duties.

Artisans = skilled worker who makes things by hand.

Semi-skilled = know a bit from “on-the-job” training kind of skill

5. In terms of work experience, could you indicate the work that your company has undertaken to-date, the value of the work, the name of the Client and the period taken to complete the works.

Client	Project Name	Value work	of	Consulting Engineer	Period

6. Plant and Equipment – can you list below the type and number of plant and/or equipment that you either own, intend to buy or normally hire in executing the jobs you have had or intend tendering for.

Item	Owned	Hired	Intend to buy

CONTRACTING:

7. Are you familiar with the following Contract Documents & Terminology?
Mark with an X

1. No. 2. Sort of No. 3. Sort of Yes. 4. Yes.

- a) FIDIC
- b) COLTO
- c) CSRA
- d) BOQ
- e) TENDERING
- f) LABOUR BASED METHODS

1.	2.	3.	4.
.....
.....
.....
.....
.....
.....

8. What is the level of your understanding of the current Government Tendering Process?

- 1).....Poor/ don't understand
- 2).....Moderate/ understand a little bit from hearsay
- 3).....Fair/ understand from practice
- 4).....Good/ have been doing it for some time now.

9. Have you as yet won any Roads Department Tender?

- 1).....No
- 2).....Yes

10. If yes, what has been your experience when it comes to receiving payment for the job you had delivered?

- 1)..... Always-late payments.
- 2)..... Most of the time payments are late.
- 3)..... Most of the time payments are on time.
- 4)..... Payment always received on time.

FINANCING:

11. For the type of work you have done previously, did you require any financial assistance to enable you to undertake the job before you could get paid?

- 1).....No
- 2).....Yes

12. If yes, was it easy to get the assistance from Financial Institutions like the Banks, National Developmental Funds e.g. Inhlanyelo Fund, Job Creation Fund, etc.?

- 1).....No
- 2).....Yes

13. If no, what in your opinion is the major cause of this difficulty in obtaining financial assistance from these Institutions?

- 1).....Lack of collateral
- 2).....Risk of failure to service loans on time
- 3).....Instability of the local contracting industry
- 4).....Other reasons advanced by the Institution(s). Elaborate on the following space.....
.....
.....
.....

THE MARKET:

14. In Swaziland there are only two major Clients in the road sector, i.e. the Government and the Town Boards/City Councils and yet there appears to be so many upcoming local Contractors. What in your view would solve the problem of having only a small number getting the jobs while the rest languishing in the dark?

- 1).....Nothing can be done to solve the problem
- 2).....Joint-venturing and forming few big contractors.
- 3).....Proportioning of the available jobs to give everyone a chance.
- 4).....Using a rotation system to give all contractors a chance to work.

15. Any other comments you would like to add that you think should be considered in addressing the Privatization of Road Maintenance in Swaziland?

.....
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.....
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SWAZILAND GOVERNMENT

Ministry of Public Works and Transport

LIST OF CONTRACTORS BY CATEGORIES**DATA SOURCE:** CONTRACTOR'S REGISTRATION AND CATEGORIZATION DATABASE

CONTRACTOR'S NAME	SPECIALITY	CATEGORY
GRINAKE – LTA	May sub-contract for specialist works only.	1
CONSOLIDATED-CONTRACTOR'S COMPANY		1
GROUP FIVE SWAZILAND (PTY) LTD		1
UBOMBO CIVILS (PTY) LTD	May sub-contract for specialist works only.	2
AJ ELECTRICAL		2*
S & B CIVILS – ROADS (PTY) LTD		2
INYATSI CONSTRUCTION LIMITED	Road Marking, Asphalt, Stabilization, Big Culverts, Pedestrian Bridges, Scaffolding	3
AG THOMAS		3
CONSTRUCTION ASSOCIATES (PTY) LTD	Landscaping, Road Marking, Bush Clearing, Asphalt, Small Structures, Guardrails, Road Furniture.	4
VDAN (PTY) LTD		4
D.Z. CIVILS AND BUILDINGS (PTY) LTD		4
RENNIES CONSTRUCTION (PTY) LTD		4
SD CIVILS (PTY) LTD		4
MENDIP INVESTMENTS (PTY) LTD		4
ROOTS CIVILS (PTY) LTD		4
DAN AND DON CONSTRUCTION (PTY) LTD	Side drains, Grassing, Guardrails, Road Furniture, Fencing, Small Culverts,	5
MILAN NANDZE CONSTRUCTION		5
PHAMBILI CONSTRUCTION (PTY) LTD		5
CORNELIUS WINDY INVESTMENTS		5

CONTRACTOR'S NAME	SPECIALITY	CATEGORY
	Side drains,	
FRONTLINE BUILDERS (PTY) LTD	Grassing, Guardrails,	5
KAPSON INVESTMENT (PTY) LTD	Road Furniture,	5
KB CONTRACTORS (PTY) LTD	Fencing, Small	5
ANZWA INVESTMENT	Culverts, small	5
MANZI CIVILS (PTY) LTD	structures,	5
DU-VAN DEVELOPERS (PTY) LTD	Landscaping, bush	5
C.M. CONCRETE (PTY) LTD	clearing, Road	5
KINGSIZE CONSTRUCTION (PTY) LTD	Reserve	5
ROAD CON (PTY) LTD	Maintenance, and	5
	Gabions.	
RAINBOW INVESTMENTS (PTY) LTD	Entry Level, Side	6
CONTINETWORKS ENGINEERS	drains, Bush	6
QUIK SAVE RD MARKINGS & SIGNS (PTY) LTD	Clearing, Gabion	6
ENGEE INVESTMENT (PTY) LTD	Basket Structures,	6
T & S ENTERPRISE	Grassing, Stone	6
MADO INVESTMENTS (PTY) LTD	Pitching, Fencing,	6
VUSANI CIVILS & BUILDING CONTRACTORS	Road Reserve	6
MONDLE INVESTMENTS (PTY) LTD	Maintenance.	6
DEVANTY CONSTRUCTION	Entry Level, Side	6
W.S.L. BUILDING CONSTRUCTION	drains, Bush	6
M & F ENGINEERING (PTY) LTD	Clearing, Gabion	6
BE-GOOD CONSTRUCTION	Basket Structures,	6
THE LAND BLESSERS	Grassing, Stone	6
WILLIE AND ZANE INVESTMENT (PTY) LTD	Pitching, Fencing,	6
ASIBONGE ASSOCIATION	Road Reserve	6
P.G.C. INVESTMENTS	Maintenance.	6
MABEKELA CONSTRUCTION		6
TEMABHELE CONSTRUCTION		6
M E M CONSTRUCTION		6
OSTRICH INVESTMENTS (PTY) LTD		6
EAGLE WING CONSTRUCTION		6
SOMOMO CONSTRUCTION		6
SISONKHE INVESTMENT		6
D.W. CONSTRUCTION		6
RDM5 CONSTRUCTION		6
MUSA A. & COMPANY		6
BUHLE BUSHISA CONTRACTORS		6
SDS LIMITED		6

CONTRACTOR'S NAME	SPECIALITY	CATEGORY
	Entry Level, Side drains, Bush	
LUSUTFU CONSTRUCTION		6
BANDJOY INVESTMENT	Clearing, Gabion	6
RINACAND PROPRIETARY	Basket Structures,	6
KAIZEN INVESTMENT	Grassing, Stone	6
IN-MOTION INVESTMENT	Pitching, Fencing,	6
PN&B SERVICES	Road Reserve	6
LUNDZI TIMBERS	Maintenance.	6
LUPHIKO SERVICES		6
LOMANGAMBO INVESTMENT		6
LUNKANKA INVESTMENTS		6
POTS CONSTRUCTION		6
SPOT LITE ELECTRICAL		6
HANIER CONSTRUCTION		6
ALECSONS CONSTRUCTION		6
MZUZU CONSTRUCTION AND BLOCKMAKING		6
SOUTHERN CIVILS		6
ARTISTIC ILLUSTRATIONS AND DESIGNS		6
L.B. CONTRACTORS		6
ZIKHANDLA CONSTRUCTION		6
MAPHAKS CONSTRUCTION		6
PETRO SWAZI		6
JUDEL INVESTMENTS		6
YETFU SONKHE MULTI-PURPOSE COMPANY	Entry Level, Side drains, Bush	6
INKOSINATSI INVESTMENT	Clearing, Gabion	6
NYONENDE INVESTMENT	Basket Structures,	6
LOKUHLE INVESTMENTS	Grassing, Stone	6
MAN OF STEEL INVESTMENT	Pitching, Fencing,	6
NKONEKAZI INVESTMENTS	Road Reserve	6
LESIBOVU INVESTMENTS	Maintenance.	6
THIMOTHY'S GRASS CUTTING		6
NATIONWIDE DISTRIBUTORS		6
M.P.D. GROUP OF COMPANIES		6
GIMBILIZI INVESTMENTS		6
I.M. & M.L. SERVICES		6
UMZAMO CIVIL CONSTRUCTION		6
NOMALUNGELO		6
TOEPFER & SONS		6
BMST INVESTMENTS		6
SAMPET		6
T.T.A. CIVILS		6

CONTRACTOR'S NAME	SPECIALITY	CATEGORY
	Entry Level, Side	
INHLABA INVESTMENTS	drains, Bush	6
SONG AND LINDIWE	Clearing, Gabion	6
BASHISE GENERAL SUPPLIERS	Basket Structures,	6
YOU & I GARDEN AND GRASS CUTTING	Grassing, Stone	6
WORKMEN AFRICA	Pitching, Fencing,	
GEM ENGINEERING	Road Reserve	6
ULTIMATE INVESTMENT	Maintenance.	6
LAMANDLA CIVILS		6
MBACEKA SERVICES		6
INYONI INVESTMENT		6
MTHABELENI & SONS ENGINEERING		6
TSELA AND SIMELANE		6
NJ MOTORS		6
NU WORLD CONSTRUCTION		6
MHLABA CONTRACTORS		6

Summary: Category 1 = 3 Contractors
Category 2 = 3 Contractors
Category 3 = 2 Contractors
Category 4 = 7 Contractors
Category 5 = 13 Contractors
Category 6 = 83 Contractors

Total: 111 Contractors

NB. 1.*AJ ELECTRICAL categorized as 2 because of their specialization is purely electrical works.

TENDERING REQUIREMENTS APPLICABLE TO CATEGORY 1 CONTRACTORS

PROJECTS FOR WHICH CATEGORY 1 IS ELIGIBLE TO TENDER:

1. Locally and internationally funded construction projects above E20 million.
2. Specialist projects of any value in areas where there is little or no expertise in the categories to generate interest and competition.

OTHER TENDERING REQUIREMENTS APPLICABLE TO CATEGORY 1

3. Will have 5% disadvantage on the tendered price on all locally funded projects when compared to the prices tendered by Category 2.
4. Will have 10% disadvantage on the tendered price on all locally funded projects when compared to the prices tendered by Category 3 Contractors.
5. Will have to manage 25% of relevant portions sub-contracted to Category 3, 4, 5 and 6 Contractors.

(These will be sub-contracts, tendered for by registered local sub-contractors as part of the main contractor's bid in line with the percentage sub-contracts specified as shown below.)

- 15% splits between category 3 and 4 contractors.
- 10% splits between Category 5 and 6 contractors.

TENDERING REQUIREMENTS APPLICABLE TO CATEGORY 2 CONTRACTORS

PROJECTS FOR WHICH CATEGORY 2 IS ELIGIBLE TO TENDER:

1. Local and internationally funded construction projects above E10 million.
2. Specialist projects of any value in areas where there is little or no expertise in the lower categories to generate interest and competition.

OTHER TENDERING REQUIREMENTS APPLICABLE TO CATEGORY 2

3. Will have 10% disadvantage on the tendered price on all locally funded projects, when compared to the prices tendered by Category 3 Contractors.
4. Will have to manage 25% of relevant portions subcontracted to category 3, 4, 5 and 6.
(These will be sub-contracts, tendered for by registered local sub-contractors as part of the main contractor's bid with the percentage sub-contracts specified as shown below.)
 - 15% splits between Category 3 and 4 Contractors.
 - 10% splits between Category 5 and 6 Contractors.

TENDERING REQUIREMENTS APPLICABLE TO CATEGORY 3 CONTRACTORS

PROJECTS FOR WHICH CATEGORY 3 IS ELIGIBLE TO TENDER:

1. Local and internationally funded construction projects above E5 million.
2. Specialists' projects of any value in areas where there is little or no expertise in the lower categories to generate interest and competition.
3. Maintenance projects above E5 million.

OTHER TENDERING REQUIREMENTS APPLICABLE TO CATEGORY 3

4. Entitled to a portion of the 15% of sub-contract works to Category 1 and 2 Contractors.
5. Will NOT be eligible to tender for routine maintenance works such as vegetable control, pothole patching, fencing, etc.
6. Will have 10% advantage on the tendered price on all locally funded projects when compared to prices tendered by Category 2 Contractors.
7. Will have 5% disadvantage on the tendered price for sub-contract work, when compared to the prices tendered by Category 4 Contractors.
8. Will have to manage 25% of relevant portions sub-contracted to Category 4, 5 and 6.

(These will be sub-contracts, tendered for by registered local sub-contractors as part of the main contractor's bid with the percentage sub-contracts specified as shown below.)

- 10% splits between Category 4 Contractors
- 15% splits between Category 5 and 6 Contractors.

TENDERING REQUIREMENTS APPLICABLE TO CATEGORY 4 CONTRACTORS

PROJECTS FOR WHICH CATEGORY 4 IS ELIGIBLE TO TENDER:

1. Local and internationally funded construction projects above E1 million.
2. Specialists' projects of any value in areas where he has sufficient expertise and experience.
3. Maintenance projects above E1 million.

OTHER TENDERING REQUIREMENTS APPLICABLE TO CATEGORY 4

4. Will NOT be eligible to tender for routine maintenance works such as vegetable control, pothole patching, fencing, etc.
5. Will have 5% advantage on the tendered price on projects when compared to the prices tendered by Category 3 Contractors.
6. Will have to manage the 25% of relevant portions sub-contracted to Category 5 and 6 Contractors.

(These will be sub-contracts, tendered for by registered local sub-contractors as part of the main contractor's bid with the percentage sub-contracts specified as shown below.)

- 15% to Category 5 Contractors.
- 10% to Category 6 Contractors.

TENDERING REQUIREMENTS APPLICABLE TO CATEGORY 5 CONTRACTORS

PROJECTS FOR WHICH CATEGORY 5 IS ELIGIBLE TO TENDER:

1. Local and internationally funded construction projects above E 500, 000.00 but below E3 million.
2. Specialists' projects between E 500, 000.00 and E1 million in areas where he has sufficient expertise and experience.
3. Maintenance projects between E 500,000.00 and E3 million.

OTHER TENDERING REQUIREMENTS APPLICABLE TO CATEGORY 5

4. Will be eligible to tender for all road reserve maintenance contracts.
5. Will have a 2% disadvantage on the tendered price on all sub-contract works when compared to the prices tendered by Category 6 Contractors
6. No sub-contract works.

TENDERING REQUIREMENTS APPLICABLE TO CATEGORY 6 CONTRACTORS

PROJECTS FOR WHICH CATEGORY 6 IS ELIGIBLE TO TENDER:

1. Local and internationally funded construction projects below E 500,000.00.
2. Specialists' projects below E 500,000.00 in areas where the contractor has sufficient expertise and experience.
3. Maintenance projects below E 500,000.00
4. Will have a 2% advantage on the tendered price on all sub-contract works when compared to the prices tendered by Category 5 Contractors.

NATURE OF SUBCONTRACT WORKS

PROJECT CATEGORY 1 & 2

Contractors under these categories may sub-contract for specialist works only.

PROJECTS CATEGORY 3

- Road Marking
- Asphalt
- Stabilization
- Big Culverts (Armco Structures, Box Culverts, etc.)
- Steel Pedestrian Bridges
- Scaffolding

PROJECTS CATEGORY 4

- Landscaping
- Road Marking
- Bush Clearing
- Asphalt
- Building Works (Small Structures e.g manholes, bus stops, etc.)
- Guardrails
- Road furniture

PROJECTS CATEGORY 5

- Side drains
- Grassing
- Guardrails
- Road Furniture
- Fencing
- Small Culverts
- Building Works (Small Structures e.g. manholes, bus stops, etc.)
- Landscaping
- Bush Clearing
- Road Reserve Maintenance
- Gabions

PROJECTS CATEGORY 6

- Side Drains
- Bush Clearing
- Gabion Basket Structures
- Grassing
- Stone Pitching
- Fencing
- Road Reserve Maintenance

